PHARMACISTS' WORK ENVIRONMENT AND THEIR PRACTICE BEHAVIORS

by

Bupendra K. Shah

A dissertation submitted in partial fulfillment of the

requirements for the degree of

Doctor of Philosophy

(Social and Administrative Sciences in Pharmacy)

at the

UNIVERSITY OF WISCONSIN-MADISON

2006

PHARMACISTS' WORK ENVIRONMENT AND THEIR PRACTICE BEHAVIORS

Bupendra K. Shah

Under the supervision of Professor Betty A. Chewning

At the University of Wisconsin-Madison

Several studies have examined factors influencing pharmacist practice behaviors. However, very few studies have assessed the influence of work environment factors such as safety culture, technician attitudes towards pharmacist role and busyness on routine community pharmacy practice. This study examined the influence of pharmacists' organizational environment (safety culture, workload and technician attitudes towards pharmacist role) and patient interaction environment (busyness and patient question-asking behavior) on four pharmacist practice behaviors. These four pharmacist practice behaviors were: prescription transfer, showing the medication to the patient, providing information about the side effects, directions and interactions, and patient assessment using open/closed ended questions.

A cross-sectional design was used. A stratified random sample of thirty pharmacies in Southeast and South-Central Wisconsin were enrolled. At each pharmacy, pharmacy staff and 12 patients filling prescriptions (6 new and 6 refill) participated in the study. The interaction between the 12 patients and the pharmacist on duty were observed. Patients were interviewed after their interaction. After all 12 patients were interviewed, participating pharmacists and technicians completed a survey on their work environment. All data were entered in SPSS version 11.5. Descriptive statistics and logistic regression analysis were carried out.

In the majority of new prescription encounters, pharmacists transferred the medications (96%) and provided information (94%) to the patients. However, the rate for prescription transfer and information provision by the pharmacist was lower for refill prescription encounters. Regardless of prescription type, pharmacists showed the medication to a very small subset of the patients (13% for new Rx and 9% for refill Rx). Patient assessment was conducted in approximately one-fourth of all encounters (24% for new Rx and 27% for refill Rx). Among work environment factors, pharmacy busyness, patient question-asking behavior and safety culture were found to be significant predictors of pharmacist practice behaviors. The results of this study suggest that strategies to reduce the impact of busyness on pharmacist practice behaviors are needed. Also, interventions aimed at improving patient passivity need to be tested.

DEDICATION

This work is dedicated with love to

My family and friends:
Without your love, support and inspiration, I would not have enjoyed and survived a long, demanding journey;

Model teachers, researchers and persons:
Mahesh Burande, Walter Siganga, Jon Schommer, David Kreling and Betty Chewning

ACKNOWLEDGMENTS

A long, demanding journey such as doctoral studies requires not only self determination but also love, support and inspiration from your family, friends and teachers. I feel fortunate that I received it all that during my graduate education.

I would like to thank my parents, mother Hansa and father Kantilal Shah for impressing on me the values of hard work, learning, and good conduct. I thank my siblings, sister Alpa Mehta and brother Dharmendra (Danny) Shah for being excellent role models throughout my life. I appreciate the love, support and inspiration provided by sister-in-law, Charmy Desai and brother in-law Parag Mehta. Of course, two little devils, nephews Shubh and Aryan brightened my days in tough times.

Many thanks to my advisor, Dr. Betty Chewning. Her encouraging, positive demeanor coupled with insightful, rational advice helped strengthened this project. I owe all my research capabilities directly and indirectly to her.

To my committee members, Drs. David Kreling, David Mott, Ramon Aldag and Henry Young, I owe a debt of gratitude. Each of these professors encouraged me throughout this project.

The encouragement, friendship and insights offered by fellow graduate students are appreciated.

Finally, I would like to acknowledge the support of my friends. Amol, Poornima, Anoop, Roopali, Dipam, Abhijit, Pallavi, Ronak, Monica and Priya, I want you to thank you for being there for me all the time.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

I. Introduction

There is a profound gap between what pharmacists have been educated to do and how they typically behave in practice.

- William Zellmer, in American Journal of Health-System Pharmacy 2005; 62: 259-65

As noted above, there is a tremendous gap between pharmacists' ideal and actual roles. The goal of this dissertation study is to explore factors associated with this gap. Specifically, this research examines personal, organizational, and patient interaction factors that may influence a subset of pharmacist practice behaviors considered important for patient safety. In doing so, this study aims to provide an insight into the extent of patient safety practices carried out by community pharmacists and the factors which influence these practices.

1.1. Patient Safety Issues in the Health Care System

In November 1999, a report by the Institute of Medicine's (IOM) Committee on Quality of Health Care in America, entitled *To Err Is Human: Building a Safer Health System,* put into perspective the extent of patient safety in the United States (U.S.). In this report, it was estimated that there were between 44,000 and 98,000 deaths each year as a result of medical errors, which ranks as the eighth leading cause of death in the U.S. The report pointed to the need for health care and governmental agencies to make patient safety a priority and to implement systems to decrease medical errors (IOM, 1999). A follow-up report from the IOM entitled, *Crossing the Quality Chasm: A New Health System for the 21st Century,* more globally identified and examined the problems that exist within the American health care delivery system. This report described the overall

delivery of health care as disjointed and inefficient and noted that "quality problems are everywhere, affecting many patients." The report called for fundamental changes to the American health care delivery system and gave a comprehensive strategy to accomplish this. Among other recommendations, patient safety was again identified as an area of focus for monitoring and improvement with greater attention placed on systems that prevent and eliminate medical errors (IOM, 2001). The latest report from IOM, *Preventing Errors: Quality Chasm series*, suggests that the progress in improving patient safety systems is slow and that efforts need to be accelerated. The report recommends a series of actions, emphasizing the need for effective patient-provider communication to ensure that patients are fully informed about their drug regimens and to minimize opportunities for mistakes to occur (IOM, 2006).

1.2. Medication Errors

Medication errors are among the most common medical errors. A poll conducted by the Louis Harris & Associates on behalf of the National Patient Safety Foundation found that one in three Americans has experienced serious medical mistakes and 28% of those mistakes were related to medication errors (National Patient Safety Foundation, 1997). They are defined by the National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP), an independent body composed of 22 national organizations in the United States, as "any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional or the patient". Many of these errors are preventable adverse events, defined as injuries due to drugs (Gandhi et al., 2000). Medication errors harm at least 1.5 million patients every year in hospitals, long-term care facilities and outpatient

clinics. Studies indicate that approximately 400,000 preventable drug-related injuries occur each year in hospitals. Another 800,000 occur in long term care settings and roughly 530,000 occur just among Medicare recipients in outpatient clinics. Estimates of the prevalence of medication related adverse events in hospital or institutional settings range from 2.9 to 25% (Brennan et. al 1991, Bates et. al 1995, Classen et. al 1997, Thomas et. al 1999, Gurwitz et. al 2000, Barker et. al 2002, and Bond et. al 2002). A systematic review and meta-analysis reported that a median 7.1% of hospital admissions result from adverse drug events, of which 59% was considered preventable (Winterstein et al., 2002). Relatively few studies have demonstrated the prevalence of adverse events in ambulatory settings but they are estimated to range from 15 to 28% (Gurwitz et. al 2003, Gandhi et. al 2003). A recent study showed that within four weeks of receiving a primary care prescription, 25% of patients experienced an adverse drug event, 11% of which were judged preventable (Gandhi et al., 2003).

The economic cost alone incurred by these errors is enormous. Researchers have shown that costs associated with drug-related problems exceed the expenditures for initial therapy; that is, the total cost of drug-related morbidity and mortality exceeds the cost of the medications themselves (Smith 1993; Sullivan et al., 1990). Johnson and Bootman (1997) found that the cost of drug related morbidity and mortality in ambulatory settings reached $76.6 billion per year. Ernst and Grizzle (2001) estimated that drug-related problems cost the health care system $177.4 billion in 2001 and result in 218,000 deaths each year.

A substantial amount of these costs and mortalities are also attributed to medication noncompliance. Upon reviewing studies carried out between 1966 and 1989,

Einarson (1993) estimated that patient noncompliance or unintentional, inappropriate use of medications contributed to about 5% of hospitalizations. Other estimates suggest that over half of the 2 billion medications prescribed each year may be taken incorrectly and result in one sixth of all hospital admissions, over one fourth of nursing home admissions, almost 2.5 million serious medical emergencies per year, and about 28% of all malpractice suits (Perrin, 1988; National Council on Patient Information and Education, 1990, 1991, 1995, Lazarou et al., 1998; Rothschild et al., 2002). These wide ranges may be due to differences in study methods but also to the variety of medications, disease types, and populations investigated.

The causes of adverse events and noncompliance are multifactorial, cutting across many lines of responsibilities. Leape and colleagues (1995) illuminate the literature on medication safety issues by defining and identifying the problem areas such as lack of knowledge of the drug, lack of knowledge about the patient, slips and memory lapses, transcription errors, etc. Studies by the Institute for Safe Medication Practices (ISMP) also indicate that failed communication, poor drug distribution practices, dose miscalculations, drug and drug-device-related problems, incorrect drug administration, and lack of patient education are risks to patient safety (Cohen 1999). Given that medication-related patient safety issues are of immense importance to the whole society, and that they are multi-factorial, attempts have been made to address them as a matter of public policy.

Several strategies have been recommended to minimize medication errors (IOM, 2001, Awe and Lin 2003, IOM, 2006). One such strategy is to improve provider-patient communication. According to the IOM report "Preventing Errors: Quality Chasm series",

establishing and maintaining a strong partnership between health care providers and patients is crucial to reducing medication errors (IOM, 2006). The report recommends that healthcare providers such as pharmacists should ensure that patients are fully informed about their medications and minimize opportunities for mistakes to occur. Interventions with pharmacist involvement in management of medications and patient education have been suggested as an important strategy to reduce medication errors and enhance patient safety (IOM, 2006).

1.3. Importance of Pharmacist Role in Minimizing Medication Errors

From a process perspective, the community pharmacists' role in reducing medication errors can be considered a function of their tasks or activities they perform while processing a prescription. During the process of filling a prescription, community pharmacists play an important role in reducing inappropriate prescribing and drug-drug interactions. They clarify orders with prescribing physicians, check patient profile thus avoiding coprescription errors and reduce noncompliance by checking patient drug utilization. During the process of checking the prescription, pharmacists play an important role in reducing dispensing errors by checking whether the right drug is filled in the right vial and the right label is put on the right vial. While dispensing the prescription, pharmacists play an important role in reducing dispensing errors by checking if the right patient receives the right drug and in reducing adverse events and patient noncompliance due to lack of adequate knowledge about medication use. They provide medication related information and assess patient knowledge. In the last three decades, the role of pharmacist in transferring the medications and counseling patients has not only been recognized but also has been mandated by state and federal laws

(Wisconsin Administrative Code, OBRA 1990). For instance, the Wisconsin Administrative Code mandates that "only licensed pharmacist transfer the prescription to the patient and provided appropriate consultation".

Given the ready accessibility of pharmacists to patients and their ability to decrease negative medication outcomes in ambulatory patients, the Omnibus Budget Reconciliation Act of 1990 (OBRA 1990) contained provisions for mandating counseling to Medicaid patients. Ultimately these requirements in OBRA 1990 were expanded to provide counseling to all patients and were included in the standards of practice for the pharmacy profession by the American Pharmaceutical Association (Molzon 1992). For over a decade, pharmacy schools have been training pharmacy students in a clinically oriented fashion, teaching them how to solve drug therapy problems and communicate with patients. Patient-centered care as exemplified by the pharmaceutical care movement (Hepler and Strand 1990) and medication therapy management (Medicare Modernization Act, 2003) has been embraced as the mission of pharmacy.

Researchers have established that pharmacist provided patient care services are important for improving appropriate medication use and achieving desired patient outcomes (De Young 1996, Singhal et al., 1999). Researchers have also established that many dispensing errors are discovered during pharmacist-patient interaction when pharmacists perform "show and tell", which includes patient counseling (Davis and Cohen 1992, Kuyper 1993). Communication between pharmacist and patient is considered an important precursor to improved drug use and patient outcomes (McKenney et al., 1978; Hammarlund et al., 1985; Wiederholt and Schommer 1991; Williford and Johnson 1995; Beney et al., 2000; Yuan et al., 2003). Researchers have

reported that improved communication between pharmacists and their patients increased: 1) patient knowledge and recall (Crichton et al., 1978; Woroniecki et al., 1982), 2) patient compliance (Slama and Gurwich 1978; Powell et al., 1979; Wandless and Whitmore 1981; Williford and Johnson 1995; Bouvy et al., 2003) and 3) disease state management (Tsuyuki et al., 2002). At the same time, researchers also reported that enhanced pharmacist-patient interaction reduced the number of: 1) adverse events (Leape et al., 1999, Schnipper et al., 2006), 2) medication errors (Folli et al.,1987, Scarsi et al.,2002), 3) inappropriate prescribing (Rupp et al., 1992; Hanlon et al., 1996) and 4) hospitalizations (Cummings et al., 1984; Yuan et al., 2003, Royal et al., 2006).

1.4. Research Problem: Factors Influencing Pharmacist Practice Behaviors

This study aims to understand the influence of pharmacists' work environment factors and personal factors on pharmacist practice behaviors considered vital for patient safety. Pharmacist practice behaviors were defined in this study in terms of activities carried out by the dispensing pharmacist in the presence of the patient to assure patient safety and patient understanding of their medications. This definition and its measurement were based on the Pharmacist Practice Activity Classification (Maine 1998) as well as reviews of the patient safety, counseling and workforce/work activities literature in pharmacy and an exploratory study of pharmacy team perspectives on patient safety (Shah and Chewning, 2006). Patient-pharmacist interaction was observed to include four activities of the dispensing pharmacist. These four activities are: 1) pharmacist handing the prescription to the patient (Prescription Transfer); 2) pharmacist showing the prescription to the patient to verify if the right patient is receiving the right

medication (Prescription Show); 3) pharmacist counseling the patient by providing information on directions, side effects and interactions (Prescription Info); 4) and assessing patient compliance, understanding of the medication information or effects of the medication (Patient Assessment).

There are several reasons that these pharmacist practice behaviors are considered vital for patient safety. First, the transfer of prescriptions by the pharmacists provides an interface for interaction with the patient. Second, transfer of prescription by the pharmacist is also an important predictor of pharmacist provided counseling (Schommer 1992). Third, it is known that pharmacist showing the prescription to the patient to verify if the right patient is receiving the right medication reduces over ninety percent of dispensing errors (Kuyper 1993, Hoxsie et al., 2006)). Moreover, performing a final verification of the prescription with the patient helps alert the pharmacist to detect an error before it leaves the pharmacy and also set the stage for patient counseling (Abood 1996). Finally, patient counseling can significantly reduce patient nonadherence, treatment failure, and wasted health resources (Roter et. al 1998). Pharmacists have ranked counseling patients as the most important of pharmacy practice activities (Fink et al., 1989).

Despite the pharmaceutical care movement and regulations stemming from the Omnibus Budget Reconciliation Act of 1990 that require pharmacists to carry out these practice behaviors, there are several challenges to their implementation. The role of the majority of community pharmacists is defined in production- line terms: processing all the prescriptions that come in as quickly as possible without compromising accuracy (Shah and Chewning 2005). Other valuable services that should be provided in tandem

with transferring a powerful medicine from the pharmacy's shelves to the patient such as patient counseling are not being performed because the pharmacist is immersed in the mechanics of dispensing (Zellmer 2005). In essence, pharmacists do not always carry out important practice tasks and it is important to understand other key reasons why this is so.

Researchers in the field have sought to understand the extent to which pharmacists demonstrate appropriate practice behaviors and the factors which enable and act as barriers to these practice behaviors. A few studies have attempted to systematically determine the extent to which pharmacists transfer the prescriptions. In a 12-year longitudinal study (data collected in 1982, 1984, 1992, and 1994) of verbal counseling about prescribed medication, Morris et al., (1997) reported that respondents indicated a slight reduction in having a pharmacist transfer their completed prescription to them (50%, 47%, 43%, and 44% over the four surveys). In another study, Schommer (1992) reported that pharmacists did not transfer prescriptions to the patient in 27% of the 360 patient encounters that he observed in 12 pharmacies. No recent study details the extent to which pharmacists transfer the prescription and interact with the patient. Also, there is very little research on factors that affect prescription transfer.

There is more research on pharmacists providing patient consultation than on research studying pharmacists' transfer of prescriptions. Most studies indicate that patient counseling rates range from 30% to 87% (Wiederholt et al., 1992). Recent estimates show that approximately 25% of patients who presented new prescriptions at community pharmacies were not provided an opportunity to talk to their pharmacists. When they did talk with their pharmacist, 47% of all patients did not receive any oral drug information from their pharmacist (Svarstad et. al 2004). Pharmacists also typically do not assess

patient compliance, patient understanding of medication information or effects of the medication. Ninety percent of all encounters in which pharmacists talk with their patients involve the pharmacist providing written information and asking the patient closed ended questions such as "do you have any questions?" (Sleath, 1995).

Among the patient counseling studies, several researchers have explored factors that influence the extent to which pharmacists communicate with their patients. These factors can be divided into patient factors, pharmacist factors and pharmacy work environment factors. Research on patient factors is in abundance (Spencer 1974, Yellin and Norwood 1974, Gagnon 1978, Carroll and Gagnon 1983, Schondelmeyer and Trinca 1983, Mackowiak and Manasse 1984, Culbertson et. al 1988, Mackowiak and Manasse 1988, Schering Laboratories 1992, Weiderholt et. al 1992, Schommer and Weiderholt 1995, Schommer et. al 1995, Chewning and Schommer 1996, Schommer 1996). Researchers have also studied the influence of pharmacist factors in detail (Mason 1983, Mason and Svarstad 1984, Kirking 1984, Carroll and Gagnon 1984, Zelnio, Nelson, and Beno 1984, Morris et. al 1987, Fink, Draugalis, and McGhan 1989, Schommer and Weiderholt 1995 Anderson-Harper et al., 1992, Schommer and Wiederholt 1994, Siganga 1992, Schommer 1996). However, studies providing insight into pharmacy work environment factors are relatively few.

It is interesting to note that no known study has investigated the extent to which pharmacists verify prescriptions by showing the medications to the patient. It is clear that pharmacists' extended role in minimizing medication error is an important, but not yet achieved, public health goal.

Several observations can be made about research on pharmacist practice behaviors. First, studies involving pharmacy work environment factors have routinely taken into account pharmacy structure factors such as the type of pharmacy (Watkins and Norwood 1977, Ludy et al., 1977, Svarstad et. al 2004), staffing factors such as average hourly prescription volume (Kirking 1984), number of staff (Dickson and Rodowksas 1975), and the physical environment factors such as busyness of the pharmacy (Berardo et. al 1989, Svarstad et al., 2004) and privacy (Spencer 1974, Schommer and Weiderholt 1995). However, no known study has been carried out to examine the influence of the pharmacy work culture on the pharmacists' behavior.

Second, notably absent among studies of the influence of pharmacy work environment factors on pharmacist counseling behavior is the influence of pharmacy team members, in particular the technicians' attitudes and their belief of what the pharmacist role should be. Given that pharmacists do not practice in isolation, and work in pharmacies as part of the pharmacist-technician team, it is important to know how technicians' attitudes influence pharmacists' behavior. The work environment at the pharmacy created by technicians' attitude may directly influence the time that is available and spent by the pharmacist in providing patient-centered care. Much is written about the importance of time as an important barrier to provision of counseling. Yet it is not known whether technicians influence the amount of time and extent to which pharmacists interact with the patients.

Third, while there are models that explain pharmacist counseling behaviors in terms of pharmacist attitudes and their interaction with patients, there is no known model that explains pharmacist counseling behavior in terms of their work environment, especially

in terms of a pharmacy's safety culture and technician attitudes. Research in the organizational literature suggests that a culture of safety in the workplace will permeate all aspects of the work environment and encourage every individual in an organization to project a level of awareness and accountability for safety (Pizzi et al., 2001). In pharmacy, this would mean that the presence of a safety culture will not only ensure patient safety enhancing practice behaviors (such as Prescription Transfer, Prescription Show, Prescription Info and Patient Assessment) by the pharmacists but also create positive attitudes towards pharmacists' role among its technicians. So far, studies investigating safety culture in healthcare have been limited to inpatient settings such as hospitals, operating rooms and academic medical centers (Nieva and Sorra 2003, Singer et. al 2003, Sexton et al., 2000, Pronovost et. al 2003, Weeks and Bagian 2000). Given the Institute of Medicine report suggesting the importance of medication safety issues and the pivotal role of safety culture in addressing medication safety problems, it is vital to study this directly in community pharmacy settings (IOM, 1999).

In summary, the conceptualization of pharmacists' work environment in earlier research on pharmacists' practice behavior did not include safety culture and technician attitudes as aspects of pharmacists' work environment. In the current context, these factors are important and need to be examined in relation to pharmacist practice behaviors.

Fourth, while it is known that prescription type is an important predictor of pharmacist counseling behavior (Moore, 1983; Kirking, 1983; Ascione, 1985; Wiederholt et al., 1992; Schommer, 1992, Raisch, 1993), very few studies have examined and compared pharmacist practice behaviors in the context of new and refill prescriptions

and the influences on the behaviors. This is important to understand because different factors may be influencing pharmacist practice behaviors in the context of new versus refill prescriptions. In doing so, targeted interventions could be developed aimed at improving pharmacist practice behaviors.

A final limitation of this body of research concerns the statistical analysis approaches used. While most pharmacist-patient interactions are nested within pharmacy, due to the lack of availability of appropriate techniques for analyzing these types of data, none of the studies indicated above examined pharmacists' behavior using two-level modeling tools, such as the Hierarchical Linear Modeling. This is important because ignoring the hierarchy or nesting among factors could lead to a higher probability of rejecting the null hypothesis due to small standard errors. Given that several user-friendly software programs, some textbooks and literature on the topic are now available, it would be useful to examine the applicability of this technique to pharmacist-patient encounters.

This study uses the theory of reciprocal determinism (Bandura, 1978) to identify pharmacy work environment factors and personal factors associated with pharmacists practice behaviors related to patient safety such as transfer of prescription, showing prescriptions to the patient and patient counseling. It is hoped that studying work environment factors will help identify how to facilitate this subset of pharmacist practice behaviors that enhance patient safety.

1.5. Research Objectives

This study has three main research objectives. The first is to explore the extent to which pharmacists engage in four important practice behaviors: transfer of prescription medications to patients, showing medications to the patient to verify their accuracy,

providing information related to directions, side effects and interactions to the patient and carrying out patient assessment using open or closed ended questions. The second objective is to assess the association between work environment factors and pharmacist practice behaviors described above. For the purpose of this study, pharmacists' work environment factors were classified into organizational environment factors and patient interaction environment factors. The final objective is to assess the association between pharmacist personal factors and pharmacist practice behaviors described above. This study will seek to answer the following research questions in the context of pharmacist-patient new prescription and refill prescription encounters:

1. To what extent do pharmacists engage in the following practice behaviors:
    a. Transfer prescriptions to their patient
    b. Show prescription to the patient to verify its accuracy
    c. Provide information to the patients about the directions of use, side effects and adverse effects and
    d. Assess patient compliance, understanding of medications or its effects by using closed or open ended questions
2. How are organizational environment factors such as technician attitudes towards the pharmacist role, safety culture and workload associated with pharmacist practice behaviors indicated above?
3. How are patient interaction environment factors (such as patient question asking behavior and busyness of the pharmacy dispensing area) associated with pharmacist practice behaviors?

4. How are personal factors such as pharmacists' attitude towards practice role associated with the above pharmacist practice behaviors?

1.6. Chapter Preview

Chapter 2 presents the theoretical basis for the research and reviews relevant literature related to pharmacist practice behaviors, personal factors and work environment. In addition, it presents the investigator's exploratory study on pharmacy team perspectives on patient safety and details the development of the model used for the study. Chapter 3 presents research hypotheses. Chapter 4 outlines the methods used in sample selection, the measures used, the data collection procedure and the data analysis procedures. Chapter 5 presents descriptive results related to independent and dependent variables and factor analytic results related to the development of pharmacists' attitudes towards practice role (PAPR) scale, technician attitudes towards the pharmacist role (TAPR) scale and the community pharmacy safety culture scale (COPSC). It also details the analytic results examining relationships between constructs and the examination of the hypotheses. Finally, Chapter 6 discusses the study findings, describes limitations and draws conclusion and implications of findings with suggestions for future research.

II. Literature Review

It is the theory that decides what we can observe

- Leonardo da Vinci

We all carry around with us a big lens, a big framework through which we look at the world order, events and decide what is important and what is not

- Thomas Friedman in his book "Longitudes and Attitudes"

This chapter is divided into five main sections. In the first section, theoretical frameworks proposed and used in the study of pharmacist-patient communication are assessed for use in this study briefly. The second section describes the conceptual framework used to accomplish the goals of the study. The third section presents a review of the literature used to develop the conceptual framework for the study. The fourth section summarizes an exploratory study of pharmacy team perspectives on patient safety. Finally, the model of pharmacists' practice behavior is laid out followed by the hypotheses for the study.

2.1. Theoretical Frameworks

While the majority of the studies on pharmacist-patient communication are do not explicitly state a specific theory that guided the research, some have used theoretical frameworks to understand pharmacist communication behaviors. For instance, Mason (1979) and Schommer (1992) used role theory to study the association between pharmacists' attitude towards counseling as measured by the counseling role orientation (CRO) and pharmacist counseling behavior. Both of these studies found that pharmacists' CRO was a positive and a significant predictor of their counseling behavior. Siganga

(1992) used the theory of reasoned action to study the association of pharmacists' attitudes towards counseling and subjective norms with pharmacist intention to provide medication counseling. The author found that attitudes were better predictors of pharmacists' intentions than subjective norms.

Ascione and colleagues (1987) used the diffusion of innovation theory to study pharmacists' use of written patient medication information. This study found that the most influential factor in the adoption of the written information sheets was the extent that they were compatible with the pharmacists' business needs, professional values, and past experiences in providing written information to patients.

More recently, Coleman (2003) used the theory of reasoned action to examine influences on community pharmacists' communication with consumers about antibiotics and antibiotic resistance. The author found that pharmacists' discussion about antibiotics in general was predicted primarily by attitudes about their role and by their perceived autonomy.

Paluck and colleagues (2003) used the proceed-precede model to study facilitators and barriers to pharmacist-client communication and evaluated their impact on the observed communication behaviors of pharmacists. The authors found that pharmacists' attitudes, year of graduation, adherence and outcome expectations were the most significant predictors of communication quality.

The theoretical frameworks used in these studies were found to be useful in exploring pharmacist behaviors, albeit from differing perspectives. It can be argued that role theory and the theory of reasoned action were mainly utilized to understand pharmacist behavior from a cognitive (attitudes) perspective (Guirguis and Chewning 2005) and that the

diffusion theory and proceed-precede model were utilized from a system perspective. While each of these studies did include elements from the other perspective (e.g. Paluck and colleagues included pharmacists' attitudes along with system facilitators), these studies either emphasized the cognitive aspects or the system that influences pharmacists' behavior. Most importantly, none of these models help conceptualize the relative importance of pharmacists' personal (cognitive) factors versus working environment factors on pharmacist behavior.

Since, the focus of this study was to understand pharmacist practice behavior in the context of their personal factors and work environment, a theory that helped conceptualize the relative influence of these elements was sought. Social cognitive theory (Bandura 1986) was selected. Specifically the model of reciprocal determinism (Bandura 1989), an important construct of the social cognitive theory, was used for several reasons. First, the model differentiates between psychological, behavioral and systems elements. Second, its dynamic nature suits the measurement of human and organizational systems that operate in dynamic environments (Dawson 1996). Finally, it provides a triangulation methodology, which encourages the use of multi-level analyses to identify the relative influence of the different elements in this study.

2.2. Conceptual Framework

The model of reciprocal determinism (Figure 1) suggests that people are neither deterministically controlled by their environments nor entirely self-determining. Instead they exist in a state of reciprocal determinism with their environments whereby they and their environments influence one another in a perpetual dynamic interplay (Davies and Powell 1992). According to this model, individuals within a work environment not only

react to the work situation as they perceive it, but also act to create that situation. For example, in a work group, an individual may choose to help others based on perceptions of group norms, the requirements of the task, and the expectation of future reciprocation. The action chosen by the individual, in turn, contributes to characteristics of the broader context. In this way, there is an ongoing interaction between an individual's reaction to a work context and the creation and maintenance of that particular work context. However, this reciprocal interaction does not imply that all sources of influence are of equal strength. The SCT recognizes that some sources of influence are stronger than others and that they do not all occur simultaneously. In fact, the interaction between the three factors will differ based on the individual, the particular behavior being examined, and the specific situation in which the behavior occurs (Bandura, 1989).

The person-behavior interaction involves the bi-directional influences of one's thoughts, emotions, biological properties and actions (Bandura, 1977;1986;1989). A bi-directional interaction also occurs between the environment and personal characteristics (Bandura, 1977;1986;1989). In this process, human expectations, beliefs, and cognitive competencies are developed and modified by social influences and physical structures within the environment. The final interaction occurs between behavior and the environment. Bandura contends that people are both products and producers of their environment (Bandura, 1977;1986;1989). A person's behavior will determine the aspects of his/her environment to which he/she is exposed, and behavior is, in turn, modified by that environment.

Figure 1

Model of Reciprocal Determinism

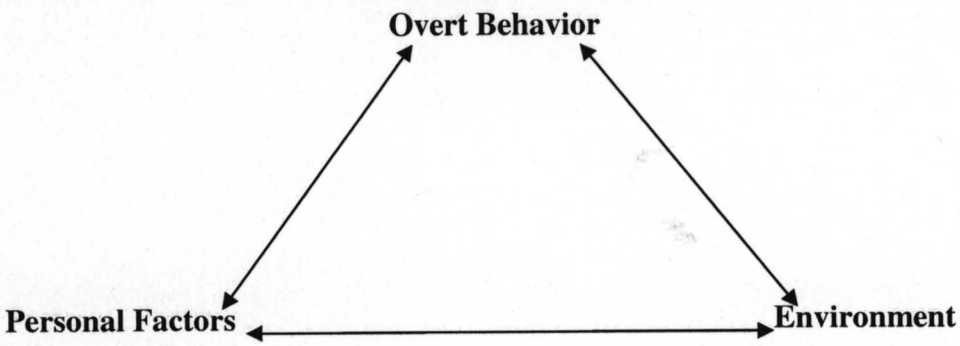
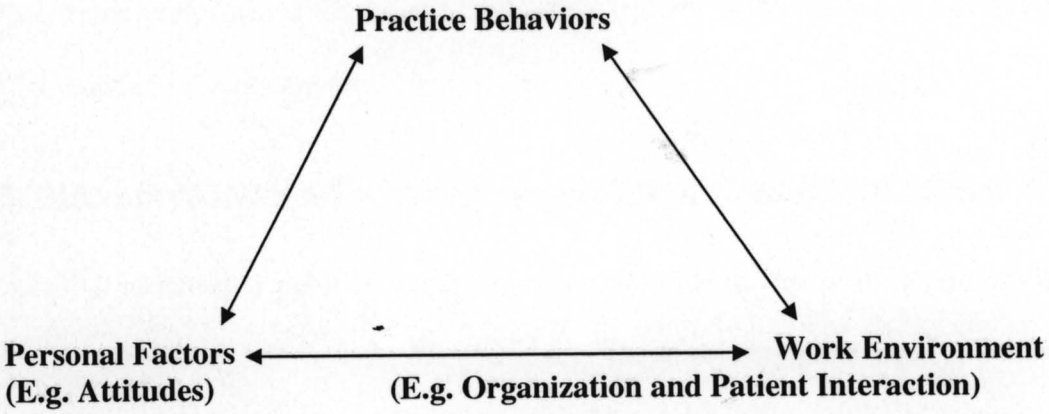


Figure 2

Conceptual Framework



To better understand the application of this model to pharmacist practice behavior, a conceptual framework was developed. In this conceptual framework, the concept of reciprocal determinism is demonstrated by the relationships between pharmacists' working environment, their personal factors and their practice behaviors (Figure 2). This conceptual framework formed the basis of the study and led to the development of the pharmacist practice behavior model.

2.3. Literature Review for the Development of Conceptual Model

To identify pharmacist practice behaviors, personal factors and work environment variables for our conceptual model, the pharmacy literature on patient safety, patient counseling and pharmacist workforce/work activities is reviewed. Next, the literature on organization culture and coworker attitudes is reviewed. Finally, results from an exploratory study of pharmacy team perspectives on patient safety are discussed to explain the inclusion of safety culture and technician attitudes towards pharmacist role in the conceptual model developed for the study.

2.3.1 Pharmacy Literature

A. Pharmacist Practice Behaviors:

The term pharmacist practice behavior is very broad, with a variety of meanings associated with it. A search for pharmacist practice behavior in databases such as Medline, International Pharmaceutical Abstracts, etc. produces at least six types of meanings ranging from unethical practices to pharmacist work activities. Thus, the Pharmacist Practice Activity Classification (PPAC), a classification system developed by the American Pharmacists' Association and nine other academies of pharmacy was used

to guide the definition and measurement of pharmacist practice behavior in this study (Maine, 1998). Given that the PPAC describes a broad spectrum of pharmacist services in all types of practice settings, three other pharmacy literature sources, the patient safety literature, the patient counseling literature and the pharmacy work activities and workforce literature were reviewed. An exploratory study on pharmacy team perspectives on patient safety further guided the conceptualization and measurement of pharmacists' practice behaviors in the study.

a. Pharmacist Practice Activity Classification

The PPAC is focused primarily on activities of licensed, practicing pharmacists across the continuum of healthcare settings. The classification captures a range of activities from traditional dispensing to direct patient care services. Within this classification, pharmacist activities have been classified under four major domains: ensuring appropriate therapy and outcomes, dispensing medications and devices, health promotion and disease prevention and health systems management. Under each domain are listed activities that pharmacists perform as part of their practice behaviors. Appendix A lists all the domains and activities classified under PPAC version 1.0. Across the four domains, activities related to prescription dispensing and patient education are the most common community pharmacist practice behaviors.

b. Patient Safety Literature in Pharmacy

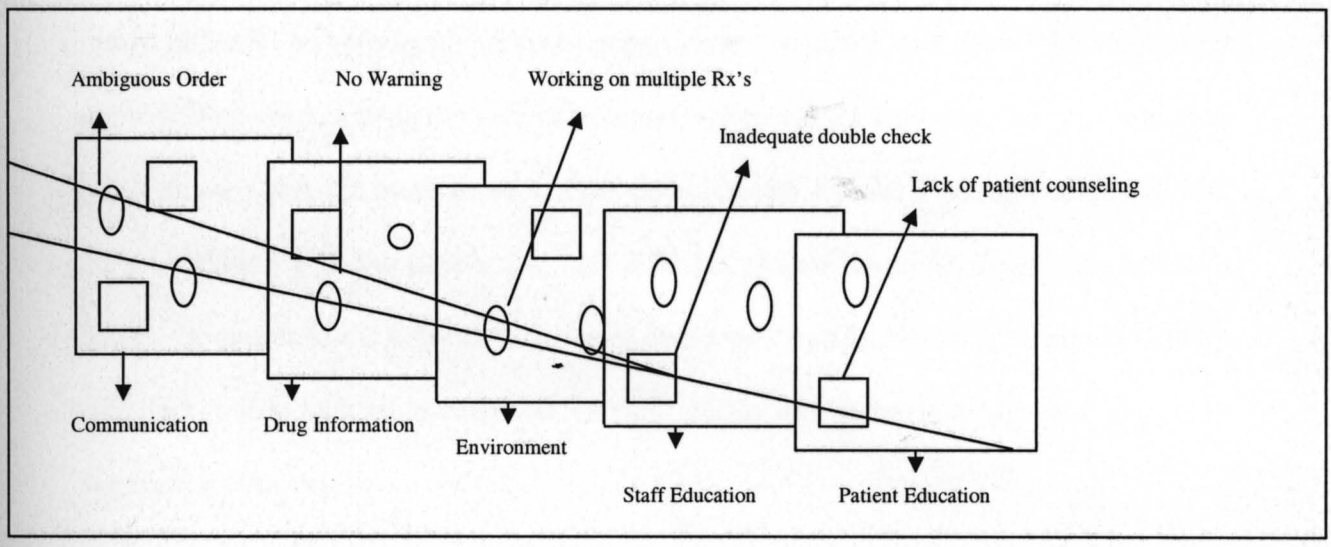
Appendix B presents a brief review of the patient safety literature in pharmacy. As evident from the findings of this review, the majority of studies in the patient safety literature report dispensing error rates. Most of these studies have been carried out in

hospital or inpatient settings. The studies by Cavuto and colleagues (1996), Flynn and colleagues (2003) and Hoxsie and colleagues (2006), are the only studies which report the extent to which dispensing errors are made in community pharmacy.

While most of these studies do not explain the actual practice behaviors that could prevent dispensing errors (with the exception of Hoxsie et al., 2006), the Latent Failure Model of Complex Systems adapted from Reason (1990) provides us with an insight into the stages and practice behaviors that could lead to dispensing errors. According to this model (Figure 3), several factors impact patient safety. These factors are physician-pharmacist or patient-pharmacist communication about the prescription order, drug information, pharmacy environment, staff education about optimal behaviors and roles, and patient education. This model implies that pharmacists' work activities such as working on multiple prescriptions, inadequate/improper double check and lack of patient education can lead to dispensing errors. It is argued that patient education/counseling can be considered as the last opportunity for the pharmacist to ensure patient safety.

Figure 3

The Latent Failure Model of Complex System Failure Modified From James Reason, 1990



Two studies provide evidence for the recommendations made by this model. In the study by Kuyper (1993), nearly 90% of errors that would have reached the patient were prevented with a final check by the dispensing pharmacist during counseling sessions. In addition to counseling patients, Abood (1996) also recommends that pharmacists adopt a "show and tell" technique during counseling, where the pharmacist shows the medication to the patient while asking the patient pertinent questions, such as what the physician said about the need for the medication and the directions for its use. This final verification of the prescription with the patient will help alert the pharmacist to detect an error before it leaves the pharmacy. These findings were confirmed by Hoxsie and colleagues (2006), who report that lack of verification or final check was strongly associated with high dispensing error rates.

In summary, while extent of dispensing errors is the most measured dependent variable, patient counseling and the use of show and tell technique (which includes verifying the patient name) are two important practice behaviors addressed in the patient safety literature in pharmacy.

c. Patient Counseling/Education Literature in Pharmacy

An elaborate literature on patient counseling exists. This literature is summarized in Appendix C. Patient counseling has been defined in many different ways and has been studied from the patient, pharmacist and patient-pharmacist interaction perspective (Shah and Chewning 2005). Thus, it is not surprising that the rates of counseling range from 30 to 87%, primarily depending on the definition of counseling and the methodology of the study (Schommer et al., 1994).

As is evident in Appendix C, studies using telephone interviews and mail survey techniques defined pharmacist practice behaviors in terms of the extent to which pharmacists provided information to their patients or talked with their patients about specific medications (Shah and Chewning 2006). These studies demonstrate considerable variation regarding the type of prescription (defined as new or refill, all prescriptions or specific medications or a specific class of medications) and the type of information (verbal versus written versus non-specific) studied. For instance, Morris and colleagues (1984) used telephone interviews to study the extent to which patients received information (non-specific) for a new prescription. Using a similar methodology, Wiederholt and colleagues (1992) studied the extent to which patients received verbal information for the last new and refill prescriptions. In contrast, Kirking (1982) used a mail survey methodology to examine the information pharmacists usually conveyed to their patients for Warfarin, Sulfisoxizole and Amitryptiline. Recently, Coleman (2003) used a similar methodology to study the extent to which pharmacists talked with their patients about antibiotics.

In comparison, studies using participant (shopper studies) and nonparticipant observation methodology studied pharmacist practice behaviors more broadly. In these studies researchers measured the quantity and quality of information discussed. Thus, along with the measurement of the extent to which specific information items (such as side effects, directions for use, etc.) were discussed, these studies also measured qualitative aspects of behavior such as the interpersonal manner, question-asking behavior of the pharmacist and the approachability of the pharmacist. For instance, Mason and Svarstad (1984) used the shopper technique to measure the extent to which

pharmacists provided verbal and written instruction, demonstrated approachability, and used open/closed ended questions. Similarly, Berardo and colleagues (1989) and Schommer (1994) used a nonparticipant observation methodology to measure the quality and quantity of communication between the pharmacist and the patient. Again, considerable variation exists regarding the type of medications (specific versus non-specific) and the number of information items studied (Shah and Chewning 2006).

In summary, the most commonly studied pharmacist practice behaviors in the patient counseling/education literature are the extent to which pharmacists provide verbal and/or written information in the context of a new/refill/specific medication and the type of questions used to assess patient knowledge, concerns or compliance with medications.

d. Pharmacy Work Activities and Workforce Literature

The pharmacist work activities literature has been carried out in diverse settings and focused on several different activities. As early as 1972, Rodowskas and Gagnon used work-sampling method to observe and record the percent of time community pharmacists spent on eight activities, four prescription dispensing activities (manipulative, clerical, consultative, and supportive), two operational activities (general communication and selling, and managerial), and two nonprescription related activities (selling over the counter medicines, and idle). The authors found that pharmacists spent over fifty percent of their time in dispensing related activities. In the early and mid nineties, Guerrero and colleagues (Guerrero et al., 1990a, 1990b, 1995) used work-sampling methodology to obtain satellite and hospital pharmacists' self-reports on the percent of time spent on drug distribution and clinical responsibilities. The authors report that pharmacists in satellite and hospital pharmacies spent approximately sixty percent of their time in clinical

activities. In 1999, Dupclay Jr. and colleagues used multidimensional work sampling methodology to categorize the amount of time spent by grocery chain pharmacists in terms of activity, function and the contact with whom the activity and function was carried out. The authors report that writing/keyboarding, one-to-one meetings and drug preparation were the most frequent activities, and that pharmacists spent sixty percent of their time working alone. According to this study, the most frequently recorded function was drug distribution and receiving or transferring a medication order (Dupclay Jr. et al., 1999).

The description of work activities in the pharmacy workforce studies was based on the PPAC version 1.0 and on previous research conducted in four Midwestern states (Schommer et al., 2001, 2002, 2006). In these studies, Schommer and colleagues grouped all professional responsibilities indicated in the PPAC into four overall categories: medication dispensing, consultation, business management and drug use management. Overall, these studies indicate that in community settings more than fifty percent of pharmacists' time is spent in medication dispensing activities, approximately twenty percent in consultation activities and only eight percent in drug use management activities.

