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# Community pharmacist medication monitoring attitudes and decision making

Matthew John Witry  
*University of Iowa*

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COMMUNITY PHARMACIST MEDICATION MONITORING ATTITUDES AND  
DECISION MAKING

by

Matthew John Witry

A thesis submitted in partial fulfillment  
of the requirements for the Doctor of  
Philosophy degree in Pharmacy  
in the Graduate College of  
The University of Iowa

December 2013

Thesis Supervisor: Professor William R. Doucette

Graduate College  
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Iowa City, Iowa

CERTIFICATE OF APPROVAL

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PH.D. THESIS

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This is to certify that the Ph.D. thesis of

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for the thesis requirement for the Doctor of Philosophy  
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To My Parents

## ACKNOWLEDGEMENTS

Thank you to my wife and best friend Sarah for her constant love and support, and also for exposing me to alternate ways of thinking, communicating, and approaching problems. Thank you to my parents, Tom and Carol, for providing me with a nurturing and supportive childhood full of unconditional love, and for teaching me the importance of hard work, relationships, trust, and faith. Thank you to my brother Mike for exposing me to exceptional intelligence, thought, and alternatives to the mainstream.

Thank you to Brandon Patterson, my graduate school comrade, for pushing me to be a better teacher and researcher. Thank you to Liz, Ben, Puttarin, Oscar, Jay, Yu-Yu, Yiran, Chien-Hsun, Ziqian, Yan, Cole, Aaron, Jacob, Matt, and Ali for the privilege of working and learning together and for friendship and laughter. I look forward to future collaborations and meetings.

Thank you to my advisor, Bill Doucette, for the hundreds of hours of mentoring and friendship, and for generously supporting my exceptional graduate experience. Thank you to the faculty members that have facilitated my learning and modeled what it means to be an impactful academician. While there are too many to mention, I especially want to thank Bernard Sorofman, Karen Farris, John Brooks, Julie Urmie, Barry Carter, Erika Ernst, Jeff Reist, Jim Hoehns, Jay Currie, Don Letendre, Linnea Polgreen, Mary Schroeder, Amber Goedken, and Carin Green. Our interactions have helped shape me as a scientist and as a person.

I wish to acknowledge the support of the University of Iowa Graduate College Presidential Fellowship program, the American Foundation for Pharmaceutical Education Postdoctoral Fellowship program, and the University of Iowa College of Pharmacy for generously supporting my graduate education.

A special thanks to Bill Doucette, Bernard Sorofman, Erika Ernst, Amber Goedken, and Pam Wesely for serving as my dissertation committee and providing

feedback from many different perspectives. I look forward to turning these chapters into manuscripts and your contributions have been invaluable. Thank you to the Iowa pharmacists who participated, your openness was appreciated and I hope the process was enjoyable and beneficial for the profession.

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## CHAPTER I

### INTRODUCTION

[M]ost [adverse drug events] do not result from improper choices of drugs or drug doses, but instead represent known side effects of drugs that have a rightful place in the therapeutic armamentarium.

Michael Steinman, *Beyond the Prescription: Medication Monitoring and Adverse Events in Older Adults*.

#### Overview

Health care in the United States has seen a dramatic shift in focus over the past century from treating acute illnesses to managing chronic diseases (Nobili, Garattini, & Mannucci, 2011). As the lifespan of Americans increased from public health efforts and societal changes, chronic health conditions such as hypertension and diabetes became more prevalent. Simultaneously, a plethora of medications were developed to manage these conditions on a chronic basis. While these drugs have had a profound impact on health, they also have been accompanied by a new set of medication-related problems significant to patients, providers, and health care payers.

#### Medication-related Problems

Medication-related problems (MRPs), also referred to as drug-related problems (DRPs), have been categorized in different ways (van Mil, Westerlund, Hersberger, & Schaefer, 2004). MRPs problems relate to the broad categories of medication safety, adherence, and effectiveness and have been associated with significant morbidity, mortality, and expense.

Medication safety problems include side effects and other unintended consequences of medication use which result in patient harm. For example, side effects can occur following inappropriate dosing or they can occur unpredictably as a known possible side effect.

Adherence problems occur when patients do not take their medication as prescribed. This includes not initiating a new medication (primary non-adherence), taking fewer doses, extra doses, altering the recommended dosing schedule, or stopping the medication altogether (non-persistence). Non-adherence can result in suboptimal chronic disease control resulting in significant morbidity, mortality, and unnecessary health care utilization estimated to cost over \$100 billion annually in direct costs (Osterberg & Blaschke, 2005; Sokol, McGuigan, Verbrugge, & Epstein, 2005).

Finally, medication effectiveness problems can be the result of aforementioned non-adherence, taking doses too low to adequately control chronic condition, not being prescribed an indicated medication. Alternatively, a patient may be taking a medication for which there is no clear benefit or a medication simply may not be effective for a given patient due to various biological factors. These problems can ultimately result in patients experiencing poor outcomes (Hepler & Strand, 1990; Steinman & Hanlon, 2010).

Over the past several decades, the primary strategy for decreasing medication-related problems has been to improve initial medication prescribing (Aspden, Wolcott, Bootman, & Cronenett, 2006). Interventions such as prescribing guidelines, computerized decision-support systems, and multi-disciplinary team approaches have been successful in decreasing prescribing errors, particularly in the inpatient setting (Beers et al., 1991; Hunt, Haynes, Hanna, & Smith, 1998; Kaboli, Hoth, McClimon, & Schnipper, 2006; Kaur, Mitchell, Vitetta, & Roberts, 2009; Leape et al., 1999). For example, there now are clear guidelines for what medications a person should take chronically following a heart attack. This reduces medication-related problems related to effectiveness (Antman et al., 2007). To illustrate another example, the Beers list of drugs to avoid in the elderly recommends against prescribing long-acting benzodiazepines (sometimes prescribed for anxiety) because they are associated with a high incidence of falls resulting in injury (The American Geriatrics Society 2012 Beers Criteria Update Expert Panel, 2012). Reducing the prescribing of these drugs for this patient population can reduce adverse events.

Recent estimates, however, suggest errors in initial prescribing account for fewer than 25% of hospitalizations and emergency room admissions directly related to adverse drug events for ambulatory patients (Gandhi et al., 2003; Gurwitz et al., 2003). Another study using nationally representative data found only 3.6% of emergency room admissions for adverse drug events involved medications “always potentially inappropriate” based on the Beers list (Budnitz, Shehab, Kegler, & Richards, 2007). Rather, the majority of hospitalizations and emergency room admissions related to medications come from reasonably prescribed medications where the patient was unfortunate and experienced a known potential side effect or other problem. Chronic medications with a narrow range of safe use and medications commonly associated with side effects such as anticoagulants, anti-diabetics, and psychoactive medications are more commonly associated with emergency room admissions from medication problems than are medications with prescribing errors (Gandhi et al., 2003; Gurwitz et al., 2003).

Safety-related adverse drug events represent only a portion of medication-related problems. Medication non-adherence and suboptimal regimens contribute to poor control of chronic medical conditions. These problems negatively impact patient health and quality of life and can result in additional use of health care resources. A study of adherence for six common medication classes found rates of medication discontinuation at 6 months between 44 and 72 percent (Yeaw, Benner, Walt, Sian, & Smith, 2009). While some medications might be discontinued because they are not tolerated, significant proportions are discontinued because of beliefs, forgetfulness, cost, and other non-clinical factors (Unni & Farris, 2011).

With regard to problems of safety, adherence, and effectiveness, a health care provider or a team of providers proactively engaged in monitoring medications for problems can work with patients to manage many of them before they become severe.

### Medication Monitoring

Prescribers are challenged to balance the benefits of prescribing a medication against the potential problems. While the benefits may appear to exceed the risks when the medication is initiated, problems are inevitable when considering large populations and can be difficult to predict. Studies report up to half of adverse drug events could be identified and managed by the health care system before they result in significant patient harm (Forster et al., 2004; Forster, Murff, Peterson, Gandhi, & Bates, 2005). Problems related to adherence and effectiveness also can be challenging to identify (Osterberg & Blaschke, 2005).

The process of identifying and managing medication-related problems after the initial prescribing decision has been referred to as medication monitoring. Medication monitoring can occur during routine encounters with health care providers or as a component of medication management services such as medication therapy management, chronic disease management, disease state management, and case management. The present study used the term medication monitoring as it most commonly refers to the context of routine care rather than specialized services. Examining routine community pharmacy practice offers a large, relatively unutilized opportunity as most practice and research has focused on providing information on new prescriptions, not monitoring of chronic medications (Puspitasari, Aslani, & Krass, 2009).

Steinman has proposed an enhanced model for medication monitoring (Steinman, Handler, Gurwitz, Schiff, & Covinsky, 2011). This model focuses on a three-step process. First, the patient is educated and engaged in reporting any problems that may possibly be due to their medications. Second, the provider uses various information sources to look for safety, adherence, and effectiveness problems. Third, the provider makes changes based on the patient's situation and the process repeats. In general, medication monitoring involves a health care provider such as a physician, nurse, or

pharmacist interviewing a patient and inquiring about his or her medication experiences (Steinman & Hanlon, 2010).

An example of medication monitoring using Steinman's monitoring model is as follows. A physician prescribes a new medication for a patient to treat high blood pressure. The physician informs the patient of some potential side effects to monitor. The patient comes back for a follow-up appointment in 3 months and the physician and patient discuss how the medication is working. The patient reports she has some dizziness upon waking. The physician recommends the patient take her evening dose with dinner instead of at bedtime. The patient agrees to try this change and notify the physician if the problem persists. The monitoring cycle then continues. A similar situation could occur with other providers with patient contact, such as pharmacists.

The previous example used patient report as the source of information for medication monitoring. Other information sources exist including laboratory tests, electronic medical records, pharmacy dispensing systems, and insurance claims. These information sources can be used to identify patients who may be experiencing side effects, not taking the medication as prescribed, or not obtaining intended benefits.

For example, laboratory tests can determine if a patient is achieving control of her diabetes; although pharmacists and other allied professionals may not have access to laboratory records (Witry & Doucette, 2009). Electronic health records can help remind physicians to order recommended laboratory tests and e-prescribing functionalities can scan for interactions and other problems similar to what pharmacists use when they process prescriptions. Little is known, however, about how physicians and pharmacists use these features when managing ongoing medications. Pharmacy prescription records may aid in monitoring as they can indicate gaps in medication use. Similar to local pharmacy computer systems, some insurers use prescription and medical claims to identify medication-related problems based on algorithms. For example an algorithm may combine claims about a patient having a heart attack with a lack of a recommended



prescription for a cholesterol medication and notify the patient's physician or pharmacist that there may be a problem. A provider or other representative then can work with the patient in an effort to mitigate the potential problem. There has been a call for more research examining the use of claims data to target patients for interventions with pharmacists (Cutrona et al., 2012).

Medication monitoring has not been prioritized as highly as initial prescribing (Lewis, Lasack, Lambert, & Connor, 1997; Steinman et al., 2011). Physician visits often are brief and are limited to addressing acute health complaints, leaving little time to monitor medications and address issues (Bodenheimer, Wagner, & Grumbach, 2002; Richard & Lussier, 2006). Similarly, community pharmacists tend to focus more on newly prescribed medications compared to interacting with patients who have been taking a medication repeatedly (Puspitasari et al., 2009; Schommer & Wiederholt, 1997). From a funding and research perspective, the U.S. health care system has allocated fewer resources and less attention to monitoring medications compared to initial prescribing, particularly in the outpatient setting. This is not to say that monitoring does not occur; rather, it appears to occur on a more ad hoc than a systematic basis.

Even when patients present with symptoms and medication-related problems are identified, providers may not always take appropriate action to follow-up with these problems (Gandhi et al., 2003; Gurwitz et al., 2003). Studies have revealed that recommended laboratory tests to monitor certain medications often are not being ordered or evaluated by a provider (Gandhi et al., 2003; Gurwitz et al., 2003; Hurley et al., 2005; Raebel et al., 2007). Another problem area is that patients sometimes withhold symptom information from their provider (Weingart et al., 2005). A provider focused on soliciting this information may be better able to appropriately identify and resolve medication-related problems. Unfortunately, such conversations are not the norm in medical encounters (Richard & Lussier, 2006).

Increased medication monitoring has generally been regarded as positive and there currently is little to no systematic evidence of too much medication monitoring causing negative outcomes. Medication monitoring, however, does require time, resources, and changes to practice which are not without cost. In a world of limited patient, provider, and health care system resources, compromises must be made.

### Improving Medication Monitoring

A number of programs and strategies have been developed to provide medication monitoring in a structured and standardized way. For example, medication therapy management (MTM) is a service paid for by the Medicare Part D prescription drug benefit. This program reimburses pharmacists and other providers for monitoring patient medications. MTM services generally are provided in person or over the telephone and follow a structured format (American Pharmacist Association, 2008). Other medication management services have been developed to monitor patient medications following care transitions or to monitor patients with certain disease states such as depression and heart failure (Murray et al., 2007; Rickles, Svarstad, Statz-Paynter, Taylor, & Kobak, 2006).

Evaluations of numerous post-hospitalization, disease-specific, and other interventions involving physicians, nurses, and pharmacists have demonstrated the potential for medication monitoring to identify and resolve medication-related problems which may lead to improved patient outcomes (Carter et al., 2009; Kaboli et al., 2006; Lapane, Hughes, Daiello, Cameron, & Feinberg, 2011; Leape et al., 1999; McLean et al., 2008; Mehos, Saseen, & MacLaughlin, 2000; Schnipper et al., 2006; Simpson et al., 2011; Svarstad et al., 2013; Tsuyuki et al., 2002). In addition, interventions specifically designed to improve laboratory drug monitoring have been effective using a team-based approach (Feldstein et al., 2006; Raebel et al., 2005). However, not all intervention studies involving medication monitoring components have demonstrated improvement in outcomes (Kripalani et al., 2012; Odegard, Goo, Hummel, Williams, & Gray, 2005).

Medication monitoring interventions can struggle from limited uptake by patients and providers, particularly when they are scaled up. Work still is needed to expand medication monitoring as many patients do not receive these supplemental medication management services in addition to their routine care. Translating evidence-based medication monitoring strategies into routine practice remains a challenge.

### Community Pharmacists as Medication Monitors

Community pharmacists have been identified as having an important contribution to make in the area of medication monitoring for ambulatory patients with chronic disease (Steinman et al., 2011). Community pharmacists are well positioned to monitor medications because health care consumers present to community pharmacies between clinic visits to refill prescription medications on an ongoing basis (Steinman & Hanlon, 2010). Over 3 billion prescriptions are filled annually by chain, grocery, independently owned, and other types of retail pharmacies in the U.S. and the majority of these prescriptions are for chronic medications (Dispensed Prescriptions, 2012; Qiuping, Dillon, & Burt, 2010). This presents a significant opportunity for the pharmacist to inquire about the patient's medication experience and react to potential medication-related problems.

While pharmacists interact with patients less often for refill prescriptions compared to the initial fills, pharmacists do appear to engage patients on an ad hoc basis or when the patient initiates a discussion (Puspitasari et al., 2009). Few studies, however, have reported observed rates of pharmacist-patient interaction for refills since the 1990's (Puspitasari et al., 2009). One U.S. study reported pharmacists interacted verbally with patients during 35% of refills; of those encounters, 65% involved a pharmacist asking the patient a question about his or her medication (Sleath, 1995). The content of such encounters has been shown to vary (Schommer & Wiederholt, 1997; B. K. Shah, 2006; Sleath, 1995). For some patients, a pharmacist may simply greet the patient or ask, "*do*

*you have any questions?*” while in other encounters the patient and pharmacist engage in more complex exchanges where the patient’s medications and medical conditions are discussed (Schommer & Wiederholt, 1997; Sleath, 1996). Reasons for this variability are not well understood.

Pharmacist, contextual and environmental factors have been used to explain pharmacist counseling activities for new prescriptions (Puspitasari et al., 2009). Contextual factors (sometimes referred to as barriers and facilitators) have been shown to influence variation in new prescription counseling and the provision of new pharmacy services (Paluck, Green, Frankish, Fielding, & Haverkamp, 2003). Factors such as pharmacy busyness, medication type, patient interest, patient question-asking, and others have been linked to the provision of counseling and the content of pharmacist-patient encounters (Kimberlin, Jamison, Linden, & Winterstein, 2011; Schommer & Wiederholt, 1994a; Svarstad, Bultman, & Mount, 2004). Attitudes also have been useful in predicting the frequency and quality of pharmacist-provided new prescription counseling (Mason, 1983; Schommer & Wiederholt, 1995; B. K. Shah, 2006).

### Gaps

It has been established that pharmacists counsel more on new prescriptions than refill prescriptions and that pharmacists have generally been effective in monitoring and reducing medication-related problems in specific medication therapy management type interventions. While there is evidence that community pharmacists engage in medication monitoring during routine practice, such as with medication refills, few details are known about how they view and engage in medication monitoring activities, particularly during the dispensing process which is where community pharmacists engage most often with patients. Questions remain regarding how pharmacists utilize technicians and technology to monitor medications, how monitoring fits into the workplace, what medications receive the most monitoring attention from pharmacists, what questions are most likely to

be asked of patients during these encounters, and to what extent patients are receptive to these questions.

Medication monitoring interventions have struggled to translate into routine practice and monitoring continues to be provided on a seemingly ad hoc basis. One possible explanation is that providers may have a varying attitudinal orientation to engaging in monitoring. Little empirical work has been conducted with providers' medication monitoring attitudes and no scale exists for measuring these attitudes. Also, little research has been conducted to investigate how different contextual factors relate specifically to medication monitoring in the community pharmacy setting. Research is needed to understand why a pharmacist may decide to engage in medication monitoring in some situations, but not others in order to identify monitoring priorities that are not being addressed.

#### Theoretical Framework

This study used the Health Collaboration Model (HCM) to provide a framework for linking the various factors and processes involved with medication monitoring and suggesting how optimal outcomes might be achieved (Svarstad & Bultman, 2000). The HCM is a “structure-process-outcome” model that draws upon a patient-centered literature base (Donabedian, 1966; D. Roter & Hall, 2006). The monitoring portion of the model posits that characteristics of the patient, provider, drug, environment, and past interactions contribute to quality medication monitoring when paired with patient feedback. Quality information leads to quality problem solving and improved outcomes. For the present study, the HCM was viewed from the perspective of the community pharmacist.

### Specific Aims

Aim 1: Describe the attitudes, contextual factors, activities, and behaviors associated with community pharmacist medication monitoring.

Aim 2: Develop a measure for a pharmacist's medication monitoring attitude.

Aim 3: Identify significant attitudinal and contextual factors which contribute to the decision to ask questions at the time of refill.

The long term goal of this research is to improve the quality and impact of provider medication monitoring which has been identified as a mechanism for decreasing drug-related morbidity, mortality, and expense for ambulatory patients with chronic disease.

## CHAPTER II

### LITERATURE REVIEW

#### Overview

This review of the literature begins with an overview of pharmacy practice literature including the progression of the pharmacy profession, pharmacists as medication counselors, and as medication monitors. Next, the Health Collaboration Model is presented and the role of context and attitudes in pharmacy practice research is reviewed.

#### Chronic Disease and Medication Use

Chronic diseases are responsible for a significant portion of the morbidity, mortality, and expense in the U.S. health care system. These ongoing disease processes usually require the patient to play an active role in managing the condition. This may include taking daily medications, following a dietary plan, engaging in exercise, measuring blood glucose, and other behaviors. In general, patients require support from the health care system in the form of interactions with health care providers who can order prescription medications, provide education, give feedback, and perform other services.

One of the most common tools for managing chronic conditions is drug therapy. However, few medications can be taken without the potential for unintended consequences. In addition, many medications must be taken consistently to achieve the desired benefits. Furthermore, medications may not work the same for all patients and some experimentation may be required to identify an optimal regimen for a given patient. It is important that patients not only are prescribed appropriate medications given their unique situations, but also that these medications are monitored for emerging problems and desired effects.

### Patient-Centered Care

Patient-centered care is a concept in health communication where patients and providers are partners in managing the patient's health (Maizes, Rakel, & Niemiec, 2009). A patient-centered approach is based on the premise that patients are experts in their own needs and preferences and bring their own experiences and knowledge to discussions about treatments being considered. Patient-centered care has been shown to improve patient satisfaction and treatment adherence (Epstein, Fiscella, Lesser, & Stange, 2010; Epstein & Street, 2011; Mead & Bower, 2000).

In a patient-centered approach, providers and patients collaborate to make treatment decisions that are acceptable to both parties and take into account the unique knowledge and preferences of each. For example, a physician may believe prescribing a medication for twice daily use gives the best control based on clinical evidence, but the patient may only want to take a medication once daily. Knowing this preference of the patient, the prescriber may be able to pick a different medication which could achieve a similar benefit with only once daily dosing. This, of course, is a very simplistic example which only begins to illustrate the nature of patient beliefs and preferences. Patient-centered care has been associated with significant improvements in patient satisfaction, medication adherence, and other outcomes (Bertakis & Azari, 2011; Epstein & Street, 2011). Using a patient-centered approach in pharmacy has been recommended for decades; however, there is variability in adoption of this approach by pharmacists (Chewning & Sleath, 1996; de Oliveira & Shoemaker, 2006).

### Pharmaceutical Care

The profession of pharmacy has adopted a practice philosophy termed "pharmaceutical care" (Hepler & Strand, 1990). Hepler and Strand (1990) described a new orientation for pharmacists based on taking responsibility for drug therapy outcomes. To accomplish this goal, pharmacists are tasked with identifying and resolving



medication-related problems for their patients. This is in contrast to an orientation based on the distribution of drug products. Community pharmacists still primarily identify themselves as medication dispensers, but pharmacists in many settings are performing duties consistent with pharmaceutical care. Medication monitoring is an important part of that role (Rosenthal, Breault, Austin, & Tsuyuki, 2011). Some community pharmacists are spending a significant portion of their work day providing services such as medication therapy management and disease state management (Kreling et al., 2010).

A pharmacist's responsibility for drug therapy outcomes has been operationalized to include the perceived clarity of practice standards, personal control, and professional duty (Planas et al., 2005). Advocates for pharmaceutical care suggest it is not enough for pharmacists to simply fill the prescription correctly; they must ensure medications are used appropriately. A significant part of this responsibility is to continually monitor medications for safety, adherence, and to ensure the goals of therapy are being reached (Hepler & Strand, 1990).

Odedina developed a set of self-reported measures for pharmacist-provided pharmaceutical care behaviors (Odedina & Segal, 1996). These measures include items on initial prescription counseling, follow-up counseling, and engaging in aspects of medication therapy management type services. Researchers have successfully used parts of this scale as dependent variables representing pharmaceutical care behaviors (Planas et al., 2005; Rossing, Hansen, Traulsen, & Krass, 2005).

Pharmaceutical care perhaps has had its most observable impact through the development of new pharmacy services distinct from prescription dispensing such as: comprehensive medication reviews; blood pressure, diabetes, and cholesterol management; and smoking cessation programs. A number of review articles have described the benefits of certain pharmacist-provided and team-provided services that have a positive impact on outcomes (Beney, Bero, & Bond, 2000; De Young, 1996; Singhal, Raisch, & Gupchup, 1999). Pharmaceutical care, however, goes beyond the

outcome of a service. Hepler and Strand (1990) also discuss the importance of relationships and patient centeredness, knowledge and skills, processes and documentation, and other factors, as antecedents to successful pharmaceutical care activities. Studying how these factors influence pharmaceutical care service delivery has received less attention from researchers compared to controlled intervention studies focusing on testing treatment group improvements (Patwardhan, Amin, & Chewning, 2013).

### Community Pharmacist Roles

Community pharmacists engage in a variety of activities, the most common is medication dispensing (Kreling et al., 2010; Schommer, Pedersen, Gaither et al., 2006). Pharmacists are responsible for overseeing the preparation and dispensing of prescription medications for sale to their patients. One of the more observable activities in which pharmacists engage is prescription counseling. This can occur both for new prescription dispensing and for subsequent dispensing (refills) if the prescription permits. As mentioned previously, some pharmacists also have become engaged in providing specialized consultation services with patients separate from the dispensing process. During these encounters, or visits, pharmacists may take on a more cognitive, problem-solving role as they seek to improve the medication use experiences of their patients.

Pharmacists have continuously redefined their role in the U.S. health care system since the profession began licensing pharmacists. A consistent struggle has been the conflict between business and professional orientations (Gaither et al., 2008; Seabury, 1899). Over the last several decades the prescription distribution process has become increasingly automated. In an effort to maintain the professional distinction of pharmacists, this group has made an effort to redefine the role of pharmacists as a service provider rather than a product distributor.

### Pharmacists and Initial Medication Counseling

On average, community pharmacists report spending the majority of their time in the dispensing role with only about 10% of their time devoted to providing separate patient care services, such as medication therapy management (Kreling et al., 2010). A limited number of studies have been designed to describe how pharmacists spend their time while in the dispensing role. A work sampling study in grocery pharmacies found pharmacists spent approximately 20% of their time communicating with patients, but specifics about the type of prescription or the nature of the conversations were not collected (Dupclay, Rupp, Bennett, & Jarnagin, 1999).

Medication counseling has become one of the defining professional characteristics demonstrating the value of pharmacists and has been mandated by law since the adoption of OBRA 90 (Omnibus Budget Reconciliation Act, 1990). While prescription charges usually include a small dispensing fee, pharmacists receive no compensation for spending additional time to identify and resolve medication-related problems. While additional financial incentives have been shown to encourage pharmacists to engage in pharmaceutical care behaviors, such incentives are not the only factor encouraging a patient-centered approach (Christensen & Hansen, 1999). Pharmacists, as professionals, appear to incorporate these principles to varying degrees into their work because of a sense of professional responsibility (Planas et al., 2005).

Pharmacists have the professional discretion to decide how they will counsel patients on new prescriptions and patients retain the right to deny counseling. Laws vary by state, but in general, patients are expected to be offered counseling for all new prescriptions. Some states mandate that pharmacists and patients verbally interact and research shows stronger state counseling requirements are positively associated with pharmacists providing more counseling (Kimberlin et al., 2011; Svarstad et al., 2004). In Iowa, pharmacists are required to counsel patients on new prescriptions refill counseling is not required (Iowa Administrative Code, 2010).

One of the primary research tools used to investigate pharmacist-provided counseling is to send a research confederate, commonly referred to as a “secret shopper,” to a pharmacy to fill a uniform prescription. The secret shopper then records standardized information about the encounter. The most recent national secret shopper study found medication information was provided to patients by pharmacists in 41.6% of encounters (Kimberlin et al., 2011). While counseling rates were higher in states with stricter counseling regulations, many patients still did not receive verbal counseling. In this study, the pharmacist directly transferring the prescription to the patient, and the pharmacy having a private counseling area, were significant predictors of the pharmacist providing medication information. Another secret shopper study conducted in eight states found pharmacists provided counseling to 63% of patients and pharmacists asked at least one question in 48% of encounters (Svarstad et al., 2004).

Studies show the content of new prescription counseling tends to be limited, with pharmacists reiterating to the patient basic information from the prescription and some common side effects or technical information such as the number of refills remaining or a change in the manufacturer of a generic medication (Sleath, 1995). Counseling has been shown to aid in the detection of medication-related problems as pharmacists discuss the medication with the patient (Kuyper, 1993).

A static vignette-based study of pharmacists found patient unfamiliarity with the new prescription and the presence of a potentially serious drug interaction led to pharmacists reporting that it was very important to counsel, regardless of busyness (Schommer & Wiederholt, 1994a). Pharmacists reported it was more important to provide information on new prescriptions than refills. However, this study did not focus on the patient-centered elements of counseling such as question-asking. This study also was limited because of the use of intentionally constructed vignettes which may lend themselves to greater social desirability bias since they were designed to solicit what might be considered a predictable response. Since participants were presented with a set

of clearly delineated vignettes, the respondent may have been more likely to report what he or she thought the researcher wanted to hear. The vignettes explored a small number of scenarios, so it was not possible to determine how variation in different characteristics would independently affect responses. Finally, pharmacists were asked to judge the *importance* of the counseling factors and this may be conceptually different than their *intention* to engage in a certain behavior or their actual counseling behavior. The extent to which the judgments elicited in a vignette-based study mirror actual practice behavior is a separate empirical question.

Two European studies of recorded pharmacist-patient consultations from the early 1990's found pharmacists predominantly used closed-ended questions (Morrow, Hargie, Donnelly, & Woodman, 1993; Smith, 1992). These studies were not limited to counseling interactions. While most questions were closed-ended, the topics varied significantly, focusing on a variety of areas including symptoms, patient medications, and small-talk (Morrow et al., 1993). Patients often initiated conversations by reporting their symptoms or requesting a recommendation for an over-the-counter product (Morrow et al., 1993). Smith (1992) found pharmacist consultations regarding over-the-counter products generally followed a pattern of question-asking to narrow down product selection followed by information giving designed to promote safe and appropriate use.

In sum, the prescription counseling literature demonstrates variation in the extent to which pharmacists provide counseling to patients. The majority of this research focuses on new prescription counseling, an activity occurring significantly more often than counseling for refill prescriptions. Pharmacists generally take on the role of information-provider rather than question-asker and problem-evaluator. During this time, the pharmacy profession has attempted to move more toward a patient-centered role (Hepler & Strand, 1990), however, this has not been well adopted in the prescription dispensing process, in which community pharmacists spend the majority of their time.

### Pharmacists in a Medication Monitoring Role

Medication monitoring is a process where a health care provider evaluates aspects of a patient's medication use based on different information sources and takes appropriate action to improve outcomes (Steinman, 2011). Community pharmacists have engaged in this role in certain situations such as with MTM, and there is potential for this role to expand. Evidence suggests pharmacists make positive contributions involving the identification and resolution of medication-related problems of chronic drug therapy (Carter et al., 2009; Chrischilles et al., 2004; Currie, Chrischilles, Kuehl, & Buser, 1997; Doucette, Witry, Farris, & McDonough, 2009; McDonough & Doucette, 2003; Witry, Doucette, & Gainer, 2011).

Medication monitoring has not received as much attention as new prescription counseling in the dispensing process. A counseling model developed by the U.S. Indian Health Service offers "three prime questions" pharmacists can use when counseling patients with new prescriptions, and three used at the time of refill. The refill questions are: *What do you take the medication for? How do you take it? And, What kinds of problems are you having?* (Gardner, Boyce, & Herrier, 1991). These questions, however, have not been tested empirically.

Guirguis asked a small sample of motivated pharmacists to use the Indian Health three prime questions for new and refill prescriptions during the dispensing process and used surveys and focus groups to gather pharmacist perspectives on using these questions in practice (Guirguis, 2011). The author found these pharmacists were positive toward using the questions because they wanted to "matter", although more for new prescriptions than for refills. The author also put forward a qualitative theme of "door opener" where the pharmacists perceived the questions led to more information being disclosed about patient medication use experiences. Some of the questions, however, seemed awkward at times and the pharmacists made modifications to how they phrased the questions.

A limited number of studies have tested modifications to community pharmacy dispensing process designed to increase pharmacist-patient interaction, problem identification, and problem solving. One study focused on patients with diabetes and measuring their blood glucose (Berringer et al., 1999). Initially, patients participated in an interview where drug-related problems were identified. During the dispensing process, computer-generated reminders prompted the technician to give the patient a diabetes checklist. The pharmacist would review the patient's chart and the checklist and then engage in a discussion with the patient while dispensing the prescription. In this small intervention, patients reported significant decreases in average morning blood glucose readings and pharmacists made drug therapy recommendations for a third of patients, many of which were accepted by physicians.

In a European intervention study, patients were randomly assigned to receive either a community pharmacist-provided medication monitoring intervention following repeat prescriptions or usual care (Bond, Matheson, Williams, Williams, & Donnan, 2000). Here, pharmacists were given authority under protocol to reauthorize (renew) prescriptions during the 12-month intervention period if the pharmacist deemed the medication still was needed and appropriate. Pharmacists investigated adherence problems and side effects and worked with the patient and physician to manage them. The authors reported the intervention was useful for identifying adherence problems. Interestingly, more prescriptions were filled in the control group which may suggest pharmacists were able to decrease unnecessary medications in the intervention group. This raises an interesting conflict of interest. Pharmacists, taking responsibility for the patient's drug therapy outcomes may recommend medications be discontinued. The processing of more medications, however, currently is how pharmacies derive revenue, not on the health outcomes of the patient.

In an observational study of pharmacist-identified medication-related problems in Europe, pharmacists completed paper forms during the dispensing process to document

problems they uncovered during a given week (Hämmerlein, Griese, & Schulz, 2007). The forms were open-ended which gave pharmacists flexibility in describing each medication-related problem. These forms were collected and categorized by the researchers. Pharmacies reported between 1 and 72 problems per week. Of the documented problems, the most frequent type related to technical errors on the actual prescription, such as the wrong medication or dose. Drug interactions were relatively common at 7.7% and side effects comprised 2.1% of the reported problems. Overall, participating pharmacists encountered a large variety of problems (72 categories in all) and appeared to be gathering information from patients, suggesting pharmacists were engaging in a monitoring role in addition to providing medication information. Physicians were contacted for 60.5% of problems, but details about the nature of the intervention were not collected.

These studies suggest pharmacists can have a positive impact on patients through the identification and resolution of problems uncovered through various medication monitoring activities, although few details were provided. While the areas of adherence, safety, and effectiveness were each addressed, the extent to which pharmacists are targeting these areas remains unclear. Also, the approaches and strategies pharmacists use to address such problems requires further investigation.

In his 2006 dissertation, Shah used both cross-sectional surveys and dispensing observations to investigate the the theoretical link between environmental factors, pharmacist, technician, and patient attitudes, and counseling behaviors (Shah, 2006). This study used a set of 360 standardized observation and survey responses from pharmacists, technicians, and patients. This dissertation is unique because it considers both new and refill prescriptions. Also, one of the dependent variables for the counseling encounters is “patient assessment” which included both open- and closed-ended questions posed by the pharmacist. This is one of few operationalizations of medication monitoring in dispensing



in the pharmacy practice literature and one of the few examples where observational data has been collected for medication refills.

Shah (2006) suggests pharmacists have different procedures or processes for handling new and refill prescriptions as evident by different regression weights identified in the explanatory model. Also, like Mason (1983) and Schommer (1992), Shah (2006) found pharmacist attitude was significantly associated with counseling behaviors. For example, Schommer (1992) and Shah (2006) both found that pharmacist attitude toward counseling was associated with the pharmacist transferring the prescription to the patient (rather than a technician or clerk transferring the prescription). Busyness also was negatively associated with prescription transfer, but only with refill prescriptions. This suggests pharmacists may feel more obligated to provide counseling for new prescriptions whereas they find refill counseling to be more discretionary. This is an important relationship to investigate if efforts are to be made to increase monitoring at the time of refill as many pharmacies are quite busy.