In summary, the pharmacy work activities and workforce literature has examined pharmacy practice behaviors in terms of the amount of time spent in dispensing, consultation, business management and clinical/drug use management activities.

e. Summary of Pharmacy Practice Behavior Measurement

The literature on pharmacy practice activity, patient safety, patient counseling and pharmacist workforce/work activities was reviewed to identify important activities.

Across this literature, the transfer of the prescription to the patient, verification of the prescription by showing it to the patient and patient counseling and assessment were considered vital.

B. Personal Factors

The term personal factors relates to pharmacists' cognitive and demographic factors. To identify pharmacists' personal factors for their inclusion in the study, the literature on patient safety, patient counseling/education and work activities/ workforce was again reviewed.

a. Patient Safety Literature:

As is evident in the patient safety literature reviewed in Appendix B, pharmacists' distractibility measured by group embedded figures test (GEFT) scores and job satisfaction are the two personal factors that have been found to be significantly associated with the extent of dispensing errors made by the pharmacists.

b. Patient Counseling/Education Literature:

A number of cognitive and demographic factors have been found to be associated with pharmacists' counseling behaviors. These factors are presented in Appendix D. In 1975, Watkins reported that pharmacists' knowledge about medications was positively and significantly associated with their counseling practices. Mason (1979, 1983) developed and tested a 20-item Counselor Role Orientation (CRO-20) scale to measure community pharmacists' attitude towards patient counseling. Pharmacists' CRO scores were positively and significantly related to the incidence of verbal instruction, interaction and approachability. In another study, Kirking (1983) reported that pharmacists' attitude

towards counseling and their prior experience were the major explanatory variables of pharmacist provided counseling services. Both of these variables were found to be positively related to the extent to which pharmacists provided information to their patients. Ascione (1985) concluded that the provision of patient-centered services by a pharmacist was affected by pharmacists' perceptions of patient interest/need for information. Schommer (1992, 1994, and 1995), using an abridged version of the CRO (CRO-8), reported that pharmacists' counseling role orientation influenced not only the occurrence of pharmacist-patient communication but also the length of patient-pharmacist communication. Additionally, Schommer (1992, 1994, and 1995) reported that pharmacists' perceived importance of information to the patient was related to the occurrence and length of pharmacist-patient communication. Both Barnes (1996) and Coleman (2003) also reported that pharmacists' attitudes were significantly and positively related to their counseling practices. Among pharmacists' demographic factors, age, number of years in practice, and position were found to be related to pharmacists' counseling behavior.

c. Pharmacist Work Activities/ Workforce Literature:

Pharmacists' demographic factors such as age, gender and position were found to be associated with amount of time pharmacists reported spending in medication dispensing, consulting, business management and drug use management. For instance, Schommer and colleagues (2002) report that compared with managers, staff pharmacists reported spending more time in dispensing than on business management and consulting. More recently, Schommer and colleagues (2006) report that pharmacists' age was significantly positively associated with the amount of time spent in dispensing. Also, pharmacists'

position, number of years in current position and gender were positively related to the amount of time spent in consultation.

d. Summary of Pharmacist Personal Factors Measurement

In summary, pharmacists' attitudes towards counseling along with demographic factors such as age, gender and experience have been reported as important and significant predictors of their counseling behaviors.

C. Working Environment

Given that the term "work environment" broadly encompasses several aspects of working conditions, the Agency for Healthcare Research and Quality report "The Effects of Healthcare Working Conditions on Patient Safety" was used as a guide to examine the literature in pharmacy. In this report, Hickham and colleagues (2003) classified working environment into five different categories. These categories are: workforce staffing, workflow design, socio-personal factors, physical environment and organizational factors. In this report, workforce staffing refers to four aspects of job assignments: volume of work, professional skills/position, duration of experience, and work schedules. Workflow design includes task design and workplace design characteristics such as redundancy, complexity and distractions. Socio-personal factors refer to the interrelationships among workers, such as support, motivation, job satisfaction and control over work. Physical environment includes direct physical characteristics such as light, aesthetics, noise and design features such as physical layout. Finally, organizational factors refer to the structural and process aspects of the organization such as the use of teams, type of organization and organization culture. Using this classification as a guide

map, literatures in patient safety in pharmacy, patient counseling/education and pharmacy workforce/ work activities were reviewed.

a. Patient Safety Literature in Pharmacy:

As stated earlier, the dependent variable in this literature has been the extent to which dispensing errors were made by the pharmacists. A number of studies have identified the working environment factors associated with pharmacists' dispensing errors. Among these studies, the studies by Grasha and his colleagues (Grasha and O'Neill 1996, Grasha 1998, Grasha 1999) in ambulatory and community settings report that perceptions of inadequate supervision, low workload, perceptions that breaks were inadequate, field-dependence (i.e., big-picture orientation), low levels of task tension, and perceptions that pharmacy lighting was inadequate were related to higher dispensing error rates. Another noteworthy study by Bond and Raehl (2001) surveyed 3000 licensed pharmacists in Texas and sought to detect possible factors contributing to dispensing errors. The greatest risk was felt by pharmacists working in mail-order pharmacies, traditional chains, and hospital pharmacies, with somewhat less risk reported by pharmacists in independent community settings, grocery store and mass merchandise chains. The survey also revealed a positive correlation between the number of prescriptions filled per hour and the estimated risk of committing a dispensing error. It should be noted, however, that this study surveyed pharmacists' perceptions of risk and did not attempt to validate the accuracy of their beliefs.

Workload issues were also deemed significant in a retrospective follow-up study of actual documented errors conducted by the Massachusetts Board of Pharmacy (Couris et al., 1999). The study surveyed 51 pharmacists in Massachusetts whose errors were

reported to the board in 1996-97. The pharmacists perceived that they were significantly busier on the day of the incident and cited the leading causes of errors as too many phone calls, too many patients/prescriptions, and a lack of concentration. The study also revealed that on the day of the incident the pharmacists perceived that support staff was less involved in the mechanical prescription preparation processes. In addition to the factors cited above, interruptions and distractions are also likely to contribute significantly to errors. In one study conducted in a hospital ambulatory care pharmacy, errors were analyzed over a 23-day period (Allan et al. 1999). Investigators found an overall dispensing error rate of 3.2%; the rate more than doubled when the pharmacist was interrupted (cessation of activity due to an external reason) or distracted (responding to an external stimulus). Further, inadequate lighting and noise also contributed to errors.

In summary, among the working conditions classified by the AHRQ report, several aspects of staffing, personal/social factors, workflow design and physical environment have been studied for their association with pharmacists' dispensing errors. Notably absent in the patient safety literature is the measurement of organizational factors such as organizational culture.

b. Patient Counseling/Education Literature in Pharmacy:

Over the past 50 years there has been an extensive literature on factors affecting pharmacists' patient counseling behaviors (Appendix D). As early as 1975, Dickson and Rodowskas found that prescription department staffing, defined as the number of technicians, clerks and pharmacists in the department, was significantly and negatively related to the time pharmacists and patients interacted. The same study also found that pharmacists' workload defined as the average prescription volume per day was also

significantly related to pharmacist-patient interaction. In this study, the authors report that the extent of pharmacist-patient interaction decreased when the average prescription volume increased. Similar results were found for the effect of workload and staffing in the studies conducted by Kirking (1984), Mason (1979, 1984) and Berardo and colleagues (1989). In addition to workload and staffing, Berardo and colleagues (1989) also found that pharmacist busyness measured as perceived busyness had a moderately negative effect on the extent to which pharmacists communicated with their patients. The results for the effect of pharmacists' busyness on counseling were replicated in the studies by Schommer (1992), Sleath (1995) and more recently by Svarstad and colleagues (2004). Notably, Svarstad and colleagues (2004) measured busyness as the number of patients waiting in the dispensing area and found it to be significantly and negatively related to pharmacists' counseling practices. The findings on privacy and its association with pharmacists' counseling behavior were mixed. Beardsley, Johnson and Wise (1977) reported that higher privacy pharmacy environments increased the amount of pharmacist-patient communication. However, Schommer (1992) did not find any relationship between privacy and pharmacist communication behaviors. A probable reason for this result may be that privacy and busyness were found to be strongly correlated in the study by Schommer (1992).

Among the social factors, Mason (1979, 1984), Kirking (1983) and Coleman (2003) found that social or subjective norms among peers and team members were important but statistically non-significant predictors of pharmacists' patient counseling behavior. Among the organizational factors, a number of pharmacy demographics such as location

and type of pharmacy have been found to be significantly related to patient counseling behavior.

In summary, the measurement of working environment in the patient counseling/education literature has been comprehensive in relation to workforce staffing, design and physical environment such as busyness and privacy. Structural organizational factors such as type of pharmacy have been studied, but research on organizational influences such as the culture and the actual attitudes of other pharmacy staff has been missing.

c. Pharmacist Work Activities/ Workforce Literature:

As noted earlier, several studies in the pharmacist work activities/ workforce literature provide insight into the relationship between pharmacist work environment and their practice behaviors. For instance, in their reports from the workforce studies, Kreling and colleagues (2006) indicate that the type of practice setting, workload, staff size, and working with technicians were significantly associated with the amount of time pharmacists reported spending in medication dispensing. Among these factors, only practice setting and workload influenced the amount of time pharmacists reported spending in consultation. As compared to independent pharmacies, pharmacists working in chain and mass merchandiser pharmacies indicated negative effect of workload on time spent in contact with patients. In contrast, Schommer and colleagues (2002) report that there was no association between pharmacy type, prescription volume and amount of time spent in contact with patients. In an earlier study, Dupclay Jr. and colleagues (1999) report a positive relationship between grocery chain pharmacists' workload and time

spent on clinical judgments. The authors measured pharmacists' workload in terms of the prescription volume per day.

In summary, based on the classification in the AHRQ report, it can be said that the measurement of working environment in the work activities and workforce literature has focused on staffing aspects such as pharmacists' work hours, number of people with the pharmacist during their work hours, their workload, and structural organizational factors such as the type of setting.

d. Summary of Pharmacist Work Environment Measurement

The measurement of pharmacists' working environment has been limited to staffing issues such as workload, aspects of physical environment such as busyness and privacy and organizational structure such as type of settings. Research on the association between organizational influences such as organizational culture and actual attitudes of pharmacy staff is prominently absent. As pharmacists interact with patients, they are bound to be influenced by these factors. Given that the majority of community pharmacists now work as employees in major corporations, organizational culture and the attitudes of co-workers such as technicians could potentially impact their practice behaviors. However, to the best of our knowledge no published study has measured their impact on pharmacist practice behaviors. Informally, Schommer (1992) observed that in some pharmacies, pharmacist-patient communication did not occur because the technicians would dispense the prescriptions and ask their patients if they had any questions for the pharmacist. This limited the extent to which pharmacists interacted with their patients. To evaluate the utility of these concepts in our field of research, a brief review of the organization culture and coworker attitudes literature is presented.

2.3.2 Organization Culture Literature

Although organizational culture has not been addressed to a large extent within pharmacy, it has been applied in other organizational settings. Organizational culture has received much attention in organizational behavior and marketing literatures because of the key role it plays in determining levels of organizational outcomes (e.g., Chatman and Jehn, 1994; Hofstede et al., 1990; Marcoulides and Heck, 1993; Schein, 1990; Trice and Beyer, 1984; Deshpandé et al., 1993; Deshpandé and Webster, 1989; Kitchell, 1995).

Organization culture is defined as a system of shared meanings, assumptions and underlying values (Davis 1984; Schein 1985, Martin 2002). Trice and Beyer (1993) elaborate the definition of organizational culture into two elements: 1) cultural substance, which consists of shared belief systems, values and norms; and 2) cultural forms, which are observable ways that members of a culture express cultural substance. Trice and Beyer (1993) discussed these shared systems of beliefs, values and norms as ideologies. Most often, the ideologies are influenced by the historical developments, level of competitiveness, member philosophies and patient requirements (Gordon 1991). These ideologies then result in the development of shared beliefs about appropriate strategies that the organization and its members would use to meet requirements for overcoming competition and for satisfying patients (Huff 1982; Whipp et al., 1989).

Research indicates that culture plays at least four important roles in organizations. First, culture forms a collective identity that helps its members associate themselves with their organization's policies and mission, and feel themselves a part of it (Hofstede, 1998; Peters & Waterman, 1982). Second, organizational culture prescribes norms of acceptable and unacceptable behavior, making it clear for employees what they should

say or do in a given situation (Kotter & Heskett, 1992; Schein, 1990). Third, these norms help employees work together to meet patients' needs and respond to external pressures (Schneider & Bowen, 1995). Fourth, culture provides structure and control without relying on an authoritarian management style that can lessen motivation and creativity (O'Reilly & Chatman, 1996).

When organizations promote a certain set of values, like respect for people and high pay for good performance, they create a social energy or motivation that influences employees' attitudes and behaviors. For instance, Sommer et al., (1996) found that employees who perceived greater warmth, supportiveness, assigned responsibility, and rewards in their organizations increased their organizational commitment. Sheridan (1992) found that firms emphasizing interpersonal relationship values retained employees more successfully than firms emphasizing work task values. Organizational culture also affects many aspects of organizational performance, including financial performance (Barney, 1986; Fisher & Alford, 2000; Rotemberg & Saloner, 1993), patient and employee satisfaction, and innovation (Barney, 1986).

In the healthcare environment, organizational culture has been associated with elements of organizational performance that impact quality, such as nursing care, job satisfaction, and patient safety (Aiken et al., 2002). Glisson and Hemmelgarn (1998) showed that improving the work culture significantly improved the quality of services in a children's healthcare organization. Organizational culture has also been linked to safety, leading to the development of the construct "safety culture". It is generally acknowledged that the creation of a safety culture is a key part of improving patient and staff safety (Clark, 2002; Clarke et al., 2002; Firth-Cozens, 2001; Gillies et al., 2003;

Mawji et al., 2002). It is defined as 'the product of individual and group values, attitudes, competencies, and patterns of behavior that determine the commitment to, and the style and proficiency of, an organization's health and safety programs (Carnino 1989, Lucas 1990, Lee 1993, UK Health and Safety Commission 1993). A recurring theme in the literature is that organizations with effective safety cultures share a constant commitment to safety as a top-level priority, which permeates the entire organization. Organizations with a positive safety culture are characterized by communications founded on mutual trust, by shared perceptions of the importance of safety, and by confidence in the efficacy of preventative measures.

In describing how to engineer a safety culture, Reason (1997) proposed that an organization with an effective safety culture:

- has a safety information system that collects, analyses and disseminates information from incidents and near misses, as well as from regular proactive checks on the system;
- has a reporting culture where people are prepared to report their errors, mistakes and violations;
- has a culture of trust where people are encouraged and even rewarded to provide essential safety-related information, but also in which it is clear where the line between acceptable and unacceptable behavior is drawn;
- is flexible, in terms of the ability to reconfigure the organizational structure in the face of a dynamic and demanding task environment;
- has the willingness and competence to draw the right conclusions from its safety system, and is willing to implement reform when it is required.

Many researchers have assessed safety climate as an indicator of the overall safety culture of an organization and to establish its relationship with patient safety practices. For example, in a study of compliance to desired protective behavior by healthcare workers at a hospital, Gershon and colleagues (1995) found that compliance to desired protective behavior such as glove use, disposal of sharps and wearing protective gears when interacting with patients was strongly correlated with the perceived organizational commitment to safety. Hofmann and Stetzer (1996) reported that when a climate for safety exists, employees are more committed to safety, more likely to comply with safety rules and regulations, and less likely to be involved in accidents. In a study of infection control practices by healthcare workers at a correctional facility, Green-McKenzie and colleagues (2001) report that management commitment to safety was found to be highly associated with the adoption of safe work practices by the workers. In this study, those employees who perceived a high level of management support for safety were more than twice as likely to adhere to recommended infection control practices.

In a study of patient safety practices, DeJoy and colleagues (2000) reported that a positive safety climate was found to increase the likelihood that workers complied with safe work practices. Similarly, Clark and colleagues (2002), report that hospital nurses from units with low staffing and poor organizational climates (in terms of resources and leadership) were twice as likely as nurses on well-staffed and better-organized units to report risk factors, needlestick injuries, and near misses. Wright and colleagues (2003) report that the emergency department nurses and other clinical staff who view their safety climate as positive report having more frequent contact and providing a greater variety of interventions to patients with psychiatric problems. Recently, Weingart and colleagues

(2004) reported that employees working in a hospital universally regarded patient safety as an essential part of their job. Two-thirds of workers worried at least once a day about making a mistake that could injure a patient; 43% said that the work load hindered their ability to keep patients safe. Workers' overall assessment of patient safety was associated with their perceptions of workplace safety and leadership commitment to patient safety.

In instances where culture does not independently predict clinical and organizational outcomes, it may still act as an important mediating or contextual factor (Shortell et al., 2001, Hofmann et al., 2003, Probst 2004). For example, in Canadian long-term care facilities, a culture that supported organizational learning and employee development was found to be a necessary condition for quality improvement programs to achieve their organizational objectives (Rondeau and Wager 2002).

Not surprisingly, healthcare organizations are now adapting safety culture surveys from other industries to benchmark and identify potential deficiencies in their unique safety culture. However, several issues related to the measurement of safety culture remain. First, several authors argue that the concept is vague, lacks empirical validation and is used as an "umbrella term" for all the social and organizational factors that affect safety. Second, a debate over the difference between "safety culture" and "safety climate" has developed, partly arising from the common dimensions that represent the safety culture, safety climate and their measures (Cox and Flin 1998; Flin 1998; Mearns et al. 1998) and partly from the atheoretical roots of safety culture and safety climate (Kennedy and Kirwan 1995; Pidgeon 1998). However, more recently, it has been argued that safety climate is an observable manifestation of the safety culture of an organization (Cox and Flin 1998; Correll and Andrewartha 2000; Mearns et al., 2003).

Finally, the actual measurement of safety culture and the number of dimensions to be included in the measurement of safety culture have also been debated. There is much variation in the number of dimensions; these vary from global measures of safety climate to 16 distinct components. Williamson et al. (1997) note that different approaches to the measurement of safety culture are partially responsible for the differences in dimensions found by empirical studies. They identify two differing approaches: first, asking workers for their perceptions of actual workplace characteristics (e.g. Zohar 1980); secondly, asking more general questions about safety (e.g. Cox and Cox 1991). Additionally, many studies lack any theoretical underpinning and construct their measurement tools by selecting items from previous questionnaires, although some studies demonstrate a systematic approach to item generation (Cox and Cox 1991; Donald and Canter 1994). A number of empirical studies, which used similar safety culture measures in different industries, have concluded that the structure of safety culture is context dependent (Cox et al. 1998; Coyle et al. 1995).

In summary, it seems that safety culture could be of great utility in the study of pharmacist practice behaviors. However, issues related to the measurement of safety culture (such as dimensions to be measured and adapting it to the pharmacy context) need to be addressed prior to its utility.

2.3.3. Coworker Attitudes Literature

Social learning theory, a precursor to the social cognitive theory, suggests that the attitudes and behavior of other people influence our own attitudes and behavior. Bandura (1977) demonstrated, for example, that vicarious learning takes place in a variety of contexts. People learn acceptable, normative behavior from observing how others behave. The work situation parallels other social situations in that people learn the behavioral norms of the workgroup by working with and watching their coworkers. As Robinson and O'Leary-Kelly (1998) note, the workgroup context is especially relevant to social learning because it is an ongoing situation in which one has the opportunity across time to observe coworkers and to learn vicariously the effect of the learned behavior upon the coworker. Beyond learning the appropriate work behavior, social scientists have discovered that attitudinal views are also transmitted with social context.

Salancik and Pfeffer's (1978) social information-processing theory most aptly notes how people come to share the attitudes and opinions of their coworkers. Pfeffer (1981) argued that employee attitudes and behaviors were more influenced by their social cues such as co-workers than their job characteristics. Evidence in the service marketing literature also supports this contention. For example, Kohli and Jaworski (1994) report that coworker attitude and feedback significantly influenced salespeople's performance and satisfaction. In a recent study, Susskind and colleagues (2003) report that employees who indicate a strong presence of both coworker and supervisor support have higher scores for patient orientation.

Within pharmacy, while there are no studies determining the relationship between co-worker support and pharmacist counseling role orientation, both Kirking (1983) and

Mason (1984) found that the subjective norms measured as supervisor and co-workers' influence were related to pharmacists' counseling behavior. The increased responsibilities of technicians along with the shift in pharmacy's paradigm from a focus on product to an emphasis on patient care, have led to suggestions that technicians should assume dispensing responsibilities (Dunn and Wolfe 1998). Given the nature of technicians' responsibilities, it is possible that the attitudes of technicians may play an important role in pharmacist practice behaviors. Technicians with positive attitudes about the pharmacist role may facilitate pharmacist practice behavior by relieving pharmacists to counsel more patients. Thus, technician attitudes towards the pharmacist role can be an important work environment factor that can potentially affect pharmacist attitudes and practice behavior.

In summary, both safety culture and technician attitudes towards a pharmacists' role appear to be valuable factors to include in the model of pharmacist behavior. To explore their potential utility in the context of pharmacist practice behaviors, an exploratory study of pharmacy team views on patient safety was carried out by the investigator. This work facilitated the development of scales to measure these two concepts in the context of pharmacist practice behaviors.

2.3.4. Exploratory Study on Pharmacy Team Views on Patient Safety in Community Pharmacies

The main objective of this exploratory study was to explore community pharmacist and technician perspectives on patient safety. More specifically, the aim was to identify themes related to pharmacist role behaviors considered vital for patient safety and identify themes related to work environment factors that influence these behaviors. A

secondary aim was to develop an instrument for measuring the constructs identified during the study.

A case study design was used for this holistic, in-depth investigation (Feagin et al., 1991). Based on recommendations by Yin (1984), a purposive sample of 10 community pharmacists and 10 technicians working in 5 different community pharmacies (independent, traditional chain, grocery store, stand alone health system and mass merchandiser store) were enrolled in the study. Data collection was carried out in two waves. In the first wave, semi-structured interviews were carried out with each participant. The semi-structured interviews utilized open ended questions and probes to explore several aspects of pharmacist roles and work factors that influence patient safety. Examples of questions used during the interviews are:

1. Tell me about what you do to ensure patient safety
    a. What is the role of the pharmacist?
2. Tell me about work environment factors that influence these activities
    a. Tell me more about it?

Once all the interviews were completed, they were transcribed and examined for content manually using directed content analysis procedures (Carley, 1990; Hickey and Kipping 1996) to develop themes related to the constructs in the study. Two themes were identified for each construct. For the pharmacist role behavior construct, both technicians and pharmacists routinely described pharmacist roles in quality assurance and control and in patient counseling. Overall, respondents' focus seemed to be mostly on delivering the right drug to the right patient along with relevant drug information. Examples of statements for each theme are given below:

1. Quality Assurance and Control Theme:
    a. " I make sure that the prescription is correctly filled, that they are given to the right patient" (Pharmacist)
    b. " the pharmacist should be the only one to hand out the prescription-that is where the last check that it is going to the right patient is done- the pharmacist needs to check every prescription that goes out" (Technician)
2. Patient Counseling Theme:
    a. "counseling them to make sure that the patient has the necessary information to take medications correctly" (Pharmacist)
    b. "counseling is very important for patient safety" (Technician)

Two themes were also identified for the work environment construct. The first theme was related to workload where participants talked about the number of prescriptions that they filled during busy and non-busy days. The second theme was identified as presence (or absence) of a system where respondents talked about a number of aspects of the pharmacy work environment that in their opinion affects pharmacist role behaviors. These system factors were: the presence of adequate staffing, teamwork, management support and open communication environment at the pharmacy. Examples of statements for each theme are given below:

1. Workload Theme:
    a. " at times we fill more prescriptions than we should and it is then when I am concerned about patient safety"
2. Presence of a System Theme:
    a. Staffing:

i. "we need enough people to make sure everything is going right"

b. Teamwork:

i. "when the going is tough a good team that helps each other out makes sure that the right patient receives the right prescription"

c. Management Support:

i. "if the management is proactive and provides necessary resources there is no way things can go wrong"

d. Open Communication:

i. "we all need to be on the same page when it comes to patient safety

After all themes were identified, literature in pharmacy and patient safety was examined to identify scales that could be adapted for instrument development. The Counseling Role Orientation Scale developed by Mason (1979) and later modified by Schommer (1992) was identified as a representative scale for the pharmacist counseling sub-theme under the pharmacist role behavior theme. The Workload measure used in pharmacy workforce area by Mott and colleagues (2002, 2004) was identified to represent the workload theme. Four dimensions from the Hospital Safety Culture Scale developed by the Agency for Healthcare Research and Quality were found to be representative of the four sub-themes under the presence of a system theme. No scale was found for the quality assurance and control sub-theme under the pharmacist role behavior theme. Thus, a 5 item scale (QAC) was developed using items from the content analysis procedure. A survey questionnaire was developed using these three scales. Theme and scale validity were established by cognitive testing of each scale where both technicians

and participants were asked to utilize the think-aloud technique while responding to survey items (Worthen and Sanders, 1987). As a result the following modifications were made to the existing scales:

1. A new item (Counseling is not important for patient safety) was added to Counseling Role Orientation (CRO) scale
2. Anchors for Safety Culture scale were changed from Strongly Agree-Strongly Disagree to All of the time-Never

Survey data were collected and entered in SPSS version 11.5. Descriptive statistics were run. These descriptive results indicated that both pharmacists and technicians had positive attitudes towards the pharmacist counseling role and that their scores on the modified CRO varied slightly. Pharmacist and technician scores on the quality assurance and control scale (QAC) and the safety culture were positive and similar.

Given that the sample size was limited, no reliability testing of the scale items and model testing was feasible. However, this exploratory study suggested that pharmacists and technicians may have different attitudes towards the pharmacist role in patient safety. If true, technician attitudes could have an important influence on pharmacist practice behaviors. The study results also indicated that safety culture may be an important variable influencing pharmacist's practice behavior.

2.4. Conceptual Model of Pharmacist Practice Behaviors

The review of patient safety, counseling, workforce and work activities literature in pharmacy, combined with the exploratory study on pharmacy team perspectives on patient safety, helped develop the model of pharmacists' practice behavior underlying this study (Figure 4). According to this model, pharmacists' work environment is

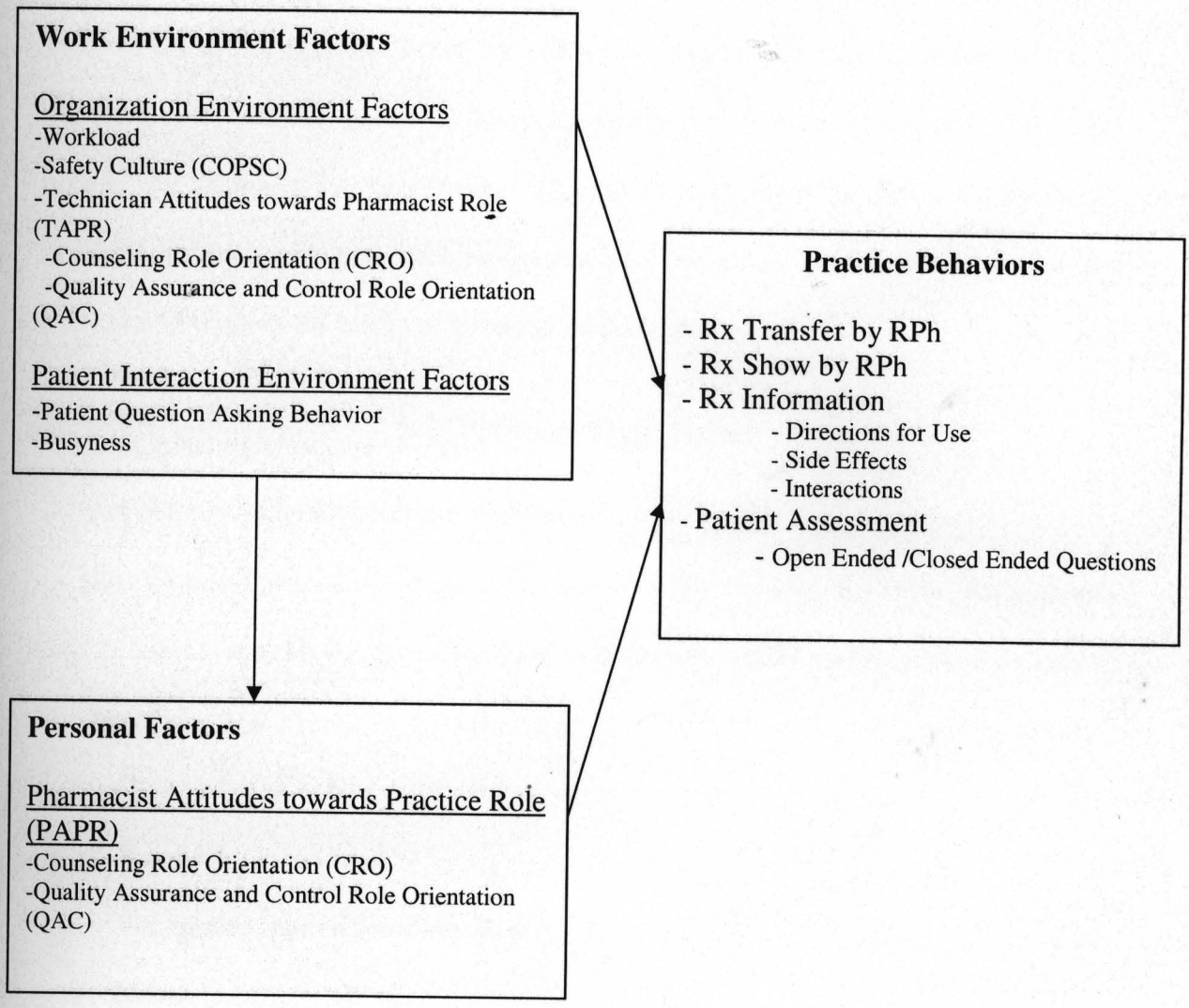
conceptualized as a function of two important factors: the organizational factors and the patient interaction factors which have the potential to influence pharmacist practice behaviors. Organizational environment factors included in this study are workload, technician attitudes towards pharmacist role (TAPR), and community pharmacy safety culture (COPSC). TAPR is measured as an individual variable on the following dimensions: attitude towards pharmacist counseling role and quality assurance and control role. COPSC is measured as a group variable on the following dimensions: staffing, teamwork, communication openness and management support. Busyness and patient question-asking behavior are included as patient interaction factors. A prime reason for this categorization is that the latter work environment variables vary for each pharmacist-patient encounter whereas organizational environment factors do not vary across pharmacist-patient encounters. Also, this categorization would establish the hierarchy among the various factors of working environment for an exploratory hierarchical linear modeling (HLM) analysis.

Among personal factors, pharmacists' attitudes towards pharmacist role (PAPR) are included in the model. PAPR measured pharmacists' attitudes towards pharmacist counseling role and quality assurance and control role.

Finally, pharmacist practice behavior is conceptualized in terms of four activities: transfer of prescription by the pharmacist (Prescription transfer), verification of prescription by showing it to the patient (Prescription show) and pharmacists' counseling behaviors related to providing information on directions for use, interactions and side effects (Prescription Info) and pharmacist assessment behaviors (Patient Assessment).

Figure 4

Model of Pharmacist Practice Behavior Based on Reciprocal Determinism Theory



III. Research Hypotheses

The main purpose of this study is to identify pharmacist work environment factors and personal factors that influence pharmacist practice behaviors. To accomplish this, relationships among variables proposed in the Model of Pharmacist Practice Behaviors were tested. In this chapter, formal hypotheses are presented for the proposed effects of PAPR, TAPR, COPSC, workload, busyness, and patient question-asking behavior on Rx transfer, Rx show, Rx Info and Patient Assessment. Hypotheses for the mediating effects of PAPR on pharmacist practice behaviors are also presented. The secondary goal of this study was to explore the utility of hierarchical linear modeling.

3.1. Primary Hypotheses

The primary hypotheses for the study were:

$H0_1$: Dispensing pharmacist practice behaviors (Rx transfer, Rx show, Rx Info and Patient Assessment) are not significantly associated with the following work environment factors:

- Patient question asking behavior
- Busyness
- Technician attitudes towards pharmacist role (TAPR)
- Safety Culture (COPSC)
- Workload

$H0_2$: Dispensing pharmacist practice behaviors (Rx transfer, Rx show, Rx Info and Patient Assessment) are not significantly associated with the following personal factor:

- Pharmacist attitudes towards pharmacist role (PAPR)

$H0_3$: PAPR is not a significant mediator of the relationship between work environment factors and pharmacist practice behaviors (Rx transfer, Rx show, Rx Info and Patient Assessment)

3.2. Secondary Hypotheses

The secondary hypotheses of the study examined the mediating effects of Rx transfer on the relationship between work environment factors, personal factors and the three other pharmacist practice behaviors (Rx show, Rx Info and Patient Assessment). The following hypotheses were tested:

$H0_4$: Rx transfer is not significantly related to the three other pharmacist practice behaviors (Rx show, Rx Info and Patient Assessment)

$H0_5$: Rx transfer is not a mediator of the relationship between work environment factors and three other pharmacist practice behaviors (Rx show, Rx Info and Patient Assessment)

$H0_6$: Rx transfer is not a mediator of the relationship between pharmacist attitudes towards pharmacist role and three other pharmacist practice behaviors (Rx show, Rx Info and Patient Assessment)

IV. Methods

This chapter is divided into seven sections. The first section presents the research design followed by the second section which details the sampling methodology used in the study. The third section describes the data collection procedure followed by the fourth section which presents the operational definitions and measures used in the study. The fifth section provides an insight into the measures followed by the sixth section which presents the measurement challenges encountered during the data collection procedure. Finally, the seventh section provides an insight into the data analysis procedures used to test the study hypotheses.

4.1. Research Design

A cross sectional, field work, descriptive design was used for the study. Independent and dependent variables were operationalized and measured using observational, interview and survey methods of data collection. Data were collected from 360 patients in 30 community pharmacies located in southeast Wisconsin.

4. 2. Sample

A stratified random sample of 30 community pharmacies from seven counties (10 each from metro, metro-other and rural counties) in south-east and south-central Wisconsin was selected for the study. At each randomly selected pharmacy, data were collected from pharmacists, technicians and 12 randomly selected patients obtaining prescriptions at the pharmacy site. Half of the patients selected were receiving new prescriptions (n=6), and the other half were receiving refill prescriptions (n=6). The total

number of patients included in the sample was 360. This sample size was based on requirements for logistic regression and hierarchical linear modeling. For logistic regression, several authors (Park and Dudycha, 1974; Cohen and Cohen, 1983; Tabachnick and Fidell, 1996) recommend a minimum of 15 observations per predictor. As compared, for hierarchical linear modeling, the general rule of thumb suggests that 10 observations per group (for 30 or more groups) are adequate for achieving a moderate amount of power (Hoffman 1997). Our total sample size was deemed adequate to conduct both analyses. Other considerations included resources such as time and personnel available for the study.

The sampling for the study was carried out in two stages. First, pharmacies were randomly selected from a sampling frame of community pharmacies in Wisconsin. This was then followed by sampling patients at each participating pharmacy. Each stage is described below.

4.2.1. Pharmacy Selection and Pharmacy Staff Recruitment

First, a database of community pharmacies licensed in Wisconsin was obtained from the Wisconsin Department of Regulation and Licensing. To create the sampling frame for the study, pharmacies were stratified by county type. This helped address variation in number and types of employees, workload, and pharmacist practice behavior as a function of access to pharmacies in the region. The classification of counties as metro-central, metro-other and rural was based on the methods used by the Wisconsin Primary Health Care Association (Byck et al., 2002). Counties with total estimated population was equal to or more than 500, 000 was classified as "metro-central" whereas counties with estimated population more than 100,000 but less than 500,000 were classified as

"metro-other" counties. A county was defined as rural if the estimated population of that county was equal to or less than 100, 000.

For the sampling frame, only community pharmacies from seven Wisconsin counties were selected. These counties were: Waukesha, Dane, Dodge, Jefferson, Columbia, Sauk and Walworth. These seven counties were selected based on their geographic proximity to the University of Wisconsin, their representation as a metro-central, metro-other, and rural county, the total number of community pharmacies in each county and available resources in terms of time required to travel and conduct the study. All community pharmacies in these seven counties were stratified into three strata: pharmacies in metro county, pharmacies in metro-other county and pharmacies in rural counties. Further, within each stratum, pharmacies were stratified into three sub-strata: 1) independent pharmacy, franchise and grocery store pharmacies, 2) mass merchandiser pharmacies and 3) traditional chain pharmacies. This sub-strata classification was based on the findings of the Pharmacy Workforce Project regarding prescriptions filled at each type of pharmacy (Mott et. al 2006). Finally, a random sample of 10 pharmacies was sampled from each stratum to yield a total of 30 community pharmacies.

Since the participation of pharmacy staff and patients was considered contingent on pharmacy manager approval, a packet containing a cover letter (Appendix E) and data collection instruments along with consent forms (Appendices F-M) was mailed to the pharmacy manager of each pharmacy. Two weeks after the packet containing the cover letter and instruments was mailed, the researcher personally visited the pharmacy manager for permission to seek participation from pharmacists, technicians and patients. The researcher introduced himself as a graduate student at the University of Wisconsin

doing a school project on the effect of pharmacy work environment on pharmacist practice behaviors such as interactions with patient, satisfaction and turnover intentions. The researcher informed the managers that a packet containing study materials was sent to the pharmacy and inquired whether the manager had received it and had a chance to review it. If the manager indicated that he/she had not received the material or did not have a chance to review the materials, the researcher explained the study objectives, showed the materials and asked them if they were willing to grant permission for their pharmacy staff to participate in the study. If the manager indicated that he/she had reviewed the materials, the researcher did not explain the study objectives and directly asked them about their willingness to grant permission for their pharmacy staff to participate in the study. This introductory script was developed and tested during the study's pretest. It reinforced respect for the manager's role as the decision-maker for the pharmacy's participation in the study.

If the pharmacy manager denied permission, the pharmacy site was replaced by a randomly selected pharmacy from the same stratum. If the pharmacy manager gave permission to conduct the study at their site, the researcher asked them to provide information on the number of staff employed at the pharmacy and the busiest days and time for the pharmacy staff. Pharmacy managers were also asked to inform pharmacy staff about the study. They were informed that the researcher would make additional visits to collect survey data from pharmacy staff (pharmacists and technicians) and pharmacy patients. At the end of the first visit, each pharmacy was randomly assigned to "busy time visit" or "non-busy time visit". This was done to control for variation in pharmacist practice behaviors introduced by the time of the day.

During the second visit to the pharmacy, the researcher informed pharmacy staff of the permission from their manager and asked pharmacy staff for their consent to participate in the study. The researcher again identified himself as a graduate student at the University of Wisconsin doing a school project on the effect of pharmacy work environment on pharmacist practice behaviors such as interactions with patients, satisfaction and turnover intentions. Pharmacy staff was informed that their participation was voluntary and assured that their survey responses would be confidential. They were told that their participation would not hinder their work and that the survey would not take more than five minutes and could be filled at their convenience. Upon consent from the pharmacy staff, the researcher explained that he would stand in a certain area of the pharmacy, wait for patients to receive their prescriptions and then ask some patients to participate in an interview. Also, he told the pharmacy staff that for the duration of patient enrollment, he would ask them about once per hour how busy they are, and then would give them a survey to complete after all 12 patients were interviewed. In case of patients denying participation, the staff was also asked to help identify the type of prescription (new vs. refill).

4.2.2. Patient Selection and Recruitment

A random sample of 12 patients filling prescriptions at the pharmacy was selected. Random selection of patients was accomplished by random selection of a time and an event of patient filling a new versus refill prescription. The random selection of patients by time required that the researcher select a time during the first 15 minutes of observation and approach a patient entering the prescription dispensing area at the selected time for their consent to participate in the study. Subsequent patients were

recruited by approaching the next patient who received a prescription once the previous patient's interview was completed. Upon consent, the researcher asked the patient whether they were filling a new versus a refill prescription. This was done to meet the criteria for the random selection of an equal number of patients receiving new prescriptions and refill prescriptions. The total time for enrollment and observation depended upon how often patients entered the pharmacy, how long patient interviews were and how many patients filled new prescriptions versus refill prescriptions. Most patient interviews took less than five minutes and on an average three patients filled refill prescriptions as compared to one receiving a new prescription. Caregivers and children receiving prescriptions on behalf of patients were excluded from the study.

To recruit patients, the researcher stood by the pharmacy window (inside the pharmacy) and approached the patients standing by the pharmacy window. The researcher identified himself as a student from the University of Wisconsin doing a school project and asked patients if they would be willing to let the researcher observe their interaction with the pharmacy staff and also participate in an exit interview about the patients' pharmacy visit experience. The researcher also told patients that their pharmacist would not see their answers; only aggregate results from all patients. Only patients providing consent for participation in the study were observed for patient-specific observations and interviewed. For patients declining participation, demographic data such as perceived age, gender, type of prescription filled and reasons for not participating were noted.

4.3. Data Collection

Data collection was accomplished from February through June 2006. Figure 5 presents a flow chart of data collection procedures used during the study. All data were collected during the second and third visit to the pharmacy. During the first visit, the researcher recruited a pharmacy, i.e. sought permission from the pharmacy manager to contact pharmacy staff for participation in the study. At this visit, the researcher also asked the pharmacy manager to indicate the busy times of the day and the busy days for the pharmacy staff. During the second visit, the researcher sought verbal consent from the pharmacy staff to participate in the study. Upon verbal consent from the pharmacy staff, the researcher prepared for data collection. At this visit, data were collected using observation and patient interviews. Pharmacy staff surveys and consent forms were also handed out at this visit to be completed by pharmacy staff at their convenience. These surveys and consent forms were collected during a third visit to the pharmacy. Each method of data collection is described below in detail:

4.3.1. Observations

Observations at each pharmacy were conducted unobtrusively and upon patient consent. Pharmacists and technicians were noted as "dispensing pharmacist" and "dispensing technician" by whether the pharmacist and/or technician had a face-to-face encounter with the patient. During all observations, the researcher was at least 10 feet behind the patient. A warm-up period of 15 minutes was used to let the pharmacy staff get used to the researcher and resume old patient encounter habits. When the pharmacy staff appeared to settle into their normal routine, the researcher made general and patient specific observations. Appendix L and M present the two observation data collection

instruments (each pretested on 100 pharmacist-patient encounters in five pharmacies) used to record observations.