Like other authors, Shah (2006) found patient question-asking and prescription transfer (hand off) to be positively associated with pharmacists providing information to patients. In a related finding, there was a discrepancy between observer and patient report of pharmacist question-asking. It appears some patients do not consider "*Do you have any questions?*" to be an inert component of the patient-pharmacist interaction. Patient assessment behaviors also were negatively affected by pharmacist workload, however the variability was not well explained in the report. What remains to be explored is the variability and context for how pharmacists view different types of questioning and the impact of environmental factors. Understanding this relationship is important for future efforts to increase patient assessment (monitoring) at the time of refill.

These studies support the premise that pharmacists are engaging in refill counseling to an extent, although conditional on different contextual and motivational

factors. Also, interaction content appears to vary, including both closed and open-ended question-asking and other monitoring-type activities.

Overall, limited research has been conducted to investigate pharmacists as medication monitors in routine dispensing practice. Since pharmacists appear to be using a different process to decide if they will engage in new prescription and refill prescription counseling, it may not be appropriate to extrapolate findings from studies of new prescription counseling to refills. Hence, separate studies are needed to understand how different factors relate to these two unique behaviors and processes.

#### Methodological Considerations

As mentioned previously, less work has been done investigating refill or follow-up encounters in community pharmacy compared to new prescription encounters. Part of this disparity may relate to methodological considerations. Over the past several decades, a prominent strategy for investigating community pharmacist behaviors has been to use secret shoppers. Such a strategy would be more complex with refill prescriptions because the confederate would have to present at least twice. While not impossible, budgetary restrictions, institutional review board approval, and time, likely contribute to such a study not yet being conducted. Alternate strategies may be beneficial to investigate variability in medication monitoring behaviors by community pharmacists. Other methods include cross-sectional surveys and uncontrolled observations.

#### Health Collaboration Model

The Health Collaboration Model (HCM) was the conceptual framework used to guide the present study (Svarstad & Bultman, 2000). The HCM was chosen for several reasons. First, the HCM is grounded in the literature on patient-centered care and pharmaceutical care, stressing the importance of two-way communication between patient and providers. Second, the model specifically addresses medication monitoring. Third, this model includes a set of antecedent variables supported by the literature that

are related to pharmacist-patient communication, counseling, and monitoring, and lastly, the model is flexible with regard to how variables are operationalized. The HCM offers a theoretical basis for linking the various factors and processes involved with monitoring, the unique contributions of both patients and providers, and suggests how optimal outcomes might be achieved (Svarstad & Bultman, 2000). While this model also includes initial prescribing (not shown), the monitoring portion was the main focus in the present study.

The HCM states that characteristics of the patient, provider, drug, environment, and past interactions, contribute to how monitoring will proceed (Svarstad & Bultman, 2000). The patient is a vital source of information needed for quality monitoring and collaboration to occur. One of the most significant roles of the provider in this model is to solicit feedback from the patient on his or her medication experiences. When quality monitoring and patient feedback occur, the patient and provider are able to collaborate on finding suitable solutions to any medication-related problems that present, and as a result, patients are satisfied and adherent.

The HCM also posits that patients are continually evaluating their medication experiences and are engaged in their own medication monitoring and problem-solving (Svarstad & Bultman, 2000). This process can be improved when providers are involved because of their professional expertise and experience. In this view, the provider and patient both have unique perspectives and expertise. Providers have medical training which allows them to contribute to monitoring by asking questions and interpreting patient responses in an effort to create collaborative solutions and otherwise work with the patient to improve satisfaction and clinical outcomes.

While the HCM focuses on adherence as the step leading to improved outcomes, the Steinman model (2011) also suggests addressing medication effectiveness and safety are important. The HCM, together with the broader monitoring literature, organizes and highlights the important strategies for improving patient outcomes. Steinman states that

enhanced monitoring is a cycle that should include patient training and activation so the patient is better able to understand and report problems or issues (Steinman et al., 2011). This may include educating patients about side effects to monitor or at home tests to conduct. There is meaningful corroboration between the HCM and Steinman's monitoring model. In the HCM, *quality of provider monitoring – patient feedback* – and *quality of problem-solving and reinforcement* align with Steinman's monitoring framework of *monitoring - patient activation – action*. This corroboration supports using the HCM to address monitoring-related problems beyond adherence.

### Studies Using the HCM

The HCM has been used to guide several studies in pharmacy practice (Bultman & Svarstad, 2002; Rickles, Svarstad, Statz-Paynter, Taylor, & Kobak, 2005; Rickles et al., 2006; Svarstad et al., 2009). Interventions initially focused on antidepressant adherence (Bultman & Svarstad, 2002; Rickles et al., 2005; Rickles et al., 2006) and more recently has been used in an intervention study designed to improve adherence to blood pressure medications (Svarstad et al., 2009; Svarstad et al., 2013).

The first study to use the HCM recruited 100 patients newly prescribed antidepressants (Bultman & Svarstad, 2002). Participants completed two telephone interviews which were two months apart. The first interview collected patient factors such as demographics, history of antidepressant use, knowledge about antidepressants, and beliefs about these medications. The second interview inquired about the interactions patients had with their pharmacist, if the pharmacist engaged in any monitoring behaviors, satisfaction with antidepressant treatment, and adherence to the new medication.

The authors of this study (Bultman & Svarstad, 2002) expressed an important gap in the pharmacy literature which still has not been addressed and is an impetus for the present study.

“Less is known about pharmacist monitoring of medication use in settings where formalized programs have not been adopted. We know of no studies that have thoroughly examined how community pharmacists view their monitoring role or how they actually monitor medication use by patients with specific chronic conditions.”

The study utilized the HCM in several ways. First, the HCM stressed the importance of pharmacists collecting information about the patient’s medication experiences by asking questions (Svarstad & Bultman, 2000). This was included as a question set of patient views on pharmacist monitoring and included the following question which was answered using a 6 point scale (0=no monitoring interaction, 1=strongly disagree, 5 strongly agree) (Bultman & Svarstad, 2002).

[Pharmacist] Asks you if you have any questions or concerns about your antidepressant.

This study reported several important results. First, 83% of patients interacted with a pharmacist during this period (Bultman & Svarstad, 2002). This rate is higher than other rates of prescription counseling which suggests pharmacists may counsel patients taking antidepressants more than other chronic medications, including when they present for a refill. Alternatively, recall bias of patients may be inflating the frequency of counseling. For patients that did have an interaction, 75% of patients reported that the pharmacist asked if they had questions and a little over half reported feeling that the pharmacist encouraged question-asking and listened to their concerns. The authors reported a positive link between pharmacist monitoring, satisfaction, and adherence. This relationship was stronger for patients new to antidepressant medications.

The authors proposed that improving monitoring in routine care may lead to improved outcomes through increased medication adherence. They also suggested that

“Research is needed on pharmacist role perceptions with regard to monitoring behavior and why pharmacists take different approaches when monitoring medication use” (Bultman & Svarstad, 2002).

This non-interventional study, simple in design and not without limitations, supports that pharmacists are monitoring patients who are taking newly prescribed antidepressant medications (Bultman & Svarstad, 2002). Less is known about how pharmacists monitor other medication classes needed to treat conditions such as cardiovascular disease, diabetes, incontinence, and so forth. In addition, this study was from the patient perspective. Research is needed from the provider perspective to understand variability in why monitoring occurs in some situations and not others.

Rickles et. al followed up on this study with a randomized controlled trial (Rickles et al., 2005; Rickles et al., 2006). Sixty-three patients were randomly selected to receive either usual care or three monthly telephone calls from study pharmacists regarding their newly prescribed antidepressant. A 7-item patient-reported feedback scale was used to measure the extent to which patients provided feedback to their pharmacist. As hypothesized, patients in the intervention group reported providing significantly more feedback regarding their antidepressant knowledge, beliefs, and perceptions of progress than patients receiving usual care. This demonstrates that such interventions are capable of getting patients to talk about their medication experiences with a pharmacist. This study also supports the HCM and the importance it places on patient feedback. The study was not sufficiently powered to detect differences in satisfaction, adherence, or improvement in depressive symptoms, but these outcomes did trend toward favoring the intervention.

The HCM suggests patient feedback, pharmacist monitoring, pharmacist-patient problem-solving are synergistic processes. When enhanced, these processes can result in improved satisfaction, adherence, and clinical outcomes (Svarstad & Bultman, 2000). The study by Rickles (2006) provides support for this process. However, only the patient perspective was considered. This also supports the need to investigate the pharmacist perspective in the HCM.

Most recently, Svarstad et al. used the HCM to guide a randomized controlled study to improve blood pressure of African American patients (Svarstad et al., 2009; Svarstad et al., 2013). This study, conducted in retail pharmacies, used the HCM to identify several core barriers to adherence addressed during the intervention visits. Community pharmacists engaged in monitoring solicited patient feedback using the Brief Medication Questionnaire (Svarstad, Chewing, Sleath, & Claesson, 1999), tailored problem-solving and reinforcement using a toolkit, and provided regular follow-up to patients and physicians. In the intervention group, 60% of patients had satisfactory refill rates compared to only 34% of patients in the control group. For the main clinical outcomes, 50% of intervention patients reached their blood pressure goal compared to 36% in the control group. Intervention patients fully exposed to the intervention had significant and sustained blood pressure control after 6 and 12 months compared to patients exposed to only part of the intervention.

#### Research Supporting the HCM Domains in the Context of the Present Study

The HCM draws upon a large body of research to support its domains and propositions. In addition to a selection of articles referenced by the original model proposition manuscript, this section includes articles deemed to be relevant to the research focus in the present study.

##### Patient

The patient domain of the HCM focuses on patient factors related to participation in medication monitoring and subsequent satisfaction, adherence, and clinical outcomes. The HCM states patients are continuously monitoring and evaluating their medications regardless of whether or not they discuss these evaluations with their various providers.

The HCM stresses that patients should be key players in medication monitoring. This is a change from the traditional medical model where patients play a more passive

role. In general, studies show patients desire more information about their medications than they currently receive (Nair et al., 2002; Ziegler, Mosier, Buenaver, & Okuyemi, 2001). Also, many patients (although not all) want to participate more significantly in medical encounters, especially for chronic conditions where medication taking and lifestyle change are involved (Arora & McHorney, 2000; Robinson & Thomson, 2001). Specific to community pharmacists, one study found half of patients desired more information from refill counseling (Krueger & Hermansen-Kobulnicky, 2011). It is unknown how pharmacists perceive that these factors relate to monitoring.

The HCM cites five core adherence barriers: regimen knowledge barriers, recall barriers, motivational barriers, side effect barriers, and access (cost) barriers. These barriers have been used to guide adherence interventions. Reducing these barriers is positively correlated with patient satisfaction (Rickles et al., 2005; Svarstad et al., 2009).

Demographic factors also have been found to relate to how patients participate in medical encounters. Studies of physician-patient communication have shown patient age, gender, and race are significant factors to how visits proceed (Bultman & Svarstad, 2000; Cooper-Patrick et al., 1999; Greene, Adelman, Charon, & Friedmann, 1989; Greene, Adelman, Friedmann, & Charon, 1994; D. Roter & Hall, 2006; D. L. Roter, Hall, & Katz, 1988; D. L. Roter & Hall, 2004). Greene (1994) found younger patients shared greater concordance with the goals of the medical encounter and other aspects of the visit with their physician than older patients. Bultman & Svarstad (2000) found older adults were less likely to report their physician engaged in follow-up communication regarding a newly prescribed antidepressant. In a 2004 review, Roter & Hall found female physicians were more likely to engage in patient-centered communication and their patients were more likely to share information. Race concordance was correlated with longer visit times and higher quality encounters (Malat, 2001).

Several studies from the 1980's investigated how different patient variables related to pharmacist counseling. One study found pharmacists reported being more



likely to counsel patients who had less education and greater medication expenditures (Carroll & Gagnon, 1983). A telephone survey of older adults found advancing age was negatively associated with reporting receipt of information about various types of prescription information from pharmacists (Moore, Kalu, & Yavaprabbas, 1983). Other studies have shown mixed or non-linear relationships between age and receipt of counseling (Schommer & Wiederholt, 1997; Wiederholt, Clarridge, & Svarstad, 1992).

A U.K. study of recorded pharmacist-patient interactions investigated differences in verbal counseling based on gender and age (Smith, 1992). This study included pharmacist consultations for prescription and over-the-counter medications. The authors reported that female patients offered more information and asked more questions of pharmacists, but that pharmacist communication behaviors did not vary based on the gender of the patient. Patient age significantly affected the duration of encounters, with younger patients engaging in shorter encounters. The author suggests this may be due to younger patients generally having less complex medical situations. In general, however, studies of pharmacist-provided counseling have not investigated differences in counseling rates and content related to patient demographic factors as most of these labor-intensive observational studies were underpowered to detect such variation.

Pharmacists have reported that low patient demand for counseling is a barrier to counseling (Schommer & Wiederholt, 1994a). Patients also have expressed low expectations for the frequency and content of counseling from pharmacists (Schommer, 1997). Studies show patients are important in determining how long patient counseling interactions last and how much information is exchanged (Schommer, 1994). When positive patient views on counseling matched that of the pharmacist, interactions lasted approximately twice as long. In another study, shared expectations for counseling led to higher levels of patient satisfaction (Worley et al., 2007).

### Provider

Providers also play a critical role in the HCM. The model expects quality monitoring involving proactively eliciting feedback from patients about their health and medication use experiences. One of the most prevailing themes for quality care in the medical literature is the use of a patient-centered communication approach (Chewning & Sleath, 1996; Epstein, 2000; Mead & Bower, 2000). Patient-centered communication is grounded in the belief that patients have an important contribution to make in decision making. Also, patients experience psychological and social effects from their illness that can be addressed by providers, including pharmacists.

Patient-centered communication, including the use of open-ended questions, has been shown to increase satisfaction and adherence (Mead & Bower, 2000; Stewart et al., 2000; Zandbelt, Smets, Oort, Godfried, & de Haes, 2007). In a small study of New Mexico community pharmacists almost half of pharmacists did not interact with patients when picking up a prescription. Trained observers reported only, only 36% of prescriptions involved the pharmacist asking the patient a question, and of those, only 7% were open-ended questions (Sleath, 1995). Also, fewer questions were asked for refill prescriptions than new prescriptions (26% and 39%, respectively). The author classified the majority of interactions as “*default*,” meaning that neither party was taking responsibility for the encounter (Sleath, 1996). The author did find encounters where the pharmacist used a participatory (patient-centered) approach were longer. A participatory approach was more common for refill prescriptions, which suggests some pharmacists were using the refill encounter as an opportunity to engage patients in more complex discussions, which presumably may include elements of medication monitoring. More patient-centered communication has been called for in the community pharmacy setting as a means for eliciting patient feedback (de Oliveira & Shoemaker, 2006).

One study using a precursor model to the HCM found that patients reporting their physician used a collaborative communication style had greater antidepressant regimen

knowledge, positive medication beliefs, increased satisfaction and greater adherence (Bultman & Svarstad, 2000). This study demonstrated that providers using a collaborative style are important not only at the time of initial prescribing, but also as patients return for follow-up visits. For the patients in this study, 36% of the variation in antidepressant satisfaction and 25% of the variation in medication adherence was explained by the physician using a collaborative follow-up style (Bultman & Svarstad, 2000).

### Drug

Various drug-related factors have been found to be important in relation to pharmacist behavior. As mentioned previously, pharmacists tend to counsel more on new prescriptions than refill prescriptions (Puspitasari et al., 2009; Sleath, 1995). Also, some medications are associated with more frequent or more serious problems, and pharmacists appear to include this in their decision-making. Some chronic medications, like warfarin, insulin, and digoxin have been shown to have a higher risk for causing medication-related problems (Budnitz et al., 2007). Less is known, however, about how the type of medication influences a provider's medication monitoring decision process. Schommer found pharmacists rated the importance of providing different types of information and monitoring differently based on the seriousness of the drug information, busyness, and whether the prescription was new or a refill (Schommer & Wiederholt, 1994a). The author offered these findings as support that pharmacists were cognitively engaged in their decisions to counsel patients.

An observational study from Finnish community pharmacists found pharmacists were most likely to counsel on antibiotics, eye-drops, and pain medications. These generally represented first time uses of the medication for acute conditions rather than chronic illnesses and likely involve pharmacists engaging in information and

demonstration giving rather than information collecting or monitoring behaviors (Vainio, Airaksinen, Hyykky, & Enlund, 2002).

Compared to medications for acute medications, pharmacists have a broader scope of potential monitoring behaviors for chronic medications. Pharmacists can probe about medication effectiveness such as symptom improvement specific to certain medications (e.g. antidepressants), safety issues such as side effects (e.g. dizziness associated with anti-hypertensive medications), and adherence (e.g. many patients cease taking statins because there are no observable benefits) (Bultman & Svarstad, 2002; Mann, Allegrante, Natarajan, Halm, & Charlson, 2007).

Pharmacists are trained to be medication experts and to identify and manage medication-related problems. These skills have demonstrated utility with finding important clinical problems with new prescriptions and in the context of medication therapy management and other pharmacist-provided services (Rupp, DeYoung, & Schondelmeyer, 1992). Less research has examined how pharmacists use these skills to target medication monitoring efforts in the dispensing process.

### Environment

Health care visits, whether with physicians, pharmacists, or other providers, often are under time constraints. This has resulted in visits oriented more to addressing acute complaints versus managing and monitoring chronic diseases and medications (Bodenheimer et al., 2002). Pharmacists and patients report the busyness of the pharmacy is a barrier to communication (Schommer & Wiederholt, 1994a; Schommer & Wiederholt, 1995; Svarstad et al., 2004). This busyness is observable to patients and may decrease their perception of the quality of the service (Bitner, 1990).

Community pharmacy type has been associated with different rates of counseling. Clinic-based pharmacies counseled more and had higher patient expectations for counseling than traditional pharmacy settings (Mackowiak & Manasse Jr, 1984). Another

study reported that chain pharmacies provided less counseling than other types.(Kirking, 1984). Still others have not found an association between pharmacy type and counseling frequency (Svarstad et al., 2004).

Workflow factors such as whether or not the pharmacist hands off the prescription have been identified as important antecedents to pharmacist-patient communication in routine dispensing encounters (Kimberlin et al., 2011; Schommer & Wiederholt, 1995; Shah, 2006). Recently, there has been a push to use pharmacy technicians to a greater capacity in an effort to free up pharmacist time for counseling and other patient-centered services. It is unknown, however, if and how this translates into pharmacists engaging in more medication monitoring or if they find other uses for this time. Other factors include pharmacist autonomy, control over practice behaviors, and organizational priorities and norms (Doucette et al., 2011). Such factors can be associated with some pharmacies adopting innovative practice models with the goal of increasing the interaction between pharmacists and patients.

### Past Interactions

Interpersonal communication theories, such as role theory (Biddle, 1986), and models like the HCM assume patients and providers enter into health care encounters having some expectation of how they will proceed. If patients and providers have a congruent view of the encounter, satisfaction is expected to be higher. A study which paired observations, pharmacist surveys, and patient surveys, found patients and pharmacists who held similar expectations for how a counseling encounter would proceed had more satisfied patients (Schommer, 1994). The study also found that when either patient or pharmacist expectations for counseling were higher than the other, satisfaction was lower for the patient. However, such congruency may not be ideal if both parties have low expectations for monitoring in the pharmacy refill encounter. These findings suggest both parties should be engaged for collaboration to occur, which is

supported by the HCM. Trust and relationship quality have been identified as important for satisfying pharmacy encounters (Worley et al., 2007). Patients reporting that the pharmacists used a participative approach during their interactions showed more relationship commitment and communication (Worley, 2006).

The patient-pharmacist relationship also can be thought of in terms of an exchange (Doucette & McDonough, 2002; Dwyer, Schurr, & Oh, 1987). Patients can benefit from a better experience at the pharmacy and from drug therapy interventions from the pharmacist and the pharmacist/pharmacy benefits from repeat business and employee satisfaction. When the patient is satisfied with her pharmacy experience, relationship commitment may increase.

#### Patient Feedback

Patients form evaluations of their medications based on their experiences (Svarstad & Bultman, 2000). Patient feedback occurs when patients share information about their medication beliefs, concerns, and experiences with their health care provider. Research suggests providers can support patient feedback by asking open-ended questions during medical encounters (Bertakis & Azari, 2011; Stewart et al., 2000). Open-ended questioning is an important part of quality medication monitoring. It is important that patients feel comfortable sharing personal information with their health care provider (Roter & Hall, 2006).

Several studies have examined patient question-asking behaviors of community pharmacists. One study reported that some patients feared embarrassment, did not know it was a pharmacist's role to answer questions or felt the pharmacist was too busy (Chewning & Schommer, 1996). Other barriers to patient question-asking included a lack of privacy or the clerk transferring the prescription instead of the pharmacist. One study found a brief pamphlet about pharmacists' roles presented to patients increased their likelihood of asking the pharmacist a question (Chewning & Schommer, 1996). Another

study found patient question-asking was an important cue to pharmacists offering additional information related to a variety of topics (Schommer & Wiederholt, 1997). In many cases, pharmacists not only answered the patient's initial question, but also offered additional information, asked follow-up questions, or provided monitoring information. This study also found pharmacists were more likely to ask feedback questions of older patients. The authors suggested this might be due to older patients having more complex medication regimens and multiple chronic diseases.

### Quality Medication Monitoring

As discussed previously, studies have reported higher rates of medication-related problems from inadequate monitoring versus errors in prescribing (Forster et al., 2005; Gurwitz et al., 2003). This is due in part to the difficulty in predicting how helpful or harmful a medication will be when used by a specific patient versus all users. This variability can be due to a patient taking multiple medications (polypharmacy), having multiple medical conditions, advancing age, genetic variation, and other factors. There is an established need for quality medication monitoring to address problems occurring in individual patients (Steinman et al., 2011).

Several strategies have been identified for improving medication monitoring and a multifaceted approach using multiple sources of information is thought to give providers the best opportunity for identifying problems early so they can be mitigated. A primary way to monitor medications is to ask questions and give patients opportunities to report symptoms or other problems with their medication use (de Oliveira & Shoemaker, 2006; Steinman et al., 2011). Studies demonstrate that provider use of open-ended questions, a hallmark of patient-centered communication, improves patient satisfaction and medication adherence (Bertakis & Azari, 2011; Stewart et al., 2000). In many instances, however, such communication is not occurring in routine practice. For example, studies have shown providers rarely engage patients in discussions of medication side effects and

patients often do not report these symptoms to physicians (Sleath, Roter, Chewing, & Svarstad, 1999; Weingart et al., 2005).

Health information technology has been proposed as a way to improve medication monitoring (Steinman et al., 2011). Some insurance companies are using electronic notifications to inform pharmacists of potential medication-related problems such as non-adherence, or patients not taking a recommended medication given their specific medical conditions (Doucette et al., 2013). Electronic medical records are becoming the norm and these are expected to enhance monitoring. The sharing of such records among providers and across settings is still evolving. More empirical work is needed to test these interventions and to understand how the tasks fit into practice.

Patient outreach programs such as medication therapy management, hospital discharge follow-up programs, medication reconciliation, patient-centered medical homes, accountable care organizations, and others put pharmacists in a position to engage in medication monitoring (Kaboli et al., 2006; Scott, Hitch, Ray, & Colvin, 2011). These programs already have demonstrated some success; however, widespread use still is building. In addition, Steinman (2011) suggests health care providers should be better socialized and educated to engage in medication monitoring.

Pharmacists are uniquely positioned to contribute to medication monitoring because of their frequent access to patients and specialized medication knowledge. Community pharmacists also are the only provider to have direct access to medication dispensing records which can facilitate the identification of non-adherent patients (Choo et al., 1999).

#### Quality of Problem-solving and Reinforcement

Multiple empirical studies examining medication therapy management, disease state management, or other program types demonstrate the ability of pharmacists to identify and resolve drug therapy problems (Carter et al., 2009; Chrischilles et al., 2004;



Currie et al., 1997; Doucette et al., 2009; McDonough & Doucette, 2003; Witry et al., 2011). The interventions in these studies involve in-depth discussions between pharmacists and patients about their medications. After problems are identified, actions can include the patient, prescriber, or both. Examples of pharmacist-patient actions include adjustments to the timing of medications or providing feedback and education on disease management. Actions involving the prescriber include dose changes, medication switches, and others. Less work has investigated actions community pharmacists take after identifying problems in the dispensing process or other routine care situations.

Studies have specifically examined pharmacist actions after identifying errors on prescriptions, but these issues were generally more technical in nature and related to processing the prescription rather than monitoring patient medication use experiences (Claesson, Burman, Nilsson, & Vinge, 1995; Rupp et al., 1992). These studies generally focus on the prescription as an information source for pharmacists. More research is needed that examines patients as an information source. Also, such studies of prescription-related problems and actions tend to focus on new prescriptions and less on refill prescriptions.

A study of Swedish community pharmacists used data collection worksheets to characterize problems identified during half-day data collection periods over the study period (Westerlund, Alnarsdottir, & Melander, 1999). On average, pharmacists identified a problem in 2.5% of total patient encounters. Problems related to inappropriate doses or indications were most common. The most common action taken by the pharmacist was to provide counseling to the patient. Pharmacists also contacted prescribers to suggest changes; however this occurred in a small number of cases. This demonstrates that pharmacists are identifying drug-related problems in routine interactions, although most of these focus on technical issues and education rather than making recommendations to improve drug therapy.

### HCM Conclusion

The HCM implicates several key domains (patient, provider, drug, environment, and past interaction) and stresses a process of soliciting patient feedback, providing quality monitoring, and engaging in collaborative problem-solving en route to better outcomes through a patient-centered approach.

### Attitudes in Social Psychology

The study of attitudes has been a central focus of social psychology for over a century. Attitude is a construct that social psychologists have defined in numerous ways. A simple, general definition has been provided by Ajzen as an evaluative judgment of an object (Ajzen, 2001). Here, an object can refer to things, behaviors, places, persons, and so forth. With this definition, attitudes are seen as distinct from cognitive beliefs, knowledge, values, and behavioral intentions. Attitudes have varying impact on behavior. Most behaviors are proposed to be influenced by multiple, sometimes conflicting attitudes with varying strength and accessibility (Fazio, Powell, & Williams, 1989).

Measuring attitudes can be challenging and is the topic of considerable research. Ajzen and Fishbein have put forth one of the most popular theories and supportive strategies for linking attitudes with behavior (Ajzen, 1991). Their Theory of Planned Behavior suggests that attitudes toward a behavior, subjective norms related to the behavior, and perceived control of engaging in the behavior are predictive of the intention to engage in the behavior which is predictive of actual behavior.

Attitudes toward a behavior have typically been assessed by providing statements about the behavior and then asking the respondent to report a level of agreement or disagreement with the sentiment using a somatic-differential or Likert-type response scale (Likert, 1932). For example,

“The pharmacist should talk to the patient every time they come in for a refill prescription” (Strongly Agree, Agree, Neither Agree nor Disagree, Disagree, Strongly Disagree).

For attitudinal items, it is recommended that there be consistency between the behavior and the attitude (Ajzen & Fishbein, 1977). If the behavior of interest for the above example is “*Pharmacist talking to patient at the time of prescription refill*” then the item demonstrates good consistency. If the attitudinal item had stated “*Medications are dangerous,*” one may expect a lower level of association because the item assesses an evaluation of medications as opposed to the behavior of medication monitoring.

Ajzen and Fishbein also recommend that behaviors ideally be specified with regard to action (the behavior of interest), target (to whom is the behavior is directed), context (the details about the setting or other situational factors), and time (specifics about when the action is to occur) (Ajzen & Fishbein, 1977). A review of studies linking attitudes and behavior found that when the action and target were consistent between the attitudinal measure and the behavior that the prediction was significantly stronger (Ajzen & Fishbein, 1977).

Actual behavior, however, can be challenging to observe. Behavioral intention often is measured instead and has been deemed a reasonable substitute, although the appropriateness can depend on context. In the present study, behavioral intention, in this case likelihood of question-asking in relation to vignettes, is proposed to be influenced by a pharmacist’s medication monitoring attitude, among other factors.

Ajzen also suggests researchers use interviews when designing items for these measures to identify salient attitudes, subjective norms, and barriers and facilitators to performing the behavior (Ajzen, 2006).

### The Role of Provider Attitudes in Practice Behavior

Provider attitudes have been useful in explaining certain professional behaviors. For example, in one study, physician attitudes about lipid-lowering therapy were related to patients reaching LDL goals (Foley et al., 2006). Physician attitudes have been useful in detecting problematic gaps in their knowledge and counterproductive attitudes, which

affect the quality of patient care. Such efforts have been useful in drawing attention to inadequate cancer pain management (Von Roenn, Cleeland, Gonin, Hatfield, & Pandya, 1993). In addition, a body of literature exists demonstrating physicians with a patient-centered attitudinal orientation communicate in a more patient-centered fashion and have more satisfied and trusting patients (Krupat et al., 2000; Krupat, Bell, Kravitz, Thom, & Azari, 2001). Provider attitudes have been useful in explaining variation in initial prescribing decisions but less research has focused on medication monitoring (Nwokeji, Rascati, Brown, & Eisenberg, 2007; Pargeon & Hailey, 1999; Von Roenn et al., 1993). There is little empirical support for the relationship between provider attitudes, contextual factors, and medication monitoring for patients taking medications to treat chronic diseases.

#### Attitudes and Norms in Pharmacy

In the pharmacy literature, the counselor role orientation was developed to measure pharmacist attitudes toward new prescription counseling (Mason, 1983). This measure was developed using qualitative data from a series of pharmacist interviews and is similar to the research strategy put forth in the present study. The counselor role orientation was useful for differentiating the influence of a pharmacist's attitude toward counseling and contextual factors on the quality of new prescription counseling (Mason, 1983; Schommer & Wiederholt, 1995). This measure of new prescription counseling may have some application to monitoring as both relate to pharmacist-patient interactions in the dispensing process. New prescription counseling, however, focuses on information-giving which is an activity with which pharmacists are more comfortable (de Oliveira & Shoemaker, 2006; Schommer, Pedersen, Worley et al., 2006). Medication monitoring focuses on information-gathering and problem-solving, which are activities to which some pharmacists may not be as strongly orientated

Around the same time, Kirking (1984) used attitudes and norms to predict community pharmacist self-reported counseling frequency. The author found attitudes were a stronger predictor of intention than norms, although both were statistically significant (Kirking, 1984). He also found chain pharmacists reported counseling less often than independent pharmacists and recently graduated pharmacists were more likely to report higher counseling rates.

Shah (2006) used a single counseling attitude measure for both new and refill prescriptions. This measure was adapted from Schommer's revision of the counselor role orientation (1994) and included an additional item on the effect of counseling on patient safety (*Pharmacist provided patient counseling is not important for enhancing patient safety*). While this measure was significantly associated with both new and refill counseling behaviors, the Shah suggested an attitudinal measure more specific to refills may better explain refill counseling behaviors. However, that was beyond the scope of the project. Little is known about how community pharmacists relate attitudinally to medication monitoring at refill.

Farris & Kirking (1995) used the theory of trying, which is a goal-directed theory, to investigate the link between attitude toward trying, social norms, frequency of past trying, recency of past trying, and intentions to try to prevent and correct drug therapy problems. Goal-directed theories are useful when there are significant barriers to a behavior. This study found pharmacist attitudes and norms were not prohibitive to the intention to try to identify and manage drug therapy problems.

Ortiz & Walker (1992) developed a professional role orientation scale for pharmacists that looked at a set of pharmacist behaviors and asked the respondent to what extent they believed this was part of their role as a pharmacist (Ortiz, Walker, & Thomas, 1992). This scale included general items about counseling for prescribed and over-the-counter medications, regularly attending continuing education functions, and having good relationships with physicians. On average, respondents believed they personally

embodied these roles better than the “average” pharmacist. A weakness of this normative scale was the very broad nature of the construct.

Planas et al. (2005) developed a model and corresponding scales for a pharmacist model of perceived responsibility for drug therapy outcomes. This model proposed that clarity of standards, perceived control, and sense of professional duty directly influence a pharmacist’s overall sense of responsibility of drug therapy outcomes, which in turn, was hypothesized to positively influence the quality of care provided (Planas et al., 2005). Using the behavioral pharmaceutical care scale as a surrogate for actual practice behavior, the proposed model was supported.

Martin et al. (2010) developed and evaluated the internal consistency of a MTM self-efficacy scale specific to performing medication therapy management services (Martin, Chui, Thorpe, Mott, & Kreling, 2010). The authors proposed a three factor solution containing 14 items with domains related to *MTM tasks*, *personal interactions*, and *goal setting*. Many of these items were very specific to the medication therapy management program used in the main part of their study. Items included: *How confident are you that you could... appeal a rejected MTM claim?* and *motivate patients who are not interested in receiving the service?* Many items were technical in nature and others were very general. Patient-centered behaviors such as open-ended questioning and empathizing were not included.

Herbert et al. (2006) used the Theory of Planned Behavior to link pharmacist attitudes, norms, and control with intention to provide medication therapy management services as part of the newly introduced Medicare Part D prescription drug benefit. Attitudes, subjective norms, and perceived behavioral control were all statistically significant predictors of intention to provide medication therapy management, with norms being the strongest of the three scales. Demographic variables were not found to be significant predictors of intention, although whether the respondent was a staff pharmacist or manager was not collected (Herbert, Urmie, Newland, & Farris, 2006).

Guirguis and Chewning developed a measure for assessing student pharmacist beliefs about monitoring three common markers of diabetes: hemoglobin A1c, blood pressure, and cholesterol. These authors employed social cognitive theory (Bandura, 1991), role theory (Guirguis & Chewning, 2005), and the concept of mattering (Schieman & Taylor, 2001) to create measures for self-efficacy, outcome expectations, monitoring role orientation, and mattering (Guirguis & Chewning, 2008). This study is noteworthy for investigating monitoring by pharmacists and there are useful questions and strategies for investigating monitoring. This study, however, is very specific to asking a series of specific questions about diabetes. One item of particular interest was

Community pharmacists should talk to patients with diabetes about A1c, blood pressure, and cholesterol at every prescription refill.

This item had one of the largest distributions and supports the proposition that student pharmacists have varying beliefs about the frequency and nature of communication at the time of refill (Guirguis & Chewning, 2008).

In summary, pharmacist attitudes have been found to be useful predictors of practice behaviors using observation, simulation, and self-report by pharmacists. Understanding the relative importance of different factors, including attitudes, can help stakeholders target interventions to improve the quality of care.