A. General Observations:

During general observations, the researcher recorded notes on the pharmacy layout and environment. An instrument designed to collect pharmacy service environment variables such as pharmacy hours, presence of drive-thru, and educational materials in the pharmacy dispensing area was used (Appendix L). Also, information about pharmacist busyness was collected by asking pharmacy staff every hour of observation about the extent to which they were busy at that time.

B. Patient-Specific Observations:

Upon completion of the general observation, the researcher randomly selected and recruited patients for observations and interviews. Upon consent from the patient (Appendix J), a patient-specific observation coding tool designed to collect pharmacy staff-patient interactions was used (Appendix M) to record researcher notes. This coding tool was developed by adapting the pharmacist-patient communication observation tool developed by Schommer (1992) and pretested during 100 patient-pharmacist observations at five pharmacies. Through patient specific observation, data were collected on pharmacy busyness, lack of privacy, pharmacist practice behaviors such as occurrence of communication, length and content of communication, question-asking behaviors and patient question-asking behavior.

4.3.2. Patient Interviews

After each patient-specific observation, an interview was carried out with the participating patient (Appendix K). Through these patient interviews, data on patient demographics and pharmacy visit experience such as information provided by pharmacist, perceived privacy, and satisfaction were collected. Also, information on the type of prescription received from the pharmacy staff and the length of its use was collected. To assure patient confidentiality, their name and the name of the medications filled at the pharmacy were not collected.

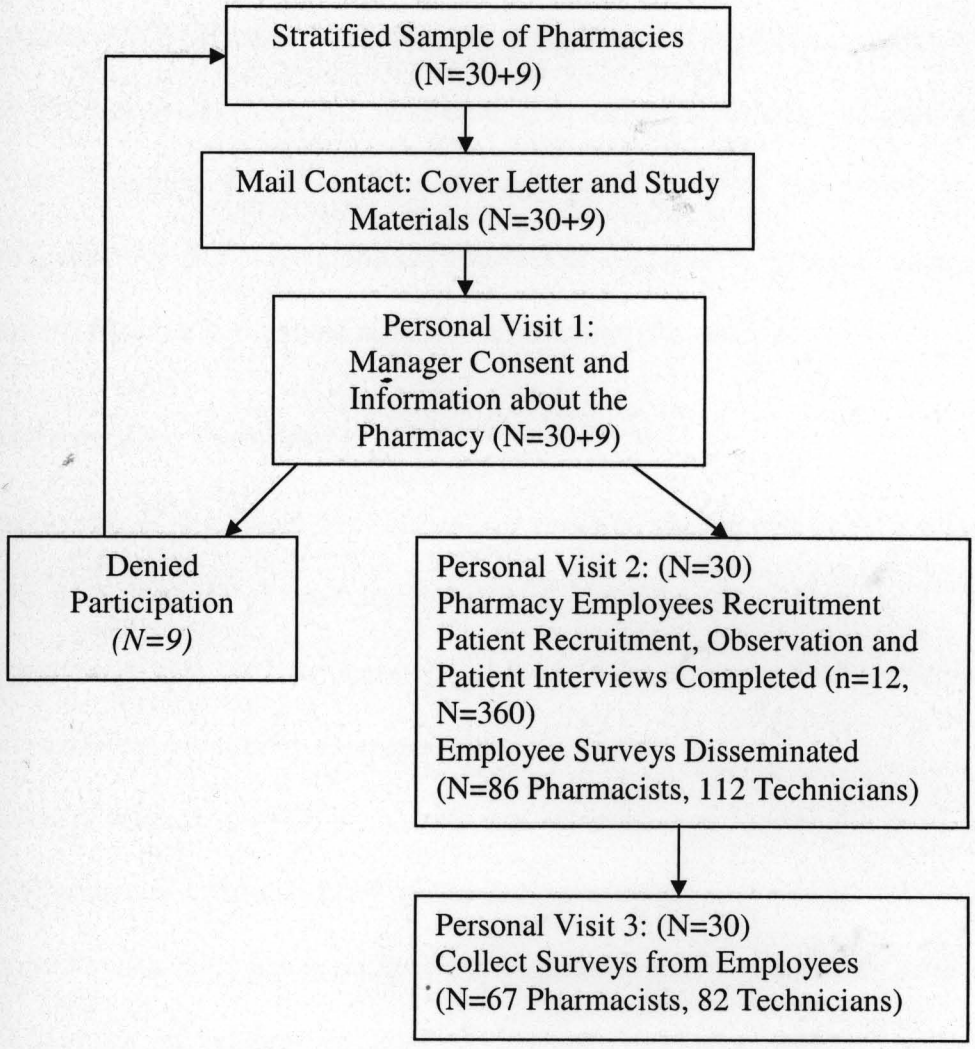
Overall, twelve patients were recruited at each pharmacy; each patient was observed when they interacted with the pharmacy staff and interviewed afterwards.

4.3.3. Pharmacy Staff Surveys

Upon completion of data collection from all twelve patients, the researcher thanked pharmacy staff for their cooperation and participation in the study. Each pharmacy staff member was then handed an envelope containing the member specific survey (pharmacist surveys to pharmacists and technician survey to technicians) and a consent form (Appendix F-I). Staff was requested to complete it within a week so that the researcher could collect all surveys at the same time. Surveys for the "dispensing pharmacist" and "dispensing technician" were assigned a different numeric code than for pharmacists and technicians who were not involved in dispensing tasks. A week later, the researcher made the third visit to the pharmacy and collected all completed surveys. Pharmacy staff that had not completed the surveys in the requested time period were requested to send the survey to the School of Pharmacy address indicated in the consent form. Figure 5 displays a flow chart describing the data collection process used during the study.

Figure 5

Flow Chart for Data Collection Process



4.4. Operational Definitions of Variables

Overall, six independent variables were used: (1) Pharmacist attitudes towards pharmacist role (PAPR), (2) Technician attitudes towards pharmacist role (TAPR), (3) Safety culture (COPSC), (4) Workload, (5) Busyness, and (6) Patient question-asking behavior. Four dependent variables were used: (1) Pharmacist handing prescription to the patient (Rx Transfer), (2) Pharmacist showing prescription to the patient to verify dispensing accuracy (Rx Show), and (3) Pharmacist information provision behavior (Rx Info), and (4) Pharmacists' patient assessment behaviors (Pt. Assess).

4.4.1. Independent Variables

Development of definitions for independent variables used in this study was provided in Chapter II. A summary of these definitions is presented here:

Pharmacist attitude towards pharmacist role (PAPR): a pharmacists' overall attitude towards counseling and quality assurance and control role.

Technician attitude towards pharmacist role (TAPR): a technicians' overall attitude towards pharmacists' counseling and quality assurance and control role.

Community pharmacy safety culture: employee perceptions of the work environment in the pharmacy in relation to teamwork, communication openness, staffing and management support for patient safety.

Workload: the average number of prescriptions filled by a pharmacist during a day.

Busyness: total number of patients waiting in the prescription dispensing area when a pharmacist is interacting with a patient. Patients who were walking around or shopping in other areas of the pharmacy were not included in the total number.

Patient question-asking behavior: whether or not the patient asks the pharmacist any questions related to the medications except cost or insurance related questions.

4.4.2. Dependent Variables

The four dependent variables relate to pharmacist-patient interaction. Pharmacist practice behaviors were defined as pharmacists' verbal and non-verbal behaviors while dispensing a prescription medication to a patient. A summary of definitions for dependent variables used in this study are presented here:

Prescription Transfer: a physical exchange of the completed prescription directly between a pharmacist and patient

Prescription Show: the act of opening the bag or bottle and showing it to the patient to confirm that the right patient is receiving the right medication

Prescription Info: the act of providing information about side effects, directions of use, and drug interactions with food or other drugs

Patient Assessment: the act of assessing patient medication knowledge, compliance or need for information by use of open or closed ended questions other than "do you have any questions?"

4.5. Measures

Several measures used in the study were adapted from prior studies in the pharmacy and patient safety literature. Table 1 provides a summary of measures and their sources. The adapted measures were pretested on 100 pharmacist-patient encounters in five pharmacies before their inclusion in the final data collection forms (Churchill, 1979).

Table 1

List of Measures, Their Source and Reliability/Validity

Measures	Source	Reported reliability and validity
Pharmacist Behavior - Rx Transfer - Provision of information - Pharmacist Question-Asking Behavior	Schommer (1992), Berardo et. al (1989) and Sleath (1995)	No reliability or validity information presented by authors
Busyness - Number of patients waiting in dispensing area - Estimate of busyness	Svarstad et al. (2003)	Correlations between number of patients and busyness estimates were reported as 0.72 No validity information reported
Patient Question-Asking Behavior	Schommer (1992)	No reliability and validity information provided
Safety Culture - Team work subscale - Staffing subscale - Communication Openness subscale - Management Support subscale	Hospital Survey on Patient Safety Culture (Nieva and Sorra, 2003)	Reliability: Teamwork subscale: 0.80 Staffing subscale: 0.63 Communication Openness: 0.72 Management Support: 0.83 Validity: Exploratory and Confirmatory Factor Analysis
Counseling Role Orientation-8 Scale	Schommer (1992)	Reliability: 0.71 Construct validity demonstrated by low to moderate correlations (0.10-0.59) between items
Quality Assurance and Control Scale	Exploratory study of pharmacy teams (Shah and Chewning, 2006)	No reliability information due to limited sample size. Face and content validity established during interviews
Workload	Mott et al. 2004	No reliability or validity information since it is a single item measure

4.5.1. Scales

Pharmacist attitudes towards pharmacist role (PAPR): A 14-item scale consisting of the following two subscales:

i. Modified counseling role orientation: A 9-item measure using a 5 point scale (1- strongly disagree to 5- strongly agree) that includes the 8-item counseling role orientation (CRO-8) developed by Schommer (1992) and a single item that was added to the existing scale during the exploratory study of pharmacy team perspectives in patient safety. The CRO-8 measure assesses pharmacists' attitudes towards counseling. It is considered to be a reliable measure (Cronbach alpha=0.71).

ii. Quality assurance and control role orientation: A 5-item measure using a 5 point scale (1- strongly disagree to 5- strongly agree) developed during the exploratory study of pharmacy team perspectives on patient safety. It was pretested with 10 pharmacists and 10 technicians in five community pharmacies.

Technician Attitudes towards pharmacist role: Items from the PAPR were adapted to develop the technician's attitude towards pharmacists' role (TAPR) scale for the first time specifically for this study.

Safety Culture: A 21- item measure adapted from the 35 item Hospital Survey on Patient Safety Culture (Sorra and Nieva 2004). These 21 items measure eight dimensions of the safety culture: teamwork (4 items), communication openness (3 items), staffing (4 items), management support for patient safety (3 items), perceptions of safety (4 items), two items assessing overall grade for pharmacy environment related to patient safety and

patient counseling and a single item assessing the number of errors made in the past 12 months. These items were adapted to reflect the community pharmacy context and the scale anchors were changed from a 5-point Likert type strongly agree-strongly disagree scale to a 5-point Likert type all of the time-never scale. The Hospital Survey on Patient Safety Culture is a reliable and valid measure of safety culture in hospitals and was developed under contract with the Agency of HealthCare Research and Quality. The corresponding reliabilities for the dimensions in the original scale have been reported as: teamwork (Cronbach's alpha=0.83), staffing (Cronbach's alpha=0.63), communication openness (Cronbach's alpha=0.72), and management support (Cronbach's alpha=0.83).

Workload: Measured using an open ended question that requires the participating pharmacists to indicate the average number of prescriptions they filled per busy and non-busy days. This measure has been used in several pharmacy workforce studies.

Busyness: For each patient receiving a prescription, busyness was measured as the total number of patients/patients waiting in the prescription area. For assessing convergent validity, the researcher asked the pharmacist to rate the level of busyness on a 7-point scale (0- Not at all busy to 6- Extremely busy) during each hour of observation. This method of measuring busyness has been used by Hammel (1989), Kirking (1980), Mason (1984), Schommer (1992) and Svarstad and colleagues (2004).

Prescription transfer by pharmacist: Measured as a dichotomous variable (yes/no) during the patient-specific observations of the pharmacist-patient interactions based on whether the pharmacist personally transferred the prescription to the patient. This method of measuring prescription transfer has been successfully used in prior research by Beardsley (1989) and Schommer (1992).

Prescription show by pharmacist (Rx Transfer): Measured as a dichotomous variable (yes/no) during the patient-specific observations based on whether the pharmacist showed the medication to the patient to verify if the right patient was receiving the right medications.

Oral provision of information on directions of use, side effects and interactions (RPh Info): For each patient receiving a prescription it was measured on a four point scale (0-3) based on whether the pharmacist provided any oral information on directions of use, side effects and interactions (score 1 for each information type and 0 for no information). Similar measures have been used in prior research by Mason (1984), Schommer (1992) and several other pharmacist-patient communication researchers. Both Mason (1984) and Schommer (1992) measured oral provision of information based on whether pharmacist provided oral information on any aspect of the medication including cost and insurance. For this study, the focus of measurement of the oral provision of information was on directions, side effects and interactions.

Assessment behaviors (Patient Assessment): For each patient receiving a prescription, it was measured as a four point scale (0-3) based on whether the pharmacist asked "do you have any questions or its variants (score 1), other closed ended questions (score 2) and open ended questions (score 3) about the patient's medications.

Patient question-asking behavior: For each patient receiving a prescription, it was measured as a dichotomous variable (yes/no) based on whether patient asked the pharmacist questions related to medication use and/or effects.

4.5.2 Scoring

A total PAPR score was calculated for each pharmacist. A summated PAPR score tabulated as a mean of PAPR scores for all pharmacists was calculated for each pharmacy. For both the logistic regression and the exploratory hierarchical linear modeling, the total PAPR scores for only the dispensing pharmacists was used. Similarly, a total TAPR score was calculated for each technician. A summated TAPR score tabulated as a mean of TAPR scores for all technicians was calculated for each pharmacy. For both the logistic regression and the exploratory hierarchical linear modeling, total TAPR score for only the dispensing technicians were used. Scores for PAPR and TAPR ranged from a minimum of 14 to a maximum of 70.

A total COPSC score based on responses to the teamwork, staffing, communication openness and management support dimensions was calculated for each technician and pharmacist. A summated COPSC score tabulated as a mean of COPSC scores for all pharmacists and technicians at a single pharmacy site was calculated for each pharmacy. For both the logistic regression and the exploratory hierarchical linear modeling, the COPSC summated score (sum of all pharmacist and technician responses on all four dimensions) was treated as a group level variable. Scores ranged from a minimum of 14 to a maximum of 70.

The dispensing pharmacist estimate of number of prescriptions filled per day was used as a score for workload, whereas the number of patients waiting in the dispensing area was used as a score for busyness.

4.6. Methodological Challenges

The data collection used for the study presented several methodological challenges. These challenges and the strategies used are detailed below:

a. Observation Effects: Observation effects were minimized by using global terms in the cover letter and the consent form. Pharmacy managers and pharmacy staff were told that the main objective of the study was to understand the effect of pharmacy work environment on pharmacist practice behaviors such as interaction with patients, satisfaction and turnover intentions. Also, patient interviews and pharmacy staff surveys were carried out only after all observations were completed.

b. Reliability of Observation: All observations were made only by the researcher. Thus, no intercoder reliability was assessed. However, convergent validity between researcher observation and patient self-reports about the pharmacy visit experience was used as indirect evidence for the reliability of observation.

c. Matching data: Since data were being collected from numerous sources (pharmacists, technicians, and patients) and using mixed methods (surveys, interviews and observations), it was important to develop a mechanism through which all data could be matched. A seven digit code number (e.g. 0110021) was used where the first two digits (01) represent the pharmacy identification number, the next two digits (10) represent the patient identification number, the two digits after that (02) indicate the technician with whom the patient interacted and the final digit (1) represents the pharmacist with whom the patient interacted. This was done to ensure that pharmacist practice behaviors were analyzed in relation to their attitudes and the attitudes of the technicians who were working with them at the time of interaction with the patient. Also,

special designation of "dispensing pharmacist" and "dispensing technician" and the special code assigned to each helped distinguish surveys from participants who were involved in patient encounters on the day and time of the observation.

d. Group level variable versus individual level variable: It is widely acknowledged that different levels of analysis can generate differing results. For example, Hofmann and Stetzer (1996) found a negative correlation between climate scores and unsafe behaviors at a team level ($r = -0.66$, $p < 0.01$), but a positive correlation at an individual level ($r = 0.34$, $p < 0.01$). Given that data were collected from all pharmacy staff, data analysis could encompass three different levels: (1) individual level (dividing employees within a pharmacy into dispensing and non-dispensing groups and comparing individual PAPR, TAPR and COPSC scores); (2) group level (aggregating PAPR, TAPR, and COPSC scores across pharmacies, dispensing and non-dispensing pharmacist and technician scores and comparing against dispensing pharmacist behaviors; (3) mixed level (aggregating PAPR and TAPR at the individual dispensing pharmacist and technician level and aggregating COPSC scores at the group level. For the descriptive and logistic regression, mixed level data were analyzed, whereas for the hierarchical linear modeling, individual level and mixed level data were analyzed.

4.7. Data Analysis

Data analysis was carried out after all data were collected.

Data Coding: All data collected were entered using the Statistical Package for Social Sciences-PC version 11.5. Double entry was carried out to ensure accuracy of data entry.

Descriptive Statistics: Frequencies and descriptive statistics were calculated for each variable (dependent and independent variable) to help describe the sample, assess the

extent of variation in pharmacies and responses from pharmacists, technicians and patients. Descriptive statistics were done for CRO-8, pharmacist workload, prescription transfer, provision of information, information items and pharmacist and patient question-asking behavior to compare data for this study's sample with statewide data collected in other studies.

Scale Reliability: Measures with three or more items were assessed for reliability using Cronbach's alpha. Cronbach's alpha greater than 0.70 supported reliability of measures. If measures were found to have unacceptable reliability, items which were correlated the least with other items in the scale were considered for deletion. Also, to identify items for deletion, item to total scale correlations were calculated. Items which were correlated the least with the total scale were considered for deletion. Reliability for subscales was also calculated.

Scale Validity: Face validity of all measures was assessed during the pilot test which involved 100 patients, 10 pharmacists and technicians in five pharmacies. Convergent validity of the busyness measure was established by using significant correlations (i.e. >0.30) between objective and subjective measures of those variables. Convergent validity of the measures related to information provision, content of information, pharmacist and patient question-asking behavior was established by using significant correlations (i.e. >0.30) between patient self-reports and researcher observations.

Discriminant validity was assessed by conducting an exploratory factor analysis of PAPR, TAPR and COPSC scales. Based on recommendation by Fabrigar and colleagues 1999 and Gorsuch 1997, a common factor model with oblique rotation was used in the factor analysis to maintain non-orthogonality of factors as the factors were assumed to be

correlated. Two criteria were used to retain factors. The first criterion was eigen values. Factors with eigen values greater than one were included in the factor solution. To support discriminant validity, items used to measure each variable should have a high factor loading for the variable they measured and a low factor loading for other variables. The second criterion was the number of factors implied by the exploratory study of pharmacy team perspectives on patient safety.

The results of the exploratory factor analysis could very well be utilized for establishing the construct validity of the scales. However, confirmatory factor analysis was chosen as the method for establishing construct validity (Kerlinger, 1979). The advantage of confirmatory factor analysis over exploratory factor analysis is that when carrying out an exploratory factor analysis no substantive constraints are imposed on the data. Instead it is assumed that each common factor affects every observed variable and that the common factors are either all correlated or uncorrelated. Also, it is not theory driven. Confirmatory factor analysis, on the other hand, is theory-driven. With confirmatory factor analysis it is possible to place substantively meaningful constraints on the factor model, such as setting the effect of one latent variable to equal zero on a subset of the observed variables (Gorsuch, 1983). The advantage of confirmatory factor analysis is that it allows for testing hypotheses about a particular factor structure which permits more powerful tests of construct validity for scales. Thus, confirmatory factor analysis was carried out using AMOS 5.0.

Construct validation of PAPR, TAPR and COPSC scales was carried out independently by conducting confirmatory factor analysis for each scale. The AMOS program requires conducting confirmatory factor analysis using a path diagram or a

model that assumes that the common factors "cause" the indicators, usually shown by the single-headed arrows pointing away from the circles and towards the manifest variables (Arbuckle, 1988). The program then tests the model for its ability to match or fit the actual data that were collected during the study. The AMOS output for the confirmatory factor analysis displays a χ^2 test statistic that tests the overall fit of the model to the data. The null hypothesis is that the model fits the data, thus a small, non-significant chi-square value is desired for this test. The χ^2 test statistic is accompanied by a probability value. A probability value of *greater* than 0.05 level is required to accept the null hypothesis that the model fits the data. Because the chi-square test of absolute model fit is sensitive to sample size and non-normality in the underlying distribution of the input variables, various descriptive fit statistics are also used to assess the relative fit of a model to the data. For example, the Root Mean Square Error of Approximation (RMSEA) fit statistic and the Tucker-Lewis Index are widely used fit statistics because they are less affected by sample size. Hu and Bentler (1999) recommend RMSEA values below .08 and Tucker-Lewis Index values of .90 or higher as an indication of model fit. Given that statistical programs such as AMOS provide 25 different goodness-of-fit measures, Jaccard and Wan (1996) recommend use of at least three fit tests to establish model fit.

During confirmatory factor analysis, a number of decisions were made to assess the construct validity of the scales. First, the loadings for each item were checked and if any item(s) did not have a loading of more than 0.05 (meaning less than 5% of variance was explained by the item) it was deleted from the model and the model was retested for fit. Second, if the model fit was not achieved despite the fact that all items had good loadings, the modification indices were checked to examine if errors related to the items

were correlated. If the modification indices suggested that the errors were correlated, the errors which made the most contribution to the model were identified. A new model with important correlated errors was retested until model fit was achieved. Upon construct validation of the scales, scale scores were recalculated and were used for hypotheses testing.

Hypothesis Testing: Prior to hypotheses testing, correlations among the independent variables were assessed for independence (i.e. correlations less than or equal to 0.30). Correlations greater than 0.30 but less than or equal to 0.60 were considered moderate. Also, distributions for each variable were examined to ascertain whether they were approximately normal. Violations of assumptions for regression analysis were investigated for each regression model. Classification plots and standardized scatter plots were obtained to check the violations of assumptions (Norusis, 1988, Field 2000).

The primary hypotheses ($H0_{1-3}$) were examined using a logistic regression method. To test the main effects proposed by hypotheses $H0_{1,2}$, the "forced entry method" was used for logistic regression. By using this method, all independent variables were entered into the analysis simultaneously as long as they satisfied tolerance criteria (p-value <0.05). The Wald statistic was used to determine whether the ß coefficient for that predictor was significantly different from zero (p-value <0.05).

The hypothesis $H0_3$ relating to mediating effects of PAPR and secondary hypotheses ($H0_{4-5}$) relating to the mediation effects of Rx transfer were analyzed using logistic regression at a significance level of 0.05. Three conditions were used to demonstrate mediation: (1) the main effects: a significant relationship between the six independent variables and a dependent variable (Rx show/ Rx Info/ Patient Assessment), (2) a

significant relationship between Rx transfer (mediator) and a dependent variable (Rx show/ Rx Info/ Patient Assessment), and (3) the relationship between the independent variable and dependent variable significantly decreasing or becoming nonsignificant when Rx transfer was added to the step (Baron and Kenny, 1986).

Extended Investigation: A parsimonious, comprehensive test of the model of pharmacist practice behavior was carried out. In conducting this extended investigation, a "meso" paradigm (House, Rousseau & Thomas-Hunt 1995) was used recognizing that the independent variables in our study exist at different levels of measurement and analysis. For instance, pharmacist personal factors such as pharmacist attitudes towards practice role and work environment factors such as technician attitudes towards pharmacist role, safety culture and workload affect pharmacist practice behavior across all 12 patient encounters. Thus, these independent variables were treated as level 2 variables. As compared, work environment factors such as busyness (number of patients waiting in the dispensing area) and patient question-asking behavior are patient specific factors which affect pharmacist practice behavior with each patient. These independent variables were treated as level 1 variables. An index of pharmacist practice behavior was created using dependent variables (Rx transfer, Rx show, Rx Info and Patient Assessment) which were correlated significantly with each other.

For the extended analyses, hierarchical linear modeling was carried out. Hierarchical linear modeling allows for the iterative investigation of multiple levels of relationships with individual-level dependent variables (Hofmann, 1997; Hoffman, Griffin & Gavin, 2000). The first level analysis estimates parameters describing the relationship(s) between independent and dependent variables within each group, that is, at the individual

level (similar to the within group ANOVA estimate). The parameters depicting the relationships (the intercept and slope estimates) become the dependent variables for the second level analysis that assesses the role of the higher order (e.g., group or organizational) variables. Significant coefficients on predictors of the intercepts and slopes provide evidence of the cross-level relationships.

The hierarchical linear model investigates the nature of the between-group variance, after controlling for within-group variance. For example, this model explores the amount of variance in groups' intercepts and slopes of the regression equations representing the relationship between the individual-level variables, busyness, and patient question-asking behavior. A t test of the parameters in the level I equation provides evidence of the strength of the relationship between pharmacist practice behavior and patient question-asking behavior. A χ^2 test for the residual variances in the level 2 equations in which group intercepts and slopes are regressed on unit vectors (no predictors) indicates whether the variances in group intercepts and slopes are significantly different from zero.

Hierarchical linear modeling provides several "centering" options to assist in the interpretation of results concerning the intercept term in the level-2 analyses (Bryk & Raudenbush, 1992; Hofmann, 1997; Hofmann & Gavin, 1998). "Grand-mean" centering indicates that the intercept represents pharmacist with an overall average level of the predictor, busyness (or customer question-asking behavior). "Group-mean" centering represents pharmacist with his or her group's average busyness (or customer question-asking behavior). The appropriate choice of centering depends on the model. Grand-mean centering provides better estimates and interpretability with most models and was used in this study.

Other Data Analysis: Observations made by the researcher that were considered relevant to the analysis and findings were used to help interpret the results.

V. Results

In this chapter, results are presented in five sections. In the first section, response rates are presented separately for pharmacies, pharmacists, technicians and patients. The second section describes the sample using results from the descriptive and bivariate statistics. In the third section, results from the measure refinement procedures are presented. The fourth section presents results from the methods used to test the hypotheses for the study. Finally, the fifth section presents results from the extended investigation of the comprehensive model of pharmacist practice behaviors.

5.1. Response Rates

5.1.1. Pharmacy Response Rate

In order to enroll 30 pharmacies, a total of 39 pharmacies were contacted across the three types of counties during the enrollment period resulting in a 77% participation rate. Table 2 shows the response rate for pharmacies by the type of county in which our sample was located (metro-central, metro-other, and rural). It is interesting to note that the response rate for pharmacies was highest for pharmacies located in the metro-other county area. This could be due to the proximity of the pharmacies to the School of Pharmacy, which is located in the metro-other county.

Appendix N and O describe characteristics of each individual participating and nonparticipating pharmacy. Four out of nine non-participating pharmacies declined participation due to perceived corporate issues. It is interesting to note that pharmacies from the same corporate group at other sites agreed to participate in the study. Table 3

presents a comparison of the characteristics of the nonparticipating and participating pharmacies. Managers at the participating pharmacies reported a similar number of employees as the non-participating pharmacies. The number of employees reported by managers at the participating pharmacies varied from 3 to 12. Participating pharmacies filled an average of about 140 prescriptions per day. This number is similar to recent estimates of pharmacist workload in the nation (Kreling et al. 2006) but lower than prescription volumes reported by Wisconsin community pharmacists (Wisconsin Pharmacist Compensation Survey, 2005). The mean number of prescriptions filled per day for nonparticipating pharmacies was approximately 200.

5.1.2. Employee Response Rate

All employees at each of the thirty pharmacies were asked to participate in the study. Overall, 67 pharmacists (78%) and 82 technicians (73%) participated in the study. Appendix P details the employee response rate for each pharmacy. No data on non-participating pharmacists and technicians were collected.

5.1.3. Patient Participation Rate

Patients who filled their prescriptions at the study sites were asked to participate in the study. The number of patients approached at each pharmacy varied from 14 to 32. Overall, twelve patients were enrolled at each site. Patient participation rate varied from 38 percent to 92 percent across pharmacies, with an average participation rate of 62% across all pharmacies (Appendix P). Overall 19 sites had lower than 62% patient participation rate. Of these 19 sites, 14 sites were from the metro-central county and the rural counties of south and south-east Wisconsin that were part of this study.

The starting time of patient enrollment and the number of hours spent by the researcher at each pharmacy varied. Appendix Q contains a summary of the time when the researcher enrolled patients, the total time spent at each pharmacy, and patient participation rate at each pharmacy. There was no significant relationship between start time, total time spent and patient participation rate.

5.2. Sample Description

5.2.1. Demographics of Participating Pharmacists and Technicians

Participating pharmacists and technicians were classified into dispensing and non-dispensing employees based on whether they were involved in patient encounters at the pharmacy dispensing window at the time of the observation. To minimize bias introduced by observation and to get a more robust picture of the employee attitudes and perceptions of work environment in the pharmacy all pharmacists and technicians working at the pharmacy site were surveyed.

Demographics of participating pharmacists and technicians are presented in Table 4. There was no statistical difference in the demographic characteristics of dispensing pharmacists and non-dispensing pharmacists. Dispensing technicians reported higher mean number of hours/week worked than non-dispensing technicians. Dispensing pharmacists were older than dispensing technicians and had more work experience. Almost 60% of the dispensing pharmacists were female and filled an average of approximately one hundred and thirty prescriptions per day. Most of the technicians in the study were females and sixty percent of them were certified technicians.

Table 2
Response Rate for Pharmacies

County Type	Number of Pharmacies Approached	Number of Pharmacies Participated	Participation Rate
Metro-Central	14	10	71.43%
Metro-Other	12	10	83.33%
Rural	13	10	76.92%
Total	**39**	**30**	**76.92%**

Metro-Central county: Population more than 500,000
Metro-Other county: Population less than 500,000 but more than 100,000
Rural county: Population less than 100,000

Table 3

Comparison of the Characteristics of Participating and Nonparticipating Pharmacies

Characteristics		Minimum	Maximum	Mean	Std. Deviation
Participating Pharmacies (N=30)	Rx Volume/ Day	20	300	143.33	67.53
	Number of Pharmacists Employed	1	5	2.87	1.17
	Number of Technicians Employed	1	7	3.73	2.00
	Hours Open	59	92	72.90	11.82
Non Participating Pharmacies (N=9)	Rx Volume/ Day	100	300	205.56	60.95
	Number of Pharmacists Employed	2	4	2.44	.73
	Number of Technicians Employed	1	7	4.00	2.65
	Hours Open	52	168	76.67	36.73

5.2.2. Demographics of the Participating Patients

The demographic characteristics of participating patients are presented in Table 5. Sixty percent of all patients were females. The majority of patients participating in the study had patronized the pharmacy for more than a year (87%). Sixty percent of the participating patients were expected to use the medication that they filled that day for more than 6 months, whereas one-fourth were expected to use it for less than three months. There was a significant difference in the demographic characteristics of patients who filled a new prescription at the pharmacy compared to patients who filled a refill prescription at the pharmacy. The majority of the patients filling refill prescriptions were females, had a mean age of fifty five years, had patronized the pharmacy more than a year, and were expected to use the medication for more than six months (chronic use).

5.2.3. Independent Variables

Six independent variables were investigated in this study. Among these, three independent variables (pharmacist attitudes towards practice role, technician attitude towards practice role and safety culture) were measured using three scales that were modified or adapted for this study. Respondent ratings on the three scales and their subscales are presented in two ways. First, participant mean ratings are presented for the three scales and subscales, classified by their function as dispensing or non-dispensing. This method of presentation provides us with an insight into the extent of variation by participant type. Then, aggregated pharmacist and technician mean ratings are presented on each scale (mean rating for all pharmacists and technicians at each site) for all thirty pharmacy sites. This method of presentation provides insight into the extent of variation by pharmacy sites.

Table 4

Participant Pharmacist and Technician Demographics

Variable	Non-Dispensing Pharmacists (N=37)	Dispensing Pharmacists (N=30)	Non-Dispensing Technicians (N=52)	Dispensing Technicians (N=30)
Mean Age (SD)	40.32 (11.30)	40.30 (10.57)	33.72 (13.80)	35.79 (13.46)
Mean Experience (SD)	14.65 (12.11)	15.20 (9.65)	5.95 (6.34)	5.70 (4.98)
Mean Number of Hours/Week Worked (SD)	34.14 (9.45)	36.59 (8.27)	32.27 (9.88)	36.80 (4.491)*
Working Full Time	43%	55%	45.1%	53.3%
Mean Number of Rx Dispensed/Day (SD)	110.56 (61.27)	128.33 (63.28)	Not Applicable	Not Applicable
Gender (% Female)	51%	56.7%	94%	93.3%
Certified (% Yes)	Not Applicable	Not Applicable	48%	60%
Mentor to Pharmacy Students (% Yes)	22%	23.3%	Not Applicable	Not Applicable

* Statistically significant at 0.05 alpha level

Table 5

Patient Demographics

Variable	New Prescription(N=180)	Refill Prescription(N=180)	Overall (N=360)
Mean Age (SD)*	43.64 (15.30)	54.99 (13.63)	49.33 (15.55)
Gender (% Female) *	54.7%	64.6%	59.7%
Patronage*			
Less than a year	20.9%	4.4%	12.6%
1-5 years	54.2%	43.9%	48.7%
More than 5 years	24.8%	51.7%	38.7%
Expected Medication Length of Use *			
Less Than 3 Months	44.1%	7.2%	25.6%
3-6 Months	19.0%	8.3%	13.6%
More Than 6 Months	36.9%	84.4%	60.7%
Experience with Medications Filled *			
Never Used	96.6%	0%	50%
Less Than 3 Months	1.7%	11.0%	6.4%
3-6 Months	0%	6.1%	3.1%
More Than 6 Months	1.7%	82.9%	40.5%

* Statistically significant at 0.05 alpha level

A. Extent of Variation in Three Scales by Participant Type

Appendix R presents participant ratings on each item for all three scales. In table 6, participant mean ratings for each scale and the subscale are summarized.

a. PAPR and TAPR: Pharmacist attitude towards practice role (PAPR) and technician attitude towards pharmacist role (TAPR) were measured on the counseling role orientation (CRO-9) subscale and quality assurance and control (QAC) subscale. Table 6 provides details about pharmacist and technician scores on each subscale. There was no significant difference between pharmacist scores and technician scores on each subscale. Also, there was no significant difference between non-dispensing employee (non-dispensing pharmacists and technicians) scores and dispensing employee (dispensing pharmacists and technicians) scores on each subscale.

The modified counseling role orientation subscale consisted of the 8-items from the original counseling role orientation scale (CRO-8) developed by Schommer (1992). To enable comparison with the Schommer study, CRO-8 scores were also calculated. CRO-8 mean score for this study (CRO-8 mean=32.76) was slightly lower than that reported by Schommer (1992), (CRO-8 mean reported was 34.3).

b. COPSC scale: Employee perceptions of the safety culture of the pharmacy were measured on the following subscales: teamwork, staffing, communication openness and management support. Table 6 provides details about pharmacist and technician scores on each subscale. There was no significant difference between pharmacist scores and technician scores on each subscale. Also, there was no significant difference between non-dispensing employee scores and dispensing employee scores on each subscale.

B. Extent of Variation in Independent Variables by Pharmacy Sites

To understand the variations for independent variables used in the study, tabulated summaries of independent variables across pharmacies were carried out. Table 7 contains a summary of the aggregated modified counseling role orientation subscale scores, aggregated quality assurance and control subscale scores and aggregated community pharmacy safety culture scores for participating pharmacists and technicians at each pharmacy. This tabulated summary for independent variables shows variation across pharmacies. Observer ratings related to busyness and rate of patient question-asking behaviors and dispensing pharmacist reported workload are presented in Table 8. Overall, across all pharmacies, an average of 1-2 patients was waiting in the dispensing area when the dispensing pharmacist interacted with a participating patient. An average of 1 patient out of the 12 patients observed asked the pharmacist questions about their medications. The level of workload also varied, ranging from 20 to 250 prescriptions filled by the pharmacist per day. These findings also suggest that desired variations for independent variables occurred across pharmacies.

5.2.4. Dependent Variables

At each pharmacy, the interaction between twelve patients participating in the study and the dispensing pharmacist/dispensing technician was observed and pharmacist practice behaviors were recorded. The patient sample was stratified so that half of the patients being observed were receiving new prescriptions (henceforth described as new prescription encounter) and the other half was receiving refill prescriptions (described as refill prescription encounter). The tabulated summaries for pharmacist practice behaviors for each encounter type and for all encounters are presented in Tables 9-12.

Table 9 presents a summary of all dependent variables for all encounters and by the type of prescription being dispensed. Overall, the average rate of prescription transfer by the dispensing pharmacist for all thirty pharmacies was 86% (range 50-100%). The average rate of the dispensing pharmacist opening the bag/bottle to show patients the prescription for all thirty pharmacies was 11% (range 0-92%). (Table 9) At twenty one pharmacies, the dispensing pharmacist did not show the prescription to any patient at all. The average occurrence of information provision for all thirty pharmacies was 62%. When information provision occurred, pharmacists provided information on side effects and drug-drug or food-drug interactions in approximately one-fourth of all encounters (range 0-58% for side effects, range 0-67% for interactions). By comparison, pharmacists provided information on directions of medication use in a little more than fifty percent of all encounters (range 50-92%). In the majority of the interactions with patients, the dispensing pharmacist asked questions to the patients (96%).

Pharmacists' question-asking behaviors were further classified into two main categories: use of the customary "do you have any questions" or assessment strategies such as use of open ended and closed ended questions exemplified by the Indian Health Service prime questions. Approximately three fourths of pharmacists' questions were in the form of "do you have any questions" or "any questions". Dispensing pharmacists used the Indian Health Service (IHS) prime questions (such as how are these medications working for you?) in approximately 8% of all encounters. These IHS prime questions were used primarily to assess patient compliance and effects of the medications. They also used the closed ended variants of the IHS prime questions (such as are these medications helping you?) to assess patient compliance and effects of medications in

approximately twenty percent of all encounters. Overall, the dispensing pharmacist carried out patient assessment using IHS open/other closed ended questions in one-fourth of all encounters. This rate is higher than that reported by Schommer (1992) and Sleath (1995).

Neither Schommer (1992) nor Sleath (1995) classified pharmacist practice behaviors by the type of prescription dispensed (new versus refill prescription). For our study, we classified pharmacist practice behaviors by whether a new or a refill prescription was dispensed. Very little variation in pharmacist practice behavior exists for new prescription encounters. Much variation exists for refill prescription encounters. The rate of prescription transfer varied significantly by the type of encounter (new versus refill prescription). For new prescription encounters, the rate of prescription transfer was 96% whereas for refill prescription encounters it was 77%. Also, the rate of pharmacists opening the bag/bottle and showing the prescription to the patient varied by the type of encounter. For new prescription encounters, pharmacists showed the prescription to the patient 13% of the time whereas for refill prescription encounters it was 9%. The rate of providing information also varied significantly by the type of encounter (new vs. refill prescription). For new prescriptions, pharmacists provided information in 94% of encounters whereas for refill prescriptions, pharmacists provided information in 28% of encounters. The rate of provision of information on side effects, interactions and directions each varied by the type of encounter. For new prescription encounters, the rate of pharmacists provided information on side effects and interactions was approximately 50% whereas for refill prescription encounters it was 6%. In the majority of new prescription encounters, pharmacists provided information on directions (92%) whereas

pharmacists provided information on directions in approximately one-fourth of refill prescription encounters. There was no significant difference in pharmacists' patient assessment behaviors by the type of encounter. For both new and refill prescription encounters, dispensing pharmacists used open ended IHS prime questions equally (7% and 8% respectively). Similarly, their use of closed ended IHS prime questions was equal across both types of prescription encounters (17% and 19% respectively).

Tables 10-12 present the rate of pharmacist practice behavior for all encounters and by type of encounter for each pharmacist. These tables indicate that there is considerable variation in rates of prescription transfer, provision of information and patient assessment across pharmacies. Much of this variation is attributed to refill encounters.

Table 6

Participant Ratings on Scales Used To Measure Independent Variables

Variable	Mean Ratings (SD) for Non-Dispensing Pharmacists (N=37)	Mean Ratings (SD) for Dispensing Pharmacists (N=30)	Mean Ratings (SD) for Non-Dispensing Technicians (N=52)	Mean Ratings (SD) for Dispensing Technicians (N=30)
CR0-8 Sum	33.19 (2.72)	32.33 (3.11)	30.90 (3.24)	30.94 (2.53)
Modified CRO subscale (CR0-9) Sum	37.95 (3.15)	36.83 (4.18)	35.46 (3.81)	35.37 (3.30)
QAC subscale Sum	17.08 (3.57)	17.67 (3.44)	17.79 (2.64)	17.30 (3.26)
PAPR Sum	**55.03 (3.33)**	**54.50 (3.78)**	**Not Applicable**	**Not Applicable**
TAPR Sum	**Not Applicable**	**Not Applicable**	**53.25 (3.44)**	**52.67 (3.28)**
Teamwork Subscale Sum	16.92 (2.41)	16.94 (2.72)	16.52 (3.30)	17.63 (2.54)
Staffing Subscale Sum	15.07 (3.28)	15.36 (3.29)	14.69 (3.46)	15.07 (3.77)
Comm. Openness Subscale Sum	11.81 (2.48)	11.86 (2.68)	11.19 (3.10)	12.16 (2.41)
Mgmt. Support Subscale Sum	12.67 (2.46)	12.43 (2.16)	12.70 (3.04)	13.44 (2.43)
COPSC Sum	**56.26 (5.23)**	**56.84 (5.47)**	**55.26 (4.19)**	**58. 64(3.14)**

Table 7

Mean Scores on Independent Variable Scales

Pharmacy ID	Pharmacists (N=67)			Technicians (N=82)		
	Mean CRO-9	Mean QAC	Mean COPSC	Mean CRO-9	Mean QAC	COPSC
1	35.50	16.50	51.50	35.67	16.67	42.67
2	36.50	22.00	62.50	39.67	19.67	67.00
3	39.50	14.75	58.75	34.67	13.00	58.00
4	36.00	17.00	56.00	37.00	18.00	48.00
5	38.00	16.00	56.00	31.67	17.00	54.00
6	37.00	18.33	62.00	37.00	19.00	59.00
7	35.25	20.00	51.00	33.17	18.67	54.67
8	35.00	17.00	52.00	32.00	13.00	58.00
9	39.00	17.00	49.50	38.00	19.00	62.50
10	38.33	21.00	51.67	40.67	19.67	58.33
11	38.00	17.00	48.00	35.00	20.33	60.67
12	36.00	14.67	57.67	35.67	15.33	56.33
13	38.50	19.50	61.00	37.67	18.33	59.67
14	32.00	18.00	50.00	31.00	21.00	53.00
15	33.50	14.50	52.00	31.25	14.25	56.00
16	33.00	17.50	66.00	34.50	16.50	64.00
17	37.50	15.50	64.50	36.00	12.00	65.00
18	31.00	21.00	61.00	35.00	14.00	60.00
19	41.25	17.50	61.50	36.50	16.75	58.75
20	40.50	16.75	66.25	38.33	18.33	67.00
21	36.50	13.00	55.00	35.67	17.83	52.17
22	43.00	19.00	61.00	35.00	16.00	53.00
23	39.00	20.00	59.00	32.33	18.00	54.67
24	37.50	15.00	53.25	34.60	16.80	55.60
25	41.00	18.67	57.33	38.80	20.20	56.80
26	39.50	17.50	52.00	33.00	21.50	55.50
27	39.00	19.00	58.00	39.00	20.00	66.00
28	26.00	14.00	45.00	32.00	16.00	50.00
29	36.33	18.33	50.67	33.50	18.00	58.00
30	37.45	19.00	53.00	35.25	17.25	53.25
Total	**37.45**	**17.34**	**56.54**	**35.43**	**17.61**	**56.84**

Table 8
Ratings on Busyness, Workload & Patient Question-Asking Behaviors (N=360)

Pharmacy ID	Average Busyness	Number of Rx filled reported by Dispensing Pharmacist	Rate of Patient Question-Asking Behavior
1	2.08 (1.08)	200	16.7%
2	0.92 (1.24)	250	16.7%
3	1.50 (1.17)	75	8.3%
4	0.00 (0.00)	20	8.3%
5	0.00 (0.00)	115	8.3%
6	2.00 (0.95)	70	8.3%
7	1.08 (0.79)	120	25.0%
8	1.50 (1.00)	100	8.3%
9	0.67 (0.78)	150	0%
10	0.67 (0.78)	200	8.3%
11	2.17 (1.59)	150	16.7%
12	1.50 (1.17)	150	0%
13	1.92 (1.93)	150	0%
14	2.67 (0.89)	250	0%
15	1.33 (0.89)	200	8.3%
16	2.17 (1.19)	80	8.3%
17	1.08 (1.08)	30	0%
18	1.75 (1.36)	40	0%
19	1.58 (1.38)	75	25%
20	1.92 (1.24)	80	8.3%
21	2.42 (1.65)	175	0%
22	1.17 (1.19)	150	25%
23	1.75 (1.14)	120	0%
24	1.58 (1.17)	150	0%
25	2.17 (1.34)	50	16.7%
26	2.00 (1.04)	200	25%
27	0.83 (0.84)	60	16.7%
28	2.33 (1.30)	140	0%
29	1.00 (0.95)	100	0%
30	0.75 (0.75)	200	0%
Total	**1.48 (1.28)**	**128.33 (63.77)**	**8.9%**

Table 9

Summary of Dependent Variables

Pharmacist Practice Behaviors	Overall (N=360)	New Prescription(N=180)	Refill Prescription(N=180)
Prescription transfer Rate*	86%	95%	77%
Rate of Showing Medication To the Patient *	11%	13%	9%
Information Provision Rate[1] *	62%	94%	28%
Rate of Information Provision on Side Effects*	27%	49%	6%
Rate of Information Provision on Interactions*	28%	49%	6%
Rate of Information Provision on Directions*	58%	92%	24%
Rate of Pharmacist Question-Asking			
Do you have any questions	72%	73%	70%
Assessment questions	26%	24%	27%
Closed ended	18%	17%	19%
Open ended	8%	7%	8%

[1] Provision of information on atleast one item (side effect, directions for use, drug/drug or drug/food interaction)

* Significant at the 0.05 level

Table 10

Dispensing Pharmacist Practice Behaviors (N=360)

Pharmacy ID	Prescription transfer Rate			Showing Medication to the Patient Rate			Information Provision Rate		
	Overall	New Rx	Refill Rx	Overall	New Rx	Refill Rx	Overall	New Rx	Refill Rx
1	83%	67%	100%	8%	17%	0%	50%	67%	33%
2	100%	100%	100%	0%	0%	0%	67%	100%	16.7%
3	75%	100%	50%	33%	67%	0%	67%	100%	33%
4	100%	100%	100%	92%	83%	100%	83%	100%	67%
5	100%	100%	100%	67%	67%	67%	50%	100%	0%
6	100%	100%	100%	0%	0%	0%	75%	100%	50%
7	75%	100%	50%	17%	33%	0%	58%	100%	17%
8	100%	100%	100%	25%	33%	17%	58%	83%	17%
9	50%	50%	0%	0%	0%	0%	33%	50%	17%
10	92%	83%	100%	25%	17%	33%	75%	50%	67%
11	100%	100%	100%	0%	0%	0%	67%	100%	17%
12	75%	100%	50%	0%	0%	0%	58%	100%	17%
13	75%	100%	50%	8%	17%	0%	50%	100%	0%
14	83%	100%	67%	0%	0%	0%	50%	83%	17%
15	58%	67%	50%	0%	0%	0%	58%	100%	17%
16	100%	100%	100%	0%	0%	0%	75%	83%	67%
17	83%	100%	67%	0%	0%	0%	50%	100%	0%
18	92%	83%	100%	0%	0%	0%	92%	100%	83%
19	92%	100%	83%	0%	0%	0%	83%	100%	67%
20	92%	83%	100%	0%	0%	0%	83%	100%	50%
21	67%	100%	33%	0%	0%	0%	50%	50%	50%
22	100%	100%	100%	0%	0%	0%	92%	100%	83%
23	75%	100%	50%	0%	0%	0%	50%	100%	0%
24	100%	100%	100%	0%	0%	0%	58%	100%	17%
25	75%	100%	50%	58%	67%	50%	42%	67%	17%
26	67%	100%	33%	0%	0%	0%	67%	100%	33%
27	100%	100%	100%	0%	0%	0%	50%	100%	0%
28	75%	100%	50%	0%	0%	0%	50%	100%	0%
29	100%	100%	100%	0%	0%	0%	50%	100%	0%
30	100%	100%	100%	0%	0%	0%	67%	100%	33%
Total	**86%**	**95%**	**77%**	**11%**	**13%**	**9%**	**62%**	**94%**	**28%**

* Provision of information on at least one item (side effect, directions for use, drug/drug or drug/food interaction)

Table 11

Dispensing Pharmacist Information Provision Behaviors (N=360)

Pharmacy ID	Rate of Information Provision on Side Effect			Rate of Information Provision on Interactions			Rate of Information Provision on Directions		
	Overall	New Rx	Refill Rx	Overall	New Rx	Refill Rx	Overall	New Rx	Refill Rx
1	17%	33%	0%	8%	17%	0%	50%	67%	33%
2	25%	50%	0%	25%	50%	0%	58%	100%	17%
3	17%	33%	0%	8%	17%	0%	67%	100%	33%
4	33%	67%	0%	33%	50%	17%	75%	100%	50%
5	42%	83%	0%	17%	33%	0%	42%	83%	0%
6	25%	50%	0%	33%	50%	17%	67%	100%	33%
7	33%	50%	17%	25%	33%	17%	58%	100%	17%
8	25%	50%	0%	17%	33%	0%	50%	83%	17%
9	17%	17%	17%	8%	17%	0%	33%	50%	17%
10	25%	17%	33%	17%	17%	17%	50%	50%	50%
11	25%	50%	0%	8%	17%	0%	58%	100%	17%
12	17%	33%	0%	25%	50%	0%	58%	100%	17%
13	33%	67%	0%	42%	83%	0%	50%	100%	0%
14	8%	17%	0%	8%	17%	0%	50%	83%	17%
15	8%	17%	0%	0%	0%	0%	50%	83%	17%
16	8%	17%	0%	42%	67%	17%	75%	83%	67%
17	17%	33%	0%	25%	50%	0%	50%	100%	0%
18	25%	50%	0%	25%	50%	0%	92%	100%	83%
19	50%	83%	17%	67%	83%	33%	67%	100%	33%
20	58%	83%	33%	58%	100%	17%	75%	100%	50%
21	50%	100%	0%	42%	83%	0%	50%	100%	0%
22	58%	100%	17%	50%	100%	0%	83%	100%	67%
23	0%	0%	0%	0%	0%	0%	50%	100%	0%
24	42%	83%	0%	58%	100%	17%	50%	100%	0%
25	25%	50%	0%	25%	50%	0%	50%	67%	33%
26	42%	50%	33%	42%	50%	33%	58%	100%	0%
27	33%	67%	0%	50%	100%	0%	50%	100%	0%
28	0%	0%	0%	0%	0%	0%	50%	100%	0%
29	17%	33%	0%	50%	100%	0%	50%	100%	0%
30	42%	83%	0%	33%	67%	0%	67%	100%	17%
Total	**27%**	**49%**	**6%**	**28%**	**49%**	**6%**	**58%**	**92%**	**24%**

* Provision of information on atleast one item (side effect, directions for use, drug/drug or drug/food interaction)

Table 12

Dispensing Pharmacist Question Asking Behavior (N=360)

Pharmacy ID	Rate of Pharmacist Use of "Do you have any questions"			Rate of Pharmacist Assessment Behavior Using Open/Other Closed Ended Questions		
	Overall (N=360)	New Rx (N=180)	Refill Rx (N=180)	Overall (N=360)	New Rx (N=180)	Refill Rx (N=180)
1	83%	83%	83%	17%	17%	17%
2	58%	83%	33%	25%	17%	33%
3	33%	33%	33%	42%	50%	33%
4	17%	33%	0%	92%	83%	100%
5	33%	0%	67%	67%	83%	50%
6	58%	67%	50%	42%	33%	50%
7	67%	67%	67%	50%	33%	67%
8	58%	50%	67%	50%	50%	50%
9	42%	33%	50%	25%	17%	33%
10	75%	100%	50%	8%	0%	17%
11	75%	67%	83%	25%	33%	17%
12	100%	100%	100%	0%	0%	0%
13	33%	17%	50%	67%	83%	50%
14	100%	100%	100%	0%	0%	0%
15	100%	100%	100%	0%	0%	0%
16	100%	100%	100%	0%	0%	0%
17	92%	83%	100%	17%	33%	0%
18	58%	67%	50%	42%	33%	50%
19	67%	67%	67%	33%	33%	33%
20	67%	83%	50%	33%	17%	50%
21	100%	100%	100%	0%	0%	0%
22	92%	100%	83%	8%	0%	17%
23	92%	100%	83%	8%	0%	17%
24	58%	83%	33%	42%	17%	67%
25	50%	33%	67%	33%	33%	33%
26	83%	83%	83%	17%	17%	17%
27	83%	67%	100%	17%	33%	0%
28	100%	100%	100%	0%	0%	0%
29	92%	100%	83%	8%	0%	17%
30	100%	100%	100%	0%	0%	0%
Total	**72%**	**73%**	**70%**	**26%**	**24%**	**27%**

5.2.5. Bivariate Relationships

A. Patient Demographics and Pharmacist Practice Behaviors:

Bivariate relationships between patient gender, age, medication type (acute versus chronic) and pharmacist practice behaviors were examined for new and refill prescription encounters. Appendix S presents results for this analysis. For new prescriptions encounters, only two of the twelve relationships were found to be significant. The relationship between patient gender and prescription transfer was found to be significant (Chi-square 4.26, p=0.045). Pharmacists handed the prescription to a lower percentage of female patients as compared to male patients. The relationship between patient age and pharmacists' patient assessment behavior was also found to be significant. The average age of the patient for whom pharmacists carried out assessment was 50 years, which was higher than the average of patients (mean = 41 yrs) for whom pharmacists did not carry out assessment. For new prescription encounters, none of the other relationships between patient demographics and pharmacist practice behaviors were found to be significant. For refill prescription encounters, only the relationship between patient gender and information provision rate was found to be significant (Chi-square 4.28 p=0.044). Pharmacists provided information to a higher percentage of male patients as compared to female patients.

B. Patient and Pharmacist Demographics and Patient Question-Asking Behaviors:

Appendix T presents bivariate relationships between patient demographics (patient gender, age, medication type) and patient question-asking behaviors. For both new and refill prescription encounters, no patient demographics were found to be significantly related to patient question-asking behavior. Appendix U presents bivariate relationships

between pharmacist demographics (gender and work experience) and patient question-asking behaviors. For both new and refill prescription encounters, no pharmacist demographics were found to be significantly related to patient question-asking behavior.

C. Pharmacist Demographics and Pharmacist Behaviors:

Appendix V presents bivariate relationships between pharmacist demographics (gender and work experience) and pharmacist practice behaviors (Prescription transfer, Show medication to the patient, Information provision and Patient assessment). For both new and refill prescription encounters, pharmacist gender was significantly related to pharmacists' behaviors related to showing medication to the patient. Female pharmacists were more likely to open the bag or bottle and show it to the patient (Chi-square=17.30, p=0.00 for new prescription encounters and Chi-square=13.43, p=0.00 for refill prescription encounters). Additionally, pharmacist gender was significantly related to pharmacists' patient assessment behaviors for new prescription encounters. Female pharmacists were more likely to assess patient knowledge/compliance or effects of medications in new prescription encounters. (Chi-square=7.25, p=0.01).

For both new and refill prescription encounters, there was a significant relationship between pharmacist work experience and pharmacists' behaviors related to showing medication to the patient. Pharmacists who had less than 15 years of experience were more likely to open the bag and show the prescription to the patient as compared to pharmacists who had more than 15 years of experience (Chi-square 15.6, p=0.000 for new prescription encounters, Chi-square 6.9, p=0.009 for refill prescription encounters). Similarly, for both new and refill prescription encounters, there was a significant relationship between pharmacist experience and patient assessment. Pharmacists who had

less than 15 years of experience were more likely to perform patient assessment as compared to pharmacists who had more than 15 years of experience (Chi-square 11.0, p=0.010 for new Rx, Chi-square 8.10, p=0.009 for refill Rx). For both new and refill prescription encounters, there was no significant relationship between pharmacist work experience and pharmacists' prescription transfer and information provision behaviors.

5.3. Measure Refinement

Nomological and face validity of the measures were supported based on the responses of pharmacists, technicians and patients at the pilot sites. Convergent validity of measures related to pharmacist behaviors (dependent variables) was assessed by computing correlations between observer ratings and patient ratings of pharmacist practice behaviors. The correlation coefficients for pharmacist practice behavior measures are provided in Table 13. These correlations exceed the apriori minimum set at 0.30, and support the convergent validity of the measures. It is interesting to note that among all pharmacist practice behaviors, pharmacist question-asking behaviors had the lowest correlation. This correlation coefficient was low because there was discrepancy between patient rating and observer rating on pharmacist question-asking behaviors. Patients had a lower rating (75%) than observer rating (96%) on whether pharmacists asked questions to the patients. Much of this discrepancy was due to the use of "do you have questions". In 40% of instances where the observer noted pharmacists using "do you have questions", patients indicated that the pharmacist had not asked any questions to the patient.

Table 13

Convergent Validity of Pharmacist Practice Behavior Measures

Measure	Correlation Coefficient
Provision of Information by the Dispensing Pharmacist (N=359)	0.89
Provision of Oral Information on Side Effects (N=359)	0.85
Provision of Oral Information on Interactions (N=359)	0.88
Provision of Oral Information on Directions (N=359)	0.92
Did the Dispensing Pharmacist Ask Questions	0.30

Convergent validity of measures related to patient question-asking behavior and pharmacist busyness (independent variables) was assessed by computing correlations between observer ratings and participant ratings. The correlation coefficient for observer rating and patient rating of patient question-asking behavior was 0.82 and for observer rating of busyness and pharmacist rating of busyness was 0.67. Again, since these correlations exceed the apriori minimum set at 0.30, the convergent validity of these measures is well supported.

Discriminant validity for items on the pharmacist attitudes towards practice role (PAPR) scale, technician attitudes towards pharmacist practice role (TAPR) scale and community pharmacy safety culture (COPSC) scale was assessed by conducting exploratory factor analysis (EFA). Table 14 contains factor loadings for each item on the three factor solution generated by using the principal axis factoring method and oblique rotation typically used for exploratory factor analysis.

As expected, all items on the COPSC loaded well under factor 1. Ten out of the 14 TAPR items loaded well under factor 2. Three of the four items which had low loadings on factor 2 loaded well on other factors indicating the need for further exploration. The majority of items on PAPR loaded well under factor 3. Only PAPR 4 did not load as expected. PAPR had a negligible and a negative loading on factor 3, which meant that PAPR 4 may not be a good indicator of PAPR. Overall, 34 out of the 42 items (81%) loaded on the expected factors. These results support the discriminant validity of the measures used for this study.

Table 14

Exploratory Factor Analysis: Factor Loadings for Items of PAPR, TAPR and COPSC

Item	Factor 1	Factor 2	Factor 3
Community Pharmacy Safety Culture Scale (N=30)			
COPSC1	**0.62**	0.07	-0.02
COPSC2	**0.76**	0.05	0.07
COPSC3	**0.64**	0.04	0.05
COPSC4	**0.57**	0.07	0.01
COPSC5	**0.54**	-0.06	-0.00
COPSC6	**0.74**	-0.04	0.08
COPSC7	**0.71**	0.12	0.07
COPSC8	**0.58**	-0.09	0.13
COPSC9	**0.54**	-0.08	0.08
COPSC10	**0.36**	0.05	-0.02
COPSC11	**0.71**	0.06	-0.01
COPSC 12	**0.59**	-0.04	-0.01
COPSC 13	**0.54**	-0.08	-0.07
COPSC 14	**0.55**	-0.24	0.08
Technician Attitude towards Pharmacist Role (N=30)			
TAPR1	-0.18	-0.01	0.06
TAPR2	0.13	**0.36**	0.13
TAPR3	0.33	0.05	0.39
TAPR4	0.20	**0.30**	0.02
TAPR5	-0.15	0.17	0.20
TAPR6	-0.24	0.03	0.03
TAPR7	0.16	**0.29**	-0.05
TAPR8	0.04	**0.40**	0.07
TAPR9	0.11	**0.49**	-0.01
TAPR10	-0.15	**0.94**	0.04
TAPR11	-0.02	**0.90**	0.09
TAPR12	-0.24	**0.90**	0.10
TAPR13	-0.06	**0.30**	-0.06
TAPR14	0.08	**0.70**	0.20
Pharmacist Attitude towards Pharmacist Role (N=30)			
PAPR1	0.00	-0.05	**0.26**
PAPR2	0.31	0.01	**0.45**
PAPR3	0.30	-0.04	**0.30**
PAPR4	0.09	0.26	-0.04
PAPR5	0.06	0.19	**0.43**
PAPR6	-0.10	-0.17	**0.48**
PAPR7	0.06	-0.10	**0.22**
PAPR8	0.23	-0.07	**0.26**
PAPR9	0.38	0.05	**0.35**
PAPR10	0.01	0.18	**0.77**
PAPR11	0.03	0.33	**0.70**
PAPR12	-0.03	0.19	**0.82**
PAPR13	0.13	-0.09	**0.46**
PAPR14	-0.14	0.21	**0.50**

Confirmatory factory analysis was conducted to establish the construct validity of each scale. For each scale, a theoretical model consisting of common factors (represented by the subscales) and their own set of indicators (items under each subscale) was tested by using AMOS 5.0. For each model, a path diagram which displayed the standardized regression weights (factor loadings), squared multiple correlation coefficients and statistical evidence for model fit (χ^2 (chi-square) statistic, RMSEA and Tucker-Lewis values) is presented. If the model fit was not achieved or if the subscale did not explain variation in items, a modified model was tested after item deletion or by establishing covariances between indicators. Results from the confirmatory factor analysis of each scale are presented below:

Construct Validity of the PAPR Scale

From the path diagram displayed in Figure 6, all the CRO items (CRO1-CRO9) except item 4 (CRO4) appear to be good indicators of the CRO subscale. The CRO subscale explains 7-43% of the variance in the different items measuring pharmacist attitude towards counseling role. Item 4 (CRO4) has a R^2 of zero, meaning that the modified CRO scale explains practically no variance in this item. It is also evident that all items on the QAC scale (QAC1-QAC5) are good indicators of QAC. The QAC subscale explains 21-88% of the variance in the different items measuring pharmacist attitude towards quality assurance and control role. The χ^2 statistic of 87.12 (DF=76) and the p-value of 0.180 indicate that the model is a good fit to the data. This finding is also supported by the RMSEA value of 0.047 (where a value below 0.08 is a cut-off for accepting model fit) and the Tucker-Lewis Index value of 0.945. Although statistically

the model fit is achieved, the CRO subscale does not explain any variance in the item 4. Thus, a model excluding item 4 from the CRO subscale was tested.

The path diagram in Figure 7 displays the modified model (without CRO4), its indicators, common factors, the standardized regression weights for each common factor and indicator and the squared multiple correlation coefficients (R^2). The overall fit for this model appears better than the earlier model. The χ^2 statistic of 79.84 (DF=64, p=0.09) is lower than the earlier model, indicating a better fit. This p-value is higher than 0.05. Thus we accept the null hypothesis that the model is a good fit to the data. This finding is well supported by the RMSEA value of 0.061 (where a value below 0.08 is a cut-off for accepting model fit) and the Tucker-Lewis Index of 0.93. Thus, all three goodness of fit tests suggest that the model displayed in Figure 7 is a better fit to the data than that of Figure 6.

In summary, item 4 from the CRO subscale was removed to get a better fit between the model and the data. There appear to be two non-orthogonal dimensions which underlie pharmacists' attitude towards pharmacist role as measured in this study. The first dimension represents pharmacist attitude towards counseling role, whereas the second dimension represents pharmacist attitude towards quality assurance and control role.

Figure 6 Path Diagram for Confirmatory Factor Analysis of the Pharmacist Attitude towards Pharmacist Role (PAPR) Scale

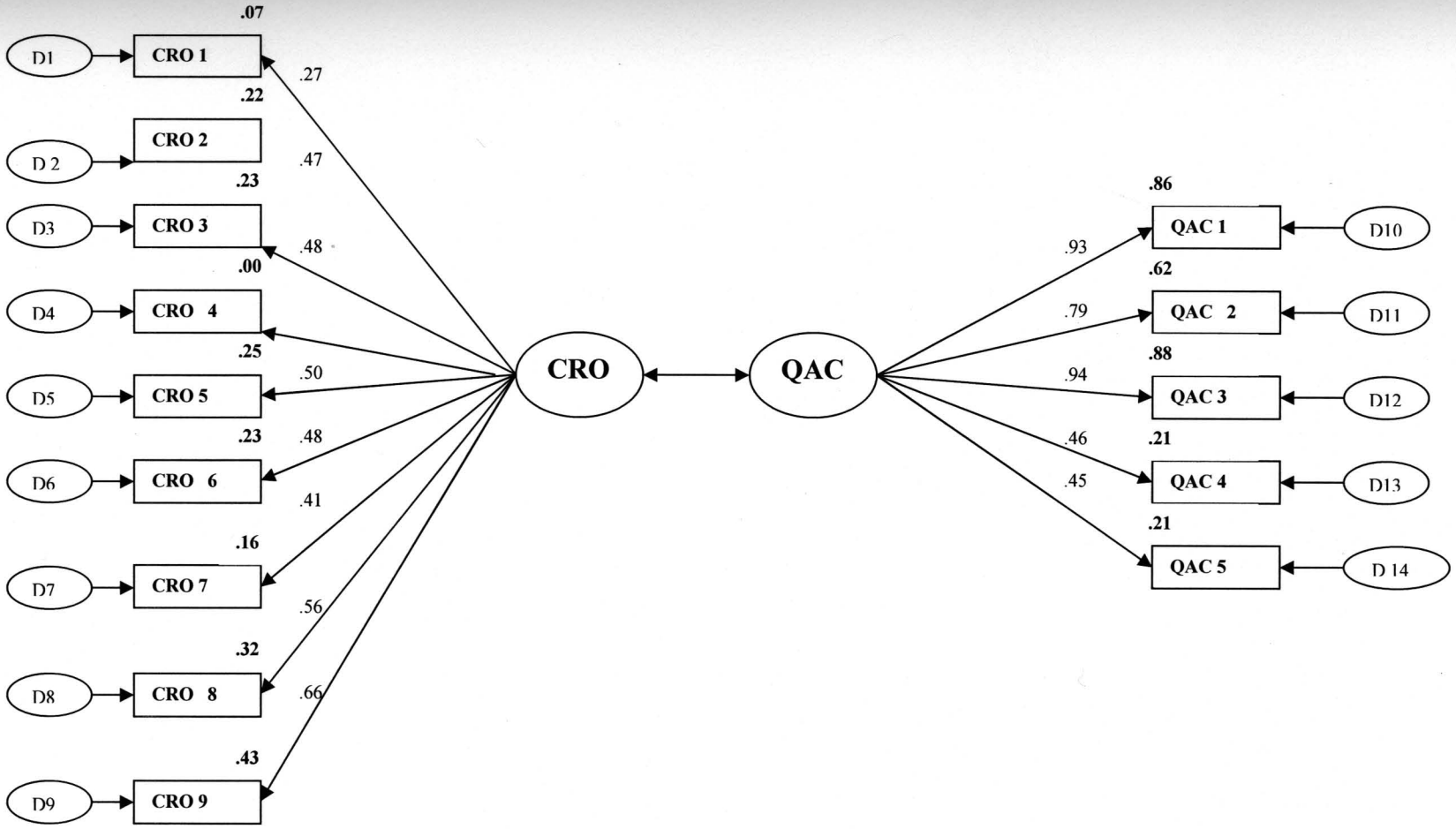
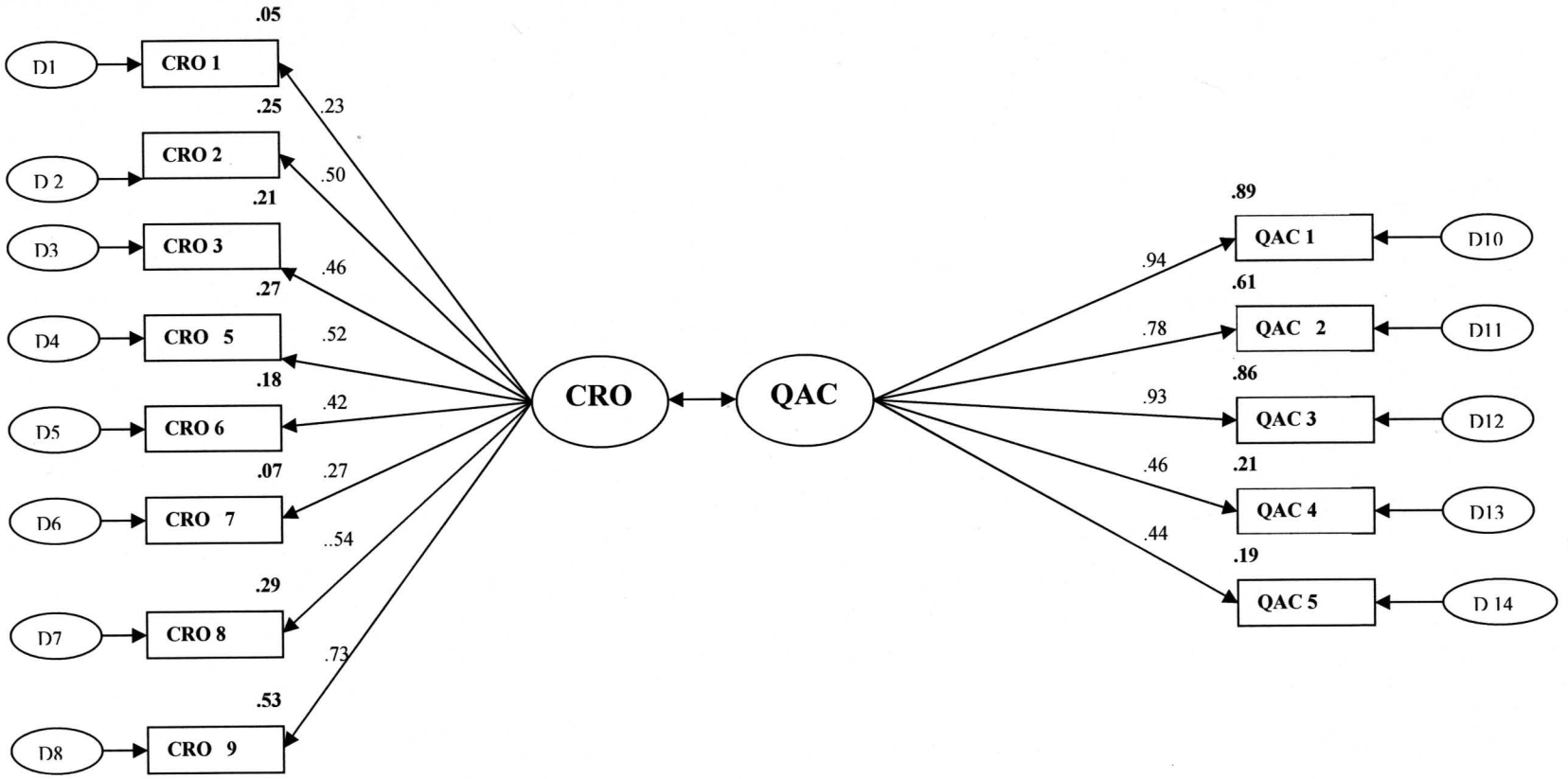


Figure 7 Modified Path Diagram for the Confirmatory Factor Analysis of the Pharmacist Attitude towards Pharmacist Role (PAPR) Scale



Construct validity of the TAPR scale:

PAPR scale items were adapted for technicians to assess technician attitudes towards the pharmacist role (TAPR) as it was assumed that the adapted scale items would have a factor structure similar to that of the pharmacist attitudes towards the pharmacist role (PAPR). However, the results from the exploratory factor analysis suggest that the factor structure for PAPR and TAPR scales are very different. These results were tested by conducting confirmatory factor analysis of the scale to assess the factor structure for the TAPR scale.

From the path diagram in Figure 8, only some modified CRO items (CRO2, CRO7-CRO9) appear to be good indicators of the modified CRO subscale for technicians. The modified CRO subscale for technicians explains 12-92% of the variance in these four items. However, items CRO1, CRO3, CRO4, CRO5 and CRO6 appear to have an R^2 of zero or less than 0.05, meaning that the modified CRO scale for technicians explains practically no variance in these items. It is also evident that all items on the QAC subscale for technicians (QAC1-QAC5) are good indicators of QAC. The QAC subscale explains 5-88% of the variance in the different items measuring pharmacist attitude towards quality assurance and control role. The χ^2 statistic of 116.77 (DF=76) and the p-value of 0.002 indicate that the model is not a good fit to the data. This finding is also supported by the RMSEA value of 0.09 (where a value below 0.08 is a cut-off for accepting model fit) and the Tucker-Lewis Index value of 0.87, both indicating that the model is not a good fit to the data.

Two conclusions can be made from this analysis. First, the factor structure for the PAPR scale is different from the TAPR scale. Second, only 9 items from the TAPR scale

are good indicators of the technician attitude towards pharmacist role. Although contrary to our initial assumptions, these results are well explained by the status characteristics theory (Berger et al., 1972) which indicates that different realities, expectations and evaluations exist for individuals with different status and expertise. Given that technicians have a different status in their work groups as compared to pharmacists, their evaluations or attitudes towards the pharmacist role may be different. This difference may be the reason for the dissimilar factor structures of PAPR and TAPR scales and may be the reason why only 9 items from the TAPR scale are good indicators of technician attitudes towards pharmacist role. Thus, a modified model excluding the 5 items (CRO1, CRO3, CRO4, CRO5 and CRO6) from the CRO subscale was tested.

The path diagram in Figure 9 displays the modified model (without CRO1, CRO3, CRO4, CRO5 and CRO6), its indicators, common factors, the standardized regression weights for each common factor and indicator and the squared multiple correlation coefficients (R^2). The χ^2 statistic of 30.1 (DF=64, p=0.26) is much lower than the earlier model, indicating a good fit for the modified model. The p-value is higher than 0.05, thus we accept the null hypothesis that the model is a good fit to the data. This finding is well supported by the RMSEA value of 0.04 (where a value below 0.08 is a cut-off for accepting model fit) and the Tucker-Lewis Index of 0.98. Thus, all three goodness of fit tests suggest that the model displayed in Figure 9 is a better fit to the data than that of Figure 8.

In summary, five items from the modified CRO subscale in the TAPR scale were deleted to get a better fit between the model and the data. There appear to be two non-orthogonal dimensions which underlie the technician attitude towards pharmacist role as

measured in this study. The first dimension represents technician attitude towards pharmacist counseling role, whereas the second dimension represents technician attitude towards pharmacist role in quality assurance and control.

Construct Validity of the COPSC scale

From the path diagram in Figure 10, all COPSC items appear to be good indicators of the four common factors detailed in the model. The Teamwork subscale explains 16-65% of the variance in the 4 items that measure teamwork (items 1, 3, 4 and 10). The Staffing subscale explains 26-48% of the variance in the 4 items that measure staffing (items 2, 5, 6, and 12). The Communication Openness subscale explains 8-73% of the variance in the 3 items that measure communication openness (items 7, 8, 11). The Management Support subscale explains 27-81% variance in the 3 items that measure management support (items 16, 17, 18). However, the χ^2 statistic of 213.72 (DF=71) and the p-value of 0.000 indicate that the model is a not a good fit to the data. This finding is also supported by the RMSEA value of 0.117 (where a value below 0.08 is a cut-off for accepting model fit) and the Tucker-Lewis Index value of 0.732. Given that each of the items had a good loading, modification indices for model fit were examined.

Modification indices generate the expected reduction in the overall model fit χ^2 for each possible path that can be added to the model. The largest modification index values were found for residual covariances. For example, the residual covariance between d6 and d8 (residuals for items 6 and 8) was expected to be .21 if the model was respecified and refitted with that covariance added. That model's chi-square test of overall fit would be approximately 25.81 units lower than the present model's value of 213.72. Thus, all residual covariances identified from the modification indices were

allowed to be estimated in a modified model. The resultant model is shown in Figure 11. The Teamwork subscale now explains 16-65% of the variance in the 4 items that measure teamwork (items 1, 3, 4, and 10). The Staffing subscale explains 13-52% of the variance in the 4 items that measure staffing (items 2, 5, 6, 12). The Communication Openness subscale explains 7-57% of the variance in the 3 items that measure communication openness (items 7, 8 and 11). The Management Support subscale explains 28-70% variance in the 3 items that measure management support (items 16, 17 and 18). Interestingly, the χ^2 statistic value dropped from 213.72 to 65.49, and the probability value increased from 0.000 to 0.136 meaning that the modified model is a good fit to the data. This result was also supported by RMSEA fit value of 0.038 and the Tucker-Lewis Index value of 0.975.

In summary, there appear to be four non-orthogonal dimensions which underlie the safety culture scale. The data representing the safety culture scale appear to have a good fit with the teamwork, staffing, communication openness and management support dimensions of safety culture scale.

Figure 8 Path Diagram for the Confirmatory Factor Analysis of the Technician Attitude towards Pharmacist Role (TAPR) Scale

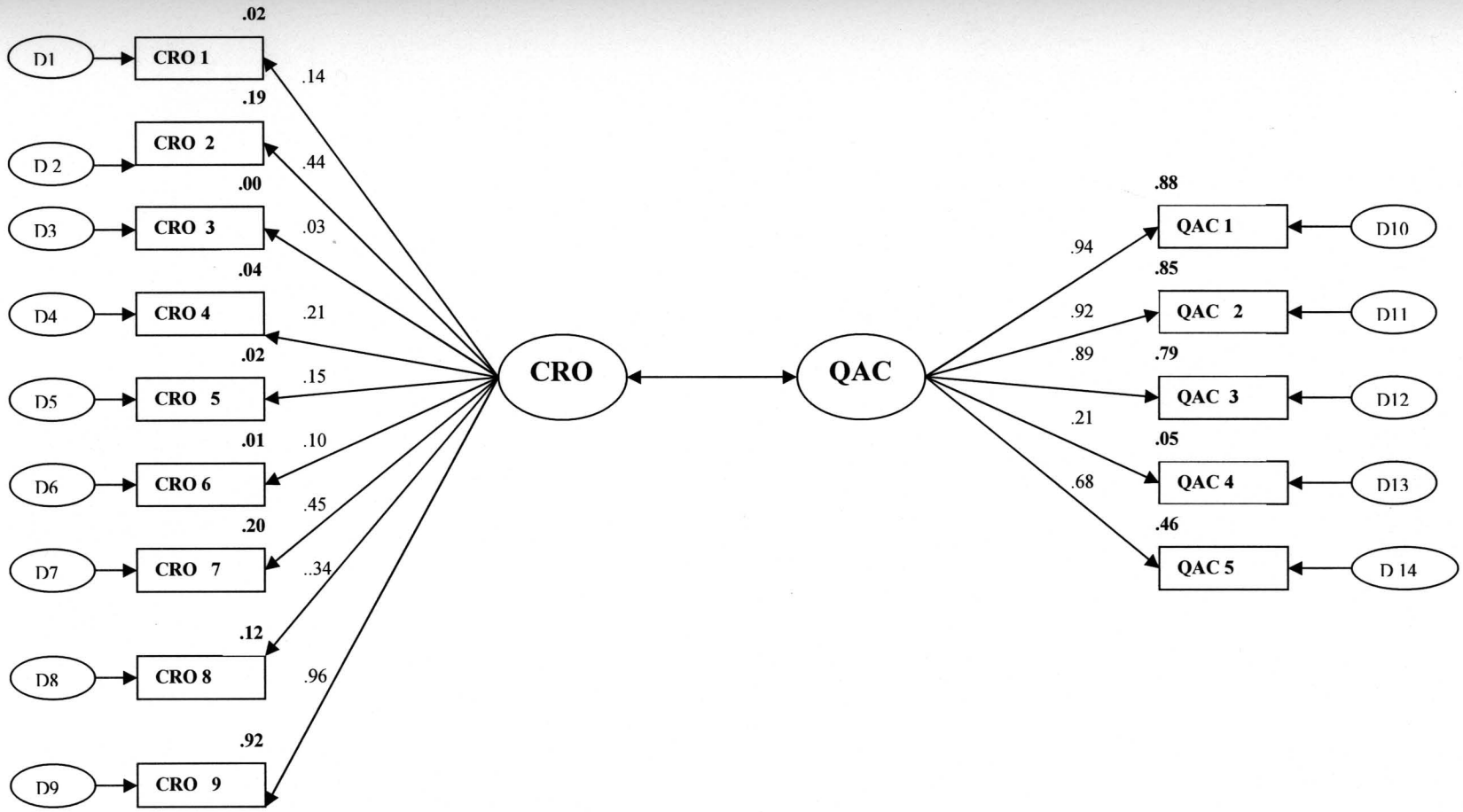


Figure 9- Modified Path Diagram for Confirmatory Factor Analysis of the Technician Attitude towards Pharmacist Role (TAPR) Scale

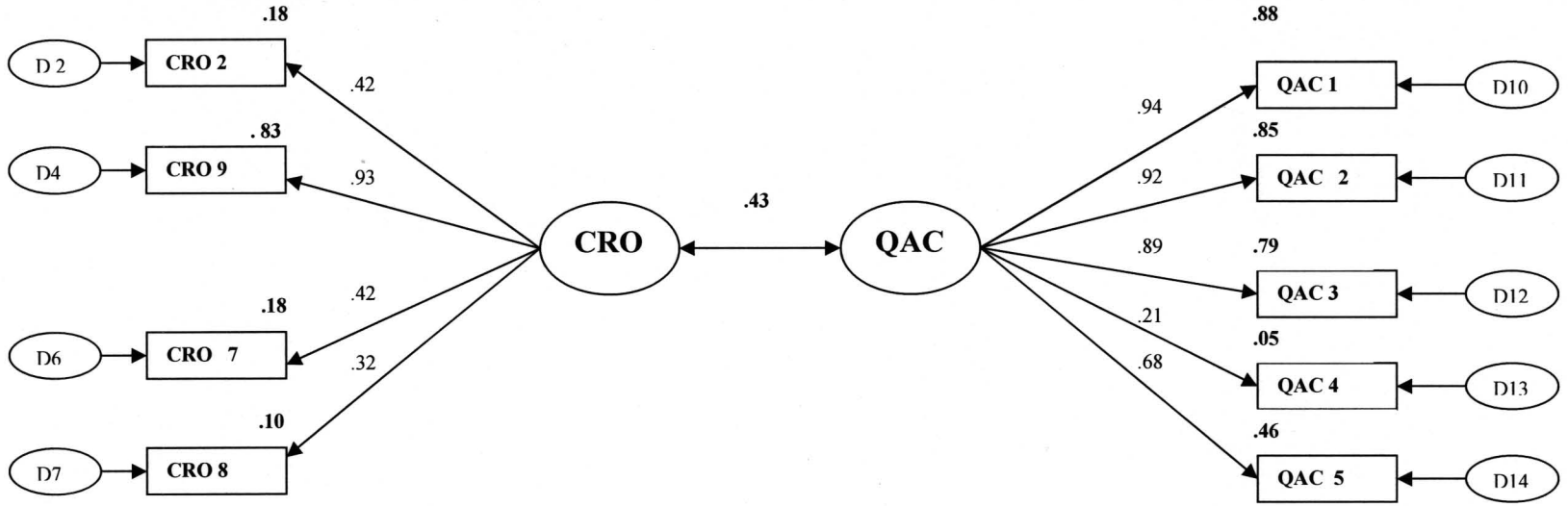


Figure 10 Path Diagram for the Confirmatory Factor Analysis of the Community Pharmacy Safety Culture Scale