### Attitudes and the HCM

Provider attitudes have not been used in research using the HCM to explain practice behaviors. Since the provider domain is flexible, including attitudes is a reasonable endeavor given the utility of using provider attitudes to predict provider behavior with regard to pharmacist new prescription counseling and pharmacist provision of medication therapy management services.

### Alternative Models and Theories

The HCM was chosen to guide this investigation over several other models and theories. The Chronic Care Model has been used in a variety of settings but was not selected for the present study (Bodenheimer et al., 2002). Like the HCM, the Chronic Care Model stresses the importance of patient engagement and provider proactivity. The Chronic Care Model, however, focuses more on health care delivery systems than individual providers. Given the objectives of the present study, selecting a model which lends itself more to studying an individual provider was deemed beneficial.

Role theory was considered because of its prior use in creating pharmacist attitude measures for practice roles (Biddle, 1986; Guirguis & Chewing, 2005). Role theory, however, has many different interpretations, no widely accepted visual representation, and typically downplays the significance of context. Role theory was the original basis for Mason's counselor role orientation (Mason, 1979).

Expectancy-value theories were considered because of their focus on attitudes. Theories such as the Theory of Planned Behavior and Health Belief Model have been popular particularly for patient behaviors (Ajzen, 1991). The Theory of Planned Behavior has a significant body of evidence supporting the link between attitudes and behavioral intention. Resources for using the Theory of Planned Behavior provide useful, empirically supported guidance on creating attitudinal scales and these propositions were influential in the design of the present study. For example, the TPB literature stresses the importance of attitude and behavioral measure congruence regarding the specificity of variables and recommends using qualitative data to support the generation of survey items.

### Study Aim Justification

While significant research suggests contextual and attitudinal factors are associated with community pharmacist provision of new prescription counseling (Table



2.1, Table 2.2), an important gap remains for explaining refill prescription interactions with patients. There is reason to believe there are differences in these two phenomena, however less work has described and analyzed the refill process from the perspective of the pharmacist. Therefore, the first aim of the present study was to *describe the attitudes, contextual factors, activities, and behaviors associated with community pharmacist medication monitoring.*

Provider attitudes have been useful in explaining variation in practice behaviors. While several scales exist for measuring pharmacist attitudes toward various practice behaviors, no scale had been designed to specifically assess a pharmacist's medication monitoring attitude. Therefore, the second aim of the present study was to *develop a measure for a pharmacist's medication monitoring attitude.*

Lastly, there is documented variability in refill prescription counseling and other related activities which have not been analyzed. Testing the interaction between pharmacist factors, contextual factors, and monitoring behaviors can further understanding of pharmacist medication monitoring. Better understanding this phenomena and the decision-making pharmacists use in this process is poised to lead to improvements in the delivery of care. The third aim of the present study was to *identify significant attitudinal and contextual factors which contribute to the pharmacist's decision engage in medication monitoring activities.*

Table 2.1. Contextual Factors from the Pharmacy Literature Related to Counseling

<b>Subject</b>	<b>Factor</b>	<b>Association</b>	<b>Reference</b>
Environment	Pharmacy type	Clinic Pharmacy positively associated with counseling	Mackowiak (1988)
Environment	Pharmacist transferring the prescription to the patient	Positively associated with counseling	Schommer (1992), Shah (2011), Kimberlin (2011)
Environment	Busyness	Negatively associated with counseling	Svarstad (2004),
Environment	Lack of time	Negatively associated with the pharmacist transferring the prescription to the patient	Schommer (1995)
Environment	Pharmacist working alone	Negatively associated with providing risk information during counseling	Kimberlin (2011)
Environment	State regulations	Stronger regulations positively associated with counseling	Svarstad (2004), Kimberlin (2011)
Patient	Age	Advancing age positively associated with counseling	Schommer (1997)
Patient	Gender	Males received more information during counseling	Schommer (1997)
Patient	Question-asking	Positively associated with counseling	Schommer (1997), Shah (2011)

Table 2.1. Continued

<b>Subject</b>	<b>Factor</b>	<b>Association</b>	<b>Reference</b>
Pharmacist	Age	Negatively associated with counseling	Svarstad (2004)
Past Interaction/Relationship	Participative Behavior, Interpersonal Communication	Positively associated with relationship Quality	Worley (2006)
Drug	Multiple drug classes	Pain medications counseled more frequently than psychotropics	Vainio (2002)

Table 2.2. Attitudinal Factors from the Pharmacy Literature Related to Counseling and Pharmaceutical Care Behaviors.

<b>Subject</b>	<b>Factor</b>	<b>Association</b>	<b>Reference</b>
Pharmacist	Counselor role orientation	Positively associated with counseling	Mason (1983), Schommer (1995), Shah (2006)
Past Interaction	Congruent expectations for counseling	Positively associated with patient satisfaction	Schommer (1994)
Pharmacist	Normative beliefs about counseling	Positively associated with self-reported counseling frequency	Kirking (1984)
Pharmacist	Normative beliefs about professional behavior	Pharmacists rated themselves more professional than the average pharmacist	Ortiz (1992)
Pharmacist	Perceived responsibility for drug therapy outcomes	Positively associated with self-reported pharmaceutical care behaviors	Planas (2005)
Pharmacist	Medication therapy management self-efficacy	-	Martin (2010)
Pharmacist	Medication therapy management attitudes, subjective norms, perceived behavioral control	Positively associated with intention to provide medication therapy management services	Herbert (2006)

## CHAPTER III

### METHODOLOGY

#### Introduction

The previous review of the literature demonstrated the importance of attitudes, contextual factors, and environmental factors for understanding pharmacy practice and pharmacist behaviors. The Health Collaboration Model guided the qualitative and quantitative phases of the present study and helped organize data and support analyses. The dispensing process is one of the most prominent aspects of community pharmacy practice and hence was a focus for all phases of the present study.

#### Study Overview and Use of Mixed Methods

Medication monitoring is a complex phenomenon and little research has focused on how community pharmacists engage in medication monitoring in routine practice (Bultman & Svarstad, 2002). Advances in both situational understanding and overall patterns are needed to understand the current state of medication monitoring in community pharmacy practice.

The present study used a mixed methods approach to address the three study aims. The main rationale for using a mixed methods approach was to offer a more complete picture of medication monitoring in community pharmacy practice than using solely qualitative or quantitative data and research methods (Creswell & Plano-Clark, 2007). That is, to not only explain in depth how and why monitoring occurs for a set of pharmacists, but also quantitatively test the relationships between different variables related to medication monitoring for a larger sample of practicing pharmacists.

Mixed methods uses pragmatism as the primary research philosophy which negotiates the use of both constructivist and positivist paradigms to conduct research (Morgan, 2007). Pragmatism sees the use of multiple perspectives, methods, and techniques as necessary and appropriate in order to best address the research questions

put forth in a study (Creswell & Plano-Clark, 2007). Pragmatism suggests it is more productive to view qualitative and quantitative paradigms as a continuum rather than incompatible opposites. This facilitates addressing complicated phenomena and integrating findings that speak both to exploring situational realities and explaining the patterned aspects of a phenomenon. Mixed methods research, however, is not simply conducting two studies, one qualitative and one quantitative. There is a requirement that data and analyses of the two be mixed (Creswell & Plano-Clark, 2007).

The present study utilized a sequential exploratory instrument development mixed methods design consisting of a qualitative interview phase, a mixed methods instrument development process, and a quantitative survey phase to mix the data, analyses and interpretations (Onwuegbuzie, Bustamante, & Nelson, 2010). This mixed methods item generation process also added methodological expansion as a second rationale for using mixed methods, as it generated a new measure of a pharmacist's medication monitoring attitude. Specifically, the present study used a mixed methods item generation table to facilitate and visually represent the linkage between the language of community pharmacists, the codes applied by the researcher in the qualitative analysis, and the items used in the study survey (Howell Smith, 2011; Onwuegbuzie et al., 2010) The purpose of this process was to create an instrument grounded in the language, experiences, and perspectives of community pharmacists, the target population for this study (Creswell & Plano-Clark, 2007). Using the qualitative data in this way has been proposed to generate more valid, novel, and experience-based items compared to those based solely on existing literature (which in this case is primarily quantitative in origin or related to new prescription counseling) and researcher experience (Onwuegbuzie et al., 2010). Ajzen also supports using qualitative interviews to build questionnaire items (Ajzen, 2006). In addition, the exercise of using the qualitative data to support the design of the quantitative instrument provided an additional opportunity to revisit the qualitative data

under different circumstances which is proposed to improve the interpretation of the qualitative data.

The content of the qualitative interviews was used to describe and contextualize pharmacist perspectives on medication monitoring using the Health Collaboration Model in the current application of investigating community pharmacist medication monitoring. The interviews also were used to identify contextual variables for use in the factorial survey vignettes. Interviewing pharmacists directly involved with medication monitoring in community pharmacy practice allowed detailed descriptions of the barriers, facilitators, attitudes, preferences, approaches, and other pharmacist-specific aspects to be explored and documented.

The survey phase of the present study contained 5 question sections designed to identify patterns in community pharmacist medication monitoring using a larger group of community pharmacists from the state of Iowa. The questions included a set of self-reported monitoring activities, a set of Likert-type item about a pharmacist's medication monitoring attitudes, a series of randomly populated factorial vignettes, four items from the Behavioral Pharmaceutical Care Scale, and a set of demographic and practice setting items. The factorial survey items were analyzed using hierarchical linear modeling to determine what pharmacist and vignette variables were significantly associated with their likelihood to ask each of three medication monitoring questions. The survey items were designed to complement the in depth interviews by providing information about medication monitoring in practice for a larger sample of pharmacists.

This study was approved by the Institutional review board of the University of Iowa.

### Qualitative Phase

Aim 1 of the present study used a series of qualitative interviews to describe the attitudes, contextual factors, activities, and behaviors associated with community

pharmacist medication monitoring. Pharmacist interviews were selected as the method of qualitative data collection so the researcher could probe responses and request detailed anecdotes about lived medication monitoring experiences.

### Participants and Recruitment

Twelve community pharmacists were used for this qualitative phase and saturation was deemed to be reached after approximately the 9<sup>th</sup> interview as additional interviews did not present new concepts (Marshall & Rossman, 2010). This is similar to other qualitative investigations in pharmacy which have saturated near 12 interviews (Ferguson, Ashcroft, & Hassell, 2011; Kirking, 1984; Lehnbohm & Brien, 2010). Subjects were licensed pharmacists in the study state in Johnson, Lynn, and Dubuque counties. Community pharmacists included in this study were defined as having direct contact with ambulatory patients through the dispensing of outpatient prescriptions in brick and mortar licensed pharmacies open to the general public. Excluded were pharmacists who exclusively worked in closed door pharmacies, such as those that prepare doses for nursing home residents. This area included a range of urban and rural pharmacies. For the purpose of defining the sample, rural pharmacies were those located in towns of fewer than 20,000 persons which were not a suburb of an adjacent larger city. Limiting the geographical area of the study increased feasibility.

A list of pharmacists from Johnson, Lynn, and Dubuque counties (n=295) was prepared using a list of community pharmacists obtained from the state board of pharmacy. A random number generator was used to select 10 pharmacists to receive an information letter about participating in the interviews. Follow-up telephone calls were made to answer questions and if interested, arrange an interview time. Of these, three agreed to be interviewed. An additional ten pharmacists were randomly selected from the same list and three more agreed to participate. Next, purposeful, key informant sampling was used to recruit pharmacists with a reputation for engaging in medication monitoring



activities (Miles & Huberman, 1994). Six pharmacists were sent recruitment letters and all six agreed to participate. By the conclusion of recruitment, the following pharmacist characteristics were represented: chain, independent, and grocery pharmacy; urban and rural pharmacy; male and female pharmacists; full-time, float, and part-time pharmacists.

### Interviews

Twelve interviews were conducted - seven were face-to-face at the workplace of the pharmacist and five were conducted over the telephone due to adverse weather conditions or interviewee preference for a more convenient format. The flow and content richness of in-person and telephone interviews was similar and all interviews lasted approximately 45 minutes. Interviews occurred between January and March of 2013.

The interview guide questions (Appendix B) addressed the primary qualitative research questions for Aim 1 (Appendix C): What activities do pharmacists do to monitor the chronic medications of their patients? How do pharmacists perceive their role at the time of refill and how they believe medication monitoring fits into that role? How do pharmacists perceive that contextual factors (patient, provider, drug, environment, past interactions) influence their medication monitoring activities?

The focus of the interviews was to explore pharmacist monitoring attitudes and beliefs including what barriers, facilitators, norms, and other factors related to medication monitoring. One of the most common opportunities pharmacists have to engage in monitoring is when patients present to the pharmacy to obtain refills of their ongoing prescriptions (Bond et al., 2000; Hugtenburg, Blom, Gopie, & Beckeringh, 2004; Lewis et al., 1997). Since this is the most common monitoring opportunity for community pharmacists, it served as a primary topic for the interview. A set of demographic questions were asked for the purpose of describing the sample.

Participants were asked to describe recent or memorable medication monitoring experiences. The questions were designed to be open and to allow the participant to voice

their experiences and perspectives. The principal investigator (PI) made an effort to ask probing questions to add detail and richness to the participant's perspective. One probing strategy was to use the different domains of the HCM to gather more information about the encounter described by the participant. For example, after a pharmacist described a recent memorable encounter with a patient obtaining a refill, the PI probed into the specific drug that was involved as "drug" is a major domain in the HCM, and characteristics of that drug might be important to his or her reasoning or actions.

The interview guide was piloted on two part-time community pharmacists affiliated with the College of Pharmacy. This provided the interviewer with practice using the interview guide and minor modifications were made to improve flow.

#### Researcher Positionality

The principal investigator of the present study was a pharmacist and a graduate student in social and administrative pharmacy during the study. The author was working part-time as a hospital pharmacist during this study. The author's past community pharmacy experiences likely influenced his baseline perspective on the study including his training as a pharmacist, clinical rotations at community pharmacies, personal use of a grocery pharmacy, friends who are community pharmacists, and active membership in the state pharmacy association. While the author's experiences likely facilitated the ability to recruit pharmacists, conduct interviews, and interpret findings in a pharmacy context, there always is the potential for author perspectives to influence the collection and reporting of data and analysis. Strategies employed to support validity included the use of contact summary sheets, the mixed methods item generation process, and peer audit (check coding).

#### Data Analysis

Interviews were digitally recorded and uploaded onto a secure personal computer. Following each interview, a contact summary sheet (Appendix D) was completed to

allow the interviewer an opportunity to summarize some of the main points and reflect on the ideas presented, for example, if other interviewees had made similar statements (Miles & Huberman, 1994). Interviews were transcribed by listening to the audio recording controlled by a foot pedal. During, and immediately following transcription, analytic memos were applied to particularly interesting quotations and to suggest how they relate to medication monitoring. These comments were recorded using the comment feature in Microsoft Word (Microsoft Inc., 2013b).

The interview transcripts were loaded into MAXQDA (VERBI, 2013). This program was selected because of its focus on efficient coding, sorting, and retrieval of quotes. The broad HCM themes (patient, provider, past-interaction, environment, and drug) were used as general descriptive codes for the main purpose of organizing data. Underneath these broad descriptive codes, the PI inductively created descriptive and interpretive sub-codes based on the content of the quotes. For example, the deductive “Drug” code from the HCM was applied to describe the specific medication that was mentioned. Also, an interpretive sub-code “Abuse” was applied when the interviewee was commenting on situations where it appeared he or she thought the patient might be abusing a controlled substance.

The code list was iteratively managed during this process which involved combining or modifying codes and updating code definitions. This process involved discussions with a member of the dissertation committee (WRD). After the first iteration of coding, it was deemed appropriate to import additional deductive codes from the HCM as the 5 structural codes did not adequately accommodate the pharmacists’ anecdotes about the processes involved in monitoring. These domains were *monitoring-gathering info and monitoring-problem solving*. This allowed for a more intuitive arrangement of interpretive sub-codes. The patient-feedback domain was not included as this study was from the perspective of the pharmacist and it was difficult to differentiate from the

*patient* and *quality monitoring* domains. Studies from the patient perspective likely would utilize this domain more fully.

Next, data were sorted by code and interpretive summaries were created. In this process, a deductive code, its corresponding sub-codes, and corresponding quotes were printed. These were reflected upon and quotes were grouped to create interpretations of the codes and sub-codes. During this iterative process, some sub-codes were combined or renamed. Other sub-codes or quotes were de-emphasized because they did not relate to medication monitoring or did not clearly add depth to the analysis. For many codes and sub-codes, there was an abundance of representative quotes. In these instances, some redundant quotes were omitted, leaving a smaller number of quotes to support the interpretations. Pattern codes emerged as the data continued to be sorted and reflected upon. Pattern codes are the “most inferential and explanatory” codes. Pattern codes used in this analysis included patterns (PATT), themes, (TH) and causal links (CL) (Miles & Huberman, 1994). For the present study, all pattern codes were assigned the (PATT) label for clarity and simplicity.

Check coding (also known as peer audit) was used to provide the PI with a second perspective on the interpretation of the transcripts (Miles & Huberman, 1994). Eleven social and administrative pharmacy graduate student colleagues from around the United States were asked via email to review one of the transcripts and eight agreed. An instruction sheet was provided which included the working definition of medication monitoring (Appendix E). The check coder was asked to highlight passages that related to medication monitoring and provide a brief explanation of why these quotes were interesting to medication monitoring. One of the final steps in the qualitative analysis and write-up was to re-read these check coded transcripts and compare them to the PI’s interpretations, codes, pattern codes, and representative quotes. No interpretations were dramatically changed, but several minor refinements were made including the re-introduction of a “routine” sub-code under the drug code. This sub-code had been

condensed by the PI for parsimony, but was reintroduced based on interest from the check coders. There also were several switches to representative quotes.

Codes, themes, and representative quotes were finalized to provide in-depth descriptions of the most relevant medication monitoring behaviors, attitudes, and contexts from the interviews. Also, additional representative quotes were selected to support the coding (Appendix F).

### Mixed Methods Item Generation

At the time of this study, there was no published measure of general provider medication monitoring attitudes. The mixed methods item generation process addressed the second aim of the present study which was to develop a measure for a pharmacist's medication monitoring attitude. The medication monitoring attitude measure (MMAM) was developed using measure development procedures described by DeVellis (2011) combined with procedures for using qualitative data to propose items using a mixed methods item generation table. The steps used in the present study included 1) specifying what was to be measured; 2) generating an item pool using a mixed methods item generation table; 3) determining measure format; and 4) having experts review the item pool (DeVellis, 2011). A mixed methods approach was utilized to create items grounded in the language and experiences of community pharmacists (Onwuegbuzie et al., 2010).

### Measure Conceptualization

The purpose of the MMAM was to measure a pharmacist's attitude toward engaging in medication monitoring using items based on the self-expectations, professional roles and responsibility, cognitive processes, contextual, and environmental influences expressed by community pharmacists. This new measure was used in the factorial survey to test the association between medication monitoring attitudes and self-reported likelihood to ask each of three medication monitoring questions under different random vignette conditions.

### Item Generation

An initial pool of items for the MMAM was generated from the qualitative interviews as follows. The PI re-read the interview transcripts and coding looking for opinions, assessments, judgments and other statements that were relatively concise, related to medication monitoring or dispensing medication refills, and an addressed an attitude object of which pharmacists presumably could have differing levels of agreement. Many of these interview segments were the same as those identified during the memoing conducted during the initial stages of the qualitative analysis, including notes on the contact summary sheets. These quotes and the code applied to them during the initial iteration of coding were put into the mixed methods item generation table (Howell Smith, 2011; Milton, Watkins, Studdard, & Burch, 2003; Onwuegbuzie et al., 2010) along with the interview segment (Appendix G).

The quotes and corresponding codes were used to generate declarative statements appropriate for a Likert-type response. The total number of items created in the initial pool was 91. These items separated into two broad, basic themes – internal and external factors. Internal items were personal orientations related to codes and concepts including responsibility, attitudes about the importance of monitoring practices such as question-asking, how monitoring leads to satisfaction, proactivity, and attitudes about monitoring for side-effects, non-adherence, and effectiveness. External items focused on outside forces to which a pharmacist must react, including busyness, patient disinterest, and workplace pressures. These concepts of internal and external attitudes are similar to concepts from Role Theory and Theory of Planned Behavior (Ajzen, 1991; Guirguis & Chewning, 2005).

To illustrate an example, a prominent barrier cited by the pharmacists was busyness of the pharmacy. One pharmacist stated

“They really want you to do so many prescriptions a day and make sure you’re filling up to kind of what they think you should be filling, kind of feel hurried when you’re counselling. So I wish you

had more time to just kind of talk to the patients and kind of get to know them more but yeah, it's kind of a hurry up process in the pharmacy I guess."

The theme applied was *External* and the code applied was *Busyness*. The *in vivo* language which clearly and concisely represented the tone of the passage was "*I feel hurried.*" The resultant item was "*I feel hurried when I talk with patients about maintenance medications.*"

An example in the *internal* domain was a sentiment shared by several interviewees that intervening with refills was not a routine occurrence. Rather, unique circumstances were required to pull the pharmacist away from the refill checking process.

"So there has to be something extraordinary that alerts me to an issue with the refill prescription."

Here, the word *extraordinary* was important to the message of the interviewee and was retained for the final item "*Circumstances must be extraordinary for me to interact with a patient about a refill prescription.*"

The items were arranged and presented to two collaborators for feedback. The item pool was examined to delete or modify ambiguous, leading, unclear, or double-barreled items (DeVellis, 2011). One researcher provided general feedback and the other ranked the items individually on a scale of 1-5 of how closely the items related to the conceptualization of medication monitoring or were otherwise potentially problematic based on the aforementioned criteria.

Approximately half of these items were removed because they related too indirectly to the conceptualization of the MMAM, were vague, or appeared subject to social desirability bias. When reducing the item pool, it was important that the MMAM retain its coverage of the aforementioned internal and externally focused topics. Many of the eliminated items related to codes where other proposed items better addressed the concept. Further modification and omission of items through the survey piloting process left 31 items.

Quotes from the interviews did not necessarily result in a one-to-one relationship to the item wording. A coded passage could have produced multiple items or none at all. It was deemed preferable to initially generate as many relevant items that presented from the quotes with the expectation that they could be pared down, rather than having to go back to the transcripts to generate more items. The ultimate goal was to include a variety of items in an effort to best represent the content of the two themes of internal and external monitoring attitudes. If there were multiple closely related items, the best one or two items were selected based on clarity and consistency with the measure conceptualization. Space on the questionnaire and response burden limited the number of attitudinal items. Eight items per theme has been recommended based on the expectation that some items are discarded due to low internal consistency. This goal was satisfied for the two domains. The mixed methods item generation table for the final item set can be found in Appendix G.

#### Measure Format

Items for the MMAM were designed to be used with a 6-point Likert scale: *strongly agree, moderately agree, slightly agree, slightly disagree, moderately disagree and strongly disagree* (Likert, 1932). A six-point scale without a neutral option was selected as neutral options have been reported to encourage “fence sitting” among respondents who have some level of ambivalence about the item (Nowlis, Kahn, & Dhar, 2002).

#### Survey Phase

The survey phase in the present study was designed to address Aim 3 which was to identify significant attitudinal and contextual factors which contribute to the pharmacist’s decision engage in medication monitoring activities. This phase included both a pilot and a final mailed survey. The purpose of the pilot survey was to gauge response rate and to see if any items or sections were repeatedly being left blank which



may suggest a lack of clarity or relevance. The final survey included numerous changes informed by the pilot and was conducted during June and July of 2013. The survey included five sections; self-reported monitoring activity frequencies, the MMAM items, a series of factorial vignettes, a set of items from the Behavioral Pharmaceutical Care Scale, and a set of demographic items.

### Pharmacist Demographic Items

The survey asked several demographic and practice site variables. Gender was selected because it is a standard demographic variable and there is some evidence that gender affects practice style and communication (D. Roter & Hall, 2006). Degree (PharmD, BS Pharm) and position type (staff, manager, owner) were included as a standard demographic variables. Pharmacists also were able to check if relief/part-time or float (work at multiple pharmacies). Pharmacy type was included as some studies including the present qualitative analysis suggested chain pharmacies may be less likely to engage in medication monitoring behaviors compared to independent pharmacies (Puspitasari et al., 2009). The size of the town or city where the pharmacy is located was asked because the qualitative analysis suggested that pharmacies in smaller towns might provide more patient interaction than pharmacies in larger cities due to a reported increased familiarity with patients. The number of hours per week that the pharmacist works and the percent of time spent in the dispensing role was assessed. Number of other pharmacists and technicians was included because the qualitative analysis suggested that additional support staff facilitated taking more time to engage in patient interaction made taking extra time with patients easier to accomplish. Lastly, pharmacists were asked, on average, how many prescriptions they check on a “busy” and “slow” day.

### Prescription Refill Activities

The survey assessed several monitoring behaviors by asking the respondent to report the percent of refill prescriptions he or she does a certain activity. These activities

were based on the counseling literature and from the qualitative interviews. These items were provided an easily interpretable measure of some of the basic, technical, and question-asking activities pharmacists do when dispensing refills of prescription medications (Table 3.1).

The formatting of this section was revised slightly based on the pilot survey to increase clarity. This section also was moved forward for the final version to provide respondents with a less demanding set of items with which to begin.

Table 3.1 Prescription Refill Activities

<b>Item</b>
1. For what percent of the refill prescriptions you verify do you pull up the patient's medication profile on the computer?
2. For what percent of the refill prescriptions you verify do you attach a note to the prescription bag for someone to follow-up when the patient presents to the pharmacy?
3. For what percent of the refill prescriptions that are dispensed while you are staffing do you personally hand off the prescription to the patient?
4. When you personally hand off the refill prescription to the patient, what percent of the time do you ask if he or she has any questions?
5. When you personally hand off the refill prescription to the patient, what percent of the time do you ask a specific question about the patient's drug therapy?

#### MMAM Items

The main survey mailing included 20 MMAM Likert-type items and 6 Likert-type monitoring action items. One Likert-type controlled substances question was deemed beyond the scope of the present analysis. This is a decrease from the 33 items included in the pilot mailing an effort to save on space and decrease response burden. Respondents were asked to circle their response from strongly disagree, moderately disagree, slightly disagree, slightly agree, moderately agree, strongly agree. Respondents were asked to

indicate his or her level of agreement with the statements by circling the corresponding number. Some items were negatively worded and were reverse coded during analysis.

### Factorial Vignettes

A factorial survey design was used to identify the pharmacist level and situation level characteristics associated with asking medication monitoring questions. Factorial surveys combine the benefits of traditional experiments and surveys and have been useful for investigating physician and nurse preferences and decision-making (Ludwick et al., 2004; Müller-Engelmann, Krones, Keller, & Donner-Banzhoff, 2008; Rossi & Anderson, 1982). Factorial surveys use a series of vignettes, randomly populated with variable values, to test what factors explain the most variation in the dependent variables. The factorial survey serves as an experiment as the participant must evaluate a number of different stimuli simultaneously and make a judgment. This is in contrast to a simple vignette design where a limited number of variables are manipulated individually and in a static manner among participants.

Factorial surveys have several strengths over traditional surveys as they are suggested to decrease social desirability bias and can uncover latent beliefs which may be difficult to assess with a more straight-forward question (Ludwick et al., 2004). For example, if a pharmacist was asked how important it was to monitor insulin, it may be difficult to provide a valid answer due to differing interpretations of the question and the desire to provide a socially desirable response. By asking the pharmacist to evaluate more complex scenarios, based on multiple variables instead of focusing on a single, obvious variable, more realistic interpretations can be made and latent attitudes and intentions can be assessed. Random assignment creates orthogonal vignettes and large samples allow responses to be analyzed using regression techniques to identify how individual vignette factors contribute to variation in the dependent variable (Jasso, 2006). It is not necessary for all respondents to assess the same vignette to yield meaningful results. A random

sample of vignettes can be drawn from the vignette universe to model the relationships of interest. A weakness of this technique, as with all cross-sectional surveys, is that only self-reported behavioral intention can be assessed, not actual behavior.

Each survey contained 5 randomly generated vignettes and one common vignette. It has been recommended that factorial surveys include between 5-9 vignettes to approximately correspond with the number of independent variables, but not overwhelm the participant (Ludwick et al., 2004). The randomly populated vignettes were created using the random number generation feature of Microsoft Excel and the mail-merge feature of Microsoft Word. Exposing respondents to more vignettes would have been preferable, but space constraints and a concern that additional burden would decrease response rate restricted this number.

Factorial vignettes generally use two levels of variables and are analyzed using hierarchical linear modeling (Ludwick et al., 2004). Level one variables are based on the vignette or hypothetical situation to which the person taking the survey is responding. Level two variables are based on respondent characteristics. These person-level characteristics are believed to affect how the individual responds to the hypothetical vignettes in general (Figure 3.1).

The level one (vignette) variables selected for the factorial survey are described in Table 3.2. Patient gender was included to make the vignettes more realistic, but was not expected to influence pharmacist decision-making. Patient age was included because the information is readily available to pharmacists in the dispensing process and because pharmacists may perceive that older patients benefit more from medication monitoring. Ages were selected randomly between 35 and 79 years. The concept of patient familiarity was included with options of “whom you are not very familiar” and “who you know by name.” This addresses pharmacist-patient relationship, which has been shown to increase interaction (Worley, 2007).

Four medications were selected for the factorial vignettes. Warfarin 7.5mg was selected as a high risk medication of which several interview respondents suggested they gave special attention and were more likely to discuss with patients. Metoprolol succinate 100mg was selected as a common chronic medication which could cause non-fatal side effects such as dizziness and had a well-established clinical monitoring goal (i.e. blood pressure). Hydrocodone 5/325 was selected because some interviewees gave this medication special attention, but more so due to the potential of prescription drug abuse and therefore may display a different pattern. Fluoxetine 40mg was selected because the counseling literature suggests pharmacists can have a role in managing antidepressant medications, but that stigma or uncertainty about how to effectively manage antidepressant medications can affect counseling rates (Phokeo, Sproule, & Raman-Wilms, 2004; Vainio et al., 2002).

The vignettes also included how many times the prescription previously had been filled. This number ranged between 1 and 10. This variable was included because some interviewees reported they were more likely to interact with a patient when a prescription was being refilled for the first few times compared to something the patient has been taking for a longer time. The number of days early or late was included. The number of days ranged from three days early to 14 days late. Three days early was selected as the earliest value because generally insurance adjudication often does not permit refill prescriptions to be processed if they are more than three days early on a 30 day prescription.

The level two (pharmacist) variables selected for this factorial survey included pharmacist gender, degree, position (staff versus other), pharmacy type (independent versus other) hours per week, and other pharmacists (Table 3.3). For this analysis, manager and owner were combined because of low response from owners and due to similar responses for these two groups compared to staff. Pharmacy type was dichotomized (independent versus other) because of a low response from mass

merchandise pharmacists and similar mean responses from chain and grocery pharmacists.

Several pharmacist variables were obtained using the survey but were not included as independent variables in the factorial analysis. Years since first licensure was not selected for the factorial analysis because it was frequently omitted by the survey respondents and would significantly decrease the number of level 1 and level 2 cases for generating a model. The population of the city or town where the pharmacy is located also was omitted from these models due to missing data from the respondents. Also, few pharmacists reported being a float pharmacist. The percent of time spent in a dispensing role appeared to be inconsistently interpreted resulting in several respondents writing comments about this question and was omitted. Number of prescriptions personally checked was not included as some participants reported very high numbers and the variable was not significantly correlated with responses to the common vignette, attitudinal measure means, or BPCS mean.

Respondents then judged the likelihood they would engage this patient to ask three questions about their medication. This question-asking is consistent with the patient-feedback and quality monitoring prescribed by the HCM.

### Common Vignette

A common vignette was presented on each survey to test responses when all vignette variables are held constant between respondents. This vignette read:

You are verifying a prescription for a 76 year old female you know by name. The prescription is for simvastatin 80 mg, take one tablet daily at bedtime, #30. The prescription has previously been filled 1 time and is 8 days late. The patient is waiting, there is one other patient waiting in the pharmacy, and the pharmacy is staffed as usual.

This common vignette was designed to be a scenario where asking questions about adherence, side effects, and effectiveness would be likely to provide useful information to the pharmacist, but would have reasonable variability in response.

### Vignette Dependent Variables

For factorial surveys, it is recommended to use more than one dependent variable so the success of the analysis does not rest on a single outcome. Using too many variables, however, results in response burden (Ludwick & Zeller, 2001).

The HCM and Steinman's medication monitoring steps both emphasize the importance of providers asking patients questions about their medications. Patient-centered communication is an important source of information for identifying problems that are important to the patient's agenda. This can strengthen relationships and build trust and satisfaction (D. Roter & Hall, 2006). These questions are based on the three main types of medication-related problems associated with monitoring identified in the monitoring literature.

If this person came into your pharmacy, how likely would you be to...

ASKNON ... Ask the patient questions to identify possible reasons for non-adherence.

ASKSE ... Ask the patient questions to find out if she might be experiencing side effects.

ASKEFF ... Ask the patient questions to find out about the effectiveness of the medication.

Respondents were asked to use an 11-point likelihood scale, ranging from 0=definitely would not ask to 10=definitely would ask. Nine to eleven-point scales are recommended for factorial surveys to allow participants to make fine distinctions between vignettes and to allow for the variation in dependent variables important for hierarchical regression (Ludwick et al., 2004).

### Behavioral Pharmaceutical Care Scale

The survey also contained the four-item refill domain from the Behavioral Pharmaceutical Care Scale (BPCS) (Odedina & Segal, 1996). This was included as a validated measure of pharmaceutical care behaviors to compare to the other self-reported dependent variables from the factorial vignettes. For each item, respondents were asked for how many of the last five patients or customers were each of four monitoring activities performed. The mean score for the four items was calculated and used to represent recent monitoring behaviors.

### Survey Feedback

The draft survey was administered to three members of the research team, three graduate research assistants with community pharmacy practice experience, and two community pharmacists. Five provided written feedback on the survey which included marking unclear statements and general comments. Two agreed to participate in a cognitive interview process where the survey-taker was asked to think aloud about how he or she interpreted the question and his response. All were asked to identify confusing, leading, or other items to which they had a negative reaction. This feedback resulted in several modifications to the formatting, instructions, and wording of the survey.

### Survey Administration

The survey was administered through the mail using a sequence of initial and follow-up mailings based on Dillman's total survey design method which has been shown to improve response rate (Dillman, Smyth, & Christian, 2008). An instrument development survey by members of the research team has obtained a response rate of 40% using similar methods to those proposed (Zillich, Doucette, Carter, & Kreiter, 2005).

Two-hundred responses are expected to be sufficient for factor analysis of the MMAM items (Costello & Osborne, 2005) and for analysis of the factorial vignettes. To



ensure there are sufficient responses for the planned analyses, a conservative response rate of 33% was selected. Therefore, 600 participants comprised the main sample. This response rate was deemed appropriate because the goal was to establish internal consistency of the scale, and test exploratory relationships between variables. Survey participants were randomly selected out of a total pool of 1,861 Iowa licensed community pharmacists from a list provided by the Iowa board of pharmacy. Participants contacted for the interview phase were excluded.

A pilot of 50 surveys, including a personalized cover-letter, incentive magnet, and business reply envelope were mailed. The first page of the survey included instructions for achieving an anonymous response. This involved tearing off or blacking out a survey identification number in the lower corner of the survey (Dillman et al., 2008). The response rate for the initial 50 surveys was 24% and this was lower than expected. Significant changes were made to the survey format to reduce the length of the survey from an 8 page booklet to a 4 page folded sheet. While the original survey was long, the 12 respondents that filled it out did so completely. Therefore, all the sections were retained.

For the main survey, a 4-contact mailing sequence for 599 Iowa community pharmacists was conducted (Dillman et al., 2008). One pharmacist was removed from the original 600 because of an out of state address that was not detected until after the envelopes were obtained from the printing service. Participants first received a pre-notification letter to introduce the study. Approximately one week later, the first survey packet was mailed which included a cover-letter, survey, and a small token. The token was a small Iowa-shaped magnet printed with "Trust me, I'm a pharmacist." Approximately ten days later, a reminder postcard was mailed. Individuals who had returned the survey and did not remove their survey identifier were removed from the second mailing, which occurred approximately ten days later.

## Survey Analysis

Surveys were dated upon return and surveys returned with the identifier removed were given a new, sequential identifier. Survey responses were entered into Microsoft Excel (Microsoft Inc., 2013a) and imported into SPSS (IBM Inc., 2013).

### MMAM Item Analysis

Descriptive statistics for items were calculated. To establish the appropriateness of factor analysis, inter-item correlations were calculated to identify the presence of items with correlations greater than 0.3. Items with means greater than 5 or less than 2 were considered for deletion based on a potential floor or ceiling effects. Bartlett's test of sphericity (Bartlett, 1954) was calculated and should be significant. A Kaiser-Meyer-Olkin test of sampling adequacy was conducted which should be greater than 0.6 (Dziuban & Shirkey, 1974).

A principal components analysis was used to determine the number of factors by evaluating the scree plot and by conducting a parallel analysis. The scree plot is used to graph the eigenvalues and to identify the number of components in a data set by identifying the point on the graph where there is significant change in slope, commonly referred to as a kink. The rule is to use one less component than this kink (Cattell, 1966). A parallel analysis also was conducted. This pairs the eigenvalues for the principal components against a Monte Carlo simulation using the same number of items and respondents. Factors should be retained as long as the eigenvalue in the principal components is greater than that of the simulation (Choi, Fuqua, & Griffin, 2001).

An exploratory factor was conducted based on the factor solution from the principal components analysis. A promax rotation was selected because of a hypothesized correlation among the scale items. Items were considered to load on a factor if their loading is  $>0.50$  and no greater than 0.40 on another factor. Items loading on multiple factors were considered for deletion. Coefficient alphas were calculated for each factor

and for the entire scale. Items not contributing to the internal consistency of the measure were considered for deletion.

### Factorial Surveys and Hierarchical Regression

Hierarchical linear regression was used for analyzing the factorial vignettes. This allows for vignette-level and respondent level variation to be considered simultaneously (Jasso, 2006). Using standard multiple regression would cause pharmacist characteristics to be counted repeatedly as each pharmacist respondent to multiple vignettes which violates the assumption of independence (Singer, 1998). Level 1 variables for the hierarchical regression included those from the vignette and Level 2 variables were those from the pharmacist respondent.

### Factorial Survey Analysis

Two databases were created using SPSS for the factorial analysis. One database contained the pharmacist level demographic information and the other contained entries for each of the vignette characteristics and the pharmacists' responses to the three question-asking likelihood items. Each pharmacist responded to 5 randomly populated vignettes and each vignette was assigned that pharmacist's survey ID number. Frequencies and correlations were calculated for each vignette characteristic in the returned surveys to ensure the randomization procedure was successful. Means for each of the three question types were calculated.

HLM 7.0 (Scientific Software International, 2011) was used for hierarchical linear modeling. A random intercepts linear model was used (Hox, Kreft, & Hermkens, 1991) to simultaneously estimate within-respondent variation based on vignette variables (Table 3.2), and between-respondent variation, based on Level 2 pharmacist variables (Table 3.3).

The within-respondent variation is based on vignette characteristics and is modeled as:

$$y_{ij} = \beta_{i0} + \beta_{i1}X_{ij1} + \beta_{i2}X_{ij2} + \cdots + \beta_{ip}X_{ijp} + \varepsilon_{ij}$$

Here, unique models were estimated based on the each pharmacist's responses to his or her 5 random vignettes. The dependent variable, denoted by  $y_{ij}$  represents the likelihood assigned by the respondent ( $i=1, \dots, n$ ) that he or she would ask the specific monitoring question (ASKNON, ASKSE, ASKEFF). Each pharmacist responded to  $j$  ( $1, \dots, 5$ ) vignettes, each with  $X_{ijp}$  characteristics populated with randomly assigned values (Table 3.2) and the corresponding within respondent regression coefficient  $\beta_{ip}$  and  $\varepsilon_{ij}$  error term.

The between-respondent variation based on pharmacist characteristics and is modeled as:

$$\beta_{im} = \gamma_{0m} + \gamma_{1m}Z_{1i} + \cdots + \gamma_{rm}Z_{ri} + \delta_{im}$$

Simultaneously, pharmacist-level regression coefficients, represented by  $\gamma_{rm}$  associated with the values of pharmacist characteristics, represented by  $Z_{ri}$ , demonstrate the relationship between pharmacist characteristics and within-respondent regression coefficients for the various vignette characteristics, represented by  $\beta_{im}$ , are estimated by pharmacist factors (Table 3.3) and error term  $\delta_{im}$ .

The following variables were centered around their grand means to yield more easily interpretable coefficients: simulated patient age (AGE), pharmacist number of hours worked during an average week (HOURS), and pharmacist's mean internal and external monitoring attitudes (MEANINT, MEANEXT).

The following analysis procedures were followed for each of the three question types, ask non-adherence questions (ASKNON), ask side-effect questions (ASKSE), and ask effectiveness questions (ASKEFF). First, intraclass correlations (ICC) were calculated to determine if there was significant correlation within pharmacists, supporting the need for 2-level modeling versus 1 level multiple regression. The ICCs were calculated by dividing the intercept variance component ( $\tau$ ) by the residual variance component ( $\sigma^2$ ) plus the intercept variance component ( $\tau$ ). In the first model, all vignette

characteristics were added. The second model added an interaction term between hydrocodone and days late. This was to model a hypothesized reverse effect for hydrocodone where pharmacists would be more likely to ask a non-adherence question for an early prescription rather than a late prescription. The third model contained pharmacist demographic characteristics, and the fourth and final model added the two attitudinal domains of the MMAM as additional pharmacist-level variables.

Log likelihood tests were used to test the improved model fit between models. Coefficients and log likelihood tests were considered significant at the  $\alpha = 0.05$  level. No adjustments were made based on the number of statistical tests performed. Maximum Likelihood estimation was used for all HLM analyses.

Robust standard error estimates and standard estimates were compared to support that the modeling did not significantly violated HLM assumptions. Since the vignettes are orthogonal and the dependent variables have a restricted range, unmeasured variables are expected to manifest as unexplained error, not as biased estimates.

#### Additional Analyses

As separate analyses, multiple regressions were conducted using the attitudinal and demographic variables as independent variables and the behavioral pharmaceutical care scale (monitoring domain), and the responses to a common vignette as dependent variables. The role of attitudes and demographic variables was expected to be similar between these analyses. Also, pharmacist demographic variables were used to predict the MMAM domains.

Figure 3.1. Aim 3 Conceptual Model Based on HCM and Qualitative Interviews

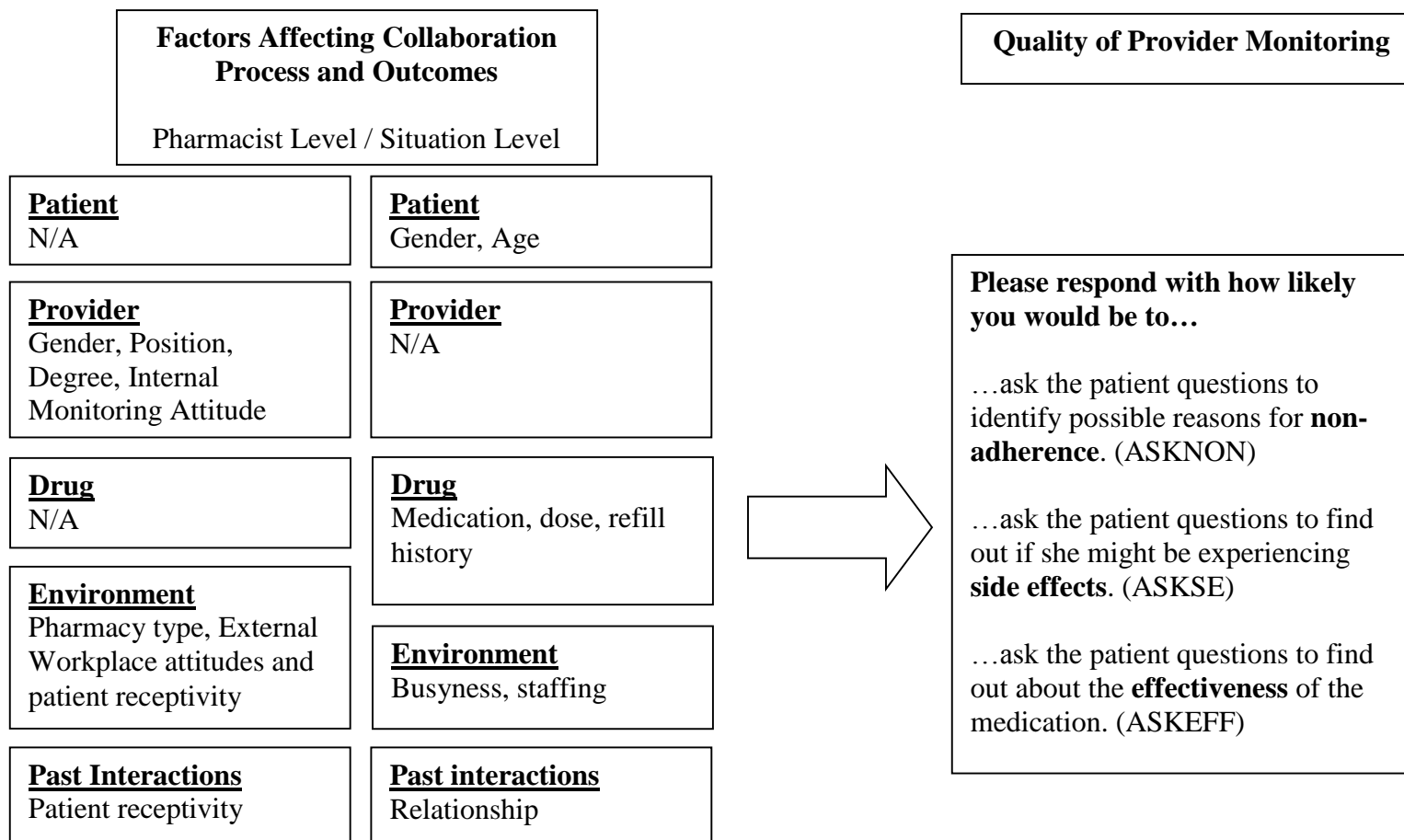


Table 3.2. Level-1 (Vignette) Variables for Factorial Survey Analysis

<b>Variable</b>	<b>Conditions</b>
AGE	Integer between 35-89 <sup>1</sup>
MALE	Male (1) Female (0)
FAMILIAR	whom you know by name (1) with whom you are not very familiar (0)
FLUOX	fluoxetine 40 mg, take one capsule daily, #30
METOP	metoprolol succinate 100 mg, take one tablet daily, #30
HYDRO	hydrocodone/APAP 5/325, take two tablets four times a day as needed for back pain, #120
WARF (reference)	warfarin 7.5 mg, take one tablet daily, #30
FILLED	Number of times previously filled. Integer between 1 and 10 times
LATE	Number of days late or early. Integer between -3 and 14 (including on-time=0)
WAITING	Number of persons waiting. Integer between 0 and 4
SHORT	short-staffed (1) staffed as usual (0)

<sup>1</sup>Grand mean centered

Table 3.3. Level-2 (Pharmacist) Variables for Factorial Survey Analysis

<b>Variable</b>	<b>Responses</b>
RPHMALE	Male (1) Female (0)
PHARMD	Yes (1) No (0)
STAFF	Staff (1) Manager/Owner (0)
INDEP	Independent Pharmacy(1) Chain/Grocery/Mass Merchandiser Pharmacy(0)
HOURS	Continuous <sup>1</sup> number of hours worked per week
RPHS	Continuous number of other pharmacists usually working
MEANINT	Possible Range: 1-6 <sup>1</sup> Internal monitoring attitude mean
MEANEXT	Possible Range: 1-6 <sup>1</sup> External monitoring attitude mean

<sup>1</sup>Grand mean centered



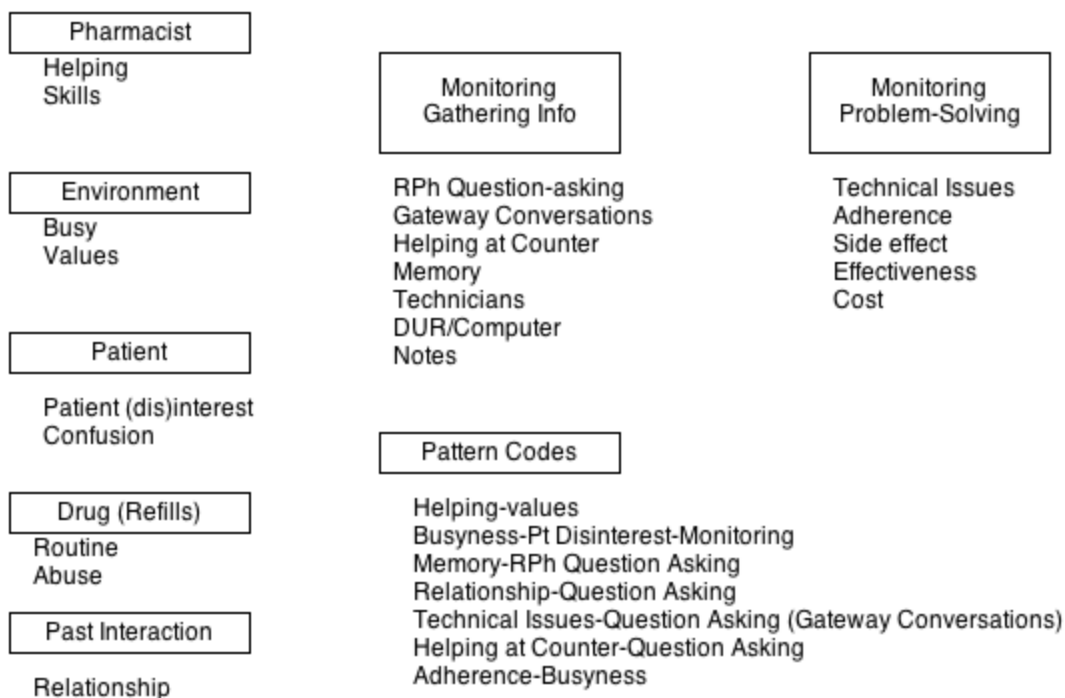
## CHAPTER IV

## RESULTS

Qualitative Results

This section presents the findings from a qualitative analysis of 12 semi-structured interviews with community pharmacists conducted face-to-face or over the telephone between January and March of 2013. These pharmacists practiced in chain (n=4) independent (n=8) and grocery pharmacies (n=2). Descriptive codes (n=21) pattern codes (n=7) and representative quotes are presented.

Figure 4.1. Qualitative Codes, Sub-codes, and Pattern Codes



### Pharmacists, their Environment, and their Patients

Several codes combined to illustrate a general characterization of pharmacists in the interview sample. The pharmacists in this group all expressed a desire to be helpful (*HELPING*). They enjoy interacting with people and making an impact on the lives of individual patients, which they find satisfying. Pharmacists also talked about several skills they possessed, and the importance of experience, which were important for monitoring medications and being an effective pharmacist in general (*SKILLS*). These skills include communication, approachability, and problem solving. Using these skills was an important part of job satisfaction and was important to their ability to be effective pharmacists.

Interviewees responded strongly to prompts about their workplace environment. Each pharmacist spoke about busyness in their pharmacy and how they must make tradeoffs due to time limitations (*BUSY*). Busyness was particularly a factor when there was only one pharmacist working at a time – a staffing strategy that seemed more common in chain pharmacies, but also in small volume independent pharmacies. Closely linked to the concept of busyness was pharmacy values (*VALUES*). Independent pharmacists spoke most about the service orientation of their pharmacy and the importance of encouraging patient interaction through increased pharmacist staffing, staff consistency, and a culture of making sure patients know the pharmacists are available for consultation. The pharmacist's positive helping orientation often directly related to how he or she saw the values of the pharmacy (*PATT: HELPING-VALUES*).

Pharmacists discussed patients who were not interested in pharmacist interaction, particularly with regard to refills (*PT (DIS)INTEREST*). Some chain and grocery pharmacists were quite vocal in discussing this issue and it was source of discouragement. Independent pharmacists seemed more vocal in discussing patients who desired pharmacist interaction, although they too encountered disinterested patients.

Related to a helping orientation, no pharmacist interviewed was averse to interacting with patients. Rather, these interactions, and the relationships that often subsequently developed were seen as a satisfying and rewarding part of their role (*RELATIONSHIPS*). Several independent pharmacists suggested the personal relationships that develop between pharmacists and patients is a defining characteristic of their pharmacy (*VALUES*).

#### Drug - Refills

One way that pharmacists conveyed their interest in medication monitoring was how they saw the prescription refill process. Many pharmacists viewed refills as very routine unless something unusual occurs with the patient or the prescription (*ROUTINE*). This particularly was true when the pharmacy was busy (*BUSY*).

“You get so many people on the same drugs. Like tons of people filling, like I could go through one thousand simvastatin 20’s in a week, so you fill so much of the same ones that the ones that probably stick out most that would be maintenance, are the ones that you don’t typically see as a maintenance drug.” GR5

Most prescriptions expire after one year and often prescribers reorder for the patient to continue on the same medication. This requires a new prescription, which can be delivered to the pharmacy by the patient, by facsimile, by telephone, or by e-prescribing. Iowa Pharmacy Code states patients need to be counseled for every new prescription. It appears pharmacists do not see renewed prescriptions as new prescriptions and generally do not treat these different than any other refill (*ROUTINE*).

“That we can classify as a refill, they don’t have to come over to us [for counseling]. But it has to, in order to meet that, they have to have already had that in the same quantity, the exact same directions, otherwise we will counsel them again.” CH3

When prescriptions were renewed, but with slight modifications, pharmacists were careful to make sure these changes were intended rather than the result of an e-

prescribing or other type of technical error, and to make sure patients were aware of the change (*TECHNICAL ISSUES*).

“If it’s a refill we want to double check. Is this really supposed to be a different ... a change, or we can verify those through a note. They might have some discussion that ... while they’re waiting for us, that they can share, but they almost always come and get us and make sure we talk.” IN12

While refills were seen as routine by most pharmacists, each interviewee recounted multiple anecdotes about medication problems involving refills and no two stories involved the same medication, problem, and pharmacist action (Appendix H). It was apparent that all pharmacists engaged in some form of medication monitoring and problem solving. Most anecdotes arose from the pharmacist reviewing the dispensing record (e.g. number of days late or drug-drug interactions) or from the patient reporting a symptom or concern. Less common was the pharmacist asking a question without evidence of a potential problem. For example, asking a patient about recent blood pressure measurements.

#### (PATT) - Busyness, Patient Disinterest, and Monitoring

Several pharmacists working in retail settings reasoned that some of the customers likely observed the high level of busyness of the pharmacy and in turn, the patient was less interested in actively participating in an encounter with the pharmacist or asking questions (*DISINTEREST*). These pharmacists were concerned because they are not able to engage with patients in a meaningful way and patients have less respect for the pharmacist’s role and low interest in interaction.

“Especially with a store that does the kind of volume that my store does, we’re busy, and people wait, they don’t want to wait, but they always decide to wait... [So] they’ve waited ten, fifteen minutes, so by the time you have it completed... they don’t want to waste any more time. “Nope, I know what I’m doing, I’ve been on it forever, and if I was concerned I would tell you” type of a thing. And that gets to be pretty common. And it almost desensitizes you a little bit in terms of, you feel like none of the patients really care.” CH4

### Medication Monitoring – Gathering Information

Asking questions was one of the main information sources available to pharmacists to support medication monitoring (*RPH QUESTION-ASKING*). Also, how pharmacists discussed question-asking was one of the ways they expressed their orientation to monitoring. Sometimes questions would be simple, such as “*Any Questions?*” While other times the questions would be more specific.

“I would say it’s about fifty-fifty. I mean there are times, and it’s not just me, you know it’s all my pharmacists, well how are things going, do you have any questions? Are you noticing, are you feeling okay from this? Are you having any side effects? You know, and depending on what they’re taking, have you noticed any dizziness? You know, somebody a couple months in on a beta blocker, how are you feelin? Are you feelin kinda sluggish or are you doin okay? Have you noticed the weight gain? I mean that’s a big one. Somebody says, gosh my legs seem to be swelling. This one, I mean, I can think of a few instances in the last couple of months where, I’ve got all this water retention, what’s going on? And you take a look, and okay, you’re on a calcium channel blocker. So it’s not that you’ve got anything else going on, your hearts not in failure per se, you’re just having a side effect from the medication.” IN2

Several patterns emerged which described antecedents to pharmacists and patients engaging in question-asking behaviors related to medication monitoring. These included: the patient and pharmacist having a relationship; the patient previously using a clinical service or working with a pharmacist to address a clinical issue; the pharmacist drawing from memory of previous encounters; pharmacists and patients engaging in “gateway conversations” about cost or technical issues related to a prescription; and the pharmacist helping at the checkout counter.

### (PATT) – Relationship Strength and Question-asking

The presence of a pharmacist-patient relationships was important for patients to volunteer information about their medication use experiences (*RELATIONSHIP*). Without a relationship or culture of pharmacist availability (*VALUES*), patients seemed to only bring up more serious issues.

“Those patients that come regularly, that are on multiple chronic meds, that you have really built a relationship for, are probably the ones you will check in with most often. Or, if you remember there was an issue at the initial fill, you know, that I think a lot of times triggers pharmacists to make a follow-up on it as well.” P2

(PATT) – Memory of Previous Interaction and Question-asking

Interviewees frequently spoke of interactions between themselves and patients of which they were familiar from a previous encounters. Pharmacists generally were not documenting these interactions or scheduling for follow-up, rather, they used their memory (*MEMORY*) to follow-up with questions or to check in with the patient and his or her medications.

“Warfarin is always one. Usually, the patients that stick out on my mind are patients that are on warfarin or high risk drugs and are frequent flyers on our pharmacy. Those people commonly stick out on my head so if I’m checking a refill for Joe Smith and he’s really sick, I’m going to remember that, “Oh, two days ago I sold Cipro when you came in here with an infection.” Those kinds of things kind of trigger my mind.” CH7

Patients taking part in a formal clinical service also seemed to receive special attention when presenting to the pharmacy for prescription refills due to pharmacist recollection of the encounter (*MEMORY*). For example, a pharmacist who facilitated a diabetes education class may then check in with one of those patients when she presents to the pharmacy to pick up a refill of her insulin.

“I do diabetes education, so patients that, you know, were started on insulin a couple months ago, if I see them in the store, I’ll definitely follow-up, how’s it going, what’s your dose at now? How are you feeling? Any questions? So people that you work with in, um, in the MTM programs, more clinical services, you tend to build a little more rapport with, and you have more time with them, and you become very familiar with their meds, too.” P2

(PATT) Technical Issues and Question-asking – “Gateway Conversations”

Several pharmacists recounted anecdotes which started with intervening on a more technical issue such as medication cost, a change in drug manufacturer, or making sure the patient was receiving all of the medications expected. This was a gateway to a medication monitoring conversation including questions about side effects, effectiveness, or adherence (*GATEWAY CONVERSATION*).

“When they come in I just usually explain ... I keep it very casual. A lot of our patients expect some dialogue. We are fortunate to know them well. I just always say, “This is what we have filled for you. How’s it going? Do you have any questions about these? They look to be the same.” We click co-pays up and they always come up. They’re looking at their co-pays, but that’s just a good chance to ... I show them what’s in the bag and then if there’s any of those notes that my cue to dive a little deeper in.” IN12

(PATT) – Helping at the Counter and Question-asking

As busy as these pharmacists were, all found time to interact with patients regarding maintenance medications, although to varying extents. One particular pharmacist described her monitoring approach as a combination of helping when needed, having an ear to patient-technician interactions, and having a non-threatening approach to pharmacist-patient interactions (*HELPING AT COUNTER*).

“I love to be at the second counter right behind the registers, so I can hear those responses. If I hear any customer that sounds like they’re misunderstanding or confused at all, I can jump in and say, let’s double check that.” IN9

Technicians, Technology and Medication Monitoring

Technicians also played a role in medication monitoring as they often collected information when notes were attached to refills. In many pharmacies, technicians routinely handed off prescriptions, especially for refills. It was their role to ask the patient if he or she has any questions for the pharmacist (*TECHNICIANS*). Interviewees seemed confident in their technicians’ ability to carry out this task.

“Our techs are also very good about asking if they have any questions. Do you have any questions about your refill? Would you like to talk to a pharmacist? Our general rule is that we try to make sure that they know they can talk to us every time and counsel on their prescription. It’s an open offer every time.” IN12

Technicians were commonly assigned the task of processing prescriptions in the computer. During this process, the processing of patient insurance claims provided feedback on certain problems associated with the prescription, such as drug interactions or if the refill was early or late. Some of these messages were serious enough to block the prescription from being processed, while others still allowed for processing. In this case, the technician appeared to exercise some discretion in alerting the pharmacist of these messages. With some systems, the technician may acknowledge the warning and the pharmacist may never see it. In this scenario, the technician may be shielding the pharmacist from potentially important medication monitoring information, including non-adherence.

“I think the technicians are mostly looking at those notes and probably notifying the pharmacist when they identify a problem and I don’t know that it’s been on their radar with the changes to workflow, to really alert the pharmacist of the late refills. They are looking more for interactions, drug-drug interaction responses. And there are a lot of false positives on those refill responses.” P2

Pharmacists also were involved in the processing of refill prescriptions. Sometimes the refill would reach the pharmacist for final verification and he or she would uncover problems, often of a technical nature (*TECHNICAL ISSUES*). For example, two medications might be refilled simultaneously that might be an inappropriate duplication. This might result in the pharmacist asking the patient for more information.

#### Medication Monitoring – Problem Solving

Pharmacists discussed several areas in which they engaged in problem solving in the medication monitoring process. Most commonly, pharmacists commented on adherence monitoring and side effects or potential safety concerns. Less common were



pharmacist discussions of monitoring for effectiveness, and in such cases, the comments were of a more hypothetical nature should they have more time or should their responsibilities change due to new incentives in the future.

### Adherence Monitoring

According to interviewees, improving adherence is a challenge in the community setting. Pharmacies are busy and late refills are common (*ROUTINE*), so it is not seen as feasible to intervene on most cases of non-adherence, rather, conditions have to be unique (*PATT: ADHERENCE and BUSYNESS*).

“I know better, but it’s that efficiency. When you’ve got 300 scripts you gotta do in a day, do you have time to call everybody who’s late refilling? No.” CH4

When discussing non-adherence, most interviewees focused on reasons that were more logistical than based on patient beliefs about medicines. These reasons included prescribers decreasing doses without writing a new prescription, recent hospitalizations where the patient would not be using their own supply of medicines, or the patient getting the medication from another pharmacy. One interviewee suggested that other pharmacists might be uncomfortable discussing adherence because they do not want to be confrontational.

“Just ask them like how they’re taking the medications and sometimes like if they go to the hospital or something, they have a valid reason for why they were late filling it or the doctor changes the dose sometimes so they’re only doing like half a tablet or something like that. And then sometimes they just say they forget to take it sometimes.” GR5

Some chain pharmacies have implemented strategies to bring about more interactions related to non-adherence by using a “cap” which prevents release of the prescription until the pharmacist has communicated with the patient about his or her medication use and approved the release. Again, the anecdotes discussed seemed to focus

on uncovering technical reasons for delayed refills more than belief-based reasons for non-adherence (*TECHNICAL*).

“It’s called like a cap where the pharmacist has to review, like once it’s ready they review it and say there’s something wrong. So if, like if they have their, and it’s just for maintenance medications, and the precision ones like for diabetes and high blood pressure and like the cholesterol medications where if, let’s say you got a prescription for 30 days and then like 45 days later you come to refill it, it blocks the pharmacist and says basically they’re late filling it and so then that pharmacist goes and talks to them and just makes sure that they’re talking it correctly and that they, or try and figure out if they’re not taking it what the issue is.” GR5

### Safety and Side Effect Monitoring

Safety-related monitoring interactions appeared to be very situational. Some drugs such as warfarin attracted the attention of the pharmacist more than others. For most other medications, interviewees seemed to wait for patients to report any symptoms or concerns they had with their medications. Some interviewees rarely asked unprovoked questions about side effects without any evidence that there might be a problem. Other pharmacists, seemingly those where the workflow places them in more frequent contact with patients, were more likely to do so (*VALUES*).

“Yes, I think a pharmacist should ... and for warfarin in particular, the pharmacist should do the handoff, and again, similar to hypertension, you should ask that patient when their last INR was, what were the results? When is your next appointment? We should know these things. I have patients go a year without getting an A1c rechecked even though I’m seeing them every month. If I would say “when was your last appointment, nine months ago?” Then well, you need to be seen.” IN12

Like the structured interventions for patients picking up late prescriptions at some chain pharmacies, there also were structured interventions to force interactions with some high-risk medications like methotrexate and morphine. These appear to be associated with some negative reactions related to having past experience with the medication and

the time involved for both pharmacists and patients (*ROUTINE, BUSYNESS, PT DISINTEREST*).

“Especially if they’ve been on it for years it’s kind of...they seem kind of annoyed with it because each one asking them the same questions whenever they fill the medication. Methotrexate that’s another one that gets an automatic block, make sure they’re taking it every week and not like daily. But yeah, like if they’ve been on it for a long time it’s kind of an annoying, like some of them have to wait for the pharmacist. But I mean if they’ve only been on it a couple of times it’s good to kind of go over it again with them.”  
GR5

#### Effectiveness Monitoring

Effectiveness was an area where most interviewees thought they could monitor if they had more time, but anecdotes of actually monitoring effectiveness in practice were infrequent. The most popular hypothetical intervention was inquiring about blood pressure and if the patient is reaching her or his goal.

“Initially when you state what it’s for, what you should be looking for, like if it’s a blood pressure medicine, if you can watch and ask them if they have a home blood pressure monitor if it’s something new that they can watch for to see if it’s working or if you have any side effects related to it.” GR11

#### Cost Monitoring

While cost was not one of the focus areas of medication monitoring originally proposed, interviewees had numerous anecdotes about how they were able to help patients save money on their prescriptions. Interviewees believed cost interventions improved patient satisfaction and could help build relationships and lead to other discussions about medications (*GATEWAY CONVERSATIONS*). Pharmacists spoke positively about cost interventions and making successful cost interventions appeared to be a source of personal satisfaction.

“It’s definitely a niche of mine is finding somebody the best price for all their meds.” IN9

## Notes and Documentation

After information has been gathered and problem solving has occurred, there often was a need to create a note to aid future follow-up. This was due to the asynchronous nature of when prescription refills are processed and when they actually are picked up by the patient or his or her agent. When processing the prescription, the pharmacist, using information sources such as dispensing records and insurance alerts, may have a question for the patient which would facilitate the pharmacist's efforts to ensure safe and effective medication use.

“Maybe it's refills, but the pharmacist has questions or wants to follow-up on something, we'll make a note right on the receipt itself. The technician knows to look for those questions.” IN6

Documentation usually occurs in the dispensing software. Some pharmacists were strong proponents of documentation as they want to refer to interaction and patient details in the future. Others pharmacists expressed they did not have enough time to document, or their dispensing software and workflow were not conducive to routine documentation. Independent pharmacies seemed to have the most barriers to documentation and they required supplementary systems (paper or electronic) to accomplish this task. Larger pharmacy chains had dispensing systems that integrated documentation without the need for supplementation or workarounds. Chain pharmacists appeared to use the dispensing system documentation abilities whereas independent pharmacies may be more likely to use physical hand written notes collected in a specific location.

“Well, we have a, we have a program where we can annotate our prescriptions, and if there are any problems, you can annotate it and put it into more or less a problem bin, a virtual problem bin.” GR5

“We honestly probably don't document as much as we should. I don't have time to stand and type up the soap note on every interaction.” IN2

## Summary

The pharmacists interviewed generally were positive toward medication monitoring, however, there are important barriers of time, busyness, patient disinterest, and a perceived routine nature of refills. When pharmacists engage in medication monitoring, they often focus on patients with whom they have a prior relationship which serves as an information source for monitoring. Alternatively, the pharmacist handing over the prescription and technical issues associated with dispensing can bring about pharmacist-patient interactions that can transition to include other monitoring topics. Technicians and technology can support or hinder monitoring, depending on design and pharmacy workflow.

## Survey Results

For the main survey mailing, 599 surveys were mailed and none were returned undeliverable. Of these, 279 were returned (46.6%). Twenty-five surveys were removed from the final data set. These included 17 from pharmacists who were retired or not practicing in community pharmacy, 5 returned blank or did not want to participate, and 2 showed clear signs of satisficing as evident by reporting all 10's for vignette responses. This left a total usable sample of 254 pharmacists (42.4%) which exceeds the estimated return rate. Survey recipients were given the choice to complete the survey anonymously by blacking out or tearing off their survey ID and 39 respondents chose to return their survey anonymously (14.0%).