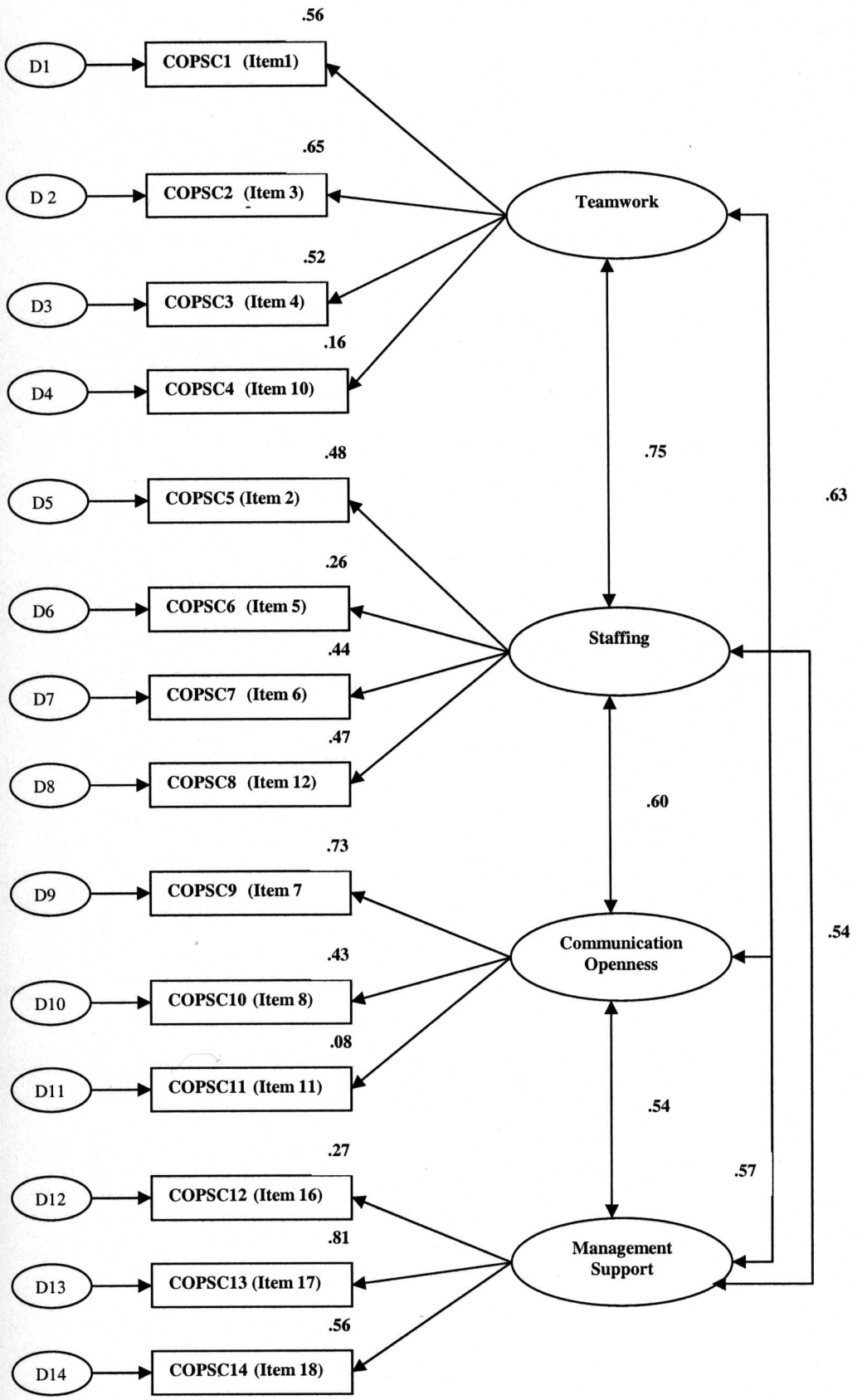
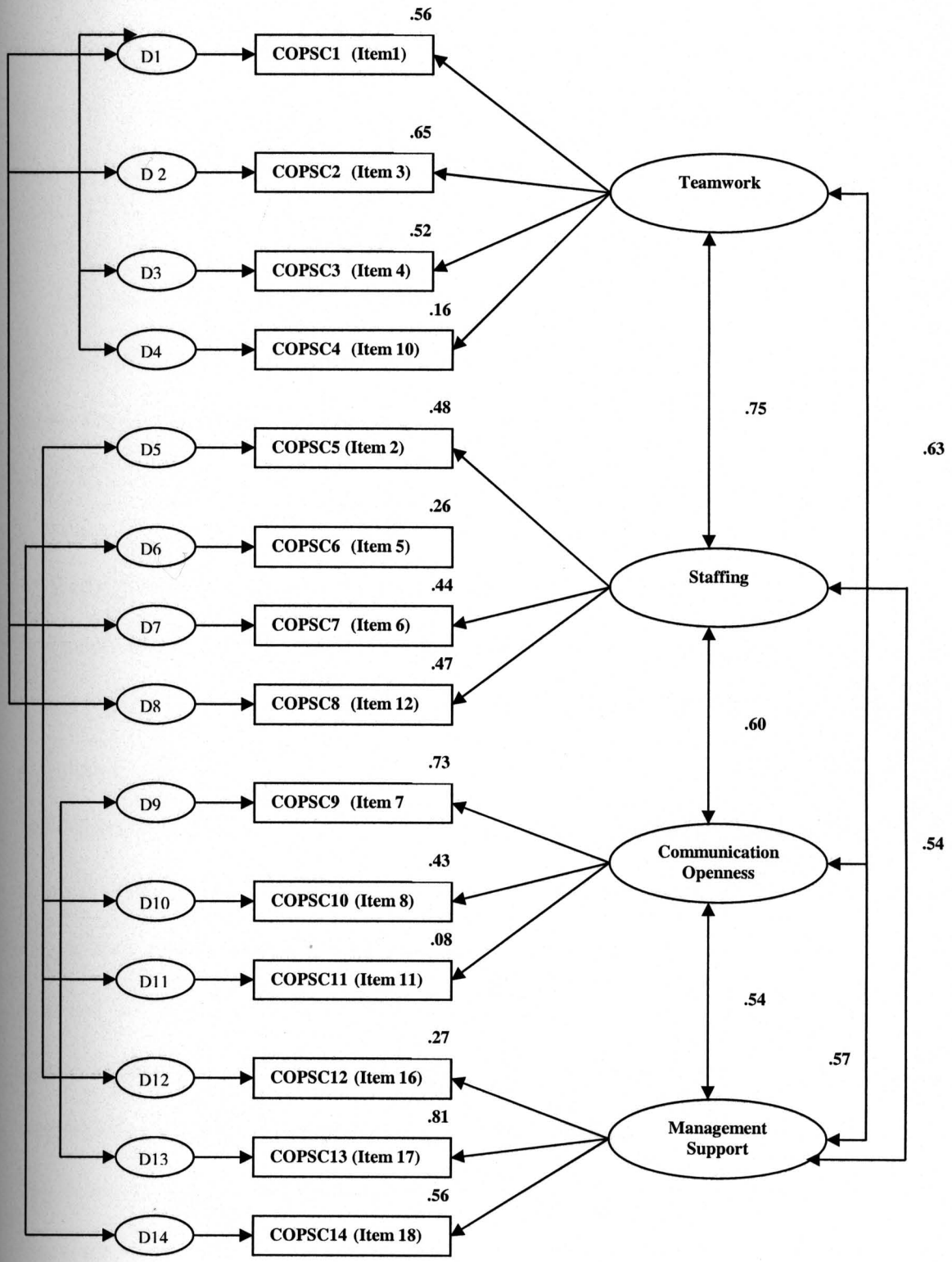


Figure 11 Modified Path Diagram for the Confirmatory Factor Analysis of the Community Pharmacy Safety Culture Scale



Reliability

Reliability scores for each scale and its sub-scales are presented in Table 15. All three scales and their subscales had good reliability (Cronbach's alpha>0.60) with the weakest being the modified CRO for the technicians. Inter-item correlation matrix and item to total scale correlations are presented in Appendix W-Z.

5.4 Recalculation of scores

Since item(s) from PAPR and TAPR scales were deleted during construct validation, scores on the validated scales were recalculated and used for testing the hypotheses in the study. These recalculated scores are presented in Table 16.

5.5. Hypotheses Testing

Correlations between independent variables were examined prior to inclusion in the regression models testing the study hypotheses (Table 17). According to Cohen and Cohen (1983), correlations greater than 0.60 indicate that variables are highly related and may pose multicollinearity problems in regression analysis. Since none of the independent variables in our study were correlated highly multicollinearity may not be an issue for our regression models. Continuous independent variables had approximately normal distributions within tolerable deviations. Therefore, the assumptions of regression appeared not to be violated. It appeared that independent variables could be used in regression analysis without transformation. Correlations between dependent variables were examined for developing an index score for pharmacist practice behaviors (Table 18). None of the dependent variables were correlated highly (i.e. correlations>0.60). Therefore, it was decided that the effects of the independent variables need to be examined on each individual pharmacist practice behavior.

Table 15

Reliability Scores for Scales Used in the Study

Scale	Reliability Score[a]
Pharmacist Attitude towards Pharmacist Role (13 items)	**0.77**
Modified CRO subscale (8 items)	0.70
QAC subscale (5 items)	0.83
Technician Attitude towards Pharmacist Role (9 items)	**0.79**
Modified CRO subscale (4 items)	0.61
QAC subscale (5 items)	0.85
Community Pharmacy Safety Culture (14 items)	**0.86**
Teamwork subscale (4 items)	0.73
Staffing subscale (4 items)	0.74
Communication Openness subscale (3 items)	0.70
Management Support subscale (3 items)	0.72

a- Reliability assessed using Cronbach's alpha

Table 16

Recalculated PAPR and TAPR Descriptives

Scale	Minimum Score	Maximum Score	Mean Score	Standard Deviation
Pharmacists (N=67)				
PAPR Sum	36.00	63.00	51.51	6.54
Modified CRO (8 items)	22.00	39.00	33.18	3.55
QAC (5 items)	7.00	25.00	18.33	4.64
Technicians (N=82)				
TAPR Sum	22.00	45.00	35.93	5.54
Modified CRO (4 items)	12.00	20.00	17.10	1.99
QAC (5 items)	7.00	25.00	18.83	4.64

5.5.1. Primary Hypotheses:

Null hypotheses for two main effects ($H0_1$ and $H0_2$) and one mediating effect ($H0_3$) were proposed as the primary hypotheses for the study.

A. Null Hypothesis 1 (Main Effects for Work Environment)

Null hypotheses were specified for relationships between work environment factors and pharmacist practice behaviors in hypothesis $H0_1$. These relationships were tested using logistic regression. Separate logistic regression models were run for each pharmacist practice behavior (prescription transfer, prescription show, information provision and patient assessment) in the context of new and refill prescription encounters.

Prescription Transfer: Table 19 contains results of logistic regression analysis for effects of the working environments on prescription transfer. The Wald statistic and its significance test for each independent variable suggests that for new prescription encounters, none of the five work environment factors was a significant predictor of prescription transfer. In contrast, busyness was a significant predictor of prescription transfer for refill prescription encounters. The negative ß coefficient for the effect of busyness on prescription transfer in refill prescription encounters suggests that the higher the number of people waiting in the dispensing area the lower was the likelihood that pharmacists transferred the medication to the patients. The value of the ß coefficient for the effect of busyness on prescription transfer in refill prescription encounters is .381. For a logical interpretation, the ß coefficient value needs to be transformed exponentially. The exponential transformation indicated in the Table 19 by Exp (B) provides the log odds ratio. The value of exp (B) for the effect of busyness on prescription transfer in refill

prescription encounters is 0.493. This value suggests that for each unit increase in the busyness of the pharmacy, the odds of prescription transfer decreases by 0.5.

Prescription Show: Table 20 contains results of the logistic regression analysis for effects of the work environment variables on pharmacists' prescription show (opening the bottle/bag and showing the medication to the patient) behaviors. For both new and refill prescription encounters, workload and safety culture were found to be significant predictors of pharmacists' prescription show behaviors. The negative ß coefficient for workload and COPSC indicate that the probability of the pharmacist showing medication to the patient was lower when the pharmacist filled more prescriptions per day and when employees of the pharmacy had positive perceptions of the safety culture in the pharmacy. For refill prescription encounters, in addition to workload and safety culture, busyness was found to be a significant predictor of pharmacist prescription show behaviors. The negative ß coefficient for busyness indicates that the probability of a pharmacist showing medication to the patient was lower when the number of patients waiting in the dispensing area increased. The exponential transformation indicated in the Table 20 by Exp (B) provides the log odds ratio of the effect of independent variables on pharmacist prescription show behaviors. For instance, the value of exp (B) for the effect of workload on prescription show in refill prescription encounters which was found to be significant is 0.970. This value suggests that for each unit increase in the workload of the pharmacy, the odds of prescription show decreases by 0.9.

Information Provision: Table 21 contains results of the logistic regression analysis for effects of the work environment factors on pharmacists' information provision behaviors. For new prescription encounters, patient question asking behavior was found

to be a significant predictor of pharmacists' information provision behaviors. For refill prescription encounters, safety culture and patient question-asking behavior were significant predictors of pharmacists' information provision behaviors at alpha less than 0.05. The positive ß coefficients for safety culture and patient question-asking behavior indicates that the probability of pharmacists providing information to patients increased when employees of the pharmacies had positive perceptions of safety culture in the pharmacy and when patients asked questions to the pharmacist. The exponential transformation indicated in the Table 21 by Exp (B) provides the log odds ratio of the effect of independent variables on pharmacist prescription show behaviors. For instance, the value of exp (B) for the effect of safety culture on prescription info in refill prescription encounters which was found to be significant is 1.094. This value suggests that for each unit increase in the safety culture of the pharmacy, the odds of prescription information provision by pharmacist increases by 1.

Patient Assessment: Table 22 contains results of logistic regression analysis for effects of work environment variables on pharmacists' patient assessment behaviors. For both new and refill prescription encounters, workload and patient question-asking behavior were significant predictors of pharmacists' patient assessment behaviors. The negative ß coefficients for workload and patient question-asking behaviors indicate that the probability of pharmacists conducting patient assessment decreased under high workload conditions and when patients asked questions. For refill prescription encounters, an additional variable, pharmacy busyness, was found to be a significant predictor of pharmacists' patient assessment behaviors. The negative ß coefficient for busyness indicates that the probability of pharmacists conducting patient assessment was

lower under conditions of more patients waiting in the dispensing area. The exponential transformation indicated in the Table 22 by Exp (B) provides the log odds ratio of the effect of independent variables on pharmacist patient assessment behaviors. For instance, the value of exp (B) for the effect of busyness on patient assessment in refill prescription encounters which was found to be significant is 0.709. This value suggests that for each unit increase in the busyness of the pharmacy, the odds of patient assessment decreases by 0.7.

B. Null Hypothesis 2:

Relationships between pharmacist personal factors and pharmacist practice behaviors were proposed in hypothesis $H0_2$. It was hypothesized that there was no significant relationship between pharmacist attitudes towards practice role and pharmacist practice behaviors. This relationship was tested using logistic regression. Consistent with earlier analyses, separate logistic regression models were run for new and refill prescription encounters.

Table 23 presents the results of the logistic regression for effects of personal factors on the pharmacist practice behaviors. Pharmacist attitudes towards practice role were found to be a significant predictor of pharmacists' prescription transfer behaviors in both new and refill prescription encounters. The positive ß coefficient indicates that the probability of prescription transfer by the pharmacist was high when pharmacists had positive attitudes towards practice roles. Pharmacist attitudes towards practice role were not found to be a significant predictor of pharmacist opening the bag/bottle and showing it to the patient in new prescription encounters, but were a significant predictor of prescription show in refill prescription encounters. Pharmacist

attitudes towards practice role were not a significant predictor of pharmacists' information provision behaviors and patient assessment behaviors in either new or refill prescription encounters. The exponential transformation indicated in the Table 22 by Exp (B) provides the log odds ratio of the effect of pharmacist attitudes towards practice role on pharmacist practice behaviors. For instance, the value of exp (B) for the effect of PAPR on prescription transfer in refill prescription encounters which was found to be significant is 1.060. This value suggests that for each unit increase in pharmacist attitude towards practice role, the odds of prescription transfer increases by 1.

C. Summary of Null Hypothesis 1 and 2 ($H0_{1,2}$):

Null hypothesis 1 and 2 tested the main effects of work environment and personal factors on dependent variables. Table 24 provides a summary of the results for these main effects testing. In summary, pharmacist attitudes towards practice role was the only significant predictor of prescription transfer in new prescription encounters whereas both pharmacist attitudes towards practice role and number of patients waiting in the dispensing area (busyness) predict prescription transfer in refill prescription encounters. Number of prescriptions filled per day (workload) and safety culture (COPSC) are important predictors of pharmacists' prescription show behaviors in both new and refill prescription encounters. An additional variable, busyness was found to be an important predictor of pharmacists' prescription show behaviors in refill prescription encounters. Patient question-asking behavior was significantly related to pharmacists' information provision behaviors in both new and refill prescription encounters. In refill prescription encounters, an additional variable, safety culture significantly predicted pharmacists' information provision behaviors. Workload and patient question-asking behaviors were

significant predictors of pharmacists' patient assessment behaviors for both new and refill prescription encounters. For refill prescription encounters, an additional variable, busyness was found to be a significant predictor of pharmacists' patient assessment behaviors.

Table 17

Correlations between Independent Variables (N=360)

Variables	PAPR	TAPR	COPSC	Workload	Busyness
PAPR	-				
TAPR	0.24**	-			
COPSC	0.41**	0.14**	-		
Workload	-0.20**	0.20**	-0.41**	-	
Busyness	-0.18**	0.02	-0.04	0.08	-
Patient Question-Asking Behavior	0.05	0.08	0.04	-0.02	-0.13

** Correlations significant at 0.01 alpha level

Table 18

Correlations between Dependent Variables (N=360)

Variables	**Prescription Transfer**	**Prescription Show**	**Information Provision**
Prescription Transfer	1.000		
Prescription Show	.142**	1.000	
Information Provision	.413*	.077	1.000
Patient Assessment	.125**	.299*	.092

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 19

Logistic Regression for Effects of Work Environment Factors on Prescription Transfer for New and Refill Prescription Encounters

Variables in the Equation	B	S.E.	Wald	Df	Sig.	Exp(B)
New Prescription(N=180)						
Busyness	-.381	.283	1.809	1	.179	.683
Workload	-.010	.008	1.637	1	.201	.990
TAPR	.071	.061	1.379	1	.240	1.074
COPSC	.072	.091	.618	1	.432	1.074
Patient Question-Asking Behavior	-7.142	32.536	.048	1	.826	.001
Constant	5.768	32.971	.031	1	.861	31.889
Refill Prescription(N=180)						
Busyness	-.708	.158	19.981	1	.000	.493
Workload	.000	.004	.009	1	.926	1.000
TAPR	.002	.034	.003	1	.954	1.002
COPSC	.040	.046	.755	1	.385	1.041
Patient Question Asking Behavior	-4.970	16.139	.095	1	.758	.007
Constant	.452	2.940	.024	1	.878	1.571

Table 20

Logistic Regression for Effects of Work Environment Factors on Pharmacists' Prescription Show Behavior for New and Refill Prescription Encounters

Variables in the Equation	B	S.E.	Wald	df	Sig.	Exp(B)
New Prescription (N=180)						
Busyness	-.251	.214	1.370	1	.242	.778
Workload	-.027	.007	17.024	1	.000	.973
TAPR	-.049	.046	1.099	1	.295	.952
COPSC	-.248	.070	12.440	1	.000	.780
Patient Question Asking Behavior	-.215	1.802	.014	1	.905	.807
Constant	16.736	4.786	12.230	1	.000	1.588
Refill Prescription (N=180)						
Busyness	-1.062	.398	7.133	1	.008	.346
Workload	-.030	.009	12.208	1	.000	.970
TAPR	-.007	.060	.016	1	.901	.993
COPSC	-.361	.104	12.169	1	.000	.697
Patient Question-Asking Behavior	-.996	1.568	.404	1	.525	.369
Constant	23.318	7.042	10.965	1	.001	1.040

Table 21

Logistic Regression for Effects of Work Environment Factors on Information Provision for New and Refill Prescription Encounters

Variables in the Equation	B	S.E.	Wald	Df	Sig.	Exp(B)
New Prescription(N=180)						
Busyness	-.252	.233	1.167	1	.280	.777
Workload	.000	.006	.003	1	.957	1.000
TAPR	-.060	.060	1.001	1	.317	.942
COPSC	.095	.076	1.546	1	.214	1.100
Patient Question-Asking Behavior	-6.294	44.417	.020	1	.002	.887
Constant	6.284	34.198	.034	1	.854	5.359
Refill Prescription(N=180)						
Busyness	-.161	.143	1.272	1	.259	.851
Workload	.000	.003	.004	1	.947	1.000
TAPR	-.011	.030	.141	1	.707	.989
COPSC	.090	.041	4.712	1	.030	1.094
Patient Question-Asking Behavior	2.153	1.157	3.464	1	.036	.116
Constant	-3.396	2.730	1.548	1	.013	.033

Table 22

Logistic Regression for Effects of Work Environment Factors on Patient Assessment for New and Refill Prescription Encounters

Variables in the Equation	B	S.E.	Wald	Df	Sig.	Exp(B)
New Prescription (N=180)						
Busyness	-.129	.157	.669	1	.414	.879
Workload	-.014	.004	11.750	1	.001	.986
TAPR	-.040	.034	1.403	1	.236	.961
COPSC	-.024	.048	.251	1	.617	.976
Patient Question-Asking Behavior	-3.598	1.357	7.033	1	.008	.027
Constant	6.731	3.552	3.592	1	.058	13.628
Refill Prescription (N=180)						
Busyness	-.344	.160	4.637	1	.031	.709
Workload	-.010	.004	6.686	1	.010	.990
TAPR	.008	.032	.059	1	.808	1.008
COPSC	-.036	.046	.615	1	.433	.965
Patient Question-Asking Behavior	-2.251	1.176	3.662	1	.010	.105
Constant	3.924	2.892	1.842	1	.175	50.627

Table 23

Logistic Regression for Effects of Pharmacist Personal Factors on Pharmacist Practice Behaviors for New and Refill Prescription encounters

Dependent Variable	Variables in the Equation	B	S.E.	Wald	Df	Sig.	Exp(B)
Prescription Transfer	**New Prescription** (N=180)						
	PAPR	.093	.047	3.965	1	.046	1.097
	Constant	-1.670	2.249	.552	1	.458	.188
	Refill Prescription (N=180)						
	PAPR	.058	.027	4.828	1	.028	1.060
	Constant	-1.752	1.349	1.686	1	.194	.173
Prescription Show	**New Prescription** (N=180)						
	PAPR	.025	.036	.477	1	.490	1.025
	Constant	-3.158	1.887	2.801	1	.094	.043
	Refill Prescription (N=180)						
	PAPR	.180	.065	7.661	1	.006	1.197
	Constant	-12.039	3.631	10.991	1	.001	.000
Information Provision	**New Prescription** (N=180)						
	PAPR	.004	.046	.007	1	.934	1.004
	Constant	2.442	2.377	1.055	1	.304	11.501
	Refill Prescription (N=180)						
	PAPR	.045	.027	2.833	1	.092	1.046
	Constant	-3.181	1.422	5.005	1	.025	.042
Patient Assessment	**New Prescription** (N=180)						
	PAPR	.033	.029	1.318	1	.251	1.034
	Constant	-2.870	1.511	3.608	1	.058	.057
	Refill Prescription (N=180)						
	PAPR	.007	.026	.070	1	.791	1.007
	Constant	-1.342	1.363	.969	1	.325	.261

Table 24

Summary of the Main Effects of Work Environment and Personal Factors on Pharmacist Practice Behaviors

Dependent Variable	Type of Rx	Significant Work Environment Predictors	Significant Personal Factors
Prescription Transfer	New Prescription (N=180)	None	PAPR
	Refill Prescription (N=180)	Busyness	PAPR
Prescription Show	New Prescription (N=180)	Workload COPSC	None
	Refill Prescription (N=180)	Busyness Workload COPSC	None
Information Provision	New Prescription (N=180)	Patient Q-Asking	None
	Refill Prescription (N=180)	COPSC Patient Q-Asking	None
Patient Assessment	New Prescription (N=180)	Workload Patient Q-Asking	None
	Refill Prescription (N=180)	Busyness Workload Patient Q-Asking	None

D. Null Hypothesis 3:

Mediation effects of pharmacist attitudes towards practice role were stated in hypothesis $H0_3$. It was hypothesized that pharmacist attitudes towards practice role was not a significant mediator of the relationship between work environment factors and pharmacist practice behaviors. According to Baron and Kenny (1986), three conditions establish mediation: a significant relationship between independent variables and dependent variables; a significant relationship between the mediator variable and independent variables and a significant relationship between the mediator variable and dependent variable controlling for the effects of the independent variable. Thus, a vital step to establish mediation in our study is to examine the relationship between work environment variables and pharmacist attitudes towards practice role. Since pharmacist attitudes towards practice role were measured as a continuous variable, multiple linear regression analysis was used to regress pharmacist attitudes towards practice role on work environment variables.

Table 25 presents the results of the linear regression for effects of work environment on personal factors. Busyness, technician attitudes towards pharmacist role and safety culture were found to be significant predictors of pharmacist attitudes towards practice role. The negative ß coefficient for busyness indicates that pharmacist attitudes towards practice role were lower in pharmacies where the number of patients waiting in the dispensing area was higher. The positive ß coefficient for technician attitudes towards pharmacist role and safety culture indicates that pharmacist attitudes towards practice role were higher in pharmacies where technicians had a positive attitude towards

pharmacist practice role and where employees perceived the safety culture of the pharmacy to be positive.

Based on results from the summary table and linear regression analysis for effect of work environment on personal factors, the mediating effect of pharmacist attitudes towards practice role needs to be tested for the following relationships:

1. Relationship between busyness and prescription transfer for refill prescription encounters
2. Relationship between busyness, workload, safety culture and prescription showing behaviors for refill prescription encounters

Separate logistic regression analyses were carried out to test the mediating effect of pharmacist attitudes towards practice role on each of these relationships.

The results from Table 26 suggest that pharmacist attitudes towards practice role were not a significant predictor of prescription transfer for refill prescription while controlling for busyness. This means that pharmacist attitudes towards practice role did not have a mediating effect on the relationship between busyness and prescription transfer for refill prescription encounter. The results from Table 27 suggest that pharmacist attitudes towards practice role was a significant predictor of pharmacists' prescription showing behaviors for refill prescription encounters while controlling for busyness, workload and safety culture. Also, busyness, workload and safety culture were each significant predictors of pharmacists' prescription showing behaviors. This means that pharmacist attitudes towards practice role did have a mediating effect on the relationship between busyness, workload, safety culture and pharmacists' prescription showing behaviors for refill prescription encounters.

Table 25

Linear Regression Analysis for Effect of Work Environment on Personal Factors (N=360)

Coefficients	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	20.306	4.247	21.234	4.782	.000
Workload	-9.465E-03	.006	-.091	-1.715	.087
TAPR	.229	.053	.213	4.353	.000
COPSC	.456	.070	.341	6.495	.000
Busyness	-.804	.238	-.159	-3.379	.001
Patient Question-Asking Behavior	-2.606E-02	.761	-.002	-.034	.973

Table 26

Logistic Regression for Mediating Effects of PAPR on Busyness and Prescription Transfer for Refill Prescription Encounters (N=180)

Variables in the Equation	B	S.E.	Wald	df	Sig.	Exp(B)
Busyness	-.720	.160	20.331	1	.000	.487
PAPR	.045	.028	2.570	1	.109	1.046
Constant	.202	1.472	.019	1	.891	1.223

Table 27

Logistic Regression for Mediating Effects of PAPR on Busyness, Workload, COPSC and Prescription Show for Refill Prescription Encounters (N=180)

Variables in the Equation	B	S.E.	Wald	df	Sig.	Exp(B)
Busyness	-.929	.386	5.801	1	.016	.395
Workload	-.034	.010	12.743	1	.000	.966
COPSC	-.700	.266	6.934	1	.008	.497
PAPR	.441	.173	6.487	1	.011	1.555
Constant	16.973	11.985	2.006	1	.157	56.599

5.5.2. Secondary Hypotheses:

The secondary hypotheses of the study examined the mediating effects of prescription transfer on the relationship between work environment factors, personal factors and three other pharmacist practice behaviors (Prescription Show, Information Provision and Patient Assessment). Steps identified by Baron and Kenny (1986), which were detailed earlier were followed to establish mediation.

Separate logistic regression analyses were carried out to test whether prescription transfer had a relationship with other pharmacist practice behaviors. For both new and refill prescription encounters, prescription transfer was not found to be a significant predictor of pharmacists' prescription show behaviors. In contrast, prescription transfer was found to be a significant predictor of information provision for both new and refill prescription encounters. Prescription transfer was also found to be a significant predictor of pharmacists' patient assessment behaviors but only for refill prescription encounters (Table 28).

Based on the earlier findings for relationship between work environment factors, personal factors and other pharmacist practice behaviors (see Table 24) and from findings for the effect of prescription transfer on other pharmacist practice behaviors (Table 28), it was possible that pharmacists' prescription transfer behaviors may be mediating the following three relationships:

1. The relationship between patient question-asking behavior and pharmacists' information provision behaviors for new prescription encounters
2. The relationship between safety culture, patient question-asking behavior and pharmacists' information provision behavior for refill prescription encounters

3. The relationship between busyness, workload, patient question-asking behavior and pharmacists' patient assessment behaviors for refill prescription encounters.

Separate logistic regression analyses were carried out to test the mediating effect of prescription transfer on each of these relationships. Table 29 presents results from these analyses. For new prescription encounters, the relationship between patient question-asking behaviors and pharmacists' information provision behavior, which was significant earlier, is no longer significant. This change in relationship due to the addition of prescription transfer suggests that prescription transfer is a mediator of the relationship between patient question-asking behavior and pharmacists' information provision behaviors. Similar results are seen for refill prescription encounters, where patient question-asking behavior is no longer a significant predictor of pharmacists' information provision behaviors. There is very little change in the significance of the effect of safety culture on pharmacists' information provision behavior, indicating that prescription transfer is not a mediator for the effect of safety culture on pharmacists' information provision behavior. Similarly, there is no change in the significance of the effect of busyness, workload, and patient question-asking behavior on pharmacists' patient assessment behavior. This suggests that prescription transfer is not a mediator for the effect of busyness, workload, and patient question-asking behavior on pharmacists' patient assessment behavior.

5.5.3. Summary of the Findings from Primary and Secondary Hypotheses Testing

Figure 12 and 13 provides a diagrammatic representation of the findings from the primary and secondary hypotheses carried out for this study.

Table 28

Logistic Regressions for Effects of Prescription transfer on Prescription Show, Information Provision and Patient Assessment for New and Refill Prescription Encounters

Variables in the Equation		B	S.E.	Wald	Df	Sig.	Exp(B)
Prescription Show (Dependent Variable)							
Refill Prescription (N=180)	Transfer	8.163	25.655	.101	1	.750	30.541
	Constant	-10.203	25.653	.158	1	.691	.000
New Prescription (N=180)	Transfer	6.390	20.145	.101	1	.751	59.906
	Constant	-8.202	20.144	.166	1	.684	.000
Information Provision (Dependent Variable)							
Refill Prescription (N=180)	Transfer	2.024	.625	10.497	1	.001	7.570
	Constant	-2.539	.600	17.924	1	.000	.079
New Prescription (N=180)	Transfer	4.007	.820	23.871	1	.000	54.998
	Constant	-.693	.707	.961	1	.327	.500
Patient Assessment (Dependent Variable)							
Refill Prescription (N=180)	Transfer	1.203	.511	5.548	1	.018	3.329
	Constant	-1.973	.477	17.102	1	.000	.139
New Prescription (N=180)	Transfer	.955	1.074	.790	1	.374	2.598
	Constant	-2.077	1.060	3.842	1	.050	.125

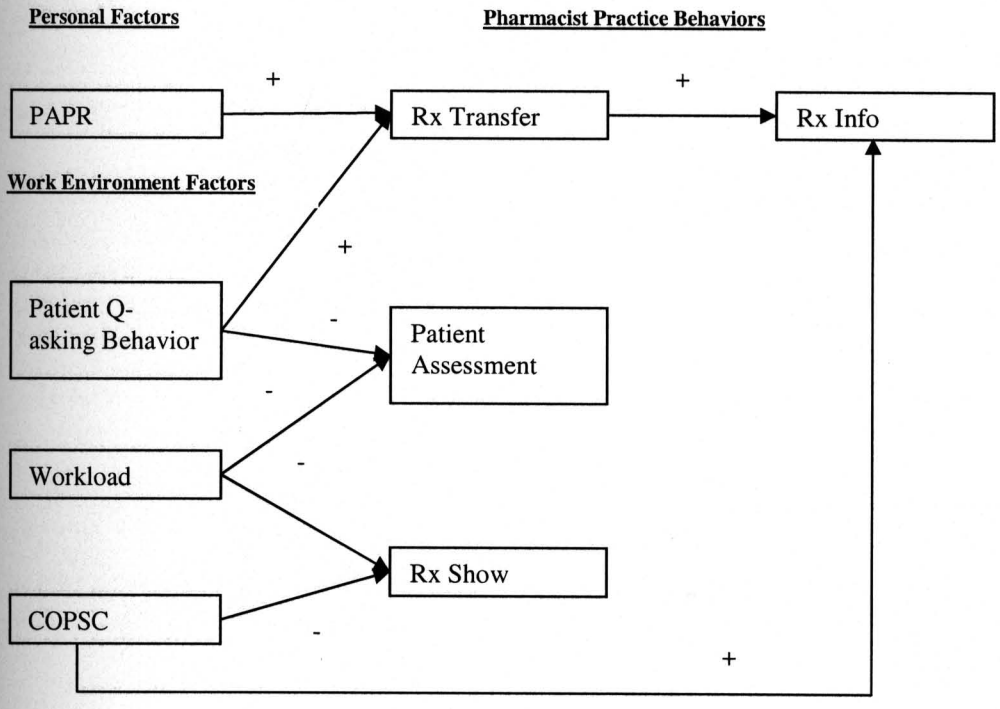
Table 29

Logistic Regressions for Mediating Effects of Prescription Transfer

Dependent Variable	Rx Type	Independent Variables in the Equation	B	S.E.	Wald	Sig.	Exp(B)
Information Provision	New Rx (N=180)	Patient Question-Asking Behavior	-9.428	62.708	.023	.880	.000
		Prescription transfer	4.290	.917	21.910	.000	.014
		Constant	12.620	2.709	.041	.841	7.172
	Refill Rx (N=180)	Patient Question-Asking Behavior	-1.970	1.143	2.972	.085	.139
		COPSC	.078	.037	4.324	.038	1.081
		Prescription transfer	2.317	.762	9.245	.002	.099
		Constant	-3.169	2.449	1.674	.196	.042
Patient Assessment	Refill Rx (N=180)	Busyness	-.257	.169	2.325	.127	.773
		Workload	-.008	.003	6.439	.011	.992
		Patient Question-Asking Behavior	-2.141	1.168	3.361	.067	.118
		Prescription transfer	-.883	.570	2.394	.122	.414
		Constant	2.436	1.211	4.043	.044	11.424

Figure 12

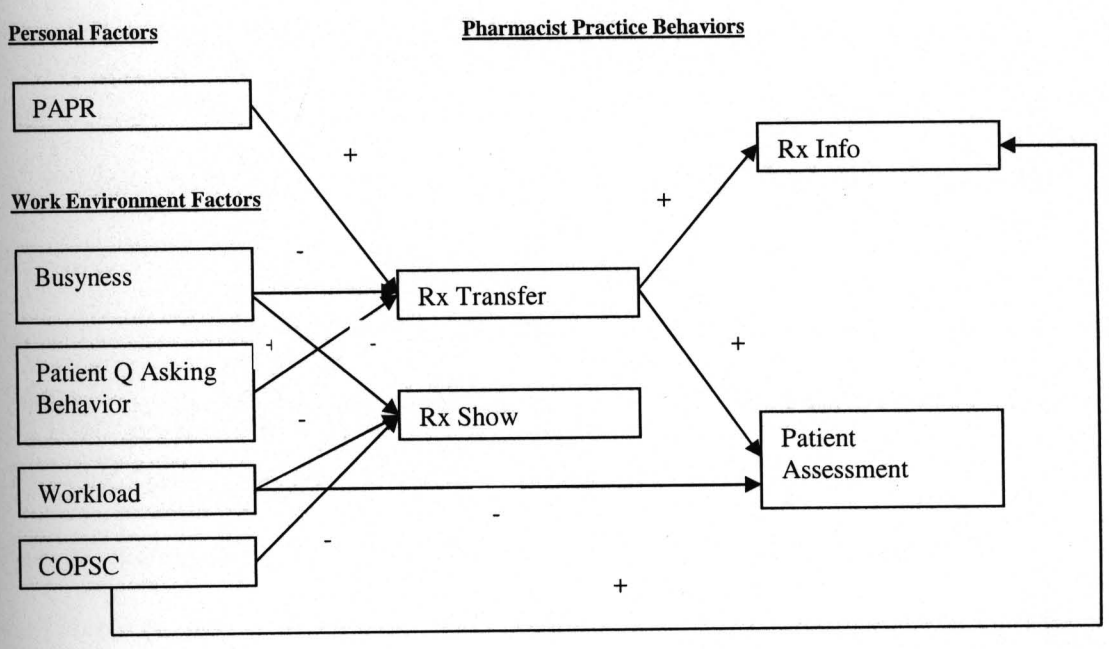
Revised Model of Pharmacist Practice Behaviors for New Rx Encounters



Note: This model is a summary of all the analysis carried out in this study. It is not a path analytic model.
+ indicates a positive effect of the independent variable on the dependent variable
- indicates a negative effect of the independent variable on the dependent variable

Figure 13

Revised Model of Pharmacist Practice Behaviors for Refill Rx Encounters



Note: This model is a summary of all the analysis carried out in this study. It is not a path analytic model.
+ indicates a positive effect of the independent variable on the dependent variable
- indicates a negative effect of the independent variable on the dependent variable

5.5.4. Extended Investigation: A Hierarchical Linear Model of Pharmacist Practice Behaviors in New and Refill Prescription encounters

An extended investigation was carried out to develop a parsimonious, comprehensive test of the model of pharmacist practice behaviors. The main aim of this extended investigation was to identify the independent variables that had the most impact on the total index score for pharmacist practice behaviors using hierarchical linear modeling. A secondary aim was to identify if variance explained by organization level variables (workload, pharmacist attitudes towards practice role, technician attitudes towards pharmacist role, and safety culture) was different from patient level variables (Osborne, 2000). Given that pharmacist-patient encounters are nested within pharmacies, such an analysis would help us understand the utility of hierarchical linear modeling in the context of pharmacist-patient encounters.

During the conceptualization of this study, it was assumed that all four pharmacist practice behaviors investigated in this study would be highly correlated with each other. It was posited that an index score be developed by adding scores on all four pharmacist behavior and that this index score would be used for hierarchical linear modeling. However, only two of the pharmacists' practice behaviors, prescription transfer and information provision were moderately correlated (r=0.50). Thus, an index score was calculated by only adding pharmacist scores on prescription transfer (0/1) and information provision rate (0-3 where 0 meant no information was provided and 3 meant that pharmacists provided information on all three items: side effects, interactions and directions for use). Overall index scores ranged from 0 to 4. For new prescription encounters, the mean pharmacists' prescription transfer and information provision

behavior index score was 2.85, with a standard deviation of 1.10. For refill prescription encounters, the mean pharmacists' prescription transfer and information provision behavior index score was 1.13, with a standard deviation of 0.85.

For both new and refill prescription encounters, a hierarchical linear model of pharmacists' prescription transfer and information provision behavior was developed. The hierarchical linear model of pharmacists' prescription transfer and information provision behavior estimated the influence of patient-level variables (busyness and patient q-asking behavior) using a level-1 model and estimated the influence of organization-level variables (workload, pharmacist attitudes towards practice role, technician attitudes towards pharmacist role, and safety culture) using a level-2 model. Both models can be summarized by the following equations:

Level-1 Model

$$Y = ß\,0 + ß\,1*(\text{Busyness}) + ß\,2*(\text{PTASKQ}) + R$$

Level-2 Model

$$ß\,0 = \gamma 00 + \gamma 01*(\text{Workload}) + \gamma 02*(\text{PAPR}) + \gamma 03*(\text{COPSC}) + \gamma 04*(\text{TAPR}) + U0$$
$$ß\,1 = \gamma 10$$
$$ß\,2 = \gamma 20$$

Table 30 presents the results of the hierarchical linear model of pharmacists' prescription transfer and information provision behavior for new prescription encounters. Based on the final estimation of fixed effects, it is evident that at alpha=0.05, only the patient-level variable busyness has a significant effect on the index score of pharmacists' prescription transfer and information provision behaviors. The negative coefficient for busyness indicates that the index scores on pharmacists' prescription transfer and information provision behaviors decreased as the number of people waiting in the dispensing area increased.

It is interesting to note that if significance was set at alpha=0.10, two more variables, the organization-level variable, safety culture of the pharmacy and the patient level variable patient question-asking behavior are also found to be significant.

Table 31 presents the results of the hierarchical linear model of pharmacists' prescription transfer and information provision behaviors for refill prescription encounters. Based on the final estimation of fixed effects, it is evident that at alpha=0.05, only patient level variables busyness and patient question-asking behaviors have a significant effect on the index score of pharmacists' prescription transfer and information provision behaviors. The coefficients for busyness and patient question-asking behavior indicate that the index scores on pharmacists' prescription transfer and information provision increased when patients asked questions and decreased in the presence of patients waiting in the dispensing area. None of the organization-level variables were found to be significant.

Overall, the findings from the hierarchical linear models for new and refill prescription encounters validate the findings from our earlier analysis based on logistic regression analysis. Both analyses indicate that busyness and patient question-asking behavior are the most important predictors of pharmacist practice behaviors.

Table 30

A Hierarchical Linear Model of Pharmacists' Transfer and Information Provision Behaviors in New Prescription encounters

Final estimation of fixed effects (With robust standard errors)

Fixed Effects	Coefficient	Standard Error	T-ratio	DF	Approximate P-value
For INTERCEPT1, ß 0					
INTERCEPT2, γ00	2.850	0.121	23.62	25	0.000
Workload, γ01	-0.002	0.002	-1.22	25	0.235
PAPR, γ02	-0.008	0.022	-0.37	25	0.713
COPSC, γ03	0.042	0.022	1.89	25	0.067
TAPR, γ04	0.017	0.021	0.81	25	0.424
For Busyness slope, ß 1					
INTERCEPT2, γ10	-0.162	0.061	-2.63	173	0.010
For Patient Q-Asking Behavior slope, ß 2					
INTERCEPT2, γ20	0.389	0.217	1.79	173	0.074

Final estimation of variance components

Random Effect	Standard Deviation	Variance Component	DF	Chi-Square	P-value
INTERCEPT1, U0	0.632	0.399	25	103.07	0.000
Level-1, R	0.873	0.763			

Table 31

A Hierarchical Linear Model of Pharmacists' Transfer and Information Provision Behaviors in Refill Prescription Encounters

Final estimation of fixed effects (With robust standard errors)

Fixed Effects	Coefficient	Standard Error	T-ratio	DF	Approximate P-value
For INTERCEPT1, ß 0					
INTERCEPT2, γ00	1.133	0.073	15.54	25	0.000
Workload, γ01	-0.000	0.001	-0.20	25	0.842
PAPR, γ02	0.007	0.013	0.53	25	0.601
COPSC, γ03	0.019	0.018	1.09	25	0.285
TAPR, γ04	-0.000	0.013	-0.01	25	0.992
For Busyness slope, ß 1					
INTERCEPT2, γ10	-0.110	0.054	-2.04	173	0.042
For Patient Q-Asking Behavior slope, ß 2					
INTERCEPT2, γ20	0.679	0.221	3.07	173	0.003

VI. Discussion

Interactions between 360 patients and 30 dispensing pharmacists in 30 community pharmacies were used to accomplish three research objectives. The first objective was to explore the extent to which pharmacists engage in four important practice behaviors: 1) transfer of prescription medications to patients; 2) showing medications to the patient to verify their accuracy; 3) providing information related to directions, side effects and interactions to the patient; 4) and carrying out patient assessment using open or closed ended questions.