## Demographics and Workplace Characteristics

The majority of survey respondents (62.2%) were female, 59.1% had a BS Pharm degree, and 65.4% were staff pharmacists (Table 4.1). The most frequent practice setting for the respondents was chain pharmacy (45.7%), followed by independent pharmacy (33.5%). The mean year of initial pharmacy licensure was 1993, however, 48 respondents omitted this information (Table 4.2). The majority (67.7%) worked full time (>34 hours

per week). A minority (37.0%) of respondents reported always working without the support of another pharmacist. The mean number of technicians was approximately 3. Respondents, on average, checked 121 prescriptions on a slow day and 209 prescriptions on a busy day.

### Prescription Refill Activities

The survey also asked for pharmacists to estimate what percent of the time they engaged in several activities that could contribute to medication monitoring in the refill dispensing process (Table 4.3). These results support, and provide some quantification of ideas from the qualitative analysis. There was wide variation in the percent of time where pharmacists inspect the prescription profile on a refill and this ranged from 0 to 100 percent of the time, with a mean of less than half (40.6%). The use of notes (16.3%) was used to manage the asynchronous nature between when patients order prescriptions for processing, and when they actually are picked up. Pharmacists reported handing-off 28.4% of prescriptions to patients and this activity was associated with significant variation between pharmacists. When handing off the prescription, pharmacists reported commonly (70.1%) making a simple query of “do you have any questions.” However, specific drug-related questions were less common (23.8%).

### Likert-Type Item Descriptives

Overall, pharmacists exercised the range of responses to the Likert-type items (Table 4.4). Pharmacists reported mixed, but slightly positive responses to action-focused questions (Table 4.5) such as “I look for opportunities to interact with patients picking up refills (Q5 AttOpportunities)” and “I ask open-ended questions when talking to patients about maintenance medications (Q15 ActOpen).” Pharmacists were less inclined to agree that they look at “a patient’s complete drug profile with every prescription” (Q2 ActLookProfile) and “have time to talk to everyone who is late refilling maintenance medications” (Q3 BusyAd). Respondents most strongly agreed that “it’s a good idea to

ask patients about medication side-effects” (Q16 SEGoodIdea) and “pharmacists should routinely follow-up with patients to see how their chronic medications are working” (Q9 EffMedsWork).

#### MMAM Item Analysis

Descriptive statistics (Table 4.4) showed one item with a means greater than 5 or less than 2 (Q16 SEGoodIdea). The mean was very close to 5, had a range of 1-6, was deemed important for content validity, and therefore was retained for the factor analysis.

The inter-item correlation matrix contained numerous correlations greater than 0.3, supporting the use of factor analysis. Bartlett’s test of sphericity was significant ( $p < 0.001$ ) which demonstrates a homoscedastic error term. The Kaiser-Meyer-Olkin test of sampling adequacy for factor analysis 0.877, which supports the use of factor analysis on the data set (Tabachnick, Field 2001).

A principle components analysis was performed on the 20 Likert-type attitudinal items (Appendix I). The scree plot (Appendix J) demonstrated a clear kink at the third component. The rule is to use one less component than this kink, which supported the use of a two-factor solution. Based on the parallel analysis (Appendix K), the third factor Eigenvalue for the simulation (1.450) was greater than that of the study Eigenvalue (1.400). This further supports a two-factor solution.

An exploratory factor analysis using a two-factor solution with promax rotation was conducted (Table 4.6, Table 4.7). Nine items separated into what appeared to be the proposed “internal” domain. These included concepts of responsibility related to improving medication efficacy and side effects, a sense of having a positive impact regarding chronic medications. Three of these items had factor loadings of less than 0.500 and were considered for removal: Q5 AttOpportunities was rejected because it loaded onto both factors. Q10 AdConcern was retained because it addressed adherence

which important to the conceptualization of medication monitoring in the present study. This produced a 7-item “internal” domain with a coefficient alpha of 0.819 (Table 4.8).

Eleven items loaded onto what appeared to be the “external” domain. These items related to workplace factors such as busyness, and patient factors such as concern about adherence encounters and patient interest in monitoring. Three items were considered for removal based on factor loadings  $<0.500$ : Q6 AttCircumstances was removed because it had been proposed to load on the internal domain; Q4 AdWorkflow and Q14 SEPtInitiate were dropped because of poor loading. This produced an 8 item “external” domain with a coefficient alpha of 0.811 (Table 4.9).

The two scales were considered for combining into a single measure by calculating item-to-scale correlations. All correlations were above 0.300 which supports combining the sub-scales. Correlation between the two factors was 0.393 for the final 2-factor solution. This demonstrates a moderate positive relationship, but also some discrimination. Both MMAM domains were retained for the planned analyses to explore variation in the independent effects of each domain.

#### MMAM Predictors

Multiple regression was used to identify significant demographic determinants of the two MMAM domains (Table 4.10). Independent pharmacists were found to have a significantly more positive external monitoring attitude versus other practice settings. This was generally supported by the interviews. Also managers and owners, and BSPharm degree pharmacists reported higher external monitoring attitudes than staff pharmacists, and PharmD pharmacists. The pharmacist factors explained 12.3% (adjusted  $r^2$ ) of the variation in the external domain of the MMAM. The internal domain of the MMAM had no significant predictors and the adjusted  $r^2$  was negligible.



### Common Vignette Analysis

Table 4.11 reports the mean likelihoods for asking the three monitoring questions (ASKNON, ASKSE, and ASKEFF). Responses were based on an 11-point scale (0=definitely would not ask and 10=definitely would ask). Side effect question-asking had the greatest likelihood among respondents (5.36) followed non-adherence question-asking likelihood (4.94), and effectiveness question-asking likelihood (3.73). Pharmacist factors predicting these likelihoods are found in Table 4.12. For the likelihood of asking an adherence or side effect question, external and internal attitudes were the only significant predictors. These two regressions had adjusted  $r^2$  values of 0.256 and 0.201 respectively. Asking effectiveness questions was not well explained by pharmacist factors (adjusted  $r^2 = 0.078$ ) and the only statistically significant predictor was the internal monitoring attitude of the pharmacist.

Bivariate correlations including the common vignette responses and pharmacist characteristics are presented in Table 4.13. Positive correlations with likelihood to ask non-adherence questions were a higher mean internal and external MMAM, a higher BPCS monitoring domain activity mean, being male, and being an owner. Negative correlations were found for more recently licensed pharmacists, staff pharmacists, and those with a PharmD.

Bivariate correlations between pharmacist factors also demonstrated significant correlations for this group of respondents. The males in the sample were more likely to be owners, work more hours, have BS Pharm degrees, and to be checking fewer daily prescriptions, work in smaller towns, and report an external medication monitoring attitude more conducive to monitoring. More recent pharmacists were positively associated with working in chain pharmacies, working in larger towns, working more hours, checking more daily prescriptions, and having an external monitoring attitude less conducive to monitoring. Other relationships can be found in Table 4.13.

### Results of Factorial Analysis

Intraclass correlations (ICC) for the three null models associated with question topic were calculated to determine if there was meaningful grouping at the respondent level. For the ask non-adherence (ASKNON) null model, the residual variance component ( $\sigma^2$ ) was 6.727 and the intercept variance component ( $\tau$ ) was 3.910. This produced an ICC of 0.367, which confirms grouping the vignettes by their respective pharmacists is responsible for a significant amount of the variation in ASKNON, although the majority of the variation can be attributed to the vignette characteristics. This model produced a -2LL of 6345.38. For the ask side effect null model ASKSE, the residual variance component ( $\sigma^2$ ) was 3.828 and the intercept variance component ( $\tau$ ) was 4.984. This produced a statistically significant ICC of 0.566 which suggests grouping the vignettes by their respective pharmacists is responsible for a significant amount of the variation in ASKSE. This model produced a -2LL of 5793.49. For the effectiveness null model, the residual variance component ( $\sigma^2$ ) was 3.739 and the intercept variance component ( $\tau$ ) was 5.957. This produced a statistically significant ICC of 0.614 which suggests grouping the vignettes by their respective pharmacists is responsible for over half of the variation in ASKEFF. This null model produced a -2LL of 5805.78.

Frequencies calculated for the vignette characteristics contained in the returned surveys suggest the randomization process was successful. Quantities for each variable were similar for each option and distributed as expected. Correlations between vignette variables all were small  $<0.05$  and insignificant except for a correlation between age and days late (two continuous variables) of 0.062, which was not concerning given the number of correlations tested at the 0.05 level of significance.

Table 4.14 presents the mean responses for all of the vignettes independent of vignette characteristics. The mean likelihood of asking an effectiveness question was the highest (3.80) followed by asking about side effects (3.54) and non-adherence (2.94).

Tables 4.15, 4.16, and 4.17 show the development and testing models for the three dependent variables, ASKNON, ASKSE, and ASKEFF. In general, log-likelihood tests showed the models containing the random vignette characteristics were better fitting than the null models. Adding an interaction term between hydrocodone and days late was a significant improvement, as was adding basic pharmacist factors such as degree and setting type showed weaker improvements, and adding in pharmacist attitudinal measures.

For the model of the likelihood of asking a non-adherence question in response to a random vignette (Table 4.15), male pharmacists, those with BS Pharm degrees, and pharmacists with higher external and internal MMAM means reported a higher likelihood of asking a question about non-adherence independent of vignette characteristics. Pharmacists also were more likely to ask questions about non-adherence if the patient was female and if fewer other patients were waiting. Pharmacists were equally likely to ask about non-adherence about hydrocodone compared to warfarin. Fluoxetine and metoprolol were significantly less likely to precipitate questions about non-adherence compared to warfarin.

For the model of the likelihood of asking a side-effect question (Table 4.16), the only significant pharmacist factors were internal and external MMAM means. For vignette factors, warfarin and hydrocodone again were equally likely to precipitate questioning. Metoprolol and fluoxetine had a significantly lower likelihood than warfarin, the reference medication. Prescriptions that had been filled fewer times were significantly associated with a greater likelihood, as was fewer patients waiting, and being “staffed as usual.” A late prescription for metoprolol, fluoxetine or warfarin was positively associated with asking about side effects, whereas an early prescription for hydrocodone was associated with asking side-effect questions, as shown by the negative interaction term of hydrocodone and days late.

For the model of the likelihood of asking an effectiveness question (Table 4.17), the only significant pharmacist factors were internal and external MMAM means. At the vignette level, hydrocodone was significantly positively associated with effectiveness question-asking likelihood compared to warfarin. Warfarin, fluoxetine, and metoprolol were not significantly different. Prescriptions that had been filled fewer times, or were late (warfarin, fluoxetine, and metoprolol) or early (hydrocodone) were positively associated with increased likelihood to ask effectiveness questions. Having other patients waiting and being short staffed were negatively associated with asking about effectiveness. Final models of all three question types are found in Table 4.18.

#### Results of BPCS-Monitoring Domain

The Behavioral Pharmaceutical Care Scale monitoring domain asks for the pharmacist to recall of the last five patients presenting for refills, how many of four activities was performed. Pharmacists reported performing these activities for up to 5 of the last 5 patients (Table 4.19). The means for the four individual items were between 1 and 1.5, and the overall mean was 1.282.

A linear regression predicting the mean BPCS-monitoring score suggested the only significant predictor of this mean was the pharmacist's internal and external monitoring attitude (Table 4.20). Pharmacist demographic and workplace factors were not significant independent predictors and the set of variables only accounted for 11.0% of the BPCS variation (adjusted).

Table 4.1. Respondent Demographics (Binary Frequencies)

<b>Variable</b>	<b>Yes</b>	<b>%</b>	<b>N</b>
Gender (Male)	98	37.8	254
BSPharm Degree	150	59.1	254
PharmD Degree	105	41.3	254
Residency Training	6	2.4	254
Staff Pharmacist	166	65.4	254
Manager	80	31.5	254
Owner	23	9.1	254
Relief/Part-time (Marked)	36	14.2	254
Part-time (<35 Hours)	82	32.3	254
Float	5	2.0	254
Chain Pharmacy	116	45.7	254
Independent Pharmacy	85	33.5	254
Grocery Pharmacy	41	16.1	254
Mass Merchandiser Pharmacy	14	5.5	254
Community population >40,000	92	36.8	250
Community Population 20,000-40,000	40	16.0	250
Community Population <20,000	118	46.5	250

Table 4.2. Respondent Demographics (Continuous)

<b>Variable</b>	<b>Mean</b>	<b>Median</b>	<b>Std. Dev</b>	<b>Min</b>	<b>Max</b>	<b>N</b>
Year of first licensure	1992.78	1995	13.11	1960	2011	206
Hours worked per week	36.05	40	11.55	1.25	80	253
Typical number of other pharmacists	0.82	1.00	0.84	0	4	253
Typical number of technicians	2.96	3.00	1.61	0	10	250
Prescriptions personally checked on a busy day	208.66	200.00	92.75	1	700	252
Prescriptions personally checked on a slow day	121.26	100.00	58.67	1	400	250

Table 4.3. Self-reported Prescription Refill Activities (%)

<b>Activity</b>	<b>Mean</b>	<b>Median</b>	<b>Std. Dev</b>	<b>Min</b>	<b>Max</b>	<b>N</b>
1. For what percent of the refill prescriptions you verify do you pull up the patient's <u>medication profile</u> on the computer?	40.63	30.00	32.19	0	100	254
2. For what percent of the refill prescriptions you verify do you <u>attach a note</u> to the prescription bag for someone to follow-up when the patient presents to the pharmacy?	16.31	10.00	16.48	0	100	254
3. For what percent of the refill prescriptions that are dispensed while you are staffing do you personally <u>hand off</u> the prescription to the patient?	28.85	20.00	25.28	0	100	253
4. When you personally hand off the refill prescription to the patient, what percent of the time do you ask if he or she <u>has any questions</u> ?	70.13	90.00	35.46	0	100	253
5. When you personally hand off the refill prescription to the patient, what percent of the time do you <u>ask a specific question</u> about the patient's drug therapy?	23.67	15.00	23.16	0	100	253

Table 4.4. Responses to Likert-type Items

<b>Item</b>	<b>Mean</b>	<b>Median</b>	<b>Std. Dev</b>	<b>Min</b>	<b>Max</b>	<b>N</b>
Q1 ActSpecial <sup>r</sup>	3.35	3.00	1.36	1	6	254
Q2 ActLookProfile	2.95	3.00	1.47	1	6	253
Q3 BusyAd <sup>r</sup>	2.85	3.00	1.47	1	6	253
Q4 AdWorkflow	3.52	4.00	1.61	1	6	254
Q5 ActOpportunities	3.84	4.00	2.17	1	6	253
Q6 AttCircumstances <sup>r</sup>	4.37	5.00	1.41	1	6	253
Q7ActTherKnow	4.26	4.00	1.09	1	6	252
Q8 AdUncomfort <sup>r</sup>	4.46	5.00	1.35	1	6	254
Q9 EffMedsWork	4.84	5.00	0.94	1	6	254
Q10 AdConcern	4.17	4.00	1.05	1	6	254
Q11 EffResponsib	4.29	4.00	1.14	1	6	251
Q12 AdConfront <sup>r</sup>	4.03	4.00	1.34	1	6	254
Q13 Effinquisitive	4.47	4.00	1.15	1	6	253
Q14 SEPtInitiate <sup>r</sup>	4.69	5.00	1.06	1	6	251
Q15 ActOpen	4.46	5.00	0.99	1	6	253
Q16 SEGGoodIdea	5.04	5.00	0.86	1	6	254
Q17 AttSatisfy	4.54	5.00	1.02	2	6	253
Q18 AttPosImpact	4.83	5.00	0.94	2	6	253
Q19 AbuseProblem	4.16	4.00	1.38	1	6	253
Q20 SERespons	4.65	5.00	0.96	1	6	252
Q21 EffPtResponsive	4.80	5.00	0.96	1	6	253
Q22 BusyStickOut <sup>r</sup>	3.81	4.00	1.27	1	6	249
Q23 PtRarelyWant <sup>r</sup>	3.64	4.00	1.32	1	6	253
Q24 BusyHighVol <sup>r</sup>	4.75	5.00	1.35	1	6	253
Q25 PtNoWant <sup>r</sup>	4.08	4.00	1.27	1	6	251
Q26 BusyHurried <sup>r</sup>	3.32	3.00	1.40	1	6	251
Q27 ActAbuseFrequent	4.64	5.00	1.19	1	6	252

Responses based on a 6-point Likert scale: 1=Strongly disagree, 2=Moderately disagree, 3=Slightly disagree, 4=Slightly agree, 5=Moderately agree, 6=Strongly agree.

<sup>r</sup> = Reverse coded



Table 4.5. Responses to Likert-type Action Items

<b>Item</b>	<b>Mean</b>	<b>Std. Dev</b>	<b>Min</b>	<b>Max</b>	<b>N</b>
Q27 Monitoring for prescription drug abuse by patients is a frequent part of my job.	4.64	1.19	1	6	252
Q15 I ask open-ended questions when talking to patients about maintenance medications.	4.46	0.99	1	6	253
Q7 I use my therapeutic knowledge when I dispense refills of maintenance medications.	4.26	1.09	1	6	252
Q5 I look for opportunities to interact with patients picking up refills.	3.84	2.17	1	6	253
Q1 I don't interact with the patient on a refill unless there is something very special. <sup>r</sup>	3.35	1.36	1	6	254
Q2 I look at a patient's complete drug profile with every refill prescription.	2.95	1.47	1	6	253

Responses based on a 6-point Likert scale: 1=Strongly disagree, 2=Moderately disagree, 3=Slightly disagree, 4=Slightly agree, 5=Moderately agree, 6=Strongly agree.

<sup>r</sup> = Reverse coded

Table 4.6. Initial MMAM Factor Analysis (Pre-removal)

<b>Item</b>	<b>Internal</b>	<b>External</b>
Q3 BusyAd	-.080	.721
Q4 AdWorkflow <sup>1</sup>	.126	.241
Q6 AttCircumstances <sup>1</sup>	.220	.473
Q8 AdUncomfort	-.115	.681
Q9 EffMedsWork	.778	-.155
Q10 AdConcern	.484	.174
Q11 EffResponsib	.697	-.064
Q12 AdConfront	-.079	.678
Q13 EffInquisitve <sup>1</sup>	.412	.210
Q14 SEPtInitiate <sup>1</sup>	.300	.371
Q16 SEGoodIdea	.678	-.207
Q17 AttSatisfy	.717	.098
Q18 AttPosImpact	.654	.164
Q20 SERespons	.774	-.097
Q21 EffPtResponsive <sup>1</sup>	.394	.256
Q22 BusyStickOut	.032	.581
Q23 PtRarelyWant	.141	.538
Q24 BusyHighVol	-.002	.594
Q25 PtNoWant	.162	.584
Q26 BusyHurried	-.225	.829

Extraction method: Principal component analysis

Rotation method: Promax with Kaiser Normalization

<sup>1</sup>Removed

Table 4.7. MMAM Pattern Matrix for Reduced 2-Factor Solution

<b>Item</b>	<b>Internal</b>	<b>External</b>
Q3 BusyAd	-.049	.705
Q8 AdUncomfort	-.090	.673
Q12 AdConfront	-.056	.667
Q22 BusyStickOut	.078	.584
Q23 PtRarelyWant	.155	.564
Q24 BusyHighVol	.016	.587
Q25 PtNoWant	.176	.604
Q26 BusyHurried	-.184	.816
Q9 EffMedsWork	.785	-.129
Q10 AdConcern	.497	.197
Q11 EffResponsib	.697	-.036
Q16 SEGGoodIdea	.666	-.169
Q17 AttSatisfy	.721	.126
Q18 AttPosImpact	.653	.185
Q20 SERespons	.751	-.058
Percent of Variance Explained	14.13%	32.35%
Factor Correlation	0.393	

Extraction method: Principal component analysis

Rotation method: Promax with Kaiser Normalization

Table 4.8. Internal MMAM Items (Descending Means)

<b>Item</b>	<b>Mean</b>	<b>Std. Dev</b>	<b>Min</b>	<b>Max</b>	<b>N</b>
Q16 It's a good idea to ask patients about medication side effects.	5.04	0.86	1	6	254
Q9 Pharmacists should routinely follow-up with patients to see how their chronic medications are working.	4.84	0.94	1	6	254
Q18 I am able to positively impact the health of patients taking chronic medications.	4.83	0.94	2	6	253
Q20 It is my responsibility to ensure that patients are not having unnecessary side effects.	4.65	0.96	1	6	252
Q17 Interacting with patients about chronic medications is a satisfying part of my job.	4.54	1.02	2	6	253
Q11 It is my responsibility to ensure the patient's chronic medications are effective.	4.29	1.14	1	6	251
Q10 I get concerned when someone is late refilling a maintenance medication.	4.17	1.05	1	6	254
<b>Internal MMAM Mean</b>	<b>4.62</b>	<b>0.68</b>	<b>2.43</b>	<b>6.00</b>	<b>254</b>

Responses based on a 6-point Likert scale: 1=Strongly disagree, 2=Moderately disagree, 3=Slightly disagree, 4=Slightly agree, 5=Moderately agree, 6=Strongly agree.

Table 4.9. External MMAM Items (Descending Means)

<b>Item</b>	<b>Mean</b>	<b>Std. Dev</b>	<b>Min</b>	<b>Max</b>	<b>N</b>
Q24 My pharmacy has too high of volume to get to know individual patients. <sup>r</sup>	4.75	1.35	1	6	253
Q8 Talking to patients about non-adherence makes me uncomfortable. <sup>r</sup>	4.46	1.35	1	6	254
Q25 Patients don't want me asking about their maintenance medications. <sup>r</sup>	4.08	1.27	1	6	251
Q12 I feel confrontational when I bring up non-adherence with patients. <sup>r</sup>	4.03	1.34	1	6	254
Q22 I see so many people on the same drugs that it is hard for any of them to stick out. <sup>r</sup>	3.81	1.27	1	6	249
Q23 Patients rarely want to discuss their chronic medications with me. <sup>r</sup>	3.64	1.32	1	6	253
Q26 Patients don't want me asking about their maintenance medications. <sup>r</sup>	3.32	1.40	1	6	251
Q3 I don't have time to talk to everyone who is late refilling maintenance medications. <sup>r</sup>	2.85	1.47	1	6	253
<b>External MMAM Mean</b>	<b>3.87</b>	<b>0.88</b>	<b>1.63</b>	<b>6.00</b>	<b>254</b>

Responses based on a 6-point Likert scale: 1=Strongly disagree, 2=Moderately disagree, 3=Slightly disagree, 4=Slightly agree, 5=Moderately agree, 6=Strongly agree.

<sup>r</sup> = Reverse coded

Table 4.10. Regression of Pharmacist Factors on MMAM Domains

<b>Variable</b>	<b>Internal</b>	<b>External</b>
Intercept	4.529** (0.203)	3.936** (0.244)
MALE	0.045 (0.096)	0.201 (0.115)
PHARMD	0.150 (0.094)	-0.320** (0.113)
STAFF	-0.123 (0.103)	-0.303* (0.124)
INDEP	0.0320 (0.093)	0.316** (0.112)
HOURS	0.002 (0.004)	0.003 (0.005)
RPHS	0.012 (0.053)	-0.010 (0.064)
Adjusted $r^2$	Not significant	0.123

Values are multiple linear regression coefficients (with standard errors)

\* $p < 0.05$ , \*\* $p < 0.01$

Table 4.11. Common Vignette Likelihood Responses

<b>Item</b>	<b>Mean</b>	<b>Median</b>	<b>Std. Dev</b>	<b>Min</b>	<b>Max</b>	<b>N</b>
Ask the patient questions to identify possible reasons for non-adherence.	4.94	5.00	3.15	0	10	254
Ask the patient questions to find out if he might be experiencing side effects.	5.36	6.00	3.05	0	10	254
Ask the patient questions to find out about the effectiveness of the medication.	3.73	4.00	3.12	0	10	253

Likelihoods are based on an 11-point scale: Definitely would not ask = 0, Definitely would ask=10.

Table 4.12. Regression of Pharmacist Factors on Common Vignette Responses

<b>Variable</b>	<b>ASKNON</b>	<b>ASKSE</b>	<b>ASKEFF</b>
Intercept	-3.920** (1.444)	-2.991** (1.442)	-0.966 (1.590)
MALE	0.417 (0.382)	0.111 (0.382)	0.199 (0.423)
PHARMD	-0.705 (0.387)	-0.482 (0.386)	-0.484 (0.428)
STAFF	-0.455 (0.413)	-0.544 (0.413)	-0.486 (0.456)
INDEP	0.126 (0.375)	(0.093) (0.375)	0.059 (0.414)
HOURS	-0.014 (0.018)	-0.002 (0.017)	-0.021 (0.019)
RPHS	0.208 (0.210)	0.104 (0.210)	-0.191 (0.231)
ATTINT	1.090** (0.235)	0.832** (0.234)	0.428 (0.258)
ATTEXT	1.160** (0.283)	1.220** (0.283)	0.951** (0.312)
Adjusted $r^2$	0.256	0.201	0.078

Values are linear regression coefficients (with standard errors)

\* $p < 0.05$ , \*\* $p < 0.01$



Table 4.13. Bivariate Correlations Including Common Vignette and Pharmacist Variables

	CommonNonQ	CommonSEQ	CommonEFFQ
CommonNonQ			
CommonSEQ	.806**		
CommonEFFQ	.600**	.669**	
Male	.170**	.118	.089
FirstLicensure	-.200**	-.118	-.186**
PHARMD	-.195**	-.121	-.109
STAFF	-.145*	-.169**	-.106
MANAGER	.075	.117	.048
OWNER	.216**	.138*	.103
CHAIN	-.061	-.060	-.029
MASS	-.072	-.068	-.040
INDEPENDENT	.112	.088	.060
GROCERY	-.002	-.003	-.004
POPULATION	-.073	-.007	.022
HOURSWK	.042	.077	-.021
RPH	.026	.009	-.075
TECH	.038	.033	-.040
RXBUSY	-.060	-.069	-.009
RXSLOW	-.023	-.040	-.033
MeanExternalAttitude	.453**	.405**	.251**
MeanInternalAttitude	.372**	.373**	.252**
MeanBPCS	.478**	.509**	.479**

\* $p > 0.05$ \*\* $p < 0.01$

Table 4.13. Continued

	Male	Year First Licensure	PharmD	Staff	Manager
Male					
FirstLicensure	-.369				
PHARMD	-.308**	.808**			
STAFF	-.166**	.079	.074		
MANAGER	.066	.003	.016	-.807	
OWNER	.263**	-.260**	-.153*	-.347**	-.037
CHAIN	-.030	.166*	.097	-.030	.144*
MASS	-.082	.053	.078	.031	.022
INDEPENDENT	.101	-.316**	-.172**	-.010	-.158
GROCERY	-.033	.104	.023	.072	-.021
POPULATION	-.145*	.250**	.095	.091	.012
HOURSWK	.178**	.164*	.060	-.436**	.347**
RPH	-.013	.138*	.075	.109	-.111
TECH	-.073	.114	.113	.077	-.042
RXBUSY	-.158*	.204**	.186**	.039	.051
RXSLOW	-.148*	.123	.094	.019	.028
MeanExternalAttitude	.220**	-.293**	-.324**	-.216**	.168**
MeanInternalAttitude	.020	.105	.091	-.095	.081
MeanBPCS	.042	-.073	-.095	-.018	-.028

\* $p > 0.05$ \*\* $p < 0.01$

Table 4.13. Continued

	<b>OWNER</b>	<b>CHAIN</b>	<b>MASS</b>	<b>INDEP.</b>	<b>GROCERY</b>
OWNER					
CHAIN	-.289**				
MASS	-.076	N/A			
INDEPENDENT	.455**	N/A	N/A		
GROCERY	-.138*	N/A	N/A	N/A	
POPULATION	-.283**	.131*	.123	-.335**	.158*
HOURSWK	.319**	-.028	-.047	-.055	.085
RPH	-.006	-.242**	-.093	.017	.329**
TECH	-.085	-.085	-.059	-.104	.253**
RXBUSY	-.185**	.196**	-.078	-.221**	.052
RXSLOW	-.121	.216**	-.124*	-.216**	.056
MeanExternalAttitude	.168**	-.143*	-.050	.214**	-.049
MeanInternalAttitude	.101	-.060	.009	.005	.053
MeanBPCS	-.088	.037	-.041	.062	-.068

\* $p > 0.05$ \*\* $p < 0.01$

Table 4.13. Continued

	<b>POPUL- ATION</b>	<b>HOURS- WK</b>	<b>RPH</b>	<b>TECH</b>	<b>RXBUSY</b>
POPULATION					
HOURSWK	-.028				
RPH	-.083	.122			
TECH	-.128*	.066	.584**		
RXBUSY	-.024	.126*	.098	.419**	
RXSLOW	-.016	.045	.087	.435**	.848**
MeanExternalAttitude	-.194**	.104	-.034	-.080	-.108
MeanInternalAttitude	.002	.083	.018	.027	.010
MeanBPCS	.111	.079	.074	-.002	.081

\* $p > 0.05$ \*\* $p < 0.01$ 

Table 4.13. Continued

	<b>RXSLOW</b>	<b>MEANEXT</b>	<b>MEANINT</b>
RXSLOW			
MeanExternalAttitude	-.042		
MeanInternalAttitude	.058	.411**	
MeanBPCS	.085	.295**	.281**

\* $p > 0.05$ \*\* $p < 0.01$

Table 4.14. Factorial Survey Overall Question-asking Likelihood Responses

<b>Variable</b>	<b>Mean</b>	<b>Std. Dev</b>	<b>Min</b>	<b>Max</b>	<b>N</b>
Ask the patient questions to identify possible reasons for non-adherence.	2.94	3.26	0	10	1259
Ask the patient questions to find out if he might be experiencing side effects.	3.54	2.99	0	10	1259
Ask the patient questions to find out about the effectiveness of the medication.	3.80	3.13	0	10	1259

Likelihoods are based on an 11-point scale: Definitely would not ask = 0, Definitely would ask=10.

Table 4.15. Pharmacists Asking Non-adherence Questions (ASKNON) - Random Intercept and Multilevel Regression Coefficients

	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>
<i>Vignette Factors</i> (Level 1)				
Vignette – Age <sup>1</sup>	0.00534 (0.00398)	0.00356 (0.00369)	0.00351 (0.00369)	0.00265 (0.00367)
Vignette - Male	-0.272* (0.127)	-0.308* (0.120)	-0.301* (0.120)	-0.298* (0.118)
Familiarity- Know by name	0.0365 (0.136)	0.00581 (0.125)	0.0139 (0.124)	0.0244 (0.124)
Drug- Fluoxetine	-1.259** (0.186)	-1.282** (0.181)	-1.286** (0.180)	-1.288** (0.179)
Drug- Hydrocodone	-2.445** (0.216)	-0.319 (0.257)	-0.332 (0.259)	-0.317 (0.260)
Drug- Metoprolol	-0.931** (0.188)	-0.996** (0.180)	-1.002** (0.180)	-1.015** (0.179)
Drug- Warfarin (Reference)	-	-	-	-
Times previously filled	-0.0307 (0.0235)	-0.0240 (0.0208)	-0.0223 (0.0207)	-0.0219 (0.0205)
Days Late	0.229** (0.0178)	0.326** (0.0189)	0.326** (0.0188)	0.327** (0.0187)
Other persons waiting	-0.126** (0.0500)	-0.133** (0.0463)	-0.126** (0.0464)	-0.130** (0.0467)
Staffing- Short staffed	-0.0583 (0.138)	-0.0986 (0.122)	-0.100 (0.122)	-0.0780 (0.122)
(Hydrocodone)* (Days Late)	-	-0.389** (0.0317)	-0.388** (0.0320)	-0.385** (0.0322)
<i>Pharmacist Factors</i> (Level 2)				
Intercept	3.403** (0.266)	2.922** (0.251)	3.090** (0.352)	2.994** (0.330)
Male	-	-	0.723** (0.270)	0.576* (0.246)
PharmD	-	-	-0.714* (0.281)	-0.637* (0.250)
Staff	-	-	-0.398 (0.293)	-0.136 (0.259)
Independent	-	-	0.459 (0.297)	0.247 (0.271)

Table 4.15. Continued

	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>
Hours/week <sup>1</sup>	-	-	-0.00475 (0.0143)	-0.00801 (0.0129)
Other pharmacists	-	-	-0.0709 (0.184)	-0.0711 (0.174)
External Monitoring Attitude <sup>1</sup>	-	-	-	0.569** (0.153)
Internal Monitoring Attitude <sup>1</sup>	-	-	-	0.713** (0.176)
-2LL	5929.24**	5732.40**	5705.51*	5663.50**

Values are linear regression coefficients (with robust standard errors)

<sup>1</sup>Grand mean centered

\* $p < 0.05$ , \*\* $p < 0.01$

Table 4.16. Pharmacists Asking Side-effect Questions (ASKSE) -  
Random Intercept and Multilevel Regression Coefficients

	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>
<i>Vignette Factors</i> (Level 1)				
Vignette – Age <sup>1</sup>	0.00504 (0.00351)	0.00423 (0.00350)	0.00422 (0.00349)	0.00335 (0.00332)
Vignette - Male	-0.0150 (0.1351)	-0.0320 (0.107)	-0.0305 (0.101)	-0.0369 (0.106)
Familiarity- Know by name	0.00596 (0.111)	-0.0103 (0.108)	-0.00520 (0.108)	0.000919 (0.107)
Drug- Fluoxetine	-0.630** (0.159)	-0.639** (0.151)	-0.639** (0.152)	-0.629** (0.150)
Drug- Hydrocodone	-0.934** (0.167)	-0.0623 (0.201)	-0.0659 (0.221)	-0.0357 (0.200)
Drug- Metoprolol	-0.315* (0.158)	-0.345* (0.155)	-0.346* (0.157)	-0.354* (0.154)
Drug- Warfarin (Reference)	-	-	-	-
Times previously filled	-0.0980** (0.0203)	-0.0948** (0.0187)	-0.0947** 0.0198	-0.0939** (0.0186)
Days Late	0.126** (0.0126)	0.165** (0.0120)	0.166** (0.0145)	0.165** (0.0119)
Other persons waiting	-0.152** (0.0414)	-0.1541** (0.0376)	-0.151** (0.0410)	-0.150** (0.0374)
Staffing- Short staffed	-0.387** (0.108)	-0.404** (0.107)	-0.405** (0.105)	-0.382** (0.107)
(Hydrocodone)* (Days Late)	-	-0.159** (0.0236)	-0.160** (0.0261)	-0.158** (0.0235)
<i>Pharmacist Factors</i> (Level 2)				
Intercept	4.333** (0.244)	4.137** (0.246)	4.300** (0.385)	4.189** (0.374)
Male	-	-	0.601 (0.314)	0.402 (0.285)
PharmD	-	-	-0.520 (0.315)	-0.461 (0.287)
Staff	-	-	-0.428 (0.341)	-0.0627 (0.307)
Independent	-	-	0.278 (0.323)	-0.00316 (0.279)



Table 4.16. Continued

	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>
Hours/week <sup>1</sup>	-	-	0.00516 (0.0153)	0.000269 (0.0131)
Other pharmacists	-	-	0.00626 (0.184)	0.000454 (0.158)
External Monitoring Attitude <sup>1</sup>	-	-	-	0.722** (0.174)
Internal Monitoring Attitude <sup>1</sup>	-	-	-	1.159** (0.211)
-2LL	5584.17**	5539.53**	5525.25*	5452.13**

Values are linear regression coefficients (with robust standard errors)

<sup>1</sup>Grand mean centered

\* $p < 0.05$ , \*\* $p < 0.01$

Table 4.17. Pharmacists Asking Effectiveness Questions (ASKEFF) - Random Intercept and Multilevel Regression Coefficients

	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>
<i>Vignette Factors</i> (Level 1)				
Vignette – Age <sup>1</sup>	0.00194 (0.00260)	0.00100 (0.00357)	0.000925 (0.00356)	0.000156 (0.00356)
Vignette - Male	-0.0324 (0.102)	-0.0496 (0.100)	-0.0487 (0.100)	-0.0554 (0.100)
Familiarity- Know by name	-0.0809 (0.113)	-0.101 (0.109)	-0.0960 (0.109)	-0.0879 (0.108)
Drug- Fluoxetine	-0.0172 (0.183)	-0.0265 (0.181)	-0.0280 (0.181)	-0.0251 (0.182)
Drug- Hydrocodone	-0.239 (0.188)	0.737** (0.256)	0.732** (0.256)	0.770** (0.255)
Drug- Metoprolol	-0.104 (0.194)	-0.137 (0.193)	-0.140 (0.192)	-0.141 (0.193)
Drug- Warfarin (Reference)	-	-	-	-
Times previously filled	-0.0755** (0.0219)	-0.0725** (0.0212)	-0.0725** (0.0211)	-0.0720** (0.0210)
Days Late	0.0973** (0.0123)	0.142** (0.0141)	0.142** (0.0141)	0.142** (0.0141)
Other persons waiting	-0.161** (0.0418)	-0.163** (0.0412)	-0.160** (0.0410)	-0.163** (0.0413)
Staffing- Short staffed	-0.364** (0.117)	-0.372** (0.113)	-0.372** (0.113)	-0.356** (0.114)
(Hydrocodone)* (Days Late)	-	-0.179** 0.0273	-0.178** (0.0273)	-0.178** (0.0271)
<i>Pharmacist Factors</i> (Level 2)				
Intercept	4.308** (0.260)	4.088** (0.163)	4.300** (0.158)	4.188** (0.398)
Male			0.575 (0.343)	0.376 (0.311)
PharmD			-0.357 (0.343)	-0.293 (0.315)
Staff			-0.804* (0.369)	-0.437 (0.316)
Independent			0.421 (0.346)	0.138 (0.301)

Table 4.17. Continued

	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>
Hours/week <sup>1</sup>			-0.00328 (0.0167)	-0.00814 (0.0146)
Other pharmacists			0.122 (0.205)	0.121 (0.179)
External Monitoring Attitude <sup>1</sup>				0.731** (0.216)
Internal Monitoring Attitude <sup>1</sup>				1.142** (0.256)
-2LL	5689.95**	5665.18**	5622.92**	5561.24**

Values are linear regression coefficients (with robust standard errors)

<sup>1</sup>Grand mean centered

\* $p < 0.05$ , \*\* $p < 0.01$

Table 4.18. Model 4 Comparison for Each Question Likelihood Responses

	<b>ASKNON</b>	<b>ASKSE</b>	<b>ASKEFF</b>
<i>Vignette Factors</i> (Level 1)			
Vignette – Age <sup>1</sup>	0.00265 (0.00367)	0.00335 (0.00332)	0.000156 (0.00356)
Vignette - Male	-0.298* (0.118)	-0.0369 (0.106)	-0.0554 (0.100)
Familiarity- Know by name	0.0244 (0.124)	0.000919 (0.107)	-0.0879 (0.108)
Drug- Fluoxetine	-1.288** (0.179)	-0.629** (0.150)	-0.0251 (0.182)
Drug- Hydrocodone	-0.317 (0.260)	-0.0357 (0.200)	0.770** (0.255)
Drug- Metoprolol	-1.015** (0.179)	-0.354* (0.154)	-0.141 (0.193)
Drug- Warfarin (Reference)	-	-	-
Times previously filled	-0.0219 (0.0205)	-0.0939** (0.0186)	-0.0720** (0.0210)
Days Late	0.327** (0.0187)	0.165** (0.0119)	0.142** (0.0141)
Other persons waiting	-0.130** (0.0467)	-0.150** (0.0374)	-0.163** (0.0413)
Staffing- Short staffed	-0.0780 (0.122)	-0.382** (0.107)	-0.356** (0.114)
(Hydrocodone)* (Days Late)	-0.385** (0.0322)	-0.158** (0.0235)	-0.178** (0.0271)
<i>Pharmacist Factors</i> (Level 2)			
Intercept	2.994** (0.330)	4.189** (0.374)	4.188** (0.398)
Male	0.576* (0.246)	0.402 (0.285)	0.376 (0.311)
PharmD	-0.637* (0.250)	-0.461 (0.287)	-0.293 (0.315)
Staff	-0.136 (0.259)	-0.0627 (0.307)	-0.437 (0.316)
Independent	0.247 (0.271)	-0.00316 (0.279)	0.138 (0.301)

Table 4.18 Continued

	<b>ASKNON</b>	<b>ASKSE</b>	<b>ASKEFF</b>
Hours/week <sup>1</sup>	-0.00801 (0.0129)	0.000269 (0.0131)	-0.00814 (0.0146)
Other pharmacists	-0.0711 (0.174)	0.000454 (0.158)	0.121 (0.179)
External Monitoring Attitude <sup>1</sup>	0.569** (0.153)	0.722** (0.174)	0.731** (0.216)
Internal Monitoring Attitude <sup>1</sup>	0.713** (0.176)	1.159** (0.211)	1.142** (0.256)
-2LL	5663.50**	5452.13**	5561.24**

Values are linear regression coefficients (with robust standard errors)

<sup>1</sup>Grand mean centered

\* $p < 0.05$ , \*\* $p < 0.01$

Table 4.19. Results of Behavioral Pharmaceutical Care Scale - Monitoring Domain

<b>Of last 5 patients...</b>	<b>Mean</b>	<b>Median</b>	<b>Std. Dev</b>	<b>Min</b>	<b>Max</b>	<b>N</b>
Asked the patient questions to assess actual patterns of use of the medication.	1.06	1.00	1.26	0	5	248
Asked the patient questions to find out if he or she might be experiencing drug-related problems.	1.47	1.00	1.40	0	5	247
Asked the patient questions to find out about the perceived effectiveness of the drugs taken.	1.41	1.00	1.33	0	5	247
Asked the patient questions to find out whether the therapeutic goal was being reached.	1.19	1.00	1.34	0	5	248
Mean of 4 item BPCS-Monitoring	1.282	1.00	1.176	0	5	248

Table 4.20. Mean BPCS-Monitoring Prediction Model Based on Pharmacist Factors

<b>Variable</b>	<b>Mean BPCS</b>
Intercept	-1.902** (0.616)
MALE	-0.070 (0.158)
PHARMD	-0.192 (0.160)
STAFF	0.264 (0.170)
INDEP	0.055 (0.155)
HOURS	0.012 (0.007)
RPHS	-0.0121 (0.089)
ATTEXT	0.267** (0.097)
ATTINT	0.374** (0.121)
Adjusted $r^2$	0.110

Values are linear regression coefficients (with standard errors)

\* $p < 0.05$ , \*\* $p < 0.01$

## CHAPTER V

### DISCUSSION

This chapter discusses each of the three study aims, study limitations, applications to the health collaboration model, and implications for practice, and future research.

#### Aim 1 Discussion

Aim 1 of the present study was to describe the attitudes, contextual factors, activities, and behaviors associated with community pharmacist medication monitoring.

#### Medication Monitoring in Practice

The qualitative interviews generally confirmed that most of the community pharmacists interviewed were not systematically monitoring adherence, side effects and effectiveness of patient medications in the dispensing process. One technique pharmacists used to support medication monitoring was to use memory of past interactions and relationships as an information source. For example, remembering the patient from a diabetes education session, a medication review, or from a past issue in the dispensing process expands the amount of information the pharmacist has for medication monitoring. Such use of memory and subsequent monitoring actions may contribute to advancing patient-pharmacist interactions from discrete to relational (Doucette & McDonough, 2002). This approach has obvious limitations as pharmacists are only able to retain a finite amount of patient-specific information, however, it does represent a unique source of information of medication monitoring.

Another strategy pharmacists used was the “gateway conversation.” Pharmacists appeared to use technical or cost issues related to a prescription to initiate an interaction. Then, if the patient seemed engaged and receptive, the pharmacist may transition the conversation to probing a more clinical issue, or ask the patient if he or she has additional questions. The idea of a “gateway conversation” is similar to the concept of “door



opener” proposed in a focus group study of community pharmacists asking the three prime questions (Guirguis, 2011). Guirguis found asking these open-ended questions opened patients to asking their own questions and seemed to encourage patients to be more active participants in their discussions. Other studies have found that pharmacists tend to focus on technical issues when engaging patients in the dispensing process (Claesson et al., 1995; de Oliveira & Shoemaker, 2006; Rupp et al., 1992; Westerlund et al., 1999).

Patients also initiated monitoring interactions by reporting symptoms or asking questions and this seemed to engage pharmacists. This is consistent with research showing that congruence between pharmacist and patient expectations for an encounter promote relationship satisfaction and that pharmacists often respond to patient questions by providing additional information beyond the original query (Schommer, 1994; Schommer & Wiederholt, 1997; Worley et al., 2007).

From the patient perspective, it is possible that using pharmacy services such as a medication review or diabetes education, may result in the pharmacist providing more medication monitoring in subsequent dispensing interactions because the pharmacist has memory of the initial, higher intensity encounter. The benefit of a pharmacist-provided service may extend beyond the initial encounter in the form of an upgraded level of service later on. However, in a study of independent pharmacy patrons, Patterson found patient use of a unique pharmacy services did not subsequently motivate higher pharmacy utilization (Patterson, Doucette, Urmie, & McDonough, 2013). If patients only use a particular pharmacy on a limited basis for the unique service offering, they may forgo enhanced monitoring during the dispensing process.

#### Barriers to Medication Monitoring

The barriers to monitoring in the refill dispensing process in the present study included a lack of time, busyness, patient disinterest, and the prevailing routine nature of

refills. Time, busyness, and patient expectation barriers have been documented in the literature (Schommer, 1997; Schommer & Wiederholt, 1994b; Worley et al., 2007). The present study adds the routine nature of refills to the list of counseling barriers.

This list of barriers is reinforced by the pattern code pharmacy busyness and perceived patient disinterest. Pharmacists sympathized that patients must see the long lines and hectic staff and not want to bother the pharmacist with a question. Bitner suggests these environmental cues shape patient expectations and can make it difficult for certain activities to occur that are inconsistent with perception of service (Bitner, 1990). Community pharmacies should consider this image if they want to encourage monitoring during the dispensing process.

#### Systematic Interventions

While most independent and grocery pharmacies appeared to not use systematic processes to target medication monitoring in the dispensing process, some chain pharmacies did use structured interventions. These included call-back programs and automatic “caps” based on programmed characteristics of the medication or refill history. Studies have shown that telephonic pharmacy services can be beneficial by improving patient satisfaction, addressing medication-related problems, and providing additional education (Bultman & Svarstad, 2002; Moczygemba, Barner, Gabrillo, & Godley, 2008; Rickles et al., 2006). In the case of the chain interventions, interviewees reported concerns such as patients not answering the phone, and when they did, patients had few medication-related questions. It may be useful to identify the optional span of time to wait before contacting the patient to increase the likelihood the patient has had time to evaluate his or her medication use experience.

These challenges with patient acceptance also could relate to relationship strength. A recent intervention study with pharmacists monitoring blood pressure in the chain setting showed that turnover in staffing was associated with patients not

participating in all of the intervention activities. It may be productive to evaluate the nature of pharmacist questioning and relationship building during these interactions and propose strategies for increasing ongoing patient engagement.

### Adherence Monitoring

Adherence was a problem pharmacists recognized they had difficulty addressing. First, busyness was a clear barrier to following up on medication non-adherence. Non-adherence was too common and most did not have a set rule for how many days late a prescription would have to be to warrant intervention. Secondly, often technicians were the staff members processing the refill prescriptions. Since days late is not a critical warning according to the prescription adjudication system, the technician can process the prescription without hesitation. Ultimately it is up to the judgment of the technician and any guidelines the pharmacy has for notifying the pharmacist on duty if the prescription was late. One pharmacist reported their pharmacy instructs technicians to write down how late or early the prescription is on the printout. Most pharmacists reported days late information was not readily available in their current workflow. Technician judgment of warnings may warrant further investigation. It is possible that pharmacists are missing important warnings because technicians are acknowledging and dismissing certain messages from the dispensing software that could have utility for the pharmacist.

Similarly, the asynchronous nature of the prescription refill process means patients may request a prescription one day, and not pick it up for a week later. In such a scenario, the technician handing off the late refill prescription likely would not know the prescription was late, nor would this information be brought to the attention of the pharmacist. Overall, pharmacists seemed discouraged by how daunting it would be to follow-up with every patient who is late refilling. As a result, pharmacists end up intervening only in extreme or unusual circumstances, when the pharmacists' memory is triggered, or when patients ask questions or report concerns.

### Monitoring Experiences

The anecdotes shared by pharmacists detailed beneficial monitoring encounters initiated by both pharmacists and patients. Often speaking in general, hypothetical terms, pharmacists prioritized the monitoring warfarin and insulin. However, when sharing anecdotes from practice, the medications varied widely with no two anecdotes involving the same circumstances. Pharmacists shared encounters based on all three monitoring question types from the Steinman model (non-adherence, side-effects, and effectiveness) and also technical issues such as cost. Other studies of pharmacists reporting their interventions also showed a wide variation in activities, medications, and contexts (Hämmerlein et al., 2007).

Controlled substances also were discussed in the context of medication monitoring. Some pharmacists held a dual concern – the potential for abuse or overuse and the potential for side effects and effectiveness. Of note, this use of the term medication monitoring with controlled substances often was in the context of a new prescription.

Overall, there appears to be a need to combine both ad-hoc and systematic approaches to yield more impactful medication monitoring approaches.

### Basic Monitoring Activities

The five pharmacist prescription refill activities (Table 4.3) were included on the survey to assess a baseline for the most basic of pharmacist monitoring activities in the refill process. On average, these pharmacists reported pulling up the patient profiles of less than half of refill prescriptions. Examining the patient's profile appears to be a useful opportunity for monitoring medications based on the anecdotes shared by the interviewees. First, it can tell the pharmacist if the prescription is being refilled late, which potentially is associated with non-adherence. Second, pharmacists in the interviews recounted many instances where they found duplications, interactions, or

overuse that were not identified when the prescription was processed as a new prescription. Reviewing a patient's profile more frequently may provide pharmacists with more information and opportunities to intervene with ongoing medications. These technical interactions, referred to previously as "gateway conversations," appeared to be a major precipitator of monitoring activities by community pharmacists. Acknowledging barriers such as time constraints, a compromise may be to systematically have pharmacists periodically review medication profiles at certain intervals, perhaps based on characteristics of the patient and his or her medication regimen.

Another activity measured was the use of handwritten or profile notes to bridge the asynchronous period between when a prescription refill is ordered and when it is picked up. There was considerable variation in this activity, although on average, pharmacists reported using a note for a minority of prescriptions (16%). The present study did not investigate the content of these messages or how the messages incorporate into workflow. In a similar area of community pharmacy practice, studies have examined the asynchronous nature of information handoff between pharmacists and suggest there is little standardization of this process (Chui & Stone, 2013).

The present study found, on average, pharmacists reported personally handing-off 29% of prescription refills and a third handing off 10% or less. This suggests there is opportunity for pharmacists to increase their interaction with patients to ask the types of questions proposed by the factorial survey. Studies have shown the pharmacist handing off the prescription is an important opportunity for patients and pharmacists to ask questions, including those related to medication monitoring (Shah & Chewning, 2006).

Of the prescription hand-off interactions, pharmacists reported asking a specific question about the patient's drug therapy for 24% of prescriptions. Pharmacists also agreed slightly to moderately that they ask open-ended questions when talking with patients about maintenance medications (Table 4.5). These self-reported findings suggest some pharmacists are engaging in communication conducive to medication monitoring

but there is room for improvement. Previous studies of pharmacist question-asking report that pharmacists only ask open-ended questions during a small number (3%) of patient counseling encounters (Sleath, 1995).

A next step is to work with pharmacists to ask more open questions in a targeted and systematic way to increase medication monitoring in community pharmacy practice. It was clear that pharmacists were much more likely to ask a general question such as “do you have any questions” than a specific question like “what concerns do you have about side effects?” or “what has your blood pressure been lately?” It is possible pharmacists asking these general questions perceive they do not have enough information to ask more meaningful questions.

### Aim 2 Discussion

Aim 2 of the present study was to develop a measure for a pharmacist’s medication monitoring attitude. There is a precedent for the importance of attitudes in pharmacy practice behaviors such as counseling for new prescriptions (Farris & Kirking, 1995; Mason, 1983; Schommer & Wiederholt, 1995). The Medication Monitoring Attitude Measure (MMAM) developed in this study demonstrated the relationship between pharmacist medication monitoring attitudes and question-asking likelihood in the prescription refill process.

Several forms of measure validity were considered during and after the measurement development process and testing. Considering content validity, the MMAM at least partially addressed the original measure conceptualization. The items of the external and internal domains focused on the general conceptualization of the attitudinal orientation for medication monitoring in the experiences self-expectations, professional responsibility, cognitive processes, and contextual and environmental factors of the target group.

There, however, may have been attitudinal concepts related to medication monitoring that were not included in the final measure due to delimitations of the study design, particularly the limited space on the survey instrument and a single mailing in the instrument development process. This limited the ability to test a larger number of items and in hindsight, promoted a heavy reliance on items from the mixed methods item generation process. Following previously developed methods for mixed-methods item generation was productive and yielded more items that could fit in the space allotted (Howell Smith, 2011; Onwuegbuzie et al., 2010). The trade-off was that no items derived solely from the literature or researcher insight were included which may have resulted in the MMAM not fully addressing all the concepts in the domain of internal and external medication monitoring attitudes.

For example, patient acceptance and busyness were prominent components in the external domain, however, the qualitative interviews also suggested technology and technicians were important parts of the external environment affecting monitoring attitude. Items related to these concepts did not reach the final measure and the quote-based items were deemed too tangential to medication monitoring and were eliminated. An alternate approach could have been to stray further from the *in vivo* language to propose an independent item that addresses the concept. These items could then be reviewed by practicing pharmacists and researchers.

For concurrent validity and predictive validity, the MMAM predicted the question-asking likelihood of the common vignette and the factorial vignettes in the hypothesized direction. The MMAM also was positively associated with mean BCPS scores, including when controlling for pharmacist and practice characteristics. The BCPS was included as a validated measure of pharmaceutical care behaviors (Odedina & Segal, 1996). A significant relationship between the medication monitoring attitude measures and the BCPS supported the validity of the MMAM. The item analysis of the MMAM produced reliable scales supporting the psychometric qualities of the individual items.

Another finding from the measure development process was the low internal consistency of some of the attitudinal items (Table 4.7). Two items including “I don’t interact with the patient on a refill unless there is something very special” and “Circumstances must be extraordinary for me to interact with a patient about a refill prescription” were not included despite apparent face validity because they cross-loaded on both domains. These items seem to have incorporated both internal motivation and the realities of external practice. Moving forward, it may be useful to combining the scales given the two sub-measures are positively correlated. The differences in measures, however, is supported by the role conflict literature which demonstrates pharmacist values and attitudes can be in conflict with the realities of practice which often restrict professional behaviors due to time constraints and other barriers (Edmunds & Calnan, 2001; Gaither et al., 2008; Gidman, Hassell, Day, & Payne, 2007). Investigating this conflict between ideals and actual behaviors could be productive in understanding role conflict in pharmacists related to medication monitoring.(Edmunds & Calnan, 2001; Gaither et al., 2008; Gidman, Hassell, Day, & Payne, 2007)

#### MMAM Antecedents

The pharmacist factors of having a BS Pharm degree, being a manager or owner, and working for an independent pharmacy were significantly associated with a respondent having an external monitoring attitude more conducive to medication monitoring (Table 4.10). Higher values on this measure were associated with less busyness and greater perceived interest by patients in medication monitoring. One possible explanation could be that PharmD’s have a higher expectation for how a work site should facilitate medication monitoring and therefore a greater dissatisfaction with a given environment. Another possibility is that since BS pharmacists generally are older, they have achieved greater autonomy through their years of experience. The bivariate



correlations confirm this relationship with BS Pharm pharmacists being more likely to be a pharmacy owner (Table 4.13).

The qualitative analysis also supported the premise that pharmacists working for independent pharmacies had a greater ability to interact with patients, at least partly due to the presence of other pharmacists and a greater patient interest or expectation for interaction. There were no significant antecedents of the internal monitoring attitude, suggesting pharmacists in a variety of settings and with other characteristics are oriented to monitoring. This is encouraging to pharmacies interested in increasing medication monitoring.

### Aim 3 Discussion

Aim 3 of the present study was to identify significant attitudinal and contextual factors which contribute to the decision to ask questions at the time of refill.

#### Respondent Characteristics

Pharmacists responding to the survey mailing (Table 4.1, Table 4.2) had different characteristics than the pharmacist characteristics reported by the pharmacy workforce project (Schommer, Doucette, Gaither, Kreling, & Mott, 2010). In the present study, 61.4% of respondents were female and 41.3% had a PharmD degree, whereas the pharmacy workforce project respondents were 46.4% female and 21.6% had a PharmD. Worksite characteristics were similar to those of the workforce project. In the present study, 45.7% of pharmacists worked in chain pharmacies, 33.5% worked in community pharmacies, 16.1% worked in grocery pharmacies, and 5.5% worked in mass merchandiser pharmacies, compared to 46.2% chain, 26.8% independent, 17.8% grocery, and 9.1% mass merchandiser for respondents to the pharmacy workforce project. Pharmacist characteristics specifically for the state of Iowa were not available for comparison. It is possible that female pharmacists and pharmacists with a PharmD degree were more likely to return the survey which may suggest a possible response bias.

## Factorial Survey

The interclass correlations of the three null models suggested that both pharmacist characteristics and vignette characteristics were important to question-asking likelihood, but in different proportions. Non-adherence question-asking was more driven by the vignette characteristics whereas side-effect and effectiveness questions were more driven by pharmacist characteristics. This pattern suggests that side-effect and effectiveness questioning are based more on pharmacist motivation and environment, and non-adherence questioning is based more on the context. These findings support the basic premise that pharmacists were cognitively evaluating these hypothetical scenarios. The same was proposed in a previous static vignette study of pharmacists evaluating dispensing scenarios (Schommer & Wiederholt, 1994b).

### Pharmacist Factors

On average, the pharmacists in this study had internal and external medication monitoring attitudes conducive to monitoring (Table 4.8, Table 4.9), although there was variation. The internal and external medication monitoring attitudes of the pharmacist were significant predictors of the likelihood to ask the three monitoring questions, whereas demographic or workplace factors were not (Table 4.18). This suggests there are pharmacists across settings and roles that are oriented to medication monitoring, not just independent pharmacists, which is where much of the empirical focus on pharmacist-provided services has been focused.

In the factorial analysis, male pharmacists and pharmacists with BS Pharm degrees were more likely to ask non-adherence questions (Table 4.15). A possible explanation is that experience associated with practicing long enough to have a BS Pharm degree facilitates comfort and skill in asking about non-adherence. This explanation, however, contradicts other research showing that younger pharmacists are more likely to provide new prescription counseling (Svarstad et al., 2004). The significance of being

male may be a manifestation of the shifting demographics in pharmacists over the last several decades.(Schommer et al., 2010) Regardless, it seems beneficial to further explore ways to make pharmacists more effective when they are discussing adherence as there appears to be variation in a pharmacist's likelihood to engage in this activity, possibly due to confidence, experience, or communication self-efficacy.

While experience may lead to more non-adherence questions, autonomy may lead to more effectiveness questions. Managers and owners were more likely to ask questions about effectiveness, a more discretionary line of questioning, although this trend did not reach statistical significance (Table 4.16, Table 4.17). Managers and owners may have greater accountability and may be more inclined to pursue activities they believe increase patient satisfaction and patronage. Alternatively, the presence of hydrocodone in the set of medications may have attracted manager and owner attention if that group happens to take on more responsibility for identifying prescription drug abuse. Understanding this pattern ultimately is an empirical question beyond the scope of the present study.

### Patient Factors

Female patients were more likely to be questioned about non-adherence than male patients in the vignettes (Table 4.15). Research on patient gender and health communication are mixed, but some have shown that women ask more questions, make sure they understand the physician as evident by paraphrasing physician instructions, and are more likely to engage in tension release (laughter) compared to males (Hall, Irish, Roter, Ehrlich, & Miller, 1994). These characteristics may also be present for patients visiting community pharmacies and may translate to pharmacists having experience with female patients being more receptive to discussing non-adherence than male patients.

The number of days late (or early in the case of hydrocodone) was significant for all three question types (Table 4.18). Days late is a common means for pharmacists to identify non-adherence. Pharmacists reacted to days late for all three question-types,

although most strongly for asking about reasons for non-adherence. Days late appears to be an important activator for pharmacists engaging in medication monitoring, more so than a patient of advancing age. Pharmacy workflows, however, often do not make this information readily available to the pharmacist. The present study provides qualitative and quantitative evidence that pharmacists often are not examining the patient profile when checking refill prescription (Table 4.3, Table 4.5). Thus, prescriptions are being handed off to the patient without the pharmacist considering if the prescription is late. Some pharmacies use mechanisms such as creating handwritten or computerized notes to alert staff of late prescriptions or block dispensing until a pharmacist can intervene, although such solutions have not been well documented or tested.

#### Environmental Factors

The number of patients waiting was important to pharmacist question-asking. This finding from the factorial survey (Table 4.18) corroborates the qualitative analysis which found that pharmacy busyness was a deterrent to pharmacist monitoring. Other simulation and observational studies in the pharmacy practice literature have shown that busyness is a barrier to counseling (Schommer & Wiederholt, 1994a; Svarstad et al., 2004). Shah (2006) found that busyness had a stronger effect on refill counseling compared to new prescription counseling, suggesting that refill counseling seems more discretionary.

This image of a busy pharmacy appears to be deterrents to medication monitoring in community pharmacy. Bitner suggests these images are important to how customers (or patients) perceive the level of service provided by a firm (Bitner, 1990). If pharmacies want to engage in more medication monitoring, it may be advisable to better manage this image. Pharmacists in multiple settings appear oriented to monitoring, given appropriate environmental conditions. Empowering these pharmacists may become more desirable to

pharmacies as they begin to be evaluated and incentivized based on quality metrics (Nau, 2009).

Short staffed was an important deterrent for side effect and efficacy questions, but not for non-adherence (Table 4.18). This supports that these questions may be seen as more discretionary and subject to the pharmacist having more staff support. This is in contrast to non-adherence questioning which may be more robust to staffing levels because there is objective evidence of the need to interact based on number of days late. The pattern differences for these environmental factors support the ability of the factorial survey method to uncover tendencies that may be socially undesirable or difficult to access directly.

### Drug Factors

Pharmacists were most likely to ask non-adherence questions related to warfarin and hydrocodone (Table 4.18). The importance of warfarin likely was due to the potential seriousness of non-adherence to this medication as far as increased risk of stroke. Interestingly, after adding an interaction term between hydrocodone and days late, pharmacists also found refilling hydrocodone early to be of a similarly high level of concern. This corroborates findings from the qualitative interviews where interviewees expressed a high level of concern related to patients refilling narcotics too early and wanting to identify cases of prescription drug abuse. Less important was asking questions about metoprolol and fluoxetine. These medications may be perceived as less risky and pharmacists may be more likely to let these routine medications pass through the dispensing process in busy community pharmacy settings.

For asking about side effects in the factorial analysis, warfarin and hydrocodone had the highest question-asking likelihoods (Table 4.18). Days late remained significant, although with a smaller impact than with the likelihood of asking an adherence question. A possible explanation is that a late prescription may be late because the patient is having

a side effect, and the pharmacist wants to inquire along those lines. For hydrocodone being early, however, it is unknown what this means. It may simply be a spurious effect of the regression, or respondents may have, for example, deemed “ask about side effects” to include “ask about pain level” or “recommend stool softener because of increased use.”

For asking about effectiveness, respondents were most likely to ask about hydrocodone with warfarin, metoprolol and fluoxetine having a significantly lower likelihood. The prescription for hydrocodone was for a fairly large number of tablets to be used as needed. The pharmacists may have expected this supply to last longer and may be interested in asking the patient questions about his or her pain level, perhaps to recommend they pursue something stronger. Alternatively, respondents may have been concerned about prescription drug abuse or diversion and such investigative questions fell under the respondent’s conceptualization of “effectiveness.” This line of questioning and thought process was raised in one of the qualitative interviews. One interviewee was fairly vocal of this dual concern of wanting the patient to have adequate pain control, but for narcotics to not be over used by the patient or diverted.

The number of times previously filled was a significant vignette factor for side effect and effectiveness question-asking (Table 4.18). It appeared pharmacists were more interested in asking side effect and effectiveness questions earlier on, while the prescription was still relatively new to the patient. Once the patient has filled the prescription multiple times, it appears pharmacists are less interested in asking questions about these two topics. This pattern was supported by the qualitative analysis by a respondent who suggested “If it aint broke, don’t fix it.” This is not an ideal approach as research shows that, for various reasons, the proportion of patients at their various health goals (e.g. blood pressure goal) decreases over time. Also, side effects or safety issues present beyond the initiation period of a medication, for example with anti-diabetic medications. This seems to parallel the general finding that pharmacists are more likely to

counsel new prescriptions than refills (Puspitasari et al., 2009), which seems in part due to the pharmacist's natural affinity to focus on information-giving rather than question-asking (de Oliveira & Shoemaker, 2006).

Different medications may benefit from different monitoring approaches given these drugs displayed significantly different patterns. A one-size-fits-all approach may not be ideal for addressing the large number of prescriptions (including narcotics) available to patients. This variation was expected based on the pharmacists in the qualitative interviews gravitating more toward warfarin and hydrocodone compared to fluoxetine and metoprolol. Interviewees believed they could expand to monitoring blood pressure, for example, but there were important barriers including a lack of time.

#### Past Interaction and Relationship Factors

The pharmacist-patient relationship was not well modeled in the current vignette approach. Knowing the patient by name versus not being very familiar may have been too similar for pharmacists to differentiate when weighing vignette characteristics and assigning question-asking likelihoods. A more vivid description may be necessary to test the importance of past interaction in question-asking likelihood.

#### Common Vignette

Several findings can be gleaned from the common vignette involving simvastatin. First, asking non-adherence and side-effect questions was more common than asking effectiveness questions (Table 4.11). This result may be due to the vignette posing a medication that is multiple days late and at a relatively high dose. For effectiveness, the prescription only had been filled one time, so there would be little reason for asking about change in cholesterol levels as these generally are not retested for 6 months. This also may explain the much lower  $r^2$  value associated with asking questions about effectiveness (Table 4.12). In hindsight, changing the vignette to have the prescription been previously filled 6 times likely would have yielded better information. Even then, it is unknown to

what extent pharmacists expect patients to be aware of their cholesterol levels (or blood pressure, blood glucose levels) and ask an effectiveness question, although beyond the scope of the present study. This at least demonstrates that the pharmacists were providing thoughtful responses to the vignettes, especially since the common vignette was the final vignette presented to the survey respondent.

The common vignette reiterated the importance of pharmacist monitoring attitude and the surprising inability of discrete pharmacist factors such as setting, degree, and number of other pharmacists to significantly explain the variation in the likelihood to ask a set of medication monitoring questions. This suggests there are pharmacists in multiple community pharmacy settings that are oriented to medication monitoring, provided they have an environment conducive to medication monitoring. The variation reiterates that there also are pharmacists in multiple settings who do not identify with this role. The mutability of the MMAM internal domain provides an opportunity for future study.

### Limitations

Pharmacists willing to participate in the interviews generally were positive toward interacting with patients. Pharmacists who were not willing to participate in the interviews may have had different views than the pharmacists in the present study about interacting with patients and medication monitoring. While age was not collected for the qualitative interview respondents, the earliest year of first licensure was 1987 (Table A1). Pharmacists receiving their degree in the decades prior may have different perspectives and lived experiences concerning medication monitoring. Similarly, while the target response rate was achieved for the survey, non-respondents may have different characteristics than respondents. There was meaningful variation in monitoring attitudes and behaviors among participants which suggest a range of pharmacists responded to the survey.



The factorial vignettes were not intended to test behaviors, rather, they were used to assess behavioral intention. The likelihood numbers supplied by pharmacists also may have been influenced by norms or ideals. Regardless, this study provides a starting point for investigating medication monitoring decision making, and attitudes in community pharmacy. Another concern with the factorial survey is satisficing with the three question asking likelihoods. Some respondents put the same likelihood for all three question types. The present analysis does not quantify this pattern, but it may have made parameters more difficult to estimate. Future factorial surveys should carefully consider the potential for satisficing. Asking more varied questions with different measurement scales could have forced the participant to shift his or her frame of thinking for a given vignette. This could help keep the participant more engaged and providing well thought-out responses. Also, including more vignettes per respondent would help with the power of the hierarchical analysis. The low response rate of the longer pilot survey, however, suggests pharmacists may need greater incentive for completion of more vignettes or a greater interest in the topic.

The dimensionality of the medication monitoring attitude measure in the present study was both established using the survey sample and used as independent variables on the same sample. Also, the current MMAM did not sample the entire domain of medication monitoring attitudes due to space restrictions on the mailed survey.