The second objective was to assess the association between work environment factors and pharmacist practice behaviors described above. Work environment factors were classified into organization environment factors and patient interaction environment factors. Based on the Model of Pharmacist Practice Behaviors proposed at the outset of this study, relationships among organization environment factors (workload, community pharmacy safety culture (COPSC), technician attitude towards pharmacist role (TAPR)), and patient interaction environment factors (patient question-asking behaviors, busyness of dispensing area) with pharmacist practice behaviors were investigated. The final objective was to assess the association between pharmacist personal factors and pharmacist practice behaviors described above. Based on the Model of Pharmacist Practice Behaviors, the relationships among pharmacist attitude towards practice role (PAPR) and pharmacist practice behaviors were investigated. In addition to these investigations, the mediating effects of PAPR and prescription transfer on the relationship between work environment factors and pharmacist practice behaviors were also

investigated. A comprehensive test of the Model of Pharmacist Practice Behaviors was also carried out using hierarchical linear modeling.

The results of the study and its implications for future research and pharmacy practice are discussed in seven parts. First, findings for the effects of work environment and personal factors on each of the four pharmacist practice behaviors presented in the Model of Pharmacist Practice Behaviors are discussed. Second, findings for the comprehensive test of the model using hierarchical linear modeling are discussed. Third, descriptive findings for each of the study variable are discussed. Fourth, findings for response rates of pharmacies, employees and patients are discussed in light of the recruitment strategies. Fifth, study limitations are presented. Sixth, directions for future studies are discussed. Finally, results from this study are summarized.

6.1. Effect of Work Environment and Personal Factors on Pharmacist Practice Behaviors

The Model of Pharmacist Practice Behaviors (Figure 4) proposed in this study helped examine the effects of work environment and personal factors on pharmacist practice behaviors. Since none of the dependent variables were correlated highly (>0.60), effects of work environment and personal factors were examined on each pharmacist practice behavior separately.

6.1.1. Prescription Transfer

For both new and refill prescription encounters, pharmacist attitude towards practice role (PAPR) was found to be significant. None of the work environment variables were found to be significant for new prescription encounters. This means that prescription transfer in

new prescription encounters occurred when pharmacists had a positive attitude towards their practice role. In addition to pharmacist attitudes towards practice role (PAPR), busyness was found to be significant in refill prescription encounters. Also, PAPR was not a mediator of the effect of busyness on prescription transfer. This means that prescription transfer in refill prescription encounters occurred when pharmacists had a positive attitude towards their practice role and the number of people waiting in the dispensing area was lower. Future research needs to understand pharmacists' and patients' perceptions of busyness and why it influences pharmacist practice behaviors. Marketing and service quality concepts such as "waiting time" (Taylor, 1994) may be useful to help understand the effects of busyness and to design interventions aimed at streamlining the process of prescription transfer and decreasing the number of people waiting in the dispensing area.

The results from this study are consistent with findings from the Schommer (1992) study which reported that prescription transfer more likely occurred when pharmacists had a positive attitude towards their counseling role and the pharmacy was less busy.

6.1.2. Prescription Show

For both new and refill prescription encounters, pharmacist workload and community pharmacy safety culture were found to be significant predictors of pharmacists' prescription show behaviors. The negative coefficient for each of the predictors mean that pharmacists opened the bag/bottle and showed the medications to the patients at sites where both workload and community pharmacy safety culture were low. In addition to workload and safety culture, busyness was also found to be a significant predictor of pharmacists' prescription show behaviors. Pharmacist attitude towards practice role was

not found to be significant for new prescription encounters but was significant for predicting whether pharmacists showed medications to patients in refill prescription encounters. Also, PAPR was found to be a mediator of the effect of busyness, workload and community pharmacy safety culture on prescription show behaviors for refill prescription encounters.

These results indicate that pharmacists show medications to the patients when they feel that the safety culture of the pharmacy is low, when they are filling lower number of prescriptions, there are fewer patients waiting in the dispensing area and when they have positive attitudes towards practice role. Interventions to increase rate of showing medication behaviors will need to target not only pharmacist attitudes towards practice role but also address the importance of showing medication under conditions of high workload, busyness and community pharmacy safety culture.

6.1.3. Information Provision

For both new and refill prescription encounters, patient question-asking behaviors and prescription transfer were found to be significant predictors of pharmacists' information provision behaviors. In addition to these variables, safety culture was found to be a significant predictor of pharmacists' information provision behavior in refill prescription encounters. Also, pharmacist attitude towards practice role was not a significant predictor of prescription transfer.

In both new and refill prescription encounters, prescription transfer was found to be a mediator of the relationship between patient question-asking behaviors and pharmacists' information provision behaviors but not for the relationship between safety culture and pharmacists' information provision behaviors. This finding signifies that pharmacists

provide information when they are asked questions by the patients and they do that when they are handing the prescription to the patients. Also, the positive ß coefficient for safety culture in refill prescription encounter indicates that information provision occurred at pharmacies where employees had positive perceptions of the safety culture. This finding signifies the importance of the culture of the pharmacy and its influence on pharmacist practice behaviors.

The findings of this study indicate that the strongest predictor of information provision rate was prescription transfer. This finding is consistent with findings from the Schommer (1992) study. Therefore, one necessary condition to improve pharmacists' behaviors related to provision of information may be to change pharmacist prescription transfer behaviors. The findings of this study also suggest that when patients asked questions about their medications, pharmacists transferred the medications and provided oral information about medications. Interventions aimed at improving patient passivity are also important in changing pharmacist information provision behaviors.

6.1.4. Patient Assessment

For both new and refill prescription encounters, workload and patient question-asking behaviors were significant predictors of pharmacists' patient assessment behaviors. The negative ß coefficient for both variables suggests that pharmacists did not conduct patient assessment when the workload was high and when patients asked questions. These findings signify that when pressed for time due to high workload, pharmacists opt to conduct only basic functions required for dispensing. Also, it suggests that when pharmacists are faced with patient questions they resort to being just information providers. From a pharmacy practice perspective, this finding indicates the need to

educate pharmacy students about the importance of assessing patients even when pharmacists are answering questions initiated by patients.

In addition to workload and patient question-asking behaviors, busyness was found to be a significant predictor of pharmacists' patient assessment behaviors. The negative ß coefficients for busyness suggest that pharmacists did not conduct patient assessment when there were patients waiting in the dispensing area. These findings signify that during busy times, pharmacists may feel pressed to dispense the prescription to a particular patient and then quickly move on to the next patient waiting in the line. From a pharmacy practice perspective, these findings indicate the need to educate pharmacists and pharmacy students about the overall importance of patient assessment. Interventions aimed at reducing the impact of busyness and workload on pharmacists' patient assessment behaviors is needed. Future research should examine pharmacists' decision-making processes related to patient assessment.

Figure 12 and 13 presents a summary of our findings in terms of the revised model of pharmacist practice behaviors for new and refill prescription encounters. It is evident from the overall findings of our study that pharmacists follow a different 'script' for new versus refill prescriptions and that these 'scripts' are influenced by different work environment factors.

Figure 4 Model of Pharmacist Practice Behavior Based on Reciprocal Determinism Theory

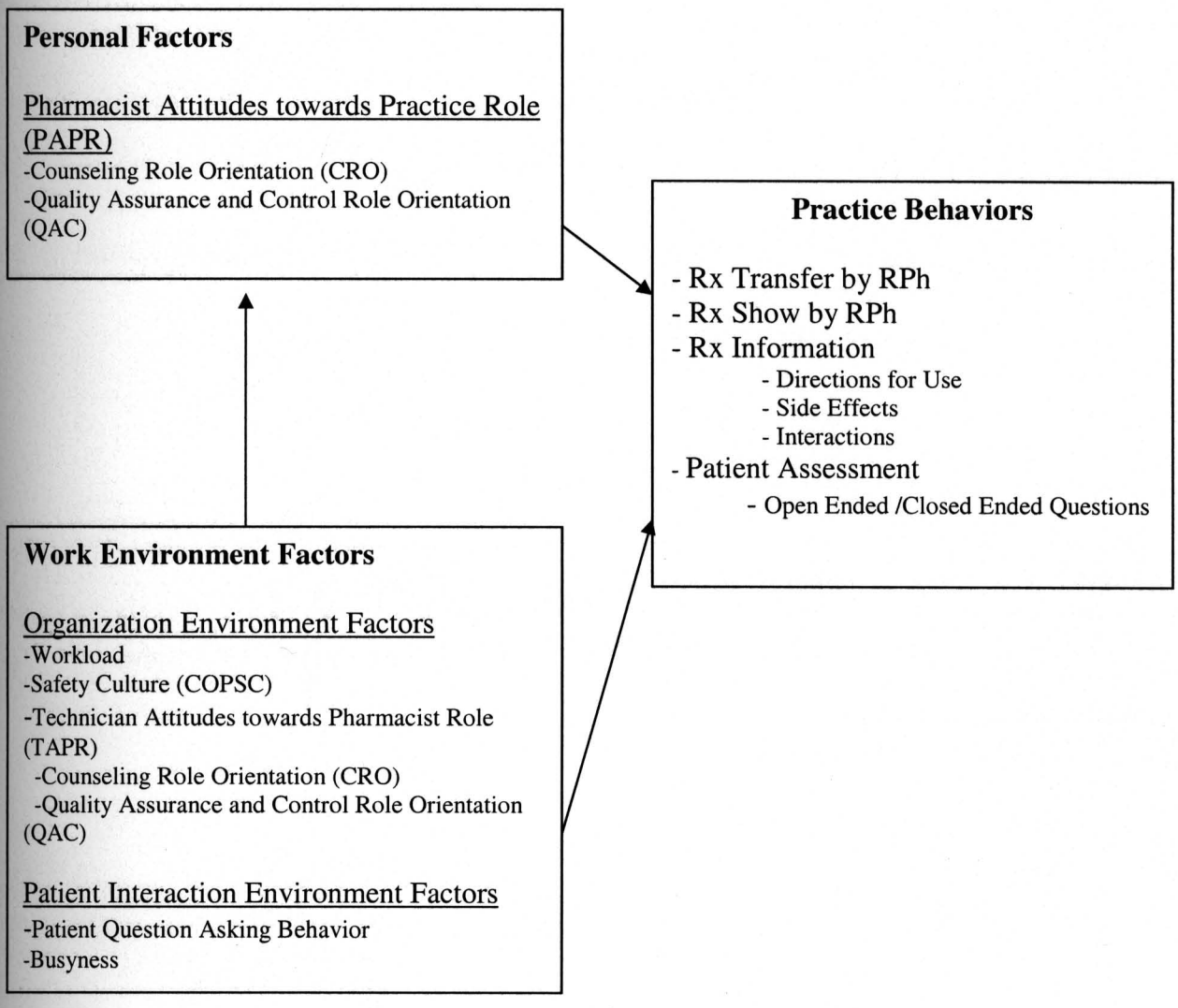


Figure 12 Revised Model of Pharmacist Practice Behaviors for New Prescription Encounters

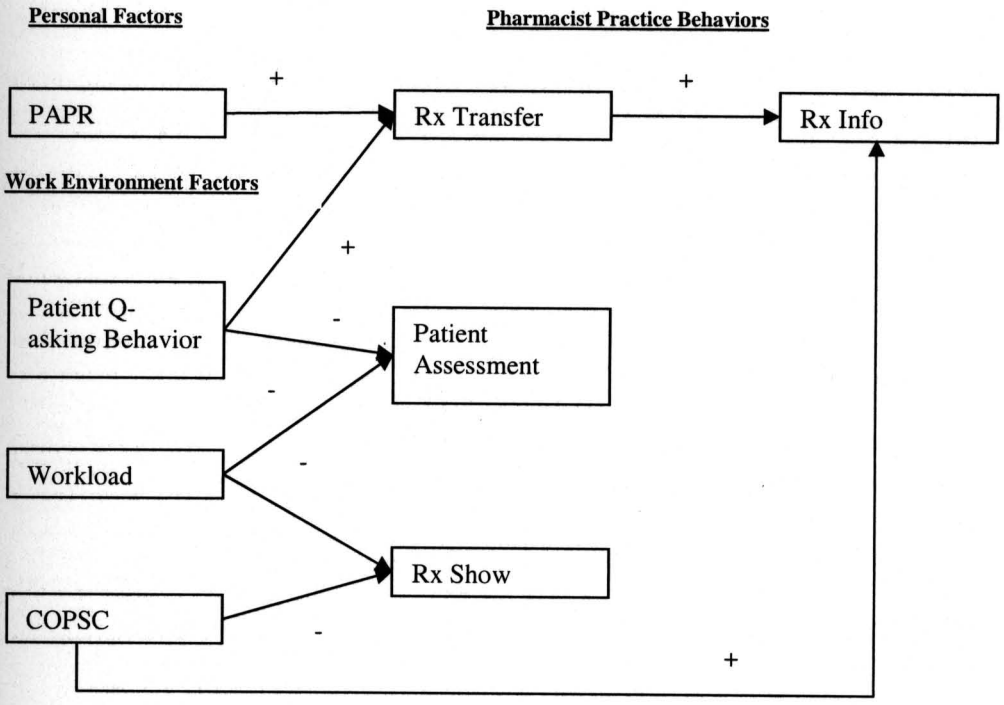
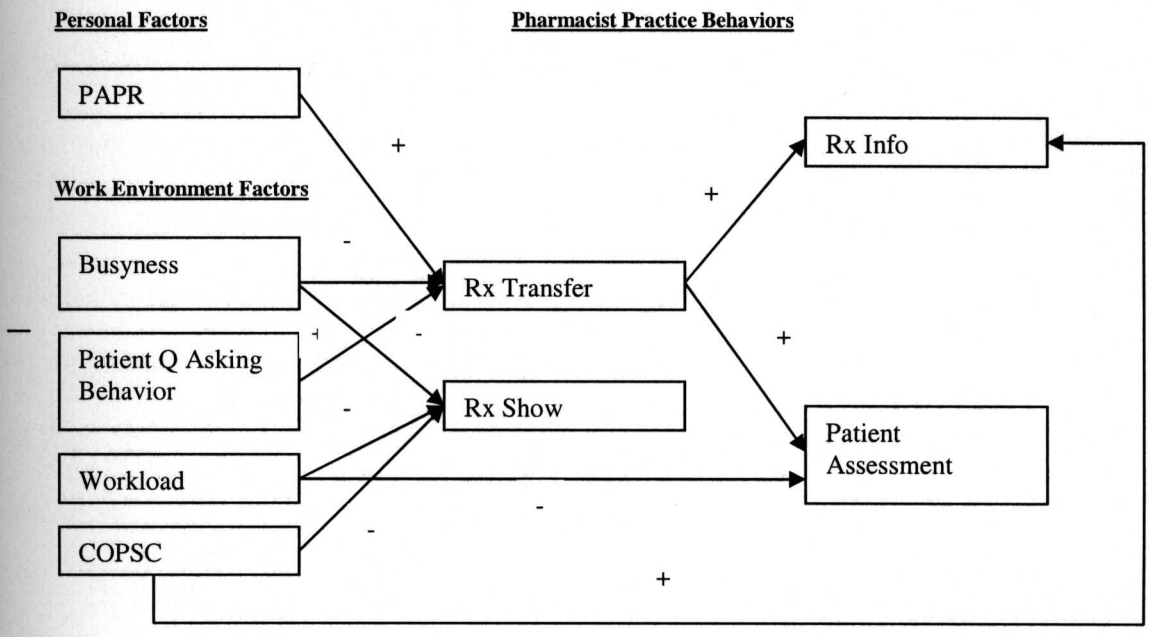


Figure 13 Revised Model of Pharmacist Practice Behaviors for Refill Prescription Encounters



6.2. Extended Investigation

The results of the extended investigation signified the utility of hierarchical linear modeling as a statistical tool. For both new and refill prescription encounters, a hierarchical linear model of pharmacists' prescription transfer and information provision behaviors was developed. Both these models indicated that individual level work environment variables busyness and patient question-asking behaviors have an important influence on pharmacists' prescription transfer and information provision behaviors. These results from the hierarchical linear model validate the findings from the logistic regression analysis that was carried out on each pharmacist practice behavior. In addition to that, this analysis found that the variance explained by group level variables was significantly different from that explained by individual-level variables.

Overall, the hierarchical linear model validates the findings that patient question-asking behavior and pharmacy busyness have an influence on pharmacists' prescription transfer and information provision behaviors. From a pharmacy practice perspective, this finding indicates that pharmacists get more influenced by their patient interaction environment than the organizational environment. This is in conformance with suggestions from the interaction adaptation theory (Burgoon, 1997) that individuals adapt during the course of their interaction with others. Future research needs to examine how pharmacist behaviors vary based on patient behaviors during different levels of pharmacy busyness.

6.3. Study Variables

6.3.1. Dependent Variables

Four pharmacist practice behaviors (Prescription Transfer, Prescription Show, Information Provision and Patient Assessment) were investigated in the context of new and refill prescription encounters. From a patient safety perspective, these four pharmacist practice behaviors that were included in this study are only a subset of activities that pharmacist perform to ensure patient safety. It is important to note that these activities are carried out at the end of dispensing process. Pharmacist activities during the dispensing process such as drug utilization review, clarifying prescription orders, and checking prescriptions before they are put in a bag, which have implications for patient safety, need to be studied to provide a complete picture of pharmacist practice behaviors.

For both new and refill prescriptions, pharmacists in Wisconsin are required to comply with a regulation that states, "Only licensed pharmacists' transfer the prescription to the patient (or agent of the patient) and provide appropriate consultation" (Wisconsin Administrative Code, Chapter Phar 7.01 (e and em). From the findings of our study related to extent of prescription transfer and information provision, it is evident that for new prescriptions, pharmacists are in compliance with this regulation (96% prescription transfer and 94% information provision). However, the extent of compliance with this regulation is lower for refill prescriptions (77% prescription transfer and 28% information provision).

To our knowledge, this is the first study to document the extent to which pharmacists show prescriptions to their patients to verify whether the right medication is being given

to the right patient. Our study findings indicate that very few encounters involved pharmacists showing medications to their patients. It is important to note that the significance of opening the bottle and showing medications to the patient has been established only in the last decade. Interestingly, pharmacists who had less than 15 years of experience were more likely to perform patient assessment indicating that the recent emphasis on "show and tell" in the pharmacy curriculum may be working. Although pharmacists did not show medications in the majority of the encounters, the researcher noted that in most encounters, pharmacists confirmed the patient name and address to verify whether the right medication was being given to the right patient. Future research should explore the extent to which "confirmation" behaviors are carried out by the pharmacists.

Overall, pharmacists provided information in approximately 60% of all encounters. This rate is lower than that 74% rate reported by Schommer (1992). This difference in information provision rate is primarily due in part to the difference in how information provision was defined. For this study, it was defined as the oral provision of information on directions, side effects and interactions whereas Schommer (1992) defined it in terms of face-to-face communication of information on any aspects of medications including insurance. Also, fifty percent of the encounters in this study were new prescription encounters, whereas only thirty six percent of the encounters in the Schommer (1992) study involved new prescriptions.

In this study, we found that pharmacist information provision rate varied by whether the prescription dispensed was new or refill. For new prescription encounters, pharmacists provided information on at least one item 94% of the time. This rate was

similar to the 92% rate reported by Schommer (1992). For refill prescription encounters, pharmacist information provision rate was 28%. This rate is lower than the 63% rate reported by Schommer (1992). Again, this huge difference in the rate of information provision for refill prescription encounters is due in part to how information provision was defined. Schommer (1992) reports that administrative information was provided in 57% of the refill prescription encounters. Administrative information such as insurance was not included in the definition of information provision for this study.

The difference in the pharmacist information provision rate for refill prescriptions versus new prescriptions suggests that pharmacists may perceive that it is not important to provide information for refill prescription encounters. Schommer (1992) provides evidence for this contention. In his study, Schommer (1992) found that pharmacists reported low importance of information for refill prescriptions. Pharmacist perceptions of low importance of information and their subsequent behaviors may also be a result of prior negative experiences with patients. It is interesting to note that in the majority of the refill prescription encounters where information provision rate occurred, pharmacists provided information on the directions of use rather than side effects or interactions. Future research needs to investigate why pharmacists favor providing information on directions for refill prescriptions as compared to information on side effects or interactions. More pharmacist practice based research involving refill prescription encounters is needed.

Pharmacists carried out patient assessment in approximately one-fourth of all encounters. This rate is higher than that reported by Schommer (1992) and Sleath (1995). The studies by Schommer (1992) and Sleath (1995) occurred more than 10 years before

this study which could be one reason for the difference. Another important reason could be the emphasis placed on patient assessment in the pharmacy curriculum. It was interesting to note that there was no difference in pharmacists' patient assessment rate for new and refill prescription encounters. From a pharmacy practice perspective, it is important to understand why patient assessment rate is not higher for refill prescription encounters.

6.3.2. Independent Variables

Pharmacist personal factors (pharmacist attitudes towards practice role) and work environment factors were the independent variables investigated in this study. Work environment factors were classified into organization work environment (workload, technician attitudes towards pharmacist role, and safety culture) and patient interaction environment (busyness and patient question-asking behavior).

Pharmacist attitudes towards practice role (PAPR) were measured on two domains: attitudes towards counseling role (modified CRO) and attitudes towards quality assurance and control role (QAC). The findings on the modified CRO subscale are consistent with previous research (Mason 1979, Kirking 1984, Schommer 1992) and suggest that pharmacists have a positive attitude towards their counseling role. The subscale measuring attitudes towards quality assurance and control role (QAC) is one of the most significant contributions of the study. Pharmacist scores on the QAC subscale suggest that pharmacists have a positive attitude towards their role in prescription checking and transfer. Overall, the scores on the PAPR scale were found to be high indicating that pharmacists have highly positive attitudes towards their practice role. It is not known if these attitudes vary by the type of prescription dispensed by the pharmacist. Future

research needs to examine pharmacist attitudes towards practice role in the context of new and refill prescriptions separately. Also, the high scores on the PAPR scale indicate ceiling effects for certain items. More research is needed to develop and tap items for a better measure of pharmacist attitudes towards practice role.

Workload was measured as the number of prescriptions filled by the pharmacist per day. The average workload for pharmacists in this study (128 Rx/day) mirrors that of national estimates provided by Kreling and colleagues (2006).

An important contribution of this study relates to the measurement of technician attitudes towards pharmacist practice (TAPR). It was assumed that technician attitudes would parallel pharmacist attitudes and thus the PAPR scale was adapted to measure TAPR. However, findings from the validity testing indicate that some of the items on the TAPR scale did not fit well in the confirmatory factor analytic model. Although after deleting some items from the original TAPR, a valid and reliable scale was developed, the need for more items specific to technician attitudes was apparent. An in-depth examination of the discrepancy between pharmacist attitudes towards practice role and technician attitudes towards pharmacist role is needed. From a pharmacy practice perspective, the high scores on the TAPR scale indicate that technicians in the study had a positive attitude towards the pharmacist role. More research is needed to examine how these positive attitudes towards pharmacist role are developed among technicians. Again, ceiling effects in the TAPR scale indicate the need for developing a better measure of the technician attitudes toward pharmacist role.

This is the first study in pharmacy to utilize the concept of safety culture and measure it in the context of community pharmacy. In doing that, this study developed a valid and

reliable scale, the community pharmacy safety culture scale (COPSC) that measures employee perceptions of the teamwork, staffing, communication openness and management support for patient safety at the pharmacy. Overall, the scores obtained on the four domains (teamwork, staffing, communication openness and management support) were high indicating that employees perceived the safety culture in our study pharmacies to be positive. The high scores on the COPSC scale also indicate a ceiling effect on some items. Future research needs to examine the different items on the four domains that have pronounced ceiling effects and its effect on the practical utility of the scale.

Among patient interaction environment factors, busyness was measured as the number of patients waiting in the dispensing area. In this study, the number of patients waiting in the dispensing area varied from 0 to 5. This variance in the number of patients was partly due to the timing of observation and partly due to the definition of waiting in the dispensing area. Patients who were browsing the over-the counter aisles near the dispensing area or who were walking around or shopping were not counted by the researcher. This is important primarily because chain and mass merchandiser pharmacies typically provide many non-pharmacy related services that patients could utilize while their prescriptions are being filled. Also, the number of patients utilizing drive-thru services was not counted. Future research should examine the availability of non-pharmacy related and drive-thru services and its influence on pharmacy environment and pharmacist practice behaviors. During observations, the researcher noted that the average distance between dispensing windows and over-the counter aisles varied from less than 15 feet to slightly more than 50 feet across pharmacies. Future research should examine

the impact of pharmacy layout on busyness of the pharmacy dispensing area. Also, alternative measures of busyness such as "amount of time patients told to wait before their prescriptions would be ready for pickup" should be assessed and validated.

The overall patient question-asking rate in this study was less than 10% indicating that patients were passive in their encounters. None of the patient or pharmacist demographics were significantly related to patient question-asking behaviors. Prior research conducted by Schommer and Chewning (1996) and recent work by Shah and colleagues (2005) suggests that patients do not ask questions because they feel embarrassed or feel hurried by the pharmacist or the environment in the pharmacy. More research is needed to understand when and why patients ask questions to their pharmacists. Interventions are needed to improve patient question-asking behaviors.

6.4. Recruitment Strategies

A cross-sectional, fieldwork, descriptive design was used. Sampling for the study was carried out in two stages: pharmacy recruitment and patient recruitment. Pharmacy recruitment was carried out via personal contact using a script that reinforced managers' role as decision-makers. The response rate for pharmacies indicates that this strategy was mostly successful. Our strategy did not work for pharmacies where managers did not perceive themselves as decision-makers. Managers at four of the nine non-participating pharmacies indicated that they could not participate because their corporation would not allow participation in research studies. Interestingly, pharmacies from the same corporate group had agreed to participate in our study. This could mean that managers at participating sites perceived themselves as key decision-makers or circumvented the corporate policy to participate in the study. More research is needed to understand why

managers at certain sites participate in studies and others do not. Also, it means that future pharmacy practice based research needs an active collaboration between pharmacy managers and scientists prior to the time of enrollment. Based on the experience garnered during this study, it can also be said that personal visits and the interpersonal interaction between the manager and researcher were responsible for the high participation rate for pharmacies. Managers may have found it difficult to decline participation during the face-to-face personal interaction with the researcher.

The high response rate for employees (pharmacists and technicians) at participating sites reinforced our assumption that manager consent to participate in the study was vital to garner a high response rate from employees. From a pharmacy practice perspective, this means that managers have an important influence on the actions of their employees. To conduct practice based research, scientists will need to acknowledge the hierarchy and integrate managers in designing studies of mutual interests.

Patient recruitment was carried out at each participating site by asking patient permission to observe their encounter with pharmacy employees and consent to participate in the exit interview. A script that identified the researcher as a student and emphasized the nature of the project was utilized. In general, patients were very receptive and helpful to the student researcher. The response rate for patients across pharmacy sites indicates that this strategy of "student" approach was successful. The success of this strategy indicates that integrating pharmacy students in practice based research can be of great value to pharmacy students, our profession and patients. Recent work by Guirguis (2006) supports this contention.

6.5. Study Limitations

6.5.1. Theoretical

The Model of Pharmacist Practice Behaviors was developed from Bandura's Model of Reciprocal Determinism (1977). While Bandura's model suggests a dynamic interplay between attitude, behavior and environment, the model of pharmacist practice behavior was developed to assess the influence of attitude and environment on behavior. This is important as pharmacists' prior behavior could have influenced their current attitudes and their work environment. Also, the model of pharmacist practice behaviors included only five work environment factors which were hypothesized to affect pharmacist practice behaviors (Prescription transfer, Prescription Show, Information Provision and Patient Assessment). Other work environment factors which may affect pharmacist practice behaviors such as the type and number of technology available for prescription processing, number of staff, and presence of a drive-thru were not included in the study. Also, only one personal factor, pharmacist attitude towards practice role (PAPR) was included in the study. Other personal factors such as pharmacists' work experience and job satisfaction, which may affect pharmacist practice behaviors, were not included in the study.

6.5.2. Methodological

The study design was exploratory in nature. Since an experimental design was not used, causality cannot be inferred from the results. A stratified random sample of community pharmacies and pharmacists from the south-east and south-central Wisconsin

was used. Thus, the results of this study should not be considered reflective of pharmacist practice behaviors in the entire state of Wisconsin.

Pharmacist encounters with drive-thru, mail and home-delivery patients were not included in this study. The researcher noted that during busy times, for every patient filling a prescription at the pharmacy window, approximately two patients picked their prescriptions from the drive-thru window. This may have influenced our measurement of busyness. Therefore, the results apply only to face-to-face encounters in the dispensing area of community pharmacies. Also, pharmacist encounters with children and adolescents were not included in the study.

There was little variation in the scores of three independent variables (pharmacist attitudes towards practice role, technician attitudes towards practice role and safety culture). This indicates that better measures of these independent variables need to be developed. Items used in this study to measure these variables were developed based on pharmacy and patient safety literature and an exploratory study conducted on pharmacy teams. These measures likely contained social desirability biases.

There was little variation in the dependent variables for new prescription encounters. This indicates that a better sampling strategy or an increased sample size was needed.

A single observer (researcher) recorded all pharmacist practice behaviors. Measurement error resulting from researcher bias and contextual bias (problems in hearing certain encounters) may have been induced. However, the strong correlations with patient responses on selected pharmacist practice behaviors indicate that the effect of this limitation may be minimal.

Finally, observation effects could have affected the results of this study. The presence of the researcher in the dispensing area could have alerted pharmacists, technicians and patients and affected their behaviors. However, Ortiz and colleagues (1989) reported that the effects of the presence of an observer on pharmacist counseling behaviors was minimal and provided more accurate measurements than other methods. Also, Schommer (1992) reported detectable changes in pharmacist behaviors occur during approximately the first 15 minutes. The author also reported that pharmacists settled into their routine after about 15 minutes. These findings were integrated into the observation methodology for this study.

Since survey and interview data were collected from pharmacists, technicians and patients after all encounters were observed their responses may have been influenced by their behavior during the encounter. Also, all survey data were collected at the pharmacy sites, which may have been a reason for the ceiling effects in some of the measures used in the study.

6.6. Implications and Future Directions

Four pharmacist practice behaviors (Prescription Transfer, Prescription Show, Prescription Info and Patient Assessment) were studied in the context of new and refill prescription encounters. Thus, from a patient safety perspective, the results of this study are only applicable to this subset of behaviors important for patient safety. This study found that for new prescriptions, pharmacists transfer the prescription and provide information to almost all patients. However, for refill prescriptions, pharmacists prescription transfer and information provision are less than ideal. This may suggest that pharmacists may perceive these two behaviors to be more important for patient safety in

the context of new prescriptions and less important for patient safety in the context of patient safety. The results from this study related to prescription show behaviors suggest that very few pharmacists have adopted the practice of opening the bottle and showing the prescription to the patient. This maybe due to the presence of technological devices such as prescription scanner and systems such as the double checking each prescription before it is bagged (Shah and Chewning, 2005) in the pharmacy. Future research aimed at examining the relationship between presence of technological devices and pharmacists' prescription show behaviors is needed. Also, the rate of patient assessment is low. It is important to understand pharmacists' perception of the importance of patient assessment and its role in patient safety. More research is needed to understand the relative importance pharmacist place on these four behaviors as compared to other aspects of their practice (such as clarifying orders, drug utilization review etc.) which ensure patient safety.

A Model of Pharmacist Practice Behaviors was developed and tested for new and refill prescription encounters. This study found that different work environment and personal factors significantly predicted pharmacists' prescription transfer, prescription show, information provision and patient assessment behaviors. The revised Model of Pharmacist Practice Behaviors in new and refill prescription encounters (Figures 12 and 13) presents factors which predict each behavior. These models may be useful for future research in the area of pharmacist practice behaviors.

An important contribution this study made for research in pharmacist practice behaviors was the difference in 'scripts' for refill and new prescription encounters. This difference in script has not been studied extensively. In particular, very little research has

been conducted on refill prescription encounters. Future research aimed at understanding pharmacist practice behaviors in refill prescription encounters is needed. For instance, questions such as what are patient perspectives on the utility and value of pharmacist provided information and patient assessment in refill prescription encounters would be useful. Also important to know in the context of refill prescription encounter is the influence of patients' interpersonal behavior on pharmacists' information provision and patient assessment behaviors. It is important to understand if pharmacist practice behaviors in the refill prescription encounters are a result of the negative reinforcement received from their patients' interpersonal behaviors.

Pharmacy busyness measured as the number of patients waiting in the dispensing area was found to be one of the most significant predictors of pharmacist practice behaviors in the context of refill prescription encounters. This study found that busyness had a negative influence of all four pharmacist practice behaviors in the context of refill prescription encounters. These findings are very similar to studies on overcrowding and its effects on emergency department visits which indicate that increased volume of patients threatens access to emergency care services (Velianoff, 2002) and often lead to errors and poor patient outcomes (Gordon et al., 2001). From a policy perspective, these findings imply that the pharmacy profession needs to be concerned about the effects of busyness on the quality of care provided by pharmacists and the resultant patient outcomes. Definitive solutions aimed at reducing busyness need to be identified. In the face of steadily growing prescription utilization and the shortage of pharmacists, this is easily said than done.

Future research should examine if busyness is related to the concept of "waiting time" that is routinely used in the marketing literature. Several studies in the marketing literature report that a delay in service lowers customers' overall evaluations and satisfaction with the service (Taylor, 1994; Taylor and Craxton, 1994; Baker and Cameron 1996). To better manage customer "waiting time" experiences and their evaluations, many firms across different service industries (e.g. banks, restaurants and more recently healthcare) have instituted a variety of programs not only to reduce the actual duration of the wait but also to improve customers' perceptions of it. Future research aimed at understanding how patients and pharmacists view "waiting time" in the context of receiving their prescriptions and why pharmacists behave differently when they see patients waiting in the dispensing area is needed. Although not collected or analyzed systematically, anecdotal evidence from pharmacy visits and observations suggest that "waiting time" would be a useful concept. The researcher noted that pharmacy employees would often give patients an estimate of the time that they would have to wait before their prescriptions would be ready.

From a patient safety perspective, the results of this study provide insight into the quality of care provided by the pharmacist during their interaction with the patient. Overall, pharmacy busyness, safety culture, workload and patient question-asking behaviors were found to be significantly related to different aspects of pharmacist practice behaviors. These findings are similar to the evidence in the nursing and medical literature which indicates that the quality and safety of patients is influenced to a great extent by the work environment of the healthcare providers. Again, it is important to note that only four pharmacist practice behaviors were studied. The influence of work

environment on important patient safety behaviors such as clarifying orders with physicians, drug utilization review and the number of error avoiding checks made before each prescription is put into a bag needs to be examined.

6.7. Summary and Conclusions

In summary, a Model of Pharmacist Practice Behaviors was developed and tested for new and refill prescription encounters. The findings from each model suggest that several work environment factors influence pharmacist practice behaviors. Among these factors, pharmacy busyness appears to have the most significant effect on pharmacist practice behaviors in the context of refill prescription encounters. This finding implies that strategies to reduce the impact of busyness on pharmacist practice behaviors need to be developed. Also, more research on why busyness has a significant influence on pharmacist practice behaviors is needed. Patient question-asking behaviors appear to have the most significant effect on pharmacist practice behaviors in the context of new prescription encounters. Interventions such as brochures educating patient about the pharmacist role and aimed at improving patient passivity are needed. The two models also indicate that pharmacists follow different scripts for new versus refill prescription encounters. Future research should focus on patient and pharmacists' interpersonal behaviors and their effects on pharmacist motivation to provide information and conduct patient assessment in refill prescription encounters.

Bibliography

Abood, R.R. (1996). Errors in pharmacy practice. *US Pharmacist*, 21, 122-130.

Advisory Committee on the Safety of Nuclear Installations (ACSNI). (1993). Human Factors Study Group Third Report: Organizing for Safety. London: HMSO.

Aiken, L.H., Smith, H.L., Lake, E.T. (1994). Lower Medicare mortality among a set of hospitals known for good nursing care. *Med Care,* 32(8), 771-787.

Aiken, L.H., Clarke, S.P., Sloane, D.M., Sochalski, J., Silber, J.H. (2002). Hospital nurse staffing and patient mortality, nurse burnout, and job dissatisfaction. *JAMA, 288*(16), 1987-1993.

Allan, E., Barker, K.N., Gibson, J.T. (1999). Impact of interruptions and distractions on dispensing errors in an ambulatory care pharmacy. *Am J Health-Syst Pharm.*, 56,1319-1325.

Anderson-Harper, H. M., Berger, B. A., Noel, R. (1992). Pharmacists' predisposition to communicate, desire to counsel and job satisfaction. *Am J Pharm Educ., 56,* 252-258.

American Pharmaceutical Association. (1992). An APhA white paper on the role of pharmacist in comprehensive medication use management; the delivery of pharmaceutical care. Washington D.C.

Ascione, F.J., Kirking, D.M., Wenzloff, N.J., Foley, T.A., Kwok, D.K. (1987). Effect of innovation characteristics on pharmacists' use of written patient medication information. *Patient Educ Couns.*, 9(1), 53-64.

Awe, C., Lin, S.J. (2003). Patient empowerment model to prevent medication errors. *J Med Syst.*, 27(6), 503-517.

Baker, J., Cameron, M. (1996). The effects of the service environment on affect and consumer perception of waiting time: an integrative review and research propositions. Journal of the Academy of Marketing Science, 24, 4, 338-349.

Bandura, A. (1977). Social learning theory. Englewood Cliffs, New Jersey: Prentice Hall.

Bandura, A. (1978). The self-system in reciprocal determinism. *Am Psychol.*,33,344-358.

Bandura, A. (1986). Social foundations of thought & action: A social cognitive theory. Englewood Cliffs, NJ: Prentice Hall.

Bandura, A. (1989). Human agency in social cognitive theory. *Am Psychol.,* 44, 1175-1184.

Barker, K.N., Flynn, E. A., Pepper, G.A., Bates, D.W., Mikeal, R.L. (2002). Medication errors observed in 36 healthcare facilities. *Arch Int Med.*,162, 897-103.

Barnes, J., Riedlinger, J., McClosky, W., Montagne, M. (1996).Barriers to compliance with OBRA '90 regulations in community pharmacies. *Ann Pharmacother.*, 30, 1101-1105.

Barney, J.B. (1986). Organizational culture: Can it be a source of sustained competitive advantage? *Academy of Management Review,* 11(3), 656.

Bates, D.W., Cullen, D., Laird, N., Petersen, L.A., Small, S.D., Servi, D., Laffel, G., Sweitzer, B.J., Shea, B. F., Hallisey, R. (1995). Incidence of adverse drug events and potential adverse drug events: implications for prevention. *JAMA.,* 274, 29–34.

Beardsley, R. S., Johnson, C. A., Wise, G. (1977). Privacy as a factor in patient counseling. *J Am Pharm Assoc.*, NS, 17(6), 366 368.

Beney, J., Bero, L.A., Bond, C. (2000). Expanding the roles of outpatient pharmacists: effects on health services utilization, costs, and patient outcomes. In: The Cochrane Library, Issue 2. Oxford: Update Software.

Berardo, D.H., Kimberlin, C.L., Barnett, C.W. (1989). Observational research on patient education activities of community pharmacists. *J Soc Adm Pharm.*, 6,21-30

Bond, C. A., Raehl, C. L. (2001). Pharmacists' assessment of dispensing errors: risk factors, practice sites, professional functions, and satisfaction. *Pharmacother.,* 21,614-626.

Bond, C. A., Raehl, C. L., Franke, T. (2002) .Clinical pharmacy services, hospital pharmacy staffing, and medication errors in United States hospitals. *Pharmacother.,* 22(2),134-147.

Brennan, T.A., Leape, L.L., Laird, N.M., Hebert, L., Localio, A.R., Lawthers, A.G., Newhouse, J.P., Weiler, P.C., Hiatt, H.H. (1991). Incidence of adverse events and negligence in hospitalized patients. Results of the Harvard Medical Practice Study I. *NEJM*, 324(6), 370-6.

Brenner, L. (1992). OBRA: It's the law. *American Druggist*, 207, 26-33

Burgoon, J. K. (1997). It takes two to tango: Interpersonal adaptation and implications for relational communication. In J. S. Trent (Ed.), Communication: Views from the helm for the twenty-first century (pp. 53-59). New York: Allyn & Bacon

Carley, K. (1990). Content analysis. In R.E. Asher (Ed): The enclycopedia of language and linguistics. Edinburgh: Pergamon Press.

Carnino, A., (1989) Preventing human errors: Progress made in this field. In Proceedings of a conference on Human Reliability in Nuclear Power. IBC Technical Services, London.

Carroll, N. V., Gagnon, J. P. (1983). The relationship between patient variables and frequency of pharmacist counseling. *Drug Intelligence and Clinical Pharmacy,* 17, 648-652.

Carroll, N. V., Gagnon, J. P. (1984). Pharmacists' perceptions of consumer demand for patient-oriented pharmacy services. *Drug Intelligence and Clinical Pharmacy,* 18, 640-644.

Cavuto, N.J., Woosley, R.L., Sale, M. (1996). Pharmacies and prevention of potentially fatal drug interactions. *JAMA,* 275, 1086

Chatman, J. A., Jehn, K. A. (1994). Assessing the Relationship Between Industry Characteristics and Organizational Culture: How Different Can You Be? *Academy of Management Journal*, 37, 522-553.