#### Transferability of Qualitative Findings

A variety of pharmacists were recruited for the interviews and all were relatively open and willing to share their perspectives. Numerous pharmacists were not willing to participate and their perspectives on medication monitoring may differ. It is possible the same characteristics that led to someone's willingness to take part in an interview about community pharmacist medication monitoring may relate to their perspectives on medication monitoring. While participants in the interviews shared some sentiments

related to negative internal and external monitoring attitudes, non-participants may have had other experiences and perspectives that may have resonated more with some of the survey respondents. Ultimately, this is a limitation of the present study. Future work could use purposeful sampling using the current measure to sample pharmacists on the entire range of the MMAM and engage in additional interviews. Such a sampling strategy of iteratively revisiting the instrument with different stakeholders is consistent with a mixed methods instrument development process (Onwuegbuzie et al., 2010).

### Methodological Considerations

#### Factorial Vignettes

Aim 3 in the present study used a factorial survey design to investigate how attitudinal and contextual factors relate to monitoring likelihood. The factorial survey design is a powerful tool that has been used with success in the nursing and medical literature to investigate decision-making, norms, and evaluations (Jasso, 2006; Lauder, Anne Scott, & Whyte, 2001; Ludwick & Zeller, 2001; Müller-Engelmann, Krones, Keller, & Donner-Banzhoff, 2008; O'Toole, O'Toole, Webster, & Lucal, 1993; Rossi & Anderson, 1982). This technique had yet to be used in its full extent in pharmacy research.

Past interactions and relationships were difficult to model using a factorial vignette design, which is unfortunate as it was a prominent concept in the qualitative analysis. Relationships are personal and an overall attitude about patient relationships may not have been easily accessible given the generic prompt of “know by name.” Greater thought and experimentation is needed for relationships to be included as a meaningful variable in factorial vignettes.

Overall, the factorial survey design yielded significant, reasonable, and interpretable results that would have been difficult to gather using simpler vignette designs used previously in the pharmacy practice research on new prescription

counseling or by using secret shopper methods (Schommer & Wiederholt, 1994b). Future uses of factorial surveys in pharmacy can include the testing of theoretical propositions and understanding of clinical decision-making processes (e.g. dosing decisions).

Due to space and perceived response burden limitations, only 5 randomly populated vignettes were included on each survey. This left only 4 degrees of freedom for the random intercept associated with pharmacist characteristics to be estimated. This decreased the precision of the pharmacist-level estimates. Future studies using factorial surveys should include more vignettes.

#### Medication Monitoring Attitude Measure (MMAM)

The present study offers significant methodological contributions to the study of medication monitoring and the field of pharmacy by creating a new measure of medication monitoring attitude. Future studies, including those involving physicians, nurses, and other providers, can use a modified version of the new measure to attribute variation in behaviors to the strength of their monitoring attitude. Adding additional items, greater refinement, and different samples can help to further develop the utility of this measure.

#### Mixed Methods Item Generation

The present study advances the use of mixed methods research in pharmacy by using published methods for creating attitudinal items using a mixed methods item generation table as a structure for data display. As mentioned previously, a challenge encountered in this process was the limited space of the mail survey. The constrained space resulted in only items from the mixed methods item generation process being used in the MMAM. Additional items from the literature or researcher experience were not included in the measurement development process in the present study, but could be included in subsequent work.

### Qualitative Methods

The present study advances discussion of rigor in qualitative research by using the validation supporting procedures of check coding, contact summary forms, and pattern coding (Miles & Huberman, 1994). The sequence of using contact summary sheets, coding, and check coding provides documentation of the researcher's qualitative analysis process. The PI used the check coded transcripts to revisit the qualitative analysis and make revisions to interpretations and focus. Examining these additional perspectives also gave the PI several ideas for additional ways to analyze the qualitative data set rather than conflicting the original interpretations. For example, the data could be analyzed to compare "pharmacist data" and "patient data" or pharmacists using "pharmacist-centered" language compared to "patient-centered language."

### Behavioral Pharmaceutical Care Scale (BPCS)

While pharmacist attitudes were positively correlated with BPCS scores, there was significant unexplained variation. The items asking about "patterns of use" and "therapeutic goals" may not have been accurately measured because the terminology may not be familiar or accessible to the respondents. While there was variation in the reporting of these monitoring activities, the values were skewed toward inaction. Of the 248 individuals that responded, 54 reported 0's for all activities. The results of the present study which found a median of 1 for each of the four BPCS items are similar to the original validation of the BPCS where the median score for the "patient assessment" also was 1 per item (although the original domain included two additional items) (Odedina & Segal, 1996).

Interestingly, one respondent reported asking all four questions to the last 5 patients who presented for refills of maintenance medications. This seems surprising based on the qualitative interviews and may suggest either satisficing or misinterpretation of the question set. Perhaps some respondents interpreted the question as

“Of the last 5 patients with whom you interacted” versus “Of the last 5 patients who presented refills at the pharmacy.” Also, these instructions may be somewhat outdated as few patients actually request refills in person, rather, they commonly call the pharmacy or use the internet to request medication refills.

### Health Collaboration Model

Overall, the Health Collaboration Model was useful as a framework for investigating pharmacist medication monitoring in community pharmacy practice from the perspective of community pharmacists. Previous studies using the HCM have focused on pharmacy systems and intervention design (Bultman & Svarstad, 2002; Rickles et al., 2005; Svarstad et al., 2013). The broad categories of patient, provider, environment, drug, and past interaction served as useful a-priori codes, without being overly prescriptive. Sub-codes grounded in the experiences and language of the respondents fell naturally underneath the broader HCM domains.

The HCM is primarily focused on medication adherence (Svarstad & Bultman, 2000). Given the present study and the enhanced monitoring model by Steinman (2011), it may be useful to expand the outcomes of quality monitoring from focusing exclusively on adherence as a means to improved patient outcomes, but also to include identifying and managing side effects, and monitoring and problem-solving related to medication effectiveness. Pharmacists in the present study considered asking side-effect and effectiveness questions important when prescriptions are late. This reinforces modifying the conceptualization of the HCM as pharmacists appear to view side effects and effectiveness as important questions involved with medication monitoring.

Additional modifications to the Health Collaboration Model could include adding the domain of “technology” to the factors affecting medication monitoring as technology can be a useful means to collect and provide medication monitoring information to health care providers. Another concept which may be useful to specify in the model is

collaboration between providers and a process important for quality monitoring. Collaborative models of care such as Accountable Care Organizations and Patient Centered Medical Homes have been designed to capitalize on the different foci and expertise among different providers (Rittenhouse & Shortell, 2009; Scott et al., 2011; Stange, Nutting, Miller, Jaén, & Gill, 2010). Explicitly including these concepts in the HCM could be useful when developing interventions.

### Future Research

#### Adherence Interventions

Community pharmacists have unique access to prescription dispensing records which provides information if a prescription filled is early or late. Interventions could be designed to make this information more accessible to pharmacists so the pharmacist does not have to rely as heavily on memory or “gateway conversations” related to technical issues. Creating interventions based on non-adherence also appears to promote the assessment of safety and effectiveness issues as shown in the results of the factorial survey analysis.

Moving forward, it may be useful to use technology to more regularly and systematically collect patient information to increase the amount of information available to pharmacists while not extending the amount of time the patient has to wait in order to talk to a busy pharmacist. A touch-screen computer or tablet could be programmed to collect information about a patient’s medication use experience and then integrate this information into the dispensing process to spur and focus pharmacist-patient interaction.

#### Pharmacist Adherence Attitudes, Perspectives and Approaches

Related to adherence interventions, it also appeared that some pharmacists may have a limited perspective on reasons for non-adherence, focusing heavily on technical

reasons such as the patient must be getting the medication somewhere else, or the patient was hospitalized, rather than medication beliefs. Understanding the community pharmacist beliefs about patient non-adherence could be useful for designing educational interventions or practice based interventions to increase the likelihood that pharmacists are investigating medication beliefs and managing them in a constructive, evidence-based manner consistent with patient-centered care. Surveys and observations can be used to gather data on pharmacist adherence perspectives and actions.

One example of a communication approach for community pharmacists is motivational interviewing (Miller & Rollnick, 2002). Pharmacists have successfully used this approach to work with patients in tobacco cessation program and diabetes adherence (Dent, Harris, & Noonan, 2007; Martin & Chewing, 2011; van Eijk-Hustings, Daemen, Schaper, & Vrijhoef, 2011). This approach, focused on open-ended questioning, seeking to understand, and empathetic responding could be useful in addressing non-adherence in a productive, non-judgmental way. Experts have proposed that pharmacists adopt a more patient-centered approach to communicating with patients (Chewing et al., 2001; de Oliveira & Shoemaker, 2006).

#### Technicians and DUR Messages

The interviews suggested technicians may be ignoring DUR messages about days late and only focusing on safety issues or prescriptions that have messages preventing processing without a pharmacist override. Technician may assume that since a warning was bypassed when originally entered, that it can be bypassed again. It may be useful to assess these technician attitudes and behaviors of processing refill prescriptions. Interventions could focus on modifying work processes with the goal of getting more key monitoring information (such as days late) to pharmacists for their professional evaluation.

### MMAM Research

More research is needed to refine the conceptualization of the MMAM. Additional interviews and items are recommended prior to retesting the measure, including items influenced by the literature. Since medication monitoring has been shown to have an attitudinal component independent from demographic and workplace characteristics, a next step is to expand the application to other health care professionals.

Some of the items from the mixed methods item generation process were specific to prescription refills which may not be relevant to every pharmacist or health care professional. Additional research is needed to investigate medication monitoring attitudes among other types of health care professionals, including clinical pharmacists, physicians and nurses. Also, this sample only included pharmacists from one mid-western state.

Once the MMAM has undergone additional testing and revision, it would be appropriate to use the measure to predict new dependent variables, ideally actual practice behaviors. Also, to expand understanding of the role of medication monitoring attitudes by using social-psychological theory such as the Theory of Planned Behavior or Social Cognitive theory instead of, or in addition to a structure-process-outcome model such as the HCM. This would allow for the testing of theoretical propositions related to attitude. Another area to explore is why some pharmacists are more monitoring focused than others, as the basic demographic characteristics of the pharmacists were not significant predictors of their internal medication monitoring attitudes. Another step would be to investigate the mutability of these attitudes through PharmD education and continuing professional development.

### Controlled Substance Monitoring

Evidence from the factorial survey analysis and the qualitative interviews suggest controlled substances like hydrocodone receive a high level of attention from pharmacists with regard to medication monitoring. Some interviewees seemed very sensitive to



prescription drug abuse in their practice role. Research suggests pharmacists have knowledge gaps in their understanding of addiction and pain control, and have concerns over long term opiate use by patients and robbery (Greenwald & Narcessian, 1999; Lafferty, Hunter, & Marsh, 2006). It may be prudent to further investigate how pharmacists approach controlled substance monitoring with the objective of ensuring that pharmacists are using constructive means to ask questions and problem solve for these patients. It is possible that pharmacists may be providing a lower level of care to patients with whom they believe are misusing controlled substances, a phenomenon known as moral disengagement (Lee, Segal, Kimberlin, Smith, & Weiler, 2013).

#### Patient Openness to Medication Monitoring

Efforts to more strongly orient pharmacists to adopting a medication monitoring role ultimately may not precipitate improvements to patient health if patients are not receptive to pharmacist-provided medication monitoring. Research has shown that patients primarily see pharmacists as sources of information rather than medication monitors (Tarn, Paterniti, Wenger, Williams, & Chewning, 2012). In another study, the majority of patients reported wanting additional information from pharmacists at the time of refill, but only a small percent during refill counseling, but only 5% were interested in the pharmacist providing monitoring guidance (Krueger & Hermansen-Kobulnicky, 2011).

Research has demonstrated that patients can be trained to have higher expectations of pharmacists in the dispensing process (Chewning & Schommer, 1996). More work is needed to explain the value of community pharmacist medication monitoring to patients and for pharmacists to provide quality monitoring. An additional caveat is to encourage pharmacists to engage in monitoring beyond the first few refills. This initial period appears to get more attention from pharmacists, but problems with non-adherence, safety, and effectiveness can emerge later on as well. A logical first step

is to better understand what patients want from community pharmacists with regard to medication monitoring in the dispensing process and beyond, and how pharmacists can better address the patients monitoring agenda. Research in this can help address the “patient feedback domains” of Steinman’s monitoring model and in the Health Collaboration Model (Steinman et al., 2011; Svarstad & Bultman, 2000).

### Practice Implications

Pharmacists in all settings had positive monitoring orientations. This should encourage pharmacies to design initiatives to increase the frequency and quality of monitoring in community pharmacy. Engaging pharmacists in medication monitoring is particularly relevant given increased attention on quality by entities such as Medicare Part D, patient-centered medical homes, and accountable care organizations. Pharmacies can work to improve quality metrics such as patient adherence to blood pressure medications.

“Days late” is one of the most accessible pieces of medication monitoring information available to community pharmacists. Pharmacists, however, often are not using this information to initiate discussions about non-adherence, which is a significant problem in the United States. Technicians can be used to alert pharmacists when prescriptions are late. Pharmacists are busy and initiatives need to take this into consideration when designing non-adherence interventions. Once interacting based on non-adherence, pharmacists can probe into other monitoring areas such as side-effects and effectiveness.

Pharmacists expressed interest in asking monitoring-related questions. It may be useful to bolster this effort with patient-centered communication strategies such as motivational interviewing. Such strategies have been useful for improving communication quality and outcomes using various providers, including pharmacists (Anderson, 2007; Miller & Rollnick, 2002; Ogedegbe et al., 2008; Possidente, Bucci, &

McClain, 2005; van Eijk-Hustings et al., 2011). Also, adherence screeners, question guides, and adherence tools may be useful for collecting patient beliefs and guiding interactions. Pharmacists should be trained against rationalizing non-adherence, which may be a barrier to interaction and to seek out the patient's perspective.

This study corroborates evidence that pharmacists experience stress and overload in their jobs and that community pharmacists desire additional time to interact with patients discussing medications (Mott, Doucette, Gaither, Pedersen, & Schommer, 2004; Schommer et al., 2006). Pharmacies should take steps to increase pharmacist medication monitoring to promote patient and pharmacist satisfaction. The number of other patients waiting in the pharmacy was a deterrent to question-asking likelihood. Pharmacies can pursue steps to manage how the busyness of their pharmacy is perceived by patients. Supporting pharmacists with technical staff and one or more other pharmacist are strategies to facilitate monitoring. Increasing the use of robotics and technicians are common strategies to free pharmacists to do more cognitive, patient-centered tasks. However, there was evidence that pharmacists lacked important monitoring-related information, such as days late, when technical aspects of refill processing were delegated to technicians. Alternative mechanisms should be developed to ensure pharmacists are exposed to information about non-adherence so patients can be targeted for follow up as non-adherence appeared to be an important cue to pharmacist question-asking.

APPENDIX A  
CHARACTERISTICS OF INTERVIEW PARTICIPANTS

Table A1. Characteristics of Interview Participants

<b>Case</b>	<b>Pharmacy Type</b>	<b>Urban/ Rural</b>	<b>Male/ Female</b>	<b>Year of Licensure</b>	<b>FT/ PT</b>	<b>Float</b>	<b>Role</b>	<b>Percent staff</b>	<b>In person/ Phone</b>
P1	Chain	Urban	Male	2011	PT	Yes	Staff	100	In person
P2	Independent	Urban	Female	2006	PT		Staff	100	In person
IN1	Mostly Independent	Rural	Female	1993	FT	Yes	Staff	100	In person
IN2	Independent	Rural	Female	2001	FT		Owner	80-100	In person
CH3	Chain	Urban	Male	2010	FT		Staff	100	In person
CH4	Chain	Urban	Female	2009	FT		Staff	100	Phone
GR5	Grocery	Urban	Female	2010	FT		Manager	100	Phone
IN6	Independent	Rural	Male	1994	FT		Owner	25	In person
CH7	Small Chain	Urban	Female	2009	FT		Manager	100	Phone
IN8	Independent	Urban	Male	1987	FT		Owner	10	In person
IN9	Independent	Urban	Female	2004	FT		Staff	100	In person
IN10	Independent	Urban	Female	2005	FT		Clinical	50	Phone
GR11	Grocery	Rural	Female	1990	PT	Yes	Staff	100	Phone
IN12	Independent	Rural	Female	1999	FT		Staff	100	In person

## APPENDIX B

### INTERVIEW GUIDE

#### Semi-structured Interview Guide

1. Introduction, review exempt information sheet, Demographics
    - a. Full time/part time/float/manager/owner
    - b. Degree/residency/training?
    - c. Have you always practiced in community pharmacy?
    - d. How long have you worked at this pharmacy?
    - e. Store volume
    - f. Staffing levels
  2. Tell me about a memorable time where you helped a patient who had been taking a medication for a chronic condition.
    - a. How did you identify that problem?
    - b. What steps or activities were involved?
    - c. What about the situation made you engage with that patient?
  3. What are your thoughts about talking to patients when they come in for on-going medications, or refills?
    - a. How do you perceive your role with refills?
    - b. How does medication monitoring fit into that role?
  4. What triggers you to ask questions of a patient when they are getting a repeat prescription?
    - a. What drugs are most important to check in with patients about?
    - b. What about certain patients make you want to talk to them or ask them questions?
    - c. What personal characteristics of yourself make you talk to patients or ask questions?
    - d. What do you think patients want or expect when they come in to pick up a refill prescription?
    - e. What about your environment or workplace influences you talking to patients about their on-going medications?
      - i. Staffing, workflow, or workload
  5. (Restate monitoring-related activities activities) What other activities or in what other ways do you monitor patient medications?
  6. (If needed) Tell me about some discussions you have recently had with patients about chronic medications.
    - a. Tell me about a time when you thought a patient may not be taking the medication as prescribed.
    - b. Tell me about a time when you thought a patient may be at risk for a safety problem or side effect.
    - c. Tell me about a time when you thought a patient may not be taking a medication that was working for them.
  7. Is there anything you want to add that we haven't talked about already?
-

APPENDIX C  
RESEARCH QUESTIONS IN RELATION TO INTERVIEW  
QUESTIONS

Table C1. Aim 1 Research Questions in Relation to Interview Questions

<b>Research Question</b>	<b>Interview Question or Probe</b>
Aim 1 RQ1: What activities do pharmacists do to monitor their patients' chronic medications?	2, 3
Aim 1 RQ2: How do pharmacists perceive their role at the time of refill and how they believe medication monitoring fits into that role?	5, 5a, 5c, 6e
Aim 1 RQ3: How do pharmacists perceive that contextual factors (patient, provider, drug, environment, past interaction - from HCM) influence their medication monitoring activities?	4, 5b, 5d, 6a-d

APPENDIX D  
CONTACT SUMMARY FORM

Subject \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_  
Location \_\_\_\_\_ Duration \_\_\_\_\_

What were the main issues or themes that struck you in this context?

Summarize the information you got (or failed to get) on each of the questions.

Question	Information
2) Memorable	
3) Problems	
4) Monitoring	
5) Pharmacist role	
6) Triggers	

Anything else that struck you as salient, interesting, illuminating or important?

What new (or remaining) questions do you have for the next interview subject?



APPENDIX E  
INSTRUCTIONS FOR CHECK CODING

Instructions for “Check Coding”

Thank you for agreeing to “check code” a transcript for my dissertation. Please look over the attached transcript with the goal of highlighting passages that you believe relate to “medication monitoring.” Medication monitoring has been defined as *pharmacist actions that promote safe and effective use of medications following the patient’s use of a drug product*. This can include patient education, asking a range of questions about a patient’s medication experience, and identifying and managing side-effects, non-adherence, and ineffective therapies.

Please mark quotes or passages that relate to medication monitoring. You don’t have to mark everything, just the quotes that really capture something interesting. These could be actions, pharmacist role perceptions, barriers, facilitators, other environmental factors, and other areas.

Medication monitoring is different from initial medication counseling that happens with new prescriptions. Medication monitoring is characterized by patient specific information gathering and interpretation which is related to the unique experience of the patient. Initial counseling, on the other hand, relates more to the appropriateness of the initial prescribing decision and providing general education

Please use the highlight or comment function to identify any passages that you think relate strongly to this idea and provide a brief explanation of how this passage relates to monitoring. I’m hoping you find reading a transcript and commenting on it to be enjoyable, and that you not spend more than an hour commenting on the transcript. The transcripts already have been coded and that is not the goal of this exercise. Rather, I am looking to make sure our general interpretations and takeaways are similar.

Thank you. Please let me know if you have any questions.

Matt  
Matthew-witry@uiowa.edu

APPENDIX F  
 CODES AND REPRESENTATIVE QUOTES FROM QUALITATIVE  
 ANALYSIS

Table F1. Codes and representative Quotes from Qualitative Analysis

<b>Code</b>	<b>Quotation</b>
Pharmacist- Helping	<p>I want good for people. I want them to have a good outcome and if there's a way that we can do that I think ... if there's something little we can do or if it's a quick double check to make sure ... look again. If we can do that upfront to help them I think that's probably my biggest thing. I really care about people and I want them to have a good outcome and feel better and hopefully we can help them in some approach. IN12</p> <p>I think it's my concern for patients, my responsibility. I think I just feel this tremendous responsibility that as a pharmacist, what is my job. What is my responsibility to the patient, I know this much, I need to make sure that the patient's, just the basic thing, that their medications are safe and effective. And the only way I can do that, is if I'm asking questions and if I can be, and again, asking good, informed, good open-ended questions where you get good information. IN8</p>
Pharmacist- Skill	<p>I like a puzzle too, so sometimes it's kind of intriguing to think, well what's going on here. IN1</p> <p>Yeah, the good Lord blessed me with the ability to talk. I feel I'm a much better talker than I am a pharmacist. I'm pretty confident in my skills as a pharmacist but I've been talking a heck of a lot longer than I've been a pharmacist. IN6</p>
Environment- Busyness	<p>The volume that we're doing is so large that you don't really have the time to physically open everyone's profile and completely scan, you know, these are their maintenance medications, this is what they're taking all the time. CH3</p> <p>I would want to change how long I have to talk to each patient. Unfortunately, in most community pharmacy environments I've worked in, it would be nice to be able to dialogue with those patients that are on five to ten medications and discuss them more in detail on a regular basis, in terms of how they're working or they're having any problems. Unfortunately we really don't have the time in our day to do that. CH7</p>

Table F1. Continued

Code	Quotation
Environment- Values	We're here to care for people, we want them to come back and we want to connect with them. That's where I feel supported that if I do have to take a couple of minutes ... it's getting hectic over there, but someone else jumps in, because the next time I'm going to help them, so they can provide the same level of care. IN12
Patient- (Dis)interest	They're one way or the other. They probably prefer to be not counseled at all. But I think most, I think most patients would be open to...to a little bit longer with the pharmacist I guess. GR5
	"I've been waiting for like, ten minutes, why isn't it ready?" And it's come to the point where it doesn't matter what you're doing, or that you're trying to make sure they're safe, that it's filled correctly, that you're processing all of these things, the things that go into their medical history. To them it's just like a hamburger. CH4
	For the most part I think patients come to us because of what we do, what we provide. And so no, our patients are seldom rushed. I think our patients are patient, I think they want us to spend the time with them. I think a lot of patients are disappointed if we don't give them the time that they want and need. So, yeah, patients that come here, they're not shopping, they're loyal and their looking for the service that we can provide. And that's why I think we're able to survive with the pharmacies all around us, because we provide that little extra value. IN8
	Honestly I think the other big problem is drive thru. I think having a drive thru pharmacy, is, killing... not so much killing pharmacy as a practice, but, people just, people don't care about their medications anymore. CH3
	Rarely do I get called over for a refill, for a patient that has a question, maybe like once a day or so. So usually they don't ask questions on refills. GR5
Patient- Confusion	You don't want to stereotype, but at the same time, the lower socioeconomic classes have less education. Some medication regimens are pretty complex. I'm more likely to spend more quality time with an individual like that than I would, say, an attorney We're much more likely to spend more time with them, trying to make sure that they understand what they're supposed to be doing. That's not at the expense of the individual, I brought up the attorney earlier. My brother in law is an attorney. He's a smart guy. But at the same time, he's got no idea what health care is about. Anytime you take a drug, he can still mess it up. IN6

Table F1. Continued

Code	Quotation
Drugs- Routine	<p>I know we should, legally, we should be counseling on every prescription, if it's a year later, we need to be doing that, but it's difficult, and a lot of our patients will just flat out tell us, they've been on it. You know, kind of frustrated. IN9</p> <p>If it's a refill and it's something that they've been on, um, you know, for 6 plus months, you probably honestly aren't going to ask how things are going, because it, it, kind of the old adage, if it ain't broke, don't fix it, they seem to be doing okay, they haven't mentioned any issues, IN2</p>
Drugs- Abuse	<p>If it's a refill and it's something that they've been on, um, you know, for 6 plus months, you probably honestly aren't going to ask how things are going, because it, it, kind of the old adage, if it ain't broke, don't fix it, they seem to be doing okay, they haven't mentioned any issues, IN2</p> <p>In my previous role at the other pharmacy I worked at, medication monitoring was ... a primary component of that was monitoring for abuse, specifically for controlled substances. CH7</p> <p>We are very fortunate that we don't have a lot of it in this community, or at least that's coming to [this pharmacy]. But that doesn't mean that it's not very real. IN2</p>
Past Interaction- Relationships	<p>It's very important to me. Especially at the volume do it, it's important to have continuity between one day and the next. If this is a revolving door of pharmacists, it's hard to follow-up on issues, and I think it's hard for patients because they come in and they see a different face every day, so at our location we're fortunate to have more or less two of the same people there day-after-day, which is nice for staffs the we work with, and also it's very nice for our patients. CH7</p> <p>But they are much more willing to ask you. You get more in depth questions just simply because you've taken the time to grow that relationship. IN6</p>

Table F1. Continued

Code	Quotation
Monitoring- Definition	<p>Medication monitoring. Well I think of that as kind of a maintenance thing. If we have somebody that's going to be on a daily medication, how is it working for them? If it's blood pressure is it effective? Are they having side effects? I think a lot about it as review and checking in from time to time and making sure with what we do. I feel the doctors can do that with labs and such, but from our standpoint are they staying on it? Are they having any side effects? If we can take their blood pressure is it ... give them another number that's end goal between now and their doctor's office. To me that's kind of what I think of. IN12</p> <p>It's an ongoing process, and there's not a beginning or an end, it's a constant, for a lack of a better term, it's not a snapshot it's a movie. Every encounter built on another encounter, and you just have to be proactive and make sure the patient is getting the monitoring they need from a lab perspective, but also making sure they understand what the medications are doing. And ah, not having an adverse event associated with it. IN8</p>
Monitoring- Pharmacist Question-asking	<p>I think there's a trust factor that's built into that too where the patient sees that we're doing everything for them through this, to the point where, they can come to us and say, hold their med set up and say, "which pill in here is making me tired?" Okay, let's look through that. IN9</p> <p>It's not something where I just pick a name out of a computer and say, "hey come, let's talk about your meds and see what we can do." It's all with people that I've talked to in a different encounter. IN9</p> <p>Speaking specifically for myself, I try to at least the first couple refills when somebody gets started on a new medication, I counsel them on it. A month later they're back. I try to have some targeted questions. I'll pick on the statins for example. Have you noticed any muscle pain or what have you? Have you been drinking grapefruit juice or anything like that just to kind of remind them. IN6</p>
Monitoring- Technology	<p>I know this is just a refill, but do you have any questions for me? CH4</p> <p>If that days-supply warning hadn't popped up, or I hadn't noticed the billing, I don't know how long she would have been using both. I mean, she was using it like candy. And, hopefully there was no harm, but she was clearly getting a lot more than she needed. CH4</p>

Table F1. Continued

Code	Quotation
Monitoring-Technology	The volume that we're doing is so large that you don't really have the time to physically open everyone's profile and completely scan, you know, these are their maintenance medications. CH3
Monitoring-Memory	<p>She was one where I had done when she transitioned to insulin. She had come in for her training. I think it was syringe training. I just knew in my mind from having seen her ... I think she was picking up a different medication, but I thought, "Oh, I hadn't seen her for a while." Was hoping that that was going well, so I just casually asked when I was talking to her about her other pick up, "How is that going by the way?" In my mind I just knew since she had been here for training, wondering how that was all going. She's been a long time patient of ours anyway, but it reminded me to ask "I wonder how she is getting along with that." I feel like that was a big transition for her. She did well in her training, but I just thought it was a cue maybe, just to check and make sure it was going okay. IN12</p> <p>A lot of it is memory. IN10</p>
Monitoring-Notes and Documentation	<p>[When a patient waits], you're more verbal with them... because they are right there, so you can ask them, you haven't got this in a long time... [I]n a more urban setting, you're [checking] it and they're coming in later so you'd have to put a note on the sack or something like that, so it would really have to trigger. IND1</p> <p>Honestly, our software that we have here is, just not conducive for that. It really isn't, so ah, so we don't document, not nearly like we should. IN2</p>
Monitoring-Helping at counter	I love to be at the second counter right behind the registers, so I can hear those responses. If I hear any customer that sounds like they're misunderstanding or confused at all, I can jump in and say, "let's double check that." IN9
Monitoring-Helping at counter	<p>What percent does the pharmacist do the handoff? Probably ninety percent. Yeah, the pharmacist, it's not that my technicians can't help, but 90 percent of the time, it's a pharmacist who is handing out. And we always show them their pills, that way they can see, and out of that time frame, I would say probably about 50 percent of the time it's, any questions? How are things going? Does it happen with every single one? No, it sure doesn't, but you know, every so often you just say, how are things going, are you feeling okay? Are you having any of these side effects? So, you figure, we do that, pharmacists hand them out 90 percent of the time, fifty percent of that is probably, so probably 45 percent, honestly, is where we ultimately ask how things are going. IN2</p>

Table F1. Continued

Code	Quotation
Monitoring-Gateway Conversations	<p>Usually it's when they talk about pricing. I'll pull it up and be like, "let's see what it was last time... You haven't gotten your Advair since 2010." And then I'll ask, "What's going on?" IN9</p> <p>I also interact with them, we see a lot of, manufacturer change, and so, you know, we put a sticker on and you try to show them that it's changed, or whatever. I use that as a trigger to interact with them on a refill. IN1</p>
Monitoring-Technicians	<p>I feel really lucky in our technicians. We had some technicians that are around for very long time and they know what we like to do. They know they have to spend time, so they'll put it this way, "I already told them they have to come back there." It's nice to be supported in that and the others are doing the same things in practicing the same way. IN12</p> <p>I think the technicians are mostly looking at those notes and probably notifying the pharmacist when they identify a problem and I don't know that it's been on their radar with the changes to workflow, to really alert the pharmacist of the late refills. They are looking more for interactions, drug-drug interaction responses. And there are a lot of false positives on those refill responses. P2</p>
Monitoring-Adherence	<p>So our technicians, every time they fill a refill, the technician will put on there whether it's late or early. Our dispensing software, as soon as you pull up the prescription, there is a spot, there that says, late refill, early refill, and the technician, that's just part of what they do, they look, and they put E1 or L9. IN10</p> <p>Monitoring for their compliance, which is really easy to miss, because you fill so many scripts, you know. Oh they haven't filled this in three months, they're clearly not taking it like they should be, and I'd say that's probably the one that gets looked by the most. CH4</p> <p>I think probably the biggest for me is, those times where I see a message that pops up that somebody's late refilling something and I don't do anything, I just assume, "eh, they probably don't like it, they probably get it somewhere else, they don't..." Whatever. I don't ask that question. Those are probably my biggest problems, just because, I know better, but it's that efficiency. When you've got 300 scripts you gotta do in a day, do you have time to call everybody who's late refilling? IN9</p>

Table F1. Continued

Code	Quotation
Monitoring- Effectiveness	<p>I had a patient that was on a blood pressure medication, had been taking it for a very long time and I happened to be ringing her up, and I asked, you know, this is a refill, do you have any questions for me at all. "Yeah, actually, the last few weeks I've been very lightheaded, I don't know what's going on." So, we kind of talked about it, has anything changed, Well it turns out her doctor recently upped a dose on a different medication, not the one in particular that she was picking up, but a different medication she was also using. And it had been about that long since they had changed her dose, and she hadn't really thought of that, and she clearly wasn't tolerating that change. CH4</p> <p>If I could ask that patient what was your last blood pressure and where do you think it should be, every single time. So that the patients are becoming in tune to what that number is and what it should mean. IN10</p>
Monitoring- Cost	<p>People always are kind of excited, or happy to save money, but they're also, you know, a little, is it really the same thing, have these questions, well we can have an opportunity to talk to them about saving a little money, CH4</p> <p>There may be a patient that we find out the circumstance may involve money, they can't afford it. Then we kind of know that we need to remind them, you know is there anything we can do to help get the cost down, because we notice you're not really getting your meds on time. I'd say that probably happens weekly. CH4</p>
Monitoring- Technical Issues	<p>It's a refill we want to double check. Is this really supposed to be a different ... a change or we can verify those through a note. They might have some discussion that ... while they're waiting for us, that they can share, but they almost always come and get us and make sure we talk. IN12</p> <p>I was checking some prescriptions for a patient that we package all their medications for them, um in compliance packaging, and the last time we filled it the directions were every 6 hours, and on the refill it was every 12 hours, so um, it was right after five o'clock, so I left a note for the other pharmacist who is working today to follow-up, you know, is this really supposed to be a change from four times a day to twice a day. P2</p>



APPENDIX G  
MIXED METHODS ITEM GENERATION TABLE

Table G1. Mixed Methods Item Generation Table

<b>Item</b>	<b>Code</b>	<b>Quotation</b>	<b>Item</b>
1	Refill Counseling Attitude	I don't counsel unless there is something very special.	I don't interact with the patient on a refill unless there is something very special.
2	Medication Review	We're always, we DUR everything before it goes out the door.	I look at a patient's complete drug profile with every refill prescription.
3	Busyness	I know better, but it's that efficiency. When you've got 300 scripts you gotta do in a day, do you have time to call everybody who's late refilling? No.	I don't have time to talk to everyone who is late refilling maintenance medications.
4	Workflow	I think workflow does... If it's over on a wall far away from you, then I probably, my interaction is less.	My pharmacy workflow makes it easy for me to tell if a patient is late refilling a prescription.
5	Patient Interaction	Customer interaction? It's where you find out what's going on.	I look for opportunities to interact with patients picking up refills.
6	Refill Counseling Attitude	So there has to be something extraordinary that alerts me to an issue with the refill prescription.	Circumstances must be extraordinary for me to interact with a patient about a refill prescription.
7	Refill Counseling Attitude	The foundation of all that we do is still our therapeutic knowledge. So we have to be on our A game at all time.	I use my therapeutic knowledge when I dispense refills of maintenance medications.