Chewning, B., Schommer, J. C. (1996). Increasing clients' knowledge of community pharmacists' roles. *Pharmaceutical Research, 13,* 1299-1304.

Christensen, D., Holmes, G., Fassett, W. E., Neil, N., Andrilla, C. H., Smith, D. H., Andrews, A., et al. (1999). Influence of financial incentive on cognitive services. *J Am Pharm Assoc.*, 39(5), 629-639

Clark, G. (2002). Organizational culture and safety: an interdependent relationship. *Aust Health Rev, 25*(6), 181-9.

Clarke, S. (1998) Perceptions of organisational safety: implications for the development of safety culture. *Journal of Organisational Behavior*, 9.

Clarke, S. (1999). Perceptions of organizational safety: Implications for the development of safety culture. *Journal of Organizational Behaviour, 20*, 185-198.

Clarke, S., Sloane, D., Aiken, L. (2002). Effects of hospital staffing and organizational climate on needlestick injuries to nurses. *Journal of Public Health, 92*(7), 1115.

Classen, D.C., Pestotnik, S.L., Evans, R.S., Lloyd, J.F., Burke, J.P. (1997). Adverse drug events in hospitalized patients. Excess length of stay, extra costs, and attributable mortality. *JAMA,* 277,301–6.

Cohen, M. R. (1999). Medication Errors. Washington, D.C.: American Pharmaceutical Association.

Coleman, C.L. (2003). Examining influences of pharmacists' communication with consumers about antibiotics. *Health Communication*, 15 (1), 79-99

Confederation of British Industries. (1991). Developing a Safety culture. Confederation of British Industry, Centre Point, 103 New Oxford Street, London WC1A lDU.

Couris, R.R., Tataronis, G.R., DePietro, S.L., DeBellis, R.A., Young, C.R. (1999). Massachusetts board of registration in pharmacy medication error study. Available at: http://www.state.ma.us/reg/boards/ph/phstudy/00phstd.htm. Accessed on February 27, 2005.

Cox, S., Cox, T. (1991). The structure of employee attitudes to safety: A European example. *Work and Stress*, 5, 93-106.

Cox, S., Cox, T. (1996). Safety, systems and people. Oxford: Butterworth-Heinemann.

Cox, S., Flin, R. (1998). Safety culture: Philosopher's stone or man of straw? *Work & Stress, 12*(3), 189-201.

Coyle, I.R., Sleeman, S.D.,Adams, N. (1995). Safety climate. *Journal of Safety Research*, 26, 247-254.

Crichton, EDL., Smith, L., Demanuele, E. (1978). Patient recall of medication information, *Drug Intelligence and Clinical Pharmacy*, 12(10), 591-9.

Culbertson, V. L., Arthur, T. G., Rhodes, P. J., Rhodes, R. S. (1988). Consumer preferences for verbal and written medication information. *Drug Intelligence and Clinical Pharmacy,* 22, 390-396.

Cummings, D.M., Corson, M., Seaman, J.J. (1984). The effect of clinical pharmacy services provided to ambulatory patients on hospitalization. Am J Pharm., 156, 44-50

Davis, S. M. (1984). Managing corporate culture. Cambridge, MA: Ballinger.

Davis, N. M., Cohen, M. R. (1992).Counseling reduces dispensing accidents. *American Pharmacy, NS32(10), 22.*

Davies, G.F., Powell, W.W. (1992) Organisation – environment relations. In: Dunnette M.D., Hough L.M. (Eds) Handbook of Industrial and Organizational Psychology, pp 315 – 375.

Dawson, S. (1996). *Analysing Organisations* 3rd Edition London: Macmillan. pp 162.

De Joy, D.M., Searcy, C.A., Murphy, L.R., & Gershon, R.M.M. (2000). Behavioral-diagnostic analysis of compliance with universal precautions among nurses. *Journal of Occupational Health Psychology*, 5, 127-141.

Denison, D.R. (1984). Corporate culture to the bottom line. *Organizational Dynamics*, 13(2), 5-22.

Dennehy, C.E., Kishi, D.T., Louie, C. (1996). Drug-related illness in emergency department patients. *Am J Health-Syst Pharm*, 53,1422-1426

Deshpandé, R., Webster, F.E. Jr. (1989). Organizational culture and marketing: defining the research agenda. *Journal of Marketing*, 53, 3-15.

Deshpandé, R., Farley, J.U., Webster, F.E Jr. (1993). Corporate culture, customer orientation, and innovativeness in Japanese firms: a quadrad analysis. Journal *of Marketing*, 57, 23-37.

DeYoung, M. (1996). Research on the effects of pharmacist-patient communication in institutions and ambulatory care sites, 1969-1994. *Am J Health Syst Pharm*, 53,1277-91

Dickson, W.M., Rodowskas, C.A. (1975). Verbal communications of community pharmacists. *Med Care*, 13, 486-98

Donald, I.J. and Canter, D.V. (1994). Employee attitudes and safety in the chemical industry. *Journal of Loss Prevention in the Process Industry*, 7, 203-208.

Dupclay, L., Rupp, M.R., Bennett, R.W., Jarnagin, T. M. (2000). Analysis of grocery store chain pharmacists' work-related behaviors. *J Am Pharm Assoc.*,39, 74-81.

Einarson, T. R. (1993). Drug-related hospital admissions. *Ann. Pharmacother.* 27, 832–840.

Ekedahl A (1996) 'Open-ended questions' and 'show-and-tell'– a way to improve pharmacist counselling and patients' handling of their medicines. Journal *of Clinical Pharmacy and Therapeutics*, 21, 95–99.

Erickson, S.R., Kirking, D.M., Sandusky, M. (1998). Michigan Medicaid recipients' perceptions of medication counseling as required by OBRA '90. *J Am Pharm Assoc.*, 38, 333-8.

Ernst, F. R., Grizzle A.J. (2001). Drug-related morbidity and mortality: updating the cost-of-illness model. *J Am Pharm Assoc.,* 41, 192-9.

Feagin, J. R., Orum, A., Sjoberg, G. (Eds). (1991). A case for the case study. Chapel Hill: University of North Carolina Press.

Fink, R.J., Draugalis, J., McGhan, W.F. (1989). Commitment to the profession of. pharmacy: Are there sex. differences? *American Pharmacy*, NS29, 1, 28-34

Firth-Cozens, J. (2001). Cultures for improving patient safety through learning: the role of teamwork. *Quality Health Care*, *10*, Suppl. 2, 26-31.

Fisher, C., & Alford, R. (2000). Consulting on Culture. *Consulting Psychology: Research and Practice*, *52*(3), 206-217.

Flin, R (1998) Safety culture: Identifying and measuring the common features. Paper presented at the 24th International Congress of Applied Psychology, Safety Culture Symposium, Aug. 9 – 14, San Francisco, Calif. US.

Flynn, E.A., Barker, K.N., Carnahan, B.J. (2003). National observational study of prescription dispensing accuracy and safety in 50 pharmacies. *J Am Pharm Assoc.*, 43, 191-200

Folli, H.L., Poole, R.L., Benitz, W.E., Russo, J.C. (1987).Medication error prevention by clinical pharmacists in two children's hospitals. *Pediatrics*, 79, 718-722.

Gagnon, J. P. (1978). Store-distributed surveys as a source of consumer feedback on pharmacy services. *The Journal of Consumer Affairs, 12,* 333-342.

Gandhi, T.K., Burstin, H.R., Cook, E.F., Puoplo, A. L., Haas, J. S., Brennan, T. A., Bates, D. W. (2000). Drug complications in outpatients. *Journal of General Internal Medicine*, 15(3):149-54.

Gandhi, T.K., Weingart, S.N., Borus, J., Seger, A.C., Peterson, J., Burdick, E., Seger, D.L., Shu, K., Federico, F., Leape, L.L., Bates, D.W. (2003). Adverse drug events in ambulatory care. *NEJM*, 348 (16), 1556-64

Gershon, R.M., Vlahov, D., Felknor, S.A., Vesley, D., Johnson, P.C., Delclos, G.L., Murphy, L.R. (1995). Compliance with universal precautions among health care workers at three regional hospitals. *American Journal of Infection Control 23*(4):225—236.

Gillies, R., Shortell, S., Casalino, L., Robinson, J., Rundall, T. (2003). How different is California? A comparison of US physician organizations. *Health Tracking,* 491-502.

Glisson, C.,Hemmelgarn, A. (1998). The effects of organizational climate and interorganizational coordination on the quality and outcomes of children's service systems. *Child Abuse & Neglect, 22*(5), 401-421.

Gordon, G. G. (1991). Industry determinants of organizational culture. *Academy of Management Review* 16: 396-415.

Green-McKenzie, J., Gershon, R.R., Karkashian, C. (2001). Infection control practices among correctional healthcare workers: effect of management attitudes and availability of protective equipment and engineering controls. *Infection Control and Hospital Epidemiology* 22(9),555-9.

Guerrero, R.M., Nickman, N.A., Bair, J.N. (1990a). Using pharmacists' perceptions in planning changes in pharmacy practice. *Am J Hosp Pharm*, 47, 2026-30.

Guerrero, R.M., Nickman, N.A., Bair, J.N. (1990b). Self-reported work sampling methods for evaluating pharmaceutical services. *Am J Hosp Pharm*, 47, 1611-7.

Guerrero, R.M., Nickman, N.A., Bair, J.N. (1995). Work activities of pharmacy teams with drug distribution and clinical responsibilities. *Am J Health Syst Pharm.*,52, 614-20.

Guirguis, L. M., Chewning, B.A. (2005). Role theory: Literature review and implications for patient-pharmacist interactions. *Research in Social and Administrative Pharmacy,* 1(4), 483-507

Guirguis, L.M. (2006). Unpublished Dissertation, University of Wisconsin-Madison.

Guldenmund, F.W. (2000). The nature of safety culture: a review of theory and research. *Safety Science* 34, 215-57.

Gurwitz, J.H., Field, T.S., Avorn, J., McCormick, D., Jain, S., Eckler, M. (2000). Incidence and preventability of adverse drug events in nursing homes. *Am J Med*,109(2), 87–94.

Gurwitz, J.H., Field, T.S., Harrold, L.R., Rothschild, J., Debellis, K., Seger, A.C., Cadoret, C., Fish, L.S., Garber, L., Kelleher, M., Bates, D.W. (2003). Incidence and preventability of adverse drug events among older persons in the ambulatory setting. *JAMA*, 289 (9), 1107-16.

Grasha, A.F. (1998). Workload and pharmacy dispensing errors. Cincinnati, OH: University of Cincinnati, Research update report 1-1198.

Grasha, A.F. (1999). Everything you always wanted to know about workload but were afraid to ask. San Antonio, TX; CE presentation at American Pharmaceutical Association Annual Meetings; 1999, March 6-11.

Grasha, A.F., O'Neill, M. (1996). Cognitive processes in medication errors. *US Pharm.*, 21, 96-109

Hale, A.R. (2000). Culture's confusions. *Safety Science*. 34, 1, 1-14

Hammarlund, E.R., Ostrom, J.R., Kethley, A.J. (1985). The effects of drug counseling and other educational strategies on drug utilization in the elderly. *Med Care*, 23,165-170

Hanlon, J. T., Weinberger, M., Samsa, G.P. Schmader, K.E., Uttech, K.M., Lewis, I.K., Cowper, P.A., Landsman, P.B., Cohen, H.J., Feussner, J.R. (1996). A randomized controlled trial of a clinical pharmacist intervention to improve inappropriate prescribing in elderly outpatients with polypharmacy. *Am J Med*,100, 428-437.

Health & Safety Commission. (1993). ACSNI Study Group on Human Factors. 3rd Report: Organising for Safety. London: HMSO

Health & Safety Executive. (1997). Successful Health and Safety Management. HS(G)65, 2nd Edition. London: HMSO

Hepler, C., Strand, L. (1990). Opportunities and responsibilities in pharmaceutical care. *Am J Pharm Educ.*, 53, 7S-15S

Hickam, D.H., Severance, S., Feldstein, A. (2003). The effect of health care working conditions on patient safety. Evidence Report/Technology Assessment: Number 74. AHRQ Publication No. 03-E024, Agency for Healthcare Research and Quality, Rockville, MD.

Hickey, G., Kipping, C. (1996). Issues in research. A multistage approach to coding of data from open-ended questions. *Nurs Res.* 4, 81-4

Hofmann, D.A. & Stetzer, A. (1996). A cross level investigation of factors influencing unsafe behavior and accidents. *Personnel Psychology*, 49, 307-339.

Hofmann, D.A., Morgeson, F.P., Geras, S.J. (2003). Climate as a moderator of the relationship between leader-member exchange and content specific citizenship: safety climate as an exemplar. *Journal of Applied Psychology*, 88,170–8.

Hofstede, G.B., Ohayv, N.D., Sanders, G. (1990). Measuring organizational cultures: a qualitative and quantitative study across twenty cases. *Administrative Science Quarterly*, 35, 286-316.

Hofstede, G. B. (1998). Attitudes, values and organizational culture: disentangling the concepts. *Organization Studies*, 19 (3), 477-483

Hoxsie, D.M., Keller, A.E., Armstrong, E.P. (2006). Analysis of community pharmacy workflow processes in preventing dispensing errors. *Journal of Pharmacy Practice*, 19:1-7.

Huff, A. (1982). Industry influences on strategy reformulation. *Strategic Management Journal*, 3, 119-131.

Institute of Medicine. (1999). To Err Is Human: Building a Safer Health System. Washington, DC: National Academy Press.

Institute of Medicine. (2001). Crossing the Quality Chasm: A New Health System for the 21st Century. Washington, DC: National Academy Press.

Institute of Medicine. (2006). Preventing Medication Errors: Quality Chasm Series. Washington, DC: National Academy Press.

International Nuclear Safety Advisory Group. (1991) Safety culture. Safety Series No 75- INSAG-4, International Atomic Energy Authority, Vienna

Johnson, J.A., Bootman, J.L. (1995). Drug-related morbidity and mortality: a cost-of-illness model. *Arch Int Med.*,155,1949-56.

Kennedy, R., Kirwan, B. (1995). The failure mechanisms of safety culture. In: Carnino, A., Weimann, G. (Eds.), Proceedings of the International Topical Meeting on Safety Culture in Nuclear Installations. American Nuclear Society of Austria, Vienna, pp. 281-290.

Kirking, D. (1982). Pharmacists' perceptions of their patient counseling activities. *Contemporary Pharmacy Practice*, 5, 230-238

Kirking, D. (1984). Evaluation of an explanatory model of pharmacists' patient counseling activities. *J Soc Adm Pharm*, 2, 50-56

Kitchell, S. (1995). Corporate culture, environmental adaptation, and innovation adoption: a qualitative/ quantitative approach. *Journal of the Academy of Marketing Science*, 23(3), 195-205.

Kohli, A.K., Jaworski, B.J. (1994). The influence of coworker feedback on salespeople. *J Marketing*, 58, 82

Kotter, J. P., Heskett, J. L. (1992). Corporate culture and performance. New York: The Free Press.

Kreling, D. H., Doucette, W.R., Mott, D.A., Gaither, C.A., Pedersen, C.A., Schommer, J.C. (2006). Community pharmacists' work environments: evidence from the 2004 national pharmacist workforce study. *J Am Pharm Assoc.* 46(3), 331-339.

Kusserow, R.P. (1990). The Inspector General's report on the clinical role of the pharmacist. Washington D.C: U.S Government Printing Office.

Kuyper, A. R. (1993) Patient counseling detects prescription errors. *Hosp Pharm.* 12, 1180-1189.

Lazarou, J., Pomeranz, B.H., Corey, P.N. (1998). Incidence of adverse drug reactions in hospitalized patients: a meta-analysis of prospective studies. *JAMA*, 279, 1200-1205.

Leape, L.L., Cullen, D.J., Clapp, M.D., Burdick, E., Demonaco, H.J., Erickson, J.I., et al. (1999). Pharmacist participation on physician rounds and adverse drug events in the intensive care unit. *JAMA*, 282, 267-270.

Lee, T. (1993). Seeking a safety culture. *ATOM Journal,* 429, pp 20-23.

Lee, T. (1998). Assessment of safety culture at a. nuclear reprocessing plant. *Work & Stress*, 12, 217-237

Lucas, D.A. (1990). Wise men learn by others harms, fools by their own; organizational barriers to learning the lessons from major accidents. *In: M.H. Walter and R.F. Cox (Eds). Proceedings of the Safety and Reliability Society Symposium Sept 1990*, Altrincham, Elsevier Applied Science Publishers, London

Ludy, J. A., Gagnon, J. P., Caiola, S. M. (1977). The patient-pharmacist interaction in two ambulatory settings. *Drug Intelligence and Clinical Pharmacy, 11,* 81-89.

Mackowiak, J. I., Manasse, H. R. (1984). Expectations for ambulatory services in traditional and office-practice pharmacies. *American Journal of Hospital Pharmacy, 41,* 1140-1146.

Mackowiak, J. I., Manasse, H. R. (1988). Expectation vs. demand for pharmacy service. *Journal of Pharmaceutical Marketing & Management, 2,* 57-72.

Maine, L.L. (1998). Pharmacy practice activity classification. *J Am Pharm Assoc.*, 38(2),139-48.

Manasse, H.R. Jr. (1989a). Medication use in an imperfect world I: drug misadventuring as an issue of public policy. *Am J Hosp Pharm.*, 46, 929-44.

Manasse, H.R. Jr. (1989b) Medication use in an imperfect world II: drug misadventuring as an issue of public policy. *Am J Hosp Pharm.*, 46, 1141-52.

Marcoulides, G.A., Heck, R.H. (1993). Organizational culture and performance: proposing and testing a model. *Organization Science*, 4, 209-224.

Martin, J. (2002). Organizational culture: mapping the terrain. Newbury Park, CA: Thousand Oaks, Sage Publications.

Mason, H.L. (1979). The pharmacist's medication counseling role: attitudes and behavior of community practitioners. Unpublished Dissertation. University of Wisconsin-Madison.

Mason, H. L. (1983). Using attitudes and subjective norms to predict pharmacist counseling behaviors. *Patient Counseling and Health Education, 4,* 190-196.

Mason, H.L., Svarstad, B.L. (1984). Medication counseling behaviors and attitudes of rural community pharmacists. *Drug Intelligence and Clinical Pharmacy*, 18, 409-414

Mawji, Z., Stillman, P., Laskowski, R., Lawrence, S., Karoly, E., Capuano, T., & Sussman, E. (2002). First do no harm: Integrating patient safety and quality improvement. *Jt Comm J Qual Improv, 28*(7), 373-86.

McKenney, J.M., Brown, E.D., Necsary, R., Reavis, L. (1978). Effect of pharmacist drug monitoring and patient education on hypertensive patients. *Contemp Pharm Report*, 1, 50-6.

Meade, V. (1995). OBRA '90: How has pharmacy reacted? *American Pharmacy*, NS35, 12-16.

Mearns, K., Whitaker, S. M., Flin, R. (2003). Benchmarking safety climate in hazardous environments: a longitudinal, interorganizational approach. *Risk Analysis, 21, 4*, 771-786.

Mearns, K., Flin, R., O'Connor, P. (2001). Sharing worlds of risk: Improving communication with crew resource management. *Journal of Risk Research, 4*(4), 377-392.

Medicare Modernization Act. (2003). Center for Medicare and Medicaid Services, Washington D.C.

Molzon, J. A. (1992). What kinds of patient counseling are required? *American Pharmacy*, NS32, 50-57.

Moore, S., Kalu, M., Yavaprabbas, S. (1983). Receipt of prescription drug information by the elderly. *Drug Intell Clin Pharm,* 17, 920-3

Morris, L.A., Grossman, R.., Barkdoll, G., Gordon, E., Soviero, C. (1984). A survey of patient sources of prescription drug information. *Am J Public Health,* 74, 1161-1162

Morris, L.A., Tabak, E.R., Gondek, K. (1997). Counseling patients about prescribed medication: 12-year trends. *Med Care*, 35, 996-1007

Mott, D.A., Sorofman, B.A., Kreling, D.H., Schommer, J.C., Pederson, C. (2001). A four-state summary of the pharmacy workforce. *J Am Pharm Assoc.*, 41, 693-702

Mott, D.A., Doucette, W.R., Gaither, C.A., et al. (2002). A ten-year trend analysis of pharmacist participation in the workforce. *Am J Pharm Educ.*, 66, 223-33.

Mott D.A., Gaither, C.A., Doucette, W.R., Pedersen, C.A., Schommer, J.C. (2004). Pharmacists' attitudes toward worklife: results from the 2000 national pharmacist workforce survey. *J Am Pharm Assoc.*, 44(3), 326-336.

Mott D.A., Doucette, W.R., Gaither, C.A., Kreling, D.H., Pedersen, C.A., Schommer, J.C. (2006). Pharmacist participation in the workforce: 1990, 2000, and 2004. *J Am Pharm Assoc.*, 46(3), 322-330.

National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP). (1998). NCC MERP taxonomy of medication errors.

National Council on Patient Information and Education (1990). Smart medicines need smart patients. Talk about prescriptions month newsletter.

National Council on Patient Information and Education (1991,). October is 'Talk About Prescriptions' month. Talk about prescriptions month newsletter.

National Council on Patient Information and Education (1995). Prescription medicine compliance: a review of the baseline of knowledge. Talk about prescriptions month newsletter.

National Patient Safety Foundation. (1997). Nationwide poll on patient safety: 100 million Americans see medical mistakes directly touching them. Retrieved May 6, 2005, from http://www.npsf.org/html/pressrel/finalgen.htm

Ness, J. E., Grauss, P.E. (1997). Is tech-check-tech good for the profession? *Drug Topics* 141,13, 56.

Nieva, V.F., Sorra. J. (2003). Safety culture assessment: a tool for improving patient safety in healthcare organizations. *Quality and Safety in Health Care* 12: 7-23.

Omnibus Budget Reconciliation Act of 1990, Pub. L. No. 101-508, 4401, 104 Stat. 1388 (1990).

O'Reilly, C., Chatman, J. (1996). Culture as social control: Corporations, cults and. commitment. In B. Staw & L. Cummings (eds). Research in organizational behavior. 18, 157-200. JAI Press.

Paluck, E.C., Green, L.W., Frankish, C.J., Fielding, D.W., Haverkamp, B. (2003). Assessment of communication barriers in community pharmacies. *Eval Health Prof.*, 26: 380 - 403.

Perri, M., Kotzan, J., Pritchard, L., Ozburn, W., & Francisco, G. (1995). OBRA '90: The impact on pharmacists and patients. *American Pharmacy*, NS35, 24-28, 65.

Perrin, F. V. (1988). Improving communication with your patients. *Drug Topics, 132* (9), 48,50, 52, 54, 56.

Peters, T. J., Waterman, R.H. (1982). In search of excellence. New York: Harper and Row.

Pfeffer, J. (1981). Power In organizations. Marshfield, MA: Pittman.

Pidgeon, N.F. and O'Leary, M. (1994). Organizational safety culture: implications for aviation practice. In N. Johnston , N. McDonald and R. Fuller (Eds.), Aviation Psychology in Practice, Aldershot, Avebury Technical, 21-43.

Pidgeon, N. (1998). Safety culture: Key theoretical issues. *Work & Stress, 12*(3), 202-216.

Pizzi, L., Goldfarb, N., Nash, D. (2001). Promoting a culture of safety. In: Shojania K, Duncan B, McDonald K, Wachter R, eds. *Making HealthCare Safer: A Critical Analysis of Patient Safety Practices.* Rockville, MD: AHRQ.

Powell, M.F., Burkhart, V., Lamy, P.P. (1979). Diabetic patient compliance as a function of patient counseling. *Drug Intell Clin Pharm*, 13, 506-11.

Probst, T.M. (2004). Safety and insecurity: exploring the moderating effect of organizational safety climate. *Journal of Occupational Health Psychology*, 9(1), 3–10.

Pronovost, P.J., Weast, B., Holzmueller, C.G.,Rosenstein, B.J., Kidwell, R.P., Haller, K.B., Feroli, E.R., Sexton, J.B., Rubin, H.R. (2003). Evaluation of the culture of safety: survey of clinicians and managers in an academic medical center. *Qual Saf Health Care.* 12(6), 405-10.

Raisch, D. (1993). Barriers to providing cognitive services. *American Pharmacy*, NS33, 54-58

Reason, J. (1990). *Human Error.* Cambridge, UK: Cambridge University Press.

Reason, J. (1997). *Managing the Risks of Organizational Accidents.* Ashgate Publishing Ltd. Aldershot, Hants.

Robinson, S.L., O'Leary-Kelly, A.M. (1998). Monkey see, monkey do: the influence of work groups on the antisocial behavior of employees. *Academy of Management Journal*, 41(6), 658.

Rondeau, K.V., Wager, T.H. (2002). Organizational learning and continuous quality improvement: examining the impact on nursing home performance. *Healthcare Management Forum*, 15(2), 17–23

Roter, D.L., Hall, J.A., Merisca, R., Nordstrom, B., Cretin, D., Svarstad, B. (1998). Effectiveness of interventions to improve patient compliance: a meta-analysis. *Med Care*, 36,1138-61

Rotemberg, J. J., Saloner, G. (1993). Leadership Style and Incentives. *Management Science,* 39, 1299-1318.

Rothschild, J.M., Federico, F.A., Gandhi, T.K. (2002). Analysis of medication-related malpractice claims: Causes, preventability, and costs. *Arch Intern Med*, 162, 2414-2420.

Royal, S., Smeaton, L., Avery, A.J., Hurwitz, B., Sheikh, A. (2006). Interventions in primary care to reduce medication related adverse events and hospital admissions: systematic review and meta-analysis. *Qual Saf Health Care*, 15,23-31

Rundmo, T. (1992). Risk perception and safety on offshore petroleum platforms—part II: Perceived risk, job stress and accidents. *Safety Science*, 15, 53–68

Rupp, M.T., DeYoung, M., Schondelmeyer, S.W. (1992). Prescribing problems and pharmacist interventions in community practice. *Med Care* 30, 926-940

Salancik, G.R., Pfeffer, J. (1978). A social information processing approach to job attitudes and task design. *Administrative Science Quarterly*, 23, 224-253

Scarsi, K.K., Fotis, M.A., Noskin, G.A. (2002). Pharmacist participation in medical rounds reduces medication errors. *Am J Health-Syst Pharm*, 59, 2089-2092

Schein, E.H. (1985) Organizational culture and leadership, San Francisco: Jossey-Bass.

Schein, E. H. (1990). Organizational culture. *American Psychologist*, 45, 109-119

Schering Laboratories (1992). Schering Report XIV. Improving patient compliance: Is There a Pharmacist in the House? Kenilworth, NJ.

Schneider, B., Bowen, D. E. (1995). Winning the service game. Boston: Harvard Business School Press.

Schnipper, J.L., Kirwin, J.L., Cotugno, M.C. Wahlstrom, S.A., Brown, B.A., Tarvin, E., Kachalia, A., Horng, M., Roy, C.L., McKean, S.C., Bates, D.W. (2006). Role of

pharmacist in preventing adverse drug events after hospitalizations. *Arch Intern Med.* 166, 565-571

Schommer, J.C. (1992). The roles of pharmacists, patients and contextual cues in pharmacist-patient communication. Unpublished Dissertation. University of Wisconsin-Madison.

Schommer, J.C., Wiederholt, J.B (1994a). Pharmacist conceptual views of patient counseling. *American Pharmacy,* NS, 34(7), 46-53.

Schommer, J.C., Wiederholt, J.B (1994b). Pharmacists' perceptions of patients' needs for counseling. *Am J Hosp Pharm*, 51, 478-485.

Schommer, J.C., Sullivan, D.L., Wiederholt, J.B (1994). Measurement issues for pharmacist counseling behaviors. *The Journal of Pharmaceutical Technology*, 10, 261-268.

Schommer, J.C., Wiederholt, J.B (1995a).A field investigation of participant and environment effects on pharmacist-patient communication in community pharmacies. *Med Care*, 35(6), 567-584.

Schommer, J. C., Sullivan, D. L., & Haugtvedt, C. L. (1995b). Patients' role orientation for pharmacist consultation. *J Soc Adm Pharm.*, 12, 33-41.

Schommer, J. C. (1996). The pharmacist's role in health care as viewed by pharmacists and patients. Paper presented to the 143rd Annual Meeting of the American Pharmaceutical Association, Nashville, TN.

Schommer, J.C., Wiederholt, J.B. (1997). The association of prescription status, patient age, gender and patient question asking behavior with the content of pharmacist-patient communication. *Pharmaceutical Research*, 14 (2), 145-151.

Schommer, J.C., Pedersen, C.A. (2001). Pharmacists' work activities in two mid-western states. *J Am Pharm Assoc.*, 41,760-2.

Schommer, J.C., Pedersen, C.A., Doucette, W.R., Gaither, C.A., Mott, D.A. (2002). Community pharmacists' work activities in the United States during 2000. *J Am Pharm Assoc.*, 42, 399-406.

Schommer, J.C., Pedersen, C.A., Gaither, C.A., Doucette, W.R., Kreling, D.H., Mott, D.A. (2006). Pharmacists' desired and actual times in work activities: Evidence of gaps from the 2004 national pharmacist workforce survey. *J Am Pharm Assoc.*, 46, 340-347.

Schondelmeyer, S. W., Trinca, C. E. (1983). Consumer demand for a pharmacist conducted prescription counseling service. *American Pharmacy, NS23,* 321-324.

Sexton, J., Thomas, E. J, Helmreich, R.L. (2000). Error, stress, and teamwork in medicine and aviation: cross sectional surveys. *British Medical Journal 320,* 745-747.

Shah, B.K., Chewning, B.A. (2005). Conceptualizing and Measuring Pharmacist-Patient Communication: A Review. *J Am Pharm Assoc.*, 45 (2), 267

Shah, B.K., Chewning, B.A. (2006). An exploratory study of pharmacy team perspectives on patient safety. Podium presentation at the 2006 MidWest Pharmacy Conference, Minneapolis.

Sheridan, J.E. (1992). Organizational culture and employee retention. *Academy of Management Journal*, 35, 1036-56.

Shortell, S., Zazzali, J., Burns, L., et al. (2001). Implementing evidence-based medicine: the role of market pressures, compensation incentives, and culture in physician organizations. *Med Care* 39(7—Physician-System Alignment supplement), I62–I78.

Siganga, W.W. (1992). An examination of the theory of reasoned action and pharmacists' intentions to provide medication counseling. Unpublished Dissertation. University of Maryland.

Singer, S., Gaba, D.M., Geppert, J.J., Sinaiko, A.D., Howard, S.K., Park, K.C. (2003). The culture of safety: Results of an organization-wide survey in 15 California hospitals. *Quality & Safety in Health Care 12,* 112-118.

Singhal, P.K., Raisch, D.W., Gupchup, G.V. (1993). The impact of pharmaceutical services in community and ambulatory care setting: evidence and recommendations for future research. *Ann. Pharmacother.* 33,1336–55.

Slama, P.J., Gurwich, E.L. (1978). Effect of pharmacist consultation on medication compliance. *Contemp Pharm Pract.,* 1,71-7.

Sleath, B. (1995). Pharmacist question-asking in New Mexico community pharmacies. *Am J Pharm Educ.*, 59, 374- 379

Smith, D.L. (1993). The effect of patient non-compliance on health care costs. *Med Interface*, 6(4),74-6,78,84.

Sommer, S. M., Bae, S. H. & Luthans, F. (1996). Organizational commitment across cultures: the impact of antecedents on Korean employees. *Human Relation*, 49, 977-993.

Sorensen, J.N. (2002). Safety culture: a survey of the state-of-the-art. *Reliability Engineering and System Safety*, 76,189–204

Spencer, E. (1974). The attitudes of ambulatory patients toward a hospital-based pharmacy service: The patient as consultant. *Drug Intelligence and Clinical Pharmacy, 8,* 710-716.

Sullivan, S.D., Kreling, D.H., Hazlet, T.K. (1990). Noncompliance with medical regimens and subsequent hospitalization: a literature analysis and cost of hospitalization estimate. *J Res Pharm Econ.*, 2,19-33.

Susskind, A. M., Kacmar, K. M., &: Borchgrevink. C. P. (2003). Customer service providers' attitudes relating to customer service and customer satisfaction in the customer-server exchange. *Journal of Applied Psychology*, 88, 179-187.

Svarstad, B.L., Bultman, D.C., Mount, J.K. (2004). Patient counseling provided in community pharmacies: Effects of state regulation, pharmacist age, and busyness. *J Am Pharm Assoc*, 44, 22-29.

Taylor, S. (1994). The effects of filled waiting time and service provider control over the delay on evaluations of service. Journal of the Academy of Marketing Science, 23(1), 38 - 48.

Taylor, S., Claxton, J. (1994). Delays and the dynamics of service evaluation. Journal of the Academy of Marketing Science, 22(3), 254-6.

Thomas, E.J. Studdert, D.M., Newhouse, J.P., Zbar, B.I., Howard, K.M., Williams, E.J., Brennan, T.J. (1991). Costs of medical injuries in Utah and Colorado. *Inquiry*, 36 (3), 255-64.

Trice, H. M., Beyer, J.M. (1984). Studying organizational cultures through rites and ceremonials. *Academy of Management Review*, 9(4), 653-699.

Trice, H. M., Beyer, J.M. (1993). The cultures of work organizations. Englewood Cliffs, NJ: Prentice Hall.

Tsuyuki, R.T., Johnson, J.A., Teo, K.K., Simpson, S.H., Ackman, M.L., Biggs, R.S., Cave, A., Chang, W.C., Dzavik, V., Farris, K.B., Galvin, D., Semchuk, W., Taylor, J.G.

(2002). A randomized trial of the effect of community pharmacist intervention on cholesterol risk management: the Study of Cardiovascular Risk Intervention by Pharmacists (SCRIP). *Arch Intern Med.* 162,1149-55.

Turner, B.A., Pidgeon, N., Blockley, D., Toft, B. (1989) Safety culture: its importance in future risks management. Position paper for the Second World Bank Workshop on Safety Control and Risk Management, Karlstad, Sweden

Uttal, B. (1983). The corporate culture vultures. *Fortune Magazine*, Oct 17.

Wandless, I., Whitmore, J. (1981). The effect of counseling by a pharmacist on drug compliance in elderly patients. *Journal of Clinical & Hospital Pharmacy*, 6(1), 51-6

Watkins, R. L., & Norwood, G. J. (1977). Impact of environment and age on quality of consultant behavior. *Am J Pharm Educ., 41,* 19-22.

Weeks, W.B., Bagian, J. P. (2000). Developing a culture of safety in the Veterans Health Administration. *Eff Clin Pract.* 3(6), 270-6.

Weingart, S.N., Farbstein, K., Davis, R.B., Phillips, R.S. (2004). Using a multihospital survey to examine the safety culture. *Jt Comm J Qual Saf.*, 30, 125-132.

Whipp, R., Rosenfeld, R., Pettigrew, A. (1989). Culture and competitiveness: Evidence from two mature industries. *Journal of Management Studies,* 26(6), 561-85.

Wiederholt, J. B., Schommer, J. C. (1991). Improving pharmacist-patient verbal communication. Belmar Mall, NJ: H & R Communication.

Wiederholt, J.B., Clarridge, B.R., Svarstad, B.L. (1992). Verbal consultation regarding prescription drugs: Findings from a statewide study. *Med Care*, 30, 159-173

Williamson, A.M., Feyer, A.M., Cairns, D., Biancotti, D. (1997). The development of a measure of safety climate: The role of safety perceptions and attitudes. *Safety Science*, 25, 15-27.

Williford, S.L., Johnson, D.F. (1995). Impact of pharmacist counseling on medication knowledge and compliance. *Military Medicine*, 160, 561-564.

Winterstein, A. G., Hatton, R. C., Gonzalez-Rothi, R., et al. (2002). Identifying clinically significant preventable adverse drug events through a hospital's database of adverse drug reaction reports. *Am J Health-Syst Pharm., 59,* 1742-9.

Wisconsin Administrative Code. (2005). Chapter Phar 7.01 e and em. Available at: http://www.legis.state.wi.us/rsb/code/phar/phar.html. Accessed September 7,2006.

Wisconsin Pharmacist Compensation Survey. (2005). Unpublished data. Sonderegger Research Center, University of Wisconsin-Madison. Obtained from Prof. Mott, D.A., October 15, 2006.

Woroniecki, C.L., McKercher, P.L., Flagler, D.G., Berchou, R., Cook, J.A. (1982) Effect of pharmacist counseling on drug information recall. *Am J Hospital Pharmacy*, 39(11),1907-10.

Wright, E.R., Linde, B., Rau, N.L., Gayman, M., Viggiano, T. (2003). The effect of organizational climate on the clinical care of patients with mental health problems. *J Emerg Nurs*, 29(4), 314-21.

Yellin, A. K., & Norwood, G. J. (1974). The public's attitude toward pharmacy. *J Am Pharm Assoc., NS14,* 61-65.

Yin, R.K. (1984). Case study research: design and methods. Beverly Hills: Sage.

Yuan, Y., Hay, J., McCombs, J. (2003). Mortality and hospitalization impacts of pharmacy consultation in ambulatory care. *American Journal of Managed Care*, 9(1), 101-112.

Zellmer, W. A. Unresolved issues in pharmacy. (2005). *Am J Health-Syst Pharm*, 62,262

Zelnio, R. N., Nelson, A. A., Beno, C. E. (1984). Clinical pharmaceutical services in retail practice I. Pharmacists' willingness and abilities to provide services. *Drug Intelligence and Clinical Pharmacy, 18,* 917-922.

Zohar, D. (1980) Safety climate in industrial organizations: theoretical and applied implications. *Journal of Applied Psychology*, 65, 96-102.

Appendix A: Pharmacist Practice Activity Classification

PHARMACIST PRACTICE ACTIVITY CLASSIFICATION 1.0

Domain A. Ensuring Appropriate Therapy and Outcomes

The purpose of this domain is to ensure the appropriate use of pharmaceutical products by each patient within the requirements and objectives of the patient's total healthcare plan. Activities in this domain may be performed alone or in collaboration with other providers depending upon pharmacists' scope of practice authority and other factors. "Therapy" in this document refers to the intended, beneficial use of drugs and medical devices — whether diagnostic or therapeutic — and thus includes diagnostic radiopharmaceuticals, X-ray contrast media, etc., in addition to therapeutic drugs. "Treatment plan" includes the outcomes-oriented plan for diagnostic drug use in addition to therapeutic drug use.

Class A.1. Ensuring Appropriate Pharmacotherapy

The pharmacist uses professional knowledge and skills to form clinical judgments.

Activity A.1.1. Establish relationship with patient
Task A.1.1.1. Introduce self to patient and explain services
Task A.1.1.2. Determine patient's primary spoken language and communications ability/limitations
Task A.1.1.3. Determine patient's educational level

Activity A.1.2. Obtain information to create and maintain confidential patient record
Task A.1.2.1. Obtain diagnostic patient information
Step A.1.2.1.1. Interview the patient or patient's representative
Step A.1.2.1.2. Obtain patient consent as needed to access medical information
Step A.1.2.1.3. Obtain/review the medical history or patient record
Step A.1.2.1.4. Consult other providers
Task A.1.2.2. Obtain laboratory information
Step A.1.2.2.1. Order laboratory tests
Step A.1.2.2.2. Obtain/review laboratory test results
Task A.1.2.3. Obtain physical assessment information
Step A.1.2.3.1. Perform physical assessment(s)
Step A.1.2.3.2. Obtain/review physical assessments performed by the patient or other providers
Task A.1.2.4. Create a complete medication record
Step A.1.2.4.1. Obtain and document prescription medication history
Step A.1.2.4.2. Obtain and document nonprescription medication history
Step A.1.2.4.3. Obtain and document complementary and alternative therapy history
Step A.1.2.4.4. Obtain and document devices history
Step A.1.2.4.5. Obtain the patient's social, family and nutritional history

Activity A.1.3. Assess patient information
Task A.1.3.1. Assess objective and subjective data
Task A.1.3.2. Identify potential or actual drug therapy problems
Task A.1.3.3. Perform patient triage and initiate referral(s)

Activity A.1.4. Formulate treatment plan
Task A.1.4.1. Define treatment goals
Step A.1.4.1.1. Discuss goals with the patient
Task A.1.4.2. Assess therapy alternatives
Step A.1.4.2.1. Identify diagnostic product needs
Step A.1.4.2.2. Identify untreated indications
Step A.1.4.2.3. Identify non-drug therapy alternatives
Step A.1.4.2.4. Identify nonprescription medication/self care alternatives
Step A.1.4.2.5. Identify prescription medication alternatives

Step A.1.4.2.6. Identify unnecessary medications
Task A.1.4.3. Establish an appropriate regimen
Step A.1.4.3.1. Screen for and document allergies, interactions, contraindications and duplicate therapies
Step A.1.4.3.2. Establish the medication dose, frequency and duration
Step A.1.4.3.3. Initiate therapy under protocol/guidelines
Task A.1.4.4. Establish an outcomes monitoring plan

Activity A.1.5. Document activities
Task A.1.5.1. Update the patient record
Task A.1.5.2. Communicate the treatment plan to other providers

Class A.2. Ensuring Patient's Understanding and Adherence to His or Her Treatment Plan

The pharmacist uses professional knowledge and skills to communicate clinical judgments to necessary parties.

Activity A.2.1. Interview patient
Task A.2.1.1. Assess the patient's knowledge and capability for understanding/communicating
Step A.2.1.1.1. Assess knowledge of disease state, condition or self-care needs
Step A.2.1.1.2. Assess knowledge of current drug therapy
Step A.2.1.1.3. Assess the patient's readiness and willingness to participate in the treatment plan
Step A.2.1.1.4. Assess the patient's physical and mental capability to adhere to the treatment plan
Step A.2.1.1.5. Assess the patient's financial capacity to adhere to the treatment plan
Task A.2.1.2. Discuss the treatment plan
Step A.2.1.2.1. Present the treatment plan to the patient and solicit feedback
Step A.2.1.2.2. Present the treatment plan to the family and/or caregiver and solicit feedback
Task A.2.1.3. Educate patient/family/caregiver
Step A.2.1.3.1. Provide accurate oral and/or written information as appropriate for the patient's treatment plan
Step A.2.1.3.2. Use visual aids and/or demonstrations
Step A.2.1.3.3. Demonstrate assembly and use of administration devices
Step A.2.1.3.4. Discuss use or avoidance of pharmacotherapy
Step A.2.1.3.5. Discuss use or avoidance of complementary and alternative treatments
Step A.2.1.3.6. Discuss use or avoidance of non-drug therapy (e.g., diet, exercise)
Task A.2.1.4. Verify patient understanding and knowledge of the treatment plan
Step A.2.1.4.1. Verify that the patient can describe the use of new and/or existing medications
Step A.2.1.4.2. Verify that the patient can describe expected outcomes of treatment
Step A.2.1.4.3. Verify that the patient can demonstrate proper use of administration and/or self-testing devices
Step A.2.1.4.4. Verify that the patient can identify effects and side effects of medications and other therapies
Step A.2.1.4.5. Verify that the patient can describe the monitoring plan
Step A.2.1.4.6. Verify that the patient can describe circumstances prompting contact with provider(s)

Activity A.2.2. Develop an adherence assistance plan
Task A.2.2.1. Determine with the patient potential problems in adhering to the treatment plan
Task A.2.2.2. Help the patient generate solutions to potential problems
Task A.2.2.3. Provide tools to enhance adherence to the treatment plan
Task A.2.2.4. Enlist family/caregiver assistance when necessary
Activity A.2.3. Document the patient interview, evaluation, treatment plan, educational/counseling sessions, and adherence assistance plan

Class A.3. Monitoring and Reporting Outcomes

The pharmacist uses professional knowledge and skills to assess patient status and to modify and document treatment strategies.