Table G1. Continued

<b>Item</b>	<b>Code</b>	<b>Quotation</b>	<b>Item</b>
8	Adherence	We train our pharmacists because they are uncomfortable with the adherence, so a lot of our conversations start that way, you know, are you having problems, are you having any issues?	Talking to patients about non-adherence makes me uncomfortable.
9	Monitoring Attitude	I would say it's about fifty-fifty. I mean there are times, and it's not just me, you know it's all my pharmacists, well how are things going, do you have any questions? Are you noticing, are you feeling okay from this? Are you having any side effects? You know, and depending on what they're taking, have you noticed any dizziness? You know, somebody a couple months in on a beta blocker, how are you feelin'? Are you feelin' kinda sluggish or are you doin' okay?	Pharmacists should routinely follow-up with patients to see how their chronic medications are working.
10	Adherence	I think probably the biggest thing that his me is, those times where I see a message that pops up that somebody's late refilling something and I don't do anything, I just assume, "eh, they probably don't like it, they probably get it somewhere else." Whatever. I don't ask that question.	I get concerned when someone is late refilling a maintenance medication.
11	Effectiveness	Someone gets started on blood pressure medication, part of my counseling is to find out do they know what they're goal is, and to help them realize what their goal is. Maybe even so much as to help them understand what the two numbers of blood pressure actually mean.	It is my responsibility to ensure the patient's chronic medications are effective.

Table G1. Continued

<b>Item</b>	<b>Code</b>	<b>Quotation</b>	<b>Item</b>
12	Adherence	I think it's confrontational. It's kind of that traditional finger shaking type of thing.	I feel confrontational when I bring up non-adherence with patients.
13	Question-asking	It's just being inquisitive. Always asking open-ended questions, trying to engage the patient, making sure that they're giving you meaningful information. But you gotta ask meaningful questions.	In my position, I get to be inquisitive about how patients are doing on their medicines.
14	Side Effects	They can come to us and say, hold their med set up and say, "which pill in here is making me tired?" Okay, let's look through that. But it's not something where I just pick a name out of a computer and say, "hey come, let's talk about your meds and see what we can do."	The patient should be the one to start a discussion about side effects.
15	Question-asking	It's just being inquisitive. Always asking open-ended questions, trying to engage the patient.	I ask open-ended questions when talking to patients about maintenance medications.
16	Side Effects	I would say the majority of them do leave it to the patient for self-reporting. Speaking specifically for myself, I try to at least the first couple refills when somebody gets started on a new medication, I counsel them on it. A month later they're back. I try to have some targeted questions. I'll pick on the statins for example. Have you noticed any muscle pain or what have you?	It's a good idea to ask patients about medication side effects.

Table G1. Continued

<b>Item</b>	<b>Code</b>	<b>Quotation</b>	<b>Item</b>
17	Service Orientation	That has been a god-send for me for job satisfaction, because if that's what you're out to do, we're in a place where we can do that. We face challenges as far as we all want to do more with Pharm care and that as it gets going.	Interacting with patients about chronic medications is a satisfying part of my job.
18	Service Orientation	Yes, I think there's awareness that ... so here I'm doing clinical pharmacy services and I'm not having an impact. You're not really making a change. You're not really impacting peoples' lives. You're kind of wasting resources and funds. You've got to have some sort of impact on the patient.	I am able to positively impact the health of patients taking chronic medications.
19	Abuse	It was about a controlled substance, it's always about a controlled substance.	Abuse of controlled substances by patients is a problem at my pharmacy.
20	Side Effects	Making sure the patient is achieving the therapeutic goals, and not experiencing any unnecessary side effects.	It is my responsibility to ensure that patients are not having unnecessary side effects.
21	Patient Value of Interaction	People are much more receptive to it, and expect it, throughout the years, that that has increased. Because I think people take more medications, ah, they have, and they have issues that they want help resolving	My patients are receptive to me asking questions about how their medications are working.

Table G1. Continued

<b>Item</b>	<b>Code</b>	<b>Quotation</b>	<b>Item</b>
22	Drugs, Busyness	You get so many people on the same drugs. Like tons of people filling, like I could go through one thousand simvastatin 20's in a week, so you fill so much of the same ones that the ones that probably stick out most that would be maintenance, are the ones that you don't typically see as a maintenance drug.	I see so many people on the same drugs that it is hard for any of them to stick out.
23	Patient question- asking	Rarely do I get called over for a refill for a patient that has a question, maybe like once a day or so. So usually they don't ask questions on refills.	Patients rarely want to discuss their chronic medications with me.
24	Busyness, Relationship	I've only been there six months and I guess that it's a higher volume so it's been harder to get to know them more personally and recognize names and things like that.	My pharmacy has too high of volume to get to know individual patients.
25	Patient Value of Interaction	As far as disease related concerns, I don't always feel like it's, it's not that it's not my role as a pharmacist, but it's not necessarily what the patient perceives to be my role as the pharmacist, and I feel like that can be viewed as a little bit nosy sometimes,	Patients don't want me asking about their maintenance medications.

Table G1. Continued

<b>Item</b>	<b>Code</b>	<b>Quotation</b>	<b>Item</b>
26	Busyness	They really want you to do so many prescriptions a day and make sure you're filling up to kind of what they thing you should be filling, kind of feel hurried when you're counselling. So I wish you had more time to just kind of talk to the patients and kind of get to know them more but yeah, it's kind of a hurry up process in the pharmacy I guess.	I feel hurried when I talk with patients about maintenance medications.
27	Abuse	We're a lot more prone, and programmed to catch people using things too much. Than we are not enough. And in my mind, that's partially because those meds that are not being used correctly are meds that are abused.	Monitoring for prescription drug abuse by patients is a frequent part of my job.

APPENDIX H  
 DRUGS AND DRUG CLASSES ASSOCIATED WITH PHARMACIST  
 ANECDOTES ABOUT MONITORING ACTIONS

Table H1. Drugs and Drug Classes Associated with Pharmacist Anecdotes about Monitoring Activities

<b>Dug/Class</b>	<b>Activity</b>
Flonase, Nasonex	Administration technique and cost savings
Lisinopril, metformin	Adherence counseling
Metformin	Diabetes education service recommendation
Glimepiride	Asking about disease progression
Glipizide	Questioned change from immediate to extended release
Aspirin	Recommended for patient with diabetes
Minoxidil	Inquired about renal dysfunction, insulin use, and health literacy
Anticholinergic medications	Identified as probable cause of thrush
Aspirin	Counseled on interaction with NSAIDs
Methotrexate	Counseled on continued use of folic acid
Statins	Recommendation of CoQ10 supplementation
Statins	Inquired about lipid levels
Benzodiazepines	Identified duplication at time of refill
Beta blocker	Identified as cause of lethargy after medication use
Hormone replacement cream	Identified duplication at refill
Warfarin	Double check dose change based on patient reported INR value
Roxanol	Automatic refill counseling to educate on dosing
Hydrocodone w/ acetaminophen	Concern about too much daily acetaminophen, worked with physician to change



Table H1. Continued

Calcium channel blockers	Swelling
Insulin	Injection site irritation recommendation
Statins	Brand to generic switches
Narcotics	OTC recommendations for stool softeners
Glucagon	Education about overuse
Long acting insulin	Identified ongoing use of other long acting insulin
Promethazine	Identified as cause of seizure
Digoxin	Identified as cause of visual disturbance, recommended check of drug level
Nitroglycerine	Counseled on overuse
Antibiotic cream	Identified and counseled on overuse
Birth control	Repeat counseling on blood clot symptoms
Proton pump inhibitors	Symptom assessment and recommendation

APPENDIX I  
PRINCIPLE COMPONENTS ANALYSIS

Table II. Results of Principle Components Analysis for Likert-Type Items

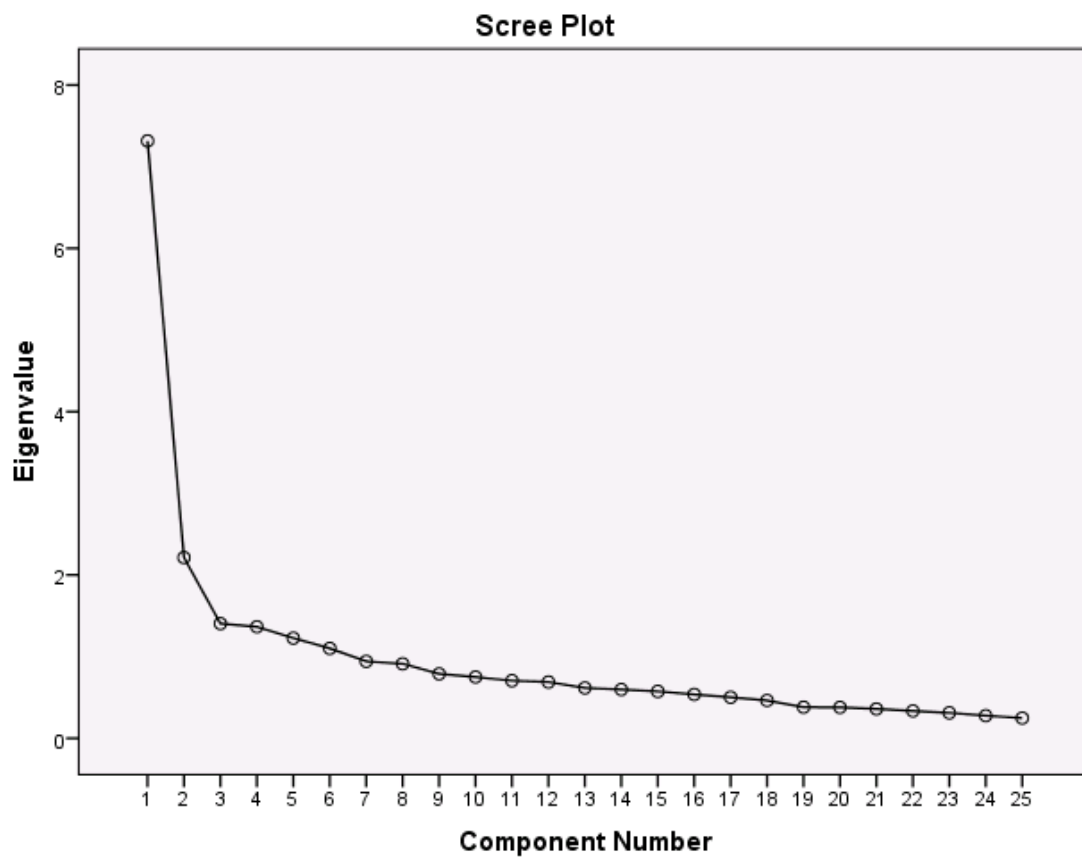
Component	<b>Total Variance Explained</b>					
	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.026	30.130	30.130	6.026	30.130	30.130
2	2.144	10.718	40.848	2.144	10.718	40.848
3	1.296	6.481	47.330	1.296	6.481	47.330
4	1.215	6.075	53.404	1.215	6.075	53.404
5	1.044	5.221	58.625	1.044	5.221	58.625
6	.915	4.577	63.202			
7	.843	4.213	67.415			
8	.807	4.037	71.452			
9	.710	3.550	75.002			
10	.662	3.310	78.313			
11	.632	3.162	81.474			
12	.586	2.930	84.404			
13	.552	2.760	87.164			
14	.500	2.502	89.666			
15	.414	2.069	91.734			
16	.389	1.946	93.681			
17	.361	1.804	95.485			
18	.320	1.598	97.083			
19	.303	1.514	98.597			
20	.281	1.403	100.000			

Extraction Method: Principal Component Analysis.

## APPENDIX J

## SCREE PLOT OF PRINCIPLE COMPONENTS ANALYSIS

Figure J1. Scree Plot of Principle Components Analysis



APPENDIX K. PARALLEL ANALYSIS OF ACTUAL AND  
SIMULATED EIGENVALUES

Table K1. Parallel Analysis of Actual and Simulated Eigenvalues

<b>Component Number</b>	<b>Actual Eigenvalue from PCA</b>	<b>Parallel Analysis Simulated Eigenvalue</b>	<b>Decision</b>
1	6.026	1.622	Accept
2	2.144	1.522	Accept
3	1.296	1.450	Reject
4	1.215	1.385	Reject
5	1.044	1.329	Reject

APPENDIX L  
INTERVIEW RECRUITMENT LETTER



COLLEGE OF PHARMACY  
Pharmacy Practice and Science  
115 S. Grand Avenue, S557 Phar  
Iowa City, Iowa 52242-1112  
319-335-8878 Fax 319-353-5646  
<http://www.pharmacy.uiowa.edu/pps>

«AddressBlock»

«GreetingLine»

As a community pharmacist, you play an important role in helping people take their medications safely and help them get the most benefit. For my dissertation, I am conducting a research study to investigate how community pharmacists view their roles and responsibilities when patients come to the pharmacy to obtain refills and how pharmacists engage in problem-solving during this process. Your perspectives would make a valuable contribution to this study.

Please see the enclosed information sheet for the study. Taking part in this research study is completely voluntary. Participants receive \$50 for engaging in a 45 minute interview.

We obtained your contact information from the Iowa board of pharmacy. If you are interested in participating, need more information, or wish not to be contacted further, please email me at [matthew-witry@uiowa.edu](mailto:matthew-witry@uiowa.edu). If I don't hear from you, I will follow up by telephone in a few days to gauge your interest and if desired, to set up a time for the interview..

Thank you for your consideration of this research study.

Matthew Witry, PharmD  
Ph.D. Student  
University of Iowa College of Pharmacy  
115 S. Grand Ave. S532 PHAR  
Ph: 319.384.4515  
[matthew-witry@uiowa.edu](mailto:matthew-witry@uiowa.edu)

William Doucette, PhD  
Professor  
University of Iowa College of Pharmacy  
115 S. Grand Ave. S518 PHAR  
Ph: 319.335.8786  
[william-doucette@uiowa.edu](mailto:william-doucette@uiowa.edu)

APPENDIX M  
INTERVIEW EXEMPT INFORMATION SHEET

FOR IRB USE ONLY APPROVED BY: IRB-01 IRB ID #: 201211746 APPROVAL DATE: 12/05/12 EXPIRATION DATE: N/A
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We invite you to participate in a research study being conducted by investigators from The University of Iowa. The purpose of the study is to investigate how community pharmacists view their roles and responsibilities when patients come to the pharmacy to obtain refills and how pharmacists identify potential problems.

If you agree to participate, we would like you to take part in an in-person interview lasting about 45 minutes at a quiet location convenient for you. You are free to skip any questions that you prefer not to answer.

You will receive \$50 for your participation in this interview. You will need to provide your social security number to process the payment.

We will not use your name when presenting the results of the study. These interviews will be audio recorded and transcribed. The recordings then will be erased. No identifying information will be recorded in the transcripts.

Taking part in this research study is completely voluntary. If you do not wish to participate in this study, you may email [matthew-witry@uiowa.edu](mailto:matthew-witry@uiowa.edu) to have your name removed from the list so you will not receive additional contacts.

If you have questions about the rights of research subjects, please contact the Human Subjects Office, 105 Hardin Library for the Health Sciences, 600 Newton Rd, The University of Iowa, Iowa City, IA 52242-1098, (319) 335-6564, or e-mail [irb@uiowa.edu](mailto:irb@uiowa.edu).

Thank you very much for your consideration of this research study.

APPENDIX N  
PILOT RECRUITMENT LETTER



COLLEGE OF PHARMACY  
Pharmacy Practice and Science  
115 S. Grand Avenue, S557 Phar  
Iowa City, Iowa 52242-1112  
319-335-8878 Fax 319-353-5646  
<http://www.pharmacy.uiowa.edu/pp>

May 2013

Dear «GreetingLine»,

As a community pharmacist, you play an important role in helping people take their medications safely and get the most benefit. Researchers at the University of Iowa College of Pharmacy are conducting a study to investigate the processes and problem solving strategies community pharmacists use when dispensing refill prescriptions. Your unique response will make a valuable contribution.

Taking part in this research study is voluntary. **The survey takes about 10-12 minutes to complete** and you are free to skip any questions you prefer not to answer. Enclosed with this mailing is an Iowa Pharmacy magnet as a token of our appreciation.

We obtained your contact information from the Iowa Board of Pharmacy. If you have any questions, wish to not receive any further mailings regarding this study, or if this survey does not apply to you because you do not routinely interact with patients in a community pharmacy, please email [matthew-witry@uiowa.edu](mailto:matthew-witry@uiowa.edu) or return the survey unanswered.

**Your responses are confidential.** Your name will not be associated with your responses. If you wish your response to be anonymous, instructions are provided on the cover of the survey packet. If you have questions about the rights of research subjects, please contact the Human Subjects Office, 105 Hardin Library for the Health Sciences, 600 Newton Rd, The University of Iowa, Iowa City, IA 52242-1098, (319) 335-6564, or e-mail [irb@uiowa.edu](mailto:irb@uiowa.edu).

Thank you for your time; and we look forward to your response. We appreciate your interest and your contribution to pharmacy practice in Iowa.

Matthew Witry, PharmD  
Ph.D. Candidate  
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APPENDIX O  
PRE-NOTIFICATION LETTER



COLLEGE OF PHARMACY  
Pharmacy Practice and Science  
115 S. Grand Avenue, S557 Phar  
Iowa City, Iowa 52242-1112  
319-335-8878 Fax 319-353-5646  
<http://www.pharmacy.uiowa.edu/pps>

May 2013

Dear Pharmacist Colleague,

Soon you will be receiving in the mail a request to fill out a brief questionnaire for a study conducted by researchers at the University of Iowa College of Pharmacy. A small token of our appreciation for completing the questionnaire will be included with the mailing.

The purpose of the questionnaire is to investigate how community pharmacists identify potential problems in the prescription dispensing process and the actions taken. We believe better understanding of this process is important given the expanding roles of community pharmacists and the increasing use of maintenance medications used to treat chronic health conditions.

Your name was randomly selected from a list of community pharmacists provided by the Iowa Board of Pharmacy. For this survey, we want to focus on community pharmacists who engage in the dispensing process at least 1 day a month.

Your survey response will be **confidential**. Only aggregate responses will be reported. Participation in this study is voluntary. You also are free to skip any questions you prefer not to answer. If you wish your response to be anonymous, instructions will be provided on the cover of the survey. If you have questions about the rights of research subjects, please contact the Human Subjects Office, 105 Hardin Library for the Health Sciences, 600 Newton Rd, The University of Iowa, Iowa City, IA 52242-1098, (319) 335-6564, or e-mail [irb@uiowa.edu](mailto:irb@uiowa.edu).

**At this point, we would greatly appreciate your help in letting us know if you are not a community/retail pharmacist or do not dispense prescriptions to ambulatory patients so that we can remove your name from our sample. If this is the case, please email [matthew-witry@uiowa.edu](mailto:matthew-witry@uiowa.edu) or call 319.455.6659 and leave a message with your name.**

Thank you for helping with this study. We believe the results will help the profession better understand the processes used by pharmacists as they contribute to the safe use of medications by those in the community. If you have any questions or comments about the study, please contact Dr. Witry at [matthew-witry@uiowa.edu](mailto:matthew-witry@uiowa.edu) or 319.455.6659.

Sincerely,

Matthew Witry, PharmD  
Principal Investigator  
University of Iowa College of Pharmacy  
[matthew-witry@uiowa.edu](mailto:matthew-witry@uiowa.edu)

William Doucette, PhD  
Professor  
University of Iowa College of Pharmacy  
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APPENDIX P  
MAIN SURVEY LETTER



COLLEGE OF PHARMACY  
Pharmacy Practice and Science  
115 S. Grand Avenue, 5557 Pharmacy  
Iowa City, Iowa 52242-1112  
319-335-8878 Fax 319-353-5646  
<http://www.pharmacy.uiowa.edu/pp>

June 2013

«GreetingLine»

Researchers at the University of Iowa College of Pharmacy are conducting a study to investigate how community pharmacists decide when and how to interact with patients when dispensing refill prescriptions of maintenance medications. We would like your help by filling out a short questionnaire. We believe the results will help the profession better understand how pharmacists contribute to the safe and effective use of chronic medications in the community.

Taking part in this research study is voluntary. **The survey takes about 10 minutes to complete** and you are free to skip any questions you prefer not to answer. Enclosed with this mailing is an **Iowa Pharmacy magnet as a token of our appreciation**. Also, respondents will be entered in a raffle for 1 of 4 **\$25 grocery gift cards**. **Winners will be notified by telephone or mail in July**.

We obtained your contact information from the Iowa Board of Pharmacy. If you have any questions, wish to not receive any further mailings regarding this study, or if this survey does not apply to you because you do not routinely interact with patients in a community pharmacy, please email [matthew-witry@uiowa.edu](mailto:matthew-witry@uiowa.edu) or return the survey unanswered.

**Your responses are confidential.** Your name will not be associated with your responses. Surveys are numbered so your name can be removed from reminder mailings. If you wish your response to be anonymous, you may black out or tear off the survey number in the lower right corner of the survey. If you have questions about the rights of research subjects, please contact the Human Subjects Office, 105 Hardin Library for the Health Sciences, 600 Newton Rd, The University of Iowa, Iowa City, IA 52242-1098, (319) 335-6564, or e-mail [irb@uiowa.edu](mailto:irb@uiowa.edu).

Thank you for your time; and we look forward to your response. We appreciate your interest and your contribution to pharmacy practice in Iowa. If you would like a summary of the study findings, please let us know.

Matthew Witry, PharmD  
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IRB ID #: 201211746  
APPROVAL DATE: 06/03/13  
EXPIRATION DATE: N/A

APPENDIX Q  
REMINDER POSTCARD

Dear pharmacist colleague,

Last week, a questionnaire about community pharmacy practice was mailed to you. If you already have completed and returned the questionnaire, **thank you!** If not, **please take about 10 -12 minutes and do so today.** Your response helps us better understand the problem solving strategies pharmacists use when dispensing refills of maintenance medications.

If you did not receive a questionnaire, or need a new copy, please email [matthew-witry@uiowa.edu](mailto:matthew-witry@uiowa.edu) or call 319-455-6659 and we will get another one in the mail to you today.

**Thank you,**

Matthew Witry, PharmD  
University of Iowa College of Pharmacy S532 PHAR  
Iowa City, IA 52242  
Iowa City, IA 52242

---

APPENDIX R  
SECOND SURVEY MAILING LETTER



COLLEGE OF PHARMACY  
Pharmacy Practice and Science  
115 S. Grand Avenue, S557 Phar  
Iowa City, Iowa 52242-1112  
319-335-8878 Fax 319-353-5646  
<http://www.pharmacy.uiowa.edu/pps>

July 2013

«GreetingLine»

Over the past month, we have sent several mailings regarding a research study asking about your opinions and experiences in community pharmacy practice related to prescription refills. The goal of the study is to better understand the problem identification strategies pharmacists use when dispensing refills of maintenance medications. This is an area of interest as pharmacists continue to be called upon to improve medication outcomes, but at the same time are faced with increasing demands on their time.

The study is drawing to a close, and we wanted to mail another survey to the pharmacists in our sample that have not yet responded so their perspectives can be included. We are sending this final contact because of our concern that people who have not responded may have unique characteristics and experiences than those who have. More responses help assure that the survey results are as accurate and as useful as possible. Another survey and a postage paid envelope are enclosed for your convenience.

Taking part in this research study is voluntary. **The survey takes about 10 minutes to complete** and you are free to skip any questions you prefer not to answer. Also, respondents will be entered in a raffle for 1 of 4 **\$25 grocery gift cards. Winners will be notified by telephone or mail in July**

**Your responses are confidential.** Your name will not be associated with your responses. If you wish your response to be anonymous, instructions are provided on the cover of the survey packet. If you have questions about the rights of research subjects, please contact the Human Subjects Office, 105 Hardin Library for the Health Sciences, 600 Newton Rd, The University of Iowa, Iowa City, IA 52242-1098, (319) 335-6564, or e-mail [irb@uiowa.edu](mailto:irb@uiowa.edu).

Thank you for your time. We appreciate your interest and your contribution to pharmacy practice in Iowa.

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Ph.D. Candidate  
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FOR IRB USE ONLY APPROVED BY: IRB-01 IRB ID #: 201211746 APPROVAL DATE: 06/26/13 EXPIRATION DATE: N/A
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APPENDIX S  
FINAL MAILED SURVEY

## COMMUNITY PHARMACIST PROFESSIONAL JUDGMENTS QUESTIONNAIRE

### Q1: Prescription Refill Activities

Please indicate the percent of refills where you engage in the following activities. Each activity can be 0 to 100% of the time. Provide your responses in the blanks below.

For what percent of the refill prescriptions you verify do you pull up the patient's <b>medication profile</b> on the computer?	_____ %
For what percent of the refill prescriptions you verify do you <b>attach a note</b> to the prescription bag for someone to follow up when the patient presents to the pharmacy?	_____ %
For what percent of the refill prescriptions that are dispensed while you are staffing do you personally <b>hand off</b> the prescription to the patient?	_____ %
When handing off the refill prescription to the patient, what percent of the time do you ask if he or she <b>has any questions</b> ?	_____ %
When handing off the refill prescription to the patient, what percent of the time do you <b>ask a specific question</b> about the patient's drug therapy?	_____ %

### Q2: Viewpoints

Please read each of the following statements and assign a number from 1 to 6 depending upon **your** level of agreement with the statement. Circle the corresponding number in the column to the right.

<u>1</u> Strongly Disagree	<u>2</u> Moderately Disagree	<u>3</u> Slightly Disagree	<u>4</u> Slightly Agree	<u>5</u> Moderately Agree	<u>6</u> Strongly Agree
I don't interact with the patient on a refill unless there is something very special.					1 2 3 4 5 6
I look at a patient's complete drug profile with every refill prescription.					1 2 3 4 5 6
I don't have time to talk to everyone who is late refilling maintenance medications.					1 2 3 4 5 6
My pharmacy workflow makes it easy for me to tell if a patient is late refilling a prescription.					1 2 3 4 5 6
I look for opportunities to interact with patients picking up refills.					1 2 3 4 5 6
Circumstances must be extraordinary for me to interact with a patient about a refill prescription.					1 2 3 4 5 6
I use my therapeutic knowledge when I dispense refills of maintenance medications.					1 2 3 4 5 6
Talking to patients about non-adherence makes me uncomfortable.					1 2 3 4 5 6
Pharmacists should routinely follow-up with patients to see how their chronic medications are working.					1 2 3 4 5 6
I get concerned when someone is late refilling a maintenance medication.					1 2 3 4 5 6
It is my responsibility to ensure the patient's chronic medications are effective.					1 2 3 4 5 6

-----

Black out or tear off this number if complete anonymity requested → → → Survey # «SURVEY»

## Q2: Viewpoints (continued)

1 Strongly Disagree	2 Moderately Disagree	3 Slightly Disagree	4 Slightly Agree	5 Moderately Agree	6 Strongly Agree
I feel confrontational when I bring up non-adherence with patients.					1 2 3 4 5 6
In my position, I get to be inquisitive about how patients are doing on their medicines.					1 2 3 4 5 6
The patient should be the one to start a discussion about side effects.					1 2 3 4 5 6
I ask open ended questions when talking to patients about maintenance medications.					1 2 3 4 5 6
It's a good idea to ask patients about medication side effects.					1 2 3 4 5 6
Interacting with patients about chronic medications is a satisfying part of my job.					1 2 3 4 5 6
I am able to positively impact the health of patients taking chronic medications.					1 2 3 4 5 6
Abuse of controlled substances by patients is a problem at my pharmacy.					1 2 3 4 5 6
It is my responsibility to ensure that patients are not having unnecessary side effects.					1 2 3 4 5 6
My patients are receptive to me asking questions about how their medications are working.					1 2 3 4 5 6
I see so many people on the same drugs that it is hard for any of them to stick out.					1 2 3 4 5 6
Patients rarely want to discuss their chronic medications with me.					1 2 3 4 5 6
My pharmacy has too high of volume to get to know individual patients.					1 2 3 4 5 6
Patients don't want me asking about their maintenance medications.					1 2 3 4 5 6
I feel hurried when I talk with patients about maintenance medications.					1 2 3 4 5 6
Monitoring for prescription drug abuse by patients is a frequent part of my job.					1 2 3 4 5 6

## QUESTION 3: Short Refill Scenarios

Think about the following refill dispensing scenarios. Please respond with how likely you would be to do each of the 4 specified activities on a scale from 0 to 10. Consider your experiences and how you usually interact with patients at the pharmacy where you most often work. *There are no right or wrong answers.*

**Likelihood Scale: *Definitely would not ask* – 0,1,2,3,4,5,6,7,8,9,10 - *Definitely would ask***

Scenario	Pharmacist Action	Likelihood (0-10)
You are verifying a refill prescription for a «AGE1» year old «GENDER1» «FAMILIARITY1». The prescription is for «DRUG1». The prescription previously has been filled «FILLED_TIMES_1» and is «EARLYLATE1». The patient is waiting, there «WAITING1» waiting in the pharmacy, and the pharmacy is «STAFFED1».	Ask the patient questions to identify possible reasons for <b>non-adherence</b> .	_____
	Ask the patient questions to find out if «HESHE1» might be experiencing <b>side effects</b> .	_____
	Ask the patient questions to find out about the <b>effectiveness</b> of the medication.	_____

### QUESTION 3: Short Refill Scenarios (continued)

Likelihood Scale: *Definitely would not ask* – 0,1,2,3,4,5,6,7,8,9,10 - *Definitely would ask*

Scenario	Pharmacist Action	Likelihood (0-10)
You are verifying a refill prescription for a «AGE2» year old «GENDER2» «FAMILIARITY2». The prescription is for «DRUG2». The prescription previously has been filled «FILLED_TIMES_2» and is «EARLYLATE2». The patient is waiting, there «WAITING2» waiting in the pharmacy, and the pharmacy is «STAFFED2».	Ask the patient questions to identify possible reasons for <b>non-adherence</b> .	_____
	Ask the patient questions to find out if «HESHE2» might be experiencing <b>side effects</b> .	_____
	Ask the patient questions to find out about the <b>effectiveness of the medication</b> .	_____
You are verifying a refill prescription for a «AGE3» year old «GENDER3» «FAMILIARITY3». The prescription is for «DRUG3». The prescription previously has been filled «FILLED_TIMES_3» and is «EARLYLATE3». The patient is waiting, there «WAITING3» waiting in the pharmacy, and the pharmacy is «STAFFED3».	Ask the patient questions to identify possible reasons for <b>non-adherence</b> .	_____
	Ask the patient questions to find out if «HESHE3» might be experiencing <b>side effects</b> .	_____
	Ask the patient questions to find out about the <b>effectiveness of the medication</b> .	_____
You are verifying a refill prescription for a «AGE4» year old «GENDER4» «FAMILIARITY4». The prescription is for «DRUG4». The prescription previously has been filled «FILLED_TIMES_4» and is «EARLYLATE4». The patient is waiting, there «WAITING4» waiting in the pharmacy, and the pharmacy is «STAFFED4».	Ask the patient questions to identify possible reasons for <b>non-adherence</b> .	_____
	Ask the patient questions to find out if «HESHE4» might be experiencing <b>side effects</b> .	_____
	Ask the patient questions to find out about the <b>effectiveness of the medication</b> .	_____
You are verifying a refill prescription for a «AGE5» year old «GENDER5» «FAMILIARITY5». The prescription is for «DRUG5». The prescription previously has been filled «FILLED_TIMES_5» and is «EARLYLATE5». The patient is waiting, there «WAITING5» waiting in the pharmacy, and the pharmacy is «STAFFED5».	Ask the patient questions to identify possible reasons for <b>non-adherence</b> .	_____
	Ask the patient questions to find out if «HESHE5» might be experiencing <b>side effects</b> .	_____
	Ask the patient questions to find out about the <b>effectiveness of the medication</b> .	_____
You are verifying a refill prescription for a 76 year old female with whom you know by name. The prescription is for simvastatin 80 mg, take one tablet daily at bedtime, #30 The prescription has previously been filled 1 time and is 8 days late. The patient is waiting, there is one other patient waiting in the pharmacy, and the pharmacy is staffed as usual.	Ask the patient questions to identify possible reasons for <b>non-adherence</b> .	_____
	Ask the patient questions to find out if she might be experiencing <b>side effects</b> .	_____
	Ask the patient questions to find out about the <b>effectiveness of the medication</b> .	_____

### QUESTION 4: Last 5 Refills

Think about the last five patients or customers of yours who presented a refill prescription used to treat a chronic condition, such as asthma or diabetes. Please indicate for how many of these five patients you provided the following activities by writing your response in the blank below (Numbers from 0-5).

Asked the patient questions to assess actual patterns of use of the medication.	_____/5 Patients
Asked the patient questions to find out if he or she might be experiencing drug-related problems.	_____/5 Patients
Asked the patient questions to find out about the perceived effectiveness of the drugs taken.	_____/5 Patients
Asked the patient questions to find out whether the therapeutic goal was being reached.	_____/5 Patients

### QUESTION 5: Descriptive Information

Please check the box next to your answer or fill in the blank with your response. These questions will be aggregated so we can compare our findings to other studies.

Gender	<input type="checkbox"/> Male <input type="checkbox"/> Female
Year of first pharmacist licensure	_____
What pharmacy training do you have? (Check all that apply)	<input type="checkbox"/> BS Pharm <input type="checkbox"/> PharmD <input type="checkbox"/> Residency
Additional training, degrees, certifications (Specify)	_____

Please answer the following questions about your work as a pharmacist. If you work at more than one pharmacy, answer with regard to the pharmacy where you spend the most time.

Which of the following best describes your position as a pharmacist? (Check all that apply)	<input type="checkbox"/> Staff <input type="checkbox"/> Manager <input type="checkbox"/> Owner
	<input type="checkbox"/> Clinical <input type="checkbox"/> Relief/Part Time <input type="checkbox"/> Float
	<input type="checkbox"/> Other: _____
Pharmacy type (Check one)	<input type="checkbox"/> Chain <input type="checkbox"/> Mass Merchandiser
	<input type="checkbox"/> Independent <input type="checkbox"/> Grocery
	<input type="checkbox"/> Other: _____
Population of city/town where pharmacy is located	<input type="checkbox"/> <20,000 <input type="checkbox"/> 20,000-40,000 <input type="checkbox"/> >40,000
Typically, how many hours per week do you work as a pharmacist?	_____ Hours/week
Typically, what percent of this time do you spend in a dispensing role?	_____ %
Typically, how many other staff members are present during the <b>majority</b> of your work schedule?	_____ # of other Pharmacists      _____ # of techs/interns
Typically, how many prescriptions do <b>you</b> personally check during a busy and non-busy day?	_____ Rx/ <b>Busy</b> day      _____ Rx/ <b>Non-busy</b> day

## THANK YOU!

Please return the survey in the included postage-paid return envelope.

Dr. Matthew Witry, UI College of Pharmacy, 115 S. Grand Ave, S557 PHAR, Iowa City, IA 52242



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