Activity A.3.1. Monitor plan implementation
Task A.3.1.1. Initiate monitoring activities
Step A.3.1.1.1. Initiate face-to-face patient contact
Step A.3.1.1.2. Initiate patient contact by telephone or electronically
Task A.3.1.2. Review/establish monitoring measures

Activity A.3.2. Obtain patient information
Task A.3.2.1. Obtain subjective information
e.g., change in status, adverse drug reactions
Task A.3.2.2. Obtain objective information
Step A.3.2.2.1. Obtain laboratory data
Step A.3.2.2.2. Obtain home monitoring data
Step A.3.2.2.3. Obtain physical assessment data
Step A.3.2.2.4. Obtain medication use/compliance data

Activity A.3.3. Perform patient assessment
Task A.3.3.1. Assess subjective/objective data
Step A.3.3.1.1. Assess patient demonstration/description of device and medication use
Step A.3.3.1.2. Assess patient demonstration/description of problems, concerns related to medications and devices

Activity A.3.4. Assess and modify the plan
Task A.3.4.1. Assess the plan against new data
Task A.3.4.2. Recommend treatment plan continuation
Step A.3.4.2.1. Ensure that the patient has access to sufficient medication/refills until the next appointment
Task A.3.4.3. Modify the treatment plan
Step A.3.4.3.1. Modify therapeutic objectives in the plan
Step A.3.4.3.2. Recommend therapy discontinuation
Step A.3.4.3.3. Discontinue therapy in concurrence with relevant providers
Step A.3.4.3.4. Recommend new therapy in concurrence with relevant providers
Step A.3.4.3.5. Initiate new therapy in concurrence with relevant providers
Step A.3.4.3.6. Recommend new monitoring activities
Step A.3.4.3.7. Initiate new monitoring activities
Step A.3.4.3.8. Perform patient triage and initiate referral(s)
Task A.3.4.4. Educate the patient
Step A.3.4.4.1. Provide oral, written and/or multimedia information for new therapies
Step A.3.4.4.2. Provide oral, written and/or multimedia information related to concerns/problems with existing therapy
Step A.3.4.4.3. Provide positive reinforcement to encourage adherence to treatment plan
Task A.3.4.5. Complete documentation and billing activities
Step A.3.4.5.1. Update the patient record
Step A.3.4.5.2. Communicate changes to the patient
Step A.3.4.5.3. Communicate changes to other providers
Step A.3.4.5.4. Submit billing information to the patient and/or payer

Domain B. Dispensing Medications and Devices

The purposes of this domain are to ensure that prescriptions or medication orders are appropriate for the patient's healthcare plan; more specifically, that correct pharmaceutical products are selected, compounded, packaged and labeled for dispensing and administration, and that medications are delivered to the patient when needed.

Class B.1. Processing the Prescription or Drug Order

The pharmacist assesses the prescription or medication order for appropriateness and selects and acquires the product or device.

Activity B.1.1. Assess the prescription
Task B.1.1.1. Assess the prescription for completeness
Step B.1.1.1.1. Perform routine assessment of legibility, accuracy, completeness (no problems), e.g., ensure correct dose, check for drug interactions
Step B.1.1.1.2. Clarify an incomplete or illegible prescription order
Step B.1.1.1.3. Verify and correct prescription errors
National Council on Prescription Drug Programs "reason for service" codes might apply as a further level of detail
Step B.1.1.1.4. Determine appropriateness and validity of the prescription or drug order
Step B.1.1.1.5. Make a determination not to fill a prescription as originally prescribed

Activity B.1.2. Determine eligibility
Task B.1.2.1. Determine the patient's health plan eligibility and medication coverage status
Step B.1.2.1.1. Make a routine eligibility assessment (no problems)
Step B.1.2.1.2. Contact the prescriber for medication ordered but not covered
Step B.1.2.1.3. Obtain special exemption or approval from the payer for medication denial includes prior authorization
Step B.1.2.1.4. Make revisions in the drug order to meet plan guidelines
Step B.1.2.1.5. Assist in indigent drug program qualification

Activity B.1.3. Select the product
Task B.1.3.1. Select a specific pharmaceutical product
Step B.1.3.1.1. Perform routine activity (no selection; dispense as written)
Step B.1.3.1.2. Select a bioequivalent multi-source pharmaceutical product for the prescribed brand product in accordance with state practice regulations
Step B.1.3.1.3. Carry out therapeutic interchange prescriber approved interchange or product interchange under protocol or prior authorization
Step B.1.3.1.4. Communicate generic substitution or therapeutic interchange to the patient or caregiver
Task B.1.3.2. Select the dosage, dosage form or route of administration
Step B.1.3.2.1. Perform routine activity (no selection; dispense as written)
Step B.1.3.2.2. Select a non-injectable medication
e.g., solid, liquid, topical, ophthalmic
Step B.1.3.2.3. Select the appropriate parenteral product and route of delivery
e.g., selecting intravenous (IV) push vs. IV piggyback vs. IV infusion
Step B.1.3.2.4. Order or prescribe the medical device or medication administration device
Step B.1.3.2.5. Determine dosing intervals based on the product selected
Step B.1.3.2.6. Determine dosage based on patient pharmacokinetic parameters, weight, age, etc.

Activity B.1.4. Procure the medication or device
Task B.1.4.1. Determine pharmaceutical product or device availability
Step B.1.4.1.1. Perform routine activity (no selection; dispense as written.)
Step B.1.4.1.2. Determine acquisition procedures when the product is not available
Class B.2. Preparing the Pharmaceutical Product

The pharmacist prepares, or oversees the preparation by a technician or automated device, of the pharmaceutical product or device.

Activity B.2.1. Prepare the medication
Task B.2.1.1. Prepare a routine non-injectable drug product
Step B.2.1.1.1. Prepare a multi-dose container
e.g., prescription vial
Step B.2.1.1.2. Prepare unit dose packaging solids, liquids
Step B.2.1.1.3. Prepare a bubble pack

Step B.2.1.1.4. Fill the unit dose cart
Step B.2.1.1.5. Prepare a special compliance enhancement package not compounded
Step B.2.1.1.6. Other
Task B.2.1.2. Prepare compounded non-parenteral medications
Step B.2.1.2.1. Prepare topical medications creams, ointments, etc.
Step B.2.1.2.2. Prepare powders
Step B.2.1.2.3. Prepare suppositories
Step B.2.1.2.4. Prepare sprays and inhalations
Step B.2.1.2.5. Prepare orals
e.g., capsules, suspensions, syrups
Step B.2.1.2.6. Prepare ophthalmics
Step B.2.1.2.7. Other
Task B.2.1.3. Prepare routine parenteral medications and select diluent or delivery devices
e.g., intravenous, subcutaneous, intramuscular
Step B.2.1.3.1. Select routine preparation
Step B.2.1.3.2. Select diluent for reconstitution
Step B.2.1.3.3. Select the route of administration
e.g., PIC line, catheter
Step B.2.1.3.4. Select the solution for use
e.g., NaCl, D5W
Step B.2.1.3.5. Select the rate of infusion
Step B.2.1.3.6. Select the transfer device
Task B.2.1.4. Prepare compounded parenteral medications
e.g., intravenous, subcutaneous, intramuscular
Step B.2.1.4.1. Compound total parenteral nutrition
Step B.2.1.4.2. Prepare antineoplastic therapy
Step B.2.1.4.3. Compound radiopharmaceuticals
Step B.2.1.4.4. Other
e.g., pediatric doses, electrolytes, pressor agents, antibiotics
Step B.2.1.4.5. Do quality assurance testing

Activity B.2.2. Prepare the label
Task B.2.2.1. Enter new patient data
e.g., residential, demographic, health insurance
Task B.2.2.2. Update existing patient data
Task B.2.2.3. Do routine prescription data entry and create the label
Task B.2.2.4. Select and affix auxiliary warning labels to reinforce verbal messages

Activity B.2.3. Perform the final check
Task B.2.3.1. Match the prescription with the medication and label
Task B.2.3.2. Verify medication cart filling
institutional setting
Task B.2.3.3. Verify automatic dispensing device filling
Activity B.2.4. Provide patient information
Task B.2.4.1. Add written or video information

Class B.3. Delivering the Medication or Device

The pharmacist delivers or supervises the delivery of the medication or device to the patient, counsels and delivers education materials to the patient appropriate for the ordered medication or device, administers the medication or device to the patient, and documents activities.

Activity B.3.1. Consult with and/or counsel the patient on the medication or device and its use
Task B.3.1.1. Provide information and instruction about medications or devices that are not dispensed as prescriptions
e.g., nonprescription products

Step B.3.1.1.1. Provide verbal information
Step B.3.1.1.2. Supply written information
Step B.3.1.1.3. Provide multimedia display
e.g., interactive computer, video
Task B.3.1.2 Ensure patient understanding of medication use and its role in the overall treatment Plan

Activity B.3.2. Present or administer the prescribed medication or device to the patient; e.g., immunization
Task B.3.2.1. Provide routine dispensing and patient counseling as required by law or regulation
Task B.3.2.2. Provide non-routine or extended counseling activity
due to patient confusion, language barrier, counseling regarding medication adherence, etc.; may nclude demonstrating drug or device for patient, conducting patient training
Task B.3.2.3. Administer the medication dose
Step B.3.2.3.1. Administer an individual dose
e.g., oral, injection, inhalation
Step B.3.2.3.2. Administer an immunization
Step B.3.2.3.3. Administer directly observed therapy (DOT)
e.g., Antabuse, tuberculosis prophylaxis or treatment
Task B.3.2.4. Provide adherence enhancement materials
Step B.3.2.4.1. Supply a container to enhance medication regimen adherence
e.g., reusable or disposable packaging
Step B.3.2.4.2. Supply an adherence reminder aid to accompany the prescription container
e.g., calendar
Task B.3.2.5. Document dispensing, delivery or administration of medication
Task B.3.2.6. Document counseling to patient
Activity B.3.3. Prepare and submit a service or billing document
Task B.3.3.1. Prepare and submit the appropriate prescription claim form manually or electronically
Task B.3.3.2. Prepare and submit the appropriate claim form for pharmaceutical care services to payer
e.g., third party organization, patient
Task B.3.3.3. Receive and process the letter of referral from physician
e.g., Certificate of Medical Necessity
Task B.3.3.4. Provide documents relating to services provided to the patient

Domain C. Health Promotion and Disease Prevention

The purpose of this domain is to support the service population in 1) practicing healthy lifestyles; 2) accessing immunizations, health screening, education, and information-referral and counseling services, and 3) advocating for environmental and public health infrastructures and services.

Class C.1. Delivering Clinical Preventive Services

This is the planning and delivery of services to individuals for the purpose of disease prevention, early detection of disease, detection of risk factors and the promotion of healthy lifestyles.

Activity C.1.1. Assess the preventive services needs of individuals

Activity C.1.2. Develop health education programming for individuals
Task C.1.2.1. Develop/select learning objectives for patient education programming concerning health promotion and disease prevention issues of interest and concern to the individual
Task C.1.2.2. Develop/select an appropriate format for providing education programming to the individual
Task C.1.2.3. Develop/select appropriate materials for distribution to individuals or self-study
Task C.1.2.4. Develop/select an appropriate mechanism/process to determine whether the Program has met the individual's learning objectives

Activity C.1.3. Develop and participate in health initiatives for individuals: patient health programs, disease state monitoring, screening for health maintenance, health maintenance education and awareness education

Activity C.1.4. Assist patients in making lifestyle changes to improve health outcomes
Task C.1.4.1. Locate, develop and/or assess patient education materials regarding lifestyle Changes that improve outcomes for specific disease states
Task C.1.4.2. Present health education programs using a variety of formats covering lifestyle changes shown to improve outcomes in patients with specific disease states
Task C.1.4.3 Provide one-on-one support for patients attempting to make lifestyle changes

Class C.2. Surveillance and Reporting of Public Health Issues

This is the collection and reporting of information to individuals, communities and health system providers on issues related to health promotion, disease detection, disease prevention and risk detection.

Activity C.2.1. Develop community-based patient education
Task C.2.1.1. Develop/select learning objectives for patient education programming concerning health promotion and disease prevention issues of interest and concern to the intended community
Task C.2.1.2. Develop/select an appropriate format for providing education programming to Groups, e.g., health fair, lecture, self-learning program
Task C.2.1.3. Develop/select appropriate materials for distribution to or self-study by groups
Task C.2.1.4. Develop/select an appropriate mechanism or process to assess if the program has met the learning objectives and the community's needs

Activity C.2.2. Present health education programming to groups

Activity C.2.3. Provide information and presentations on healthy lifestyle activities and guidelines for the community

Activity C.2.4. Inform payers, employers and healthcare providers of services provided to promote health, prevent disease and enhance health outcomes in patients with acute and/or chronic illnesses

Activity C.2.5. Document public health data
Task C.2.5.1. Document public health patterns relative to patient care and pharmacotherapy
Task C.2.5.2. Document the results of public health initiatives directed at the outcomes of pharmacotherapy

Class C.3. Promoting Safe Medication Use in Society

This is directed at the pharmacist's role in medication safety. Medications must be properly used, stored and disposed of to protect the health of individuals. Prevention of exposure, contamination (of individuals and the environment) and poisoning are included.

Activity C.3.1. Improve adherence to the medication regimen
Task C.3.1.1. Target education for groups of individuals to improve patient adherence to the medication regimen
Task C.3.1.2. Direct educational initiatives toward improving safety as it relates to adverse medication events
Task C.3.1.3. Develop and deliver educational programs for groups about the health risks related to the discontinuation of maintenance and acute medicationse.g., antibiotics

Activity C.3.2. Prevent medication-related poisonings
Task C.3.2.1. Provide poison prevention education to reduce childhood poisoning
Task C.3.2.2. Assist in the removal of unwanted/unneeded medications from the community

Activity C.3.3. Provide education regarding the potential abuses and misuses of medications

Activity C.3.4. Promote safe medication use, storage and disposal
Task C.3.4.1. Educate groups about medication sharing
Task C.3.4.2. Educate groups about the risk of medication and device diversion
Task C.3.4.3. Educate groups about the proper storage of medications and devices
Task C.3.4.4. Educate groups about the proper disposal of medications and devices
Task C.3.4.5. Provide a general medication and device disposal service pursuant to state and federal laws and regulations

Domain D. Health Systems Management

The purpose of this domain is to ensure that pharmacy operations and services in all settings 1) embrace best practices; 2) monitor and learn from their own and other systems' experiences, and 3) maximize the use of human, material and financial resources.

Class D.1. Managing the Practice

Activity D.1.1. Perform strategic and operational planning
e.g., review continuous quality improvement principles; direct strategic planning, policies and procedures
Task D.1.1.1. Develop a strategic plan
Task D.1.1.2. Create a management plan
e.g., ensure adequate staffing levels
Task D.1.1.3. Perform monitoring and assessment

Activity D.1.2. Manage provider relations
e.g., manage health plan relationships and assess drug or benefit program effectiveness
Task D.1.2.1. Negotiate and contract with third party organizations
Step D.1.2.1.1. Actively participate in the review, selection and development of formularies and practice guidelines
Task D.1.2.2. Supervise compliance with formulary status
Task D.1.2.3. Supervise compliance with plan guidelines
Task D.1.2.4. Supervise compliance with prior authorization rules
Task D.1.2.5. Oversee compliance with other third party rules and conditions
Task D.1.2.6. Present periodic performance reports to third party organizations

Activity D.1.3. Manage inventory, including purchasing, medication storage, conduct inventory, controlled drug accountability procedures
e.g., contracts, rebates, controlled substances order forms and perpetual inventory
Task D.1.3.1. Set up an ordering system
e.g., nonprescription, prescription, controlled substance inventories, investigational drug inventories
Step D.1.3.1.1. Manage contracts
Step D.1.3.1.2. Manage rebates
Task D.1.3.2. Oversee handling procedures
Task D.1.3.3. Establish monitoring systems

Activity D.1.4. Manage information systems used in the practice
e.g., maintain patient confidentiality; monitor physicians/group database
Task D.1.4.1. Oversee computer hardware/software procurement and maintenance
Task D.1.4.2. Maintain databases
e.g., dispensing, documentation, drug information
Step D.1.4.2.1. Monitor drug database
Step D.1.4.2.2. Monitor disease database
Step D.1.4.2.3. Monitor patient database
Step D.1.4.2.4. Monitor provider database
Step D.1.4.2.5. Monitor enrollee group information

Step D.1.4.2.6. Monitor financial information

Activity D.1.5. Manage human resources
including procedures for hiring, orientation of new staff, ongoing training of staff, conditions for employment
Task D.1.5.1. Establish professional career paths
Task D.1.5.2. Develop position descriptions and update them at regular intervals
Task D.1.5.3. Ensure compliance with applicable laws and regulations
e.g., Americans with Disabilities Act, Equal Employment Opportunity Commission
Task D.1.5.4. Develop and implement performance measures/competency assessments
Task D.1.5.5. Establish incentive and reward systems
Task D.1.5.6. Conduct hiring and orientation
Task D.1.5.7. Conduct performance reviews at regular intervals including pharmacist peer review
Step D.1.5.7.1. Ensure and document training
Step D.1.5.7.2. Ensure continuous licensure
Step D.1.5.7.3. Ensure continuing competency
Task D.1.5.8. Establish grievance procedures and monitor their use

Activity D.1.6. Manage operations
Task D.1.6.1. Maintain the policy and procedures manual
Task D.1.6.2. Prepare for licensure/accreditation surveys
Task D.1.6.3. Conduct budgeting and monitor financial operations
Task D.1.6.4. Monitor staff scheduling

Activity D.1.7. Lead marketing and public relations efforts
Task D.1.7.1. Promote services to patients
Task D.1.7.2. Market services to healthcare professionals
Task D.1.7.3. Educate insurers, employers and the community
Task D.1.7.4. Participate in political action and professional activities

Activity D.1.8. Manage physical plant
Task D.1.8.1. Maintain complete records
Task D.1.8.2. Establish a security system
Task D.1.8.3. Follow state and federal regulatory agency procedures/requirements
Task D.1.8.4. Ensure compliance with environmental laws
Task D.1.8.5. Maintain equipment and supplies

Activity D.1.9. Manage billing for services
Task D.1.9.1. Establish fees
e.g., drug/device dispensing, clinical consultation, patient education/counseling, other services
Task D.1.9.2. Establish and maintain an invoicing and billing mechanism/system
Task D.1.9.3. Oversee the preparation/submission of claims
Task D.1.9.4. Reconcile claims

Class D.2. Managing Medications throughout the Health System

Activity D.2.1. Establish medication management policies and procedures
Task D.2.1.1. Develop policies/procedures for medication storage
e.g., which medications can be stored where, temperatures, controlled drug accountability
Task D.2.1.2. Develop policies/procedures for detection and disposal of outdated medications
Task D.2.1.3. Develop policies/procedures for medication administration and charting
Task D.2.1.4. Establish policies/procedures for drug recalls
Task D.2.1.5. Make decisions regarding use of automated dispensing systems
Task D.2.1.6. Develop policies/procedures for emergency drug kits and crash carts
Task D.2.1.7. Develop policies/procedures for use of non-formulary/home medications throughout the system

Task D.2.1.8. Develop policies/procedures for use of sample drugs throughout the system
Task D.2.1.9. Develop policies/procedures for use of investigational drugs
e.g., Institutional Review Board participation, protocol review/development, drug accountability

Activity D.2.2. Ensure compliance with policies and procedures
Task D.2.2.1. Schedule medication room inspection
Task D.2.2.2. Observe medication administration
Task D.2.2.3. Monitor quality assurance audits, communications and improvements
Task D.2.2.4. Provide education for health system personnel on medication policies and procedures

Class D.3. Managing the Use of Medications within the Health System

Activity D.3.1. Implement drug utilization management
e.g., produce and assess drug utilization data
Task D.3.1.1. Develop and maintain the formulary/preferred drug list
Task D.3.1.2. Conduct drug utilization review
Task D.3.1.3. Perform medication use evaluation
Task D.3.1.4. Design/produce utilization reports
Task D.3.1.5. Implement programs to improve patterns of utilization
Task D.3.1.6. Measure the impact of program improvements and monitoring systems

Activity D.3.2. Design and implement disease and drug therapy management programs
Task D.3.2.1. Establish, participate in and monitor disease state management programs
Task D.3.2.2. Establish, participate in and monitor clinical practice guidelines/critical pathways
Task D.3.2.3. Develop/monitor prior authorization procedures

Activity D.3.3. Participate in quality assessment/improvement activities
Task D.3.3.1 Identify, assess and report adverse drug reactions/drug product problems
Task D.3.3.2. Identify, assess and report medication errors
Task D.3.3.3. Conduct, document and report clinical consultations/interventions
Task D.3.3.4. Provide and document drug information services
e.g., drug names, manufacturer information, relevant literature, question evaluation and conclusion
Task D.3.3.5. Establish screening protocols and conduct regular monitoring

Appendix B: Review of Patient Safety Literature in Pharmacy

Citation	Methodology	Findings		
		Error Type and Rate	**Pharmacy Factors**	**Pharmacist Factors**
Guernsey et. al (1983)	A 12-day peer review audit of prescriptions at an outpatient hospital pharmacy.	12.4% **dispensing error** rate, 1.5% errors were clinically significant	Number of prescriptions filled by the pharmacist directly related to number of errors made	None
McGhan et. al (1983)	A randomized control trial to compare dispensing error rates for pharmacists and technicians at an outpatient hospital pharmacy. Pharmacists filled a total of 929 prescriptions and the technicians filled 1055 prescriptions.	Pharmacists had a 5.17% **dispensing error** rate whereas technicians had a 4.17% error rate. Difference was not significant	None examined	None
Buchanan et. al (1991)	A 21 day peer review audit and undisguised observations of dispensing error rate under three levels of illumination in a high volume outpatient pharmacy	3.69% **dispensing error** rate	Illumination level of 146 ft.candles was associated with low error rates. Pharmacist workload directly related to number of errors made	None examined
Kistner et. al (1994)	A 12 day peer review audit of prescriptions at an outpatient hospital pharmacy	12.5% **dispensing error** rate, 1.6% errors were clinically significant	No association found between work volume and number of errors made by the pharmacist	None examined
Allan et. al (1995)	100 community pharmacies randomly selected from designated metropolitan regions in New Jersey, New York and Florida were visited by a shopper to fill a prescription for either Coumadin (Warfarin), Tegretol or Theodur. Shoppers presenting prescription for Coumadin also purchased a bottle of aspirin.	Excluding label errors, the overall **dispensing error** rate was found to be 24%. 4% errors were found to be clinically significant. In 32% of the visits where the shopper presented the prescription for Coumadin and also purchased aspirin, the pharmacist did not stop the customer from buying aspirin	None examined	None examined

		(co-prescription error).		
Cavuto et. al (1996)	50 community pharmacies in Washington D. C were visited by a shopper to determine whether they would fill simultaneously presented prescriptions of terfenadine and erythromycin.	**Co-prescription errors**- 32% pharmacies filled prescriptions without any comment	Chain pharmacies were more likely to provide information. Computerized screening programs were present in 48 of 50 pharmacies, and were found to be ineffective in preventing co prescription errors	None examined
Allan et. al (1999)	1 ambulatory care pharmacy-14 pharmacists and 10 technicians were videotaped as they filled prescriptions during a 23 day period.	3.23% **dispensing errors**, majority label errors (80%)	Interruptions and distractions were found to be associated with dispensing errors	Pharmacists distractibility measured by GEFT scores were significantly related to errors
Flynn et. al (2003)	50 community and health system pharmacies located in six cities across US, 100 prescription orders were observed (undisguised) for 1 day at each pharmacy for dispensing errors.	3.2% **dispensing error** rate for new prescriptions, 0.4% dispensing error rate for refill prescriptions	Error rate did not vary by types of pharmacy	None examined

Appendix C: Review of Pharmacist Practice Behaviors in Patient Counseling Literature

C.1. Telephone Interview Studies of RPh-Patient Communication

Citation	Design -Method	Sample: -Who studied -Where -Sample Size	Terminology Used	Definition and Measurement (If Rx presented, type and name of medications)
Morris (1982)	Interviews via Phone	**Patients** 1223 adults, national probability sample	Counseling	Information received for the last prescription (new and/or refill)
Morris et. al (1984)	Interviews via Phone	**Patients** 1104 patients, national probability sample	Counseling	Information discussed for a new prescription obtained in the last four weeks
Morris et. al (1997)	Interviews via Phone	**Patients** 1992- 1023 patients, national probability sample 1994- 1000 patients, national probability sample	Counseling	Information communicated about the new Rx obtained in the last four weeks?
Moore et. al (1983)	Interviews via Phone	**Patients** 1223 patients, national probability sample	Counseling	Information received for the last prescription
Wiederholt et. al (1992)	Interviews via Phone	**Patients** 2135 patients, a Wisconsin household probability sample	Counseling	Verbal information received for the last new or refill prescriptions
Erickson et. al (1998)	Interviews via Phone	**Patients** 408 patients, Michigan Medicaid recipients random sample	Counseling	Offer to Counsel defined as: Being asked if the patient wanted to talk with the pharmacist about the new prescription.
Meade (1992)	Interviews via Phone	**Pharmacists** 200 pharmacists, national probability sample	Counseling	Pharmacists' active involvement in medication counseling to improve patient understanding of their diseases, drug therapy, and drug products
Scott and Wessels (1997)	Composite Surveys Mail and Telephone	**Pharmacists** 112 Nebraska pharmacists, probability sample	Counseling	Most important information that the pharmacist tells the patient

C.2. Mail Survey Studies of RPh-Patient Communication

Citation	Design -Method	Sample: -Who studied -Where -Sample Size -Demographics	Terminology Used	Definition and Measurement (If Rx presented, type and name of medications)
Carroll and Gagnon (1983)	Mail Surveys	**Patients** 144 patients, Raleigh, NC household probability sample	Counseling	How frequently patients were provided with five counseling services when they last presented a new prescription and whether this service were voluntary and was the RPh available.
Gannon (1990)	Mail Surveys	**Patients** 601 patients, national probability sample	Counseling	Verbal and written information received for last new prescription when any information was given
Kirking (1982), (1984)	Mail Surveys	**Pharmacists** 506 pharmacists, Ohio retail pharmacists, probability sample	Counseling	It was measured as the information pharmacists **usually** conveyed= to patients for Warfarin, Sulfisoxizole, and Amitriptyline
Ascione (1985)	Mail Surveys	**Pharmacists** 234 Michigan community pharmacists, probability sample	Education	Information pharmacists provided **frequently** for new prescriptions
Pugh (1995)	Mail Surveys	**Pharmacists** 157 Virginia Medicaid community pharmacists, probability sample	Counseling	Information pharmacist provided for each prescription
Rumore et. al (1995)	Mail Surveys	**Pharmacists** 187 New York City based community pharmacists and interns, nonprobability sample	Counseling	Information pharmacist discussed when each medication dispensed
Barnes et. al (1996)	Mail Surveys	**Pharmacists** 156 Massachusetts community pharmacists, probability sample	Counseling	Types of information patients received from a pharmacist when the Rx was dispensed
Coleman (2003)	Mail Surveys	**Pharmacists** 375 community pharmacists, national probability sample	Interpersonal Communication	Talking with consumers about antibiotics

C.3. Nonparticipant Observer Studies of RPh-Patient Communication

Citation	Design -Method	Sample: -Who studied -Where -Sample Size -Demographics	Terminology Used	Definition and Measurement (If Rx presented, type and name of medications)
Berardo et. al (1989)	Observation 3 trained Observers observed a total of 381 dispensing encounters pre-intervention and 954 encounters post intervention	**RPh-Pt. Interaction** 8 pharmacists with 214 patients at 8 pharmacies in Florida, nonprobability sample	Education; Counseling	Quantity and quality of information discussed between the RPh and patient when an Rx is dispensed. Consultation is defined as provision of information about medication beyond discussion of cost, a statement of number of tablets dispensed or the number of refills remaining. Quality of communication assessed by: Interpersonal manner (Greeting, Calls by name, Small Talk), Style of Presentation (Authoritative, Rude, Neutral, Friendly), Speaking Rate (Fast, Neutral), Speaking Manner (Hurried, Relaxed, Anxious, Physical Distress, Eye contact and Farewell) for both the patient and the RPh.
Raisch (1993)	Observation and Self-Reports Four students were trained to observe each pharmacists counseling activities	**RPh-Pt. Interaction** 23 pharmacists in New Mexico pharmacies, nonprobability sample	Counseling	Discussion of drug or health topic for each drug dispensed. Counseling rates were calculated for each pharmacist by dividing the number of counseling events by number of Rx's.

Schommer (1994), (1995), Schommer and Wiederholt (1995) and (1997)	Observation 1 trained observer observed a total of 360 RPh-Pt encounters	**RPh-Pt. Interaction** 23 pharmacists with 360 patients at 12 pharmacies in SE Wisconsin, nonprobability sample	Communication	Communication defined as any face-to-face verbal communication between the RPh and patient. Components of communication measured: Occurrence of communication-measured by observing whether communication took place or not; Length of communication-measured by timing, the # of seconds RPh and patients engaged in face-to-face communication about medications or health and Content of communication measure as types of information verbalized during communication
Perri et. al (1995)	Observation Trained student observers observed a total of 2,982 encounters in the pre-OBRA'90 period and 2,208 encounters in the post-OBRA'90 period.	**RPh- Pt. Interaction** 12 Georgia pharmacies	Counseling	Frequency of behaviors: collect patient information, performing prospective DUR, and conducting patient counseling and the time required for each.
Sleath (1995)	Observation Three trained observers observed a total of 344 RPh-Pt. encounters	**RPh-Pt. Interaction** 8 Bernalillo County, New Mexico pharmacies	Communication	Whether the patient interacted with a pharmacist and the number and content of questions that pharmacist asked patients

Sleath (1996)	Observation Three trained observers observed a total of 344 RPh-Pt. encounters	**RPh-Pt. Interaction** 8 Bernalillo County, New Mexico pharmacies	Communication	Extent of pharmacists use of a participatory approach measured as: 1. Number of patient questions, 2. Number of RPh open-ended and closed ended Q., 3. How RPh greets the patient, 4. Whether the RPh identifies himself/herself to the patient, 5. Whether the RPh says goodbye to the patient, 6. Number of times the RPh interrupts and ignores the patient, 7. Number of times the RPh seems rushed A +1 score was given for each occurrence of the following: Number of patient questions, How RPh greets the patient, Whether the RPh identifies himself/ herself to the patient, Whether the RPh says goodbye to the patient. A –1 score was given for each occurrence of the following: pharmacist interrupts patients, pharmacist ignores patient, and pharmacist seems rushed.
Fritsch and Lamp (1997)	Observation +Mail Survey Observation: Five student pairs observed a total of 106 pharmacist-patient interactions Mail Survey: 31 pharmacists	**RPh-Pt. Interaction** 46 Kansas city pharmacies; random sample **Pharmacists** 31 pharmacists at 31 Kansas city pharmacies	Counseling	Counseling Type: Written Information provided, detailed verbal counseling provided (four or more components of therapy information) or general verbal (fewer than four components of the therapy information) Time counseled Question Type Therapy Information

C.4. Shopper studies on RPh-Patient Communication

Citation	**Design** **-Method**	**Sample:** **-Location** **-Sample Size**	**Terminology Used**	**Definition and Measurement** **(If Rx presented, type and name of medications)**
Ross et. al (1981)	Shopper Shopper presented Rx under a prospective single-blind condition; all Rx presented during a single visit	**RPh-Pt. Interaction** 95 encounters in 95 urban pharmacies in three Midwestern states, probability sample	Counseling Practices	Any oral and/or written communication, including auxiliary labels provided by the pharmacist for tetracycline, ferrous sulphate, chlorpromazine and sulfisoxazole. **Scoring:** 2 points for voluntary counseling, 1 point for each piece of information If information contradictory to optimal counseling criteria, one point was deducted
Mason (1983), Mason and Svarstad (1984)	Shopper Two different shoppers presented Rx under a prospective single-blind condition; two visits	**RPh-Pt. Interaction** 80 encounters in 40 rural Wisconsin pharmacies, probability sample	Counseling Behavior	Verbal and written instruction, interviewing, approachability of the pharmacists when a new Actifed or Tetracycline prescription were presented **Scoring**: Interviewing Index- 2 points for open ended Q., 1 point for closed ended Q. Written Instruction Index- one point each for 17 categories of typewritten and auxiliary labeling information. Verbal Instruction Index- one point for each of the 17 categories of information Approachability Index- positive and negative points for greeting, tone of voice, general manner, speaking rate, facial expression, small talk, and bidding farewell. Total Interaction Time- number of seconds spent talking
Campbell et. al (1989)	Shopper One shopper presented the Rx to the pharmacist under a prospective single- blind condition	**RPh-Patient Interaction** 195 encounters in 195 Washington pharmacies, probability sample with judgment replacement	Counseling	Whether the RPh engaged in patient-information provision service and good interpersonal manners when the patient presented a prescription of tetracycline or panmycin. **Scoring:** whether or not pharmacist engages in services such as meeting the patient, explaining directions, counsel patients, warn patients, interpersonal manner (friendly, willing to answer Q., interested, helpful, confident, empathetic, supportive or encouraging)

Mickle et. al (1990)	Shopper Patient-Investigator (shopper) presented Rx to the pharmacist under a prospective single blind condition	**RPh-Pt. Interaction** 52 encounters in 52 Tennessee pharmacies, probability sample	MDI Education	Pharmacists' practice with regard to patient education, instruction and demonstration of MDI technique when patient presented a prescription of Albuterol MDI. **Scoring**: whether the RPh instructed, demonstrated, and observed the PI on correct technique
Eng et. al (1991)	Shopper and Observer Three teams of shopper-observer (2 in each team) presented three medical complaints and ask RPh for recommendations under a prospective single blind condition; three visits per pharmacy	**RPh-Pt. Interaction** 63 encounters in 21 NE and North Central Florida pharmacies, selected on the basis that pharmacists had engaged in prescribing	Self-Care Consultation	Assessment and answering questions posed by the patient, provision of information and quality of communication by the pharmacist when a patient presented a minor complaint such as head lice, burning sensation with urination and leg cramps for a patient with heart condition. **Scoring:** Patient Data Collection: 9 items required under law, Quality of communication assessed as manner of communication and environmental condition under which it takes place, Counseling: assessment of information provided by the pharmacists
Barnett et. al (1992)	Shopper Six shoppers presented one of the two medical complaints asking RPh for recommendations under a prospective single blind condition; two visits per pharmacy	**RPh-Pt. Interaction** 156 encounters in 84 Atlanta pharmacies, random sample	OTC Drug Consultation	Message content and context assessed by the line of questioning pursued when faced with OTC requests, recommendations, provision of information for OTC drug and communication skills **Scoring**: communication skills such as eye contact, posture, paralanguage, friendliness, accessibility, and appearance measured on a five-point Likert scale. Listening was measured using an assessment of the verbal response to an expression of worry and tone of response. Line of questioning assessment included a yes/no checklist
Allan et. Al (1995)	Shopper Three shoppers presented a Rx order for either Coumadin, Tegretol or Theo-Dur under a prospective single blind condition	**RPh-Pt. Interaction** 100 encounters in 100 pharmacies from metropolitan areas of New Jersey, New York, and Florida	Counseling; Quality of counseling	Encounter between Pt. and RPh for the oral or written communication of Rx related information Quality defined as percentage of OBRA'90 categories covered

LamSam and Kropff (1998)	Shopper Two shoppers presented one of the four medical complaints asking RPh for recommendations under a prospective single blind condition; 2 visits per pharmacy	**RPh-Pt. Interaction** 202 encounters in 101 Greater Pittsburgh area pharmacies, random sample	Quality of care	Pharmacists interpersonal skills, assessment skills and treatment recommendations when shopper presented a medical complaint for self/other **Scoring:** Communication skills such as pharmacist is pleasant, friendly, not too busy, willing to help me, has my best interest, treats me with respect assessed on a five point Likert scale. Patient assessment included a yes/no checklist
Svarstad et. al (2003)	Shopper Shopper presented Rx under a prospective single-blind condition; all Rx presented during a single visit	**RPh-Pt. Interaction** 306 encounters in 306 pharmacies across eight states; random sample	Counseling	Nature and extent of oral counseling defined as pharmacists' verbal interaction with the patient, and/or provision of information and/or asking questions to the patient presenting Rx for amoxicillin, ibuprofen and paroxetine. **Scoring:** Dichotomous coding (0= No, 1=Yes) for whether a pharmacist talked or had any verbal interaction with the shopper, whether a pharmacist or other staff mentioned one or more informational topics about any of the three drugs, whether a pharmacist or other staff mentioned any risk information, whether a pharmacist or other staff asked any questions to assess the shopper's understanding of the prescriptions, such as prior use, communication with the doctor etc. Mean number of informational items per drug: range 0-7
Schatz et. Al (2003)	Shopper (termed as Monitor in the study) Shopper presented a Rx of hydrochlorothiazide under a prospective single-blind condition	**RPh-Pt Interaction** 70 prescriptions in 70 NW Ohio and SE Michigan community and online pharmacies; convenience sample	Counseling; Provision of information	Whether the RPh engaged in patient-information provision service; the number and type of information categories provided by pharmacist; counseling index scores presented. **Scores:** based on the number of information categories provided by the RPh

C.5. Audio-Analysis of RPh-Patient Communication

Citation	**Design** **-Method**	**Sample:** **-Who studied** **-Where** **-Sample Size**	**Terminology Used**	**Definition and Measurement** **(If Rx presented, type and name of medications)**
Evans and John (1995)	Audio-recordings RPh wore a small radio microphone. Sign in the pharmacy indicated research and provided patients with an option to opt-out of the study	**RPh-Pt. Interaction** 60 encounters in five North Carolina Triangle area pharmacies; judgment sample	Counseling	Information offered and questions asked by the pharmacist. Information item defined as a phrase which standing alone can be considered meaningful. Classified as: Procedural advice, Contingent procedural advice, Condition information, Medication information Questions classified by 1) subject such as health condition, medications, contextual questions or general questions and 2) by type of questions such as closed ended/open ended/ leading questions

Appendix D: Factors Associated with Pharmacist Practice Behaviors in Patient Counseling Literature

Citation	Patient Factors	Work Environment Factors	Pharmacist Factors	Other Factors
Dickson and Rodowskas (1975)	X	Staffing (Rx/Technician ratio); Rx Volume	X	X
Jang (1975)	X	X	X	Location (Urban/Rural)
Watkins (1975)	X	X	Pharmacist knowledge	X
Beardsley (1977)	X	Privacy	X	X
Ludy (1977)	X	X	X	Practice Setting
Mason (1979,1984)	X	Work-week Length Subjective Norms	Role Orientation (CRO); Number of Years of Practice	X
Carroll (1983)	Education; Rx cost	X	X	X
Moore (1983)	Patient Age; Type of Rx	X	X	X
Kirking (1983)	Type of Rx	Rx dispensed/hr Subjective Norms	Pharmacist Attitudes Year of Graduation Position Prior Counseling Behavior	Practice Setting
Ascione (1985)	Type of Rx Patient Request for Information	X	Perception of Patient Interest/Need	X
Berardo et. al (1989)	X	Busyness	X	X
Campbell (1989)	X	X	X	Practice Setting
Mickle (1990)	X	X	X	Practice Setting
Wiederholt (1992)	Patient Age Type of Rx	X	X	X
Raisch (1993)	Payment Type Type of Rx	X	X	Practice Setting
Schommer (1994)	Patient Age Patient Gender Role Orientation	X	Role Orientation (CRO)	Interrole Congruence
Schommer (1995)	Privacy Importance of Information Role orientation	Privacy Lack of Time	Role Orientation (CRO) Importance of Information	Rx Transfer
Sleath (1995)	Ethnicity # of Rx	Busyness	X	X
Schommer (1996)	Patient Age Patient Gender Question Asking Behavior	X	X	X
Barnes (1996)	X	Workload	Pharmacist Attitudes Financial Compensation	X
Coleman (2003)	X	Rx dispensed/day Hours worked/day Social Norms	Pharmacist Attitudes	Practice Setting
Svarstad (2003)	X	Busyness	Pharmacist Age	State Regulation

Appendix E: Cover Letter to the Manager

Dear Pharmacy Manager,

You are invited to participate in a research study about pharmacist practice behaviors and turnover intentions. Specifically, we are interested in understanding how work environment factors (such as workload, technician attitudes, pharmacy culture, patient behaviors etc.) influence their practice such as interactions with patients, satisfaction with their job and turnover intentions. For our research, we have randomly selected community pharmacies across eight counties in Wisconsin. Your pharmacy was selected as one of the sites where we would like to contact the staff pharmacist, technician and 10 patients for their consent to participate in the study. However, before we contact the participants, we would like your consent. Your consent is key to enrolling a representative group of pharmacies necessary to collect valid results.

Are there any benefits to you?

There is a potential benefit to you from this research. Pharmacist shortages and turnover intentions have been issues for most pharmacies. Our results will help suggest potential factors in the pharmacy work environment that affect pharmacist turnover and satisfaction. Hopefully, such an insight will help inform your efforts to recruit and retain pharmacists.

What will the pharmacist, technician and patient participation involve?

Each participant (pharmacist, technician and patient) will be asked to complete a survey questionnaire (please see attached surveys and consent forms). These questionnaires will require approx. 5 minutes of their time and will be administered at the convenience of the participants.

Are there any risks to you? How will confidentiality be protected?

We would like to assure you that there are no study risks to you, the pharmacy staff or the patients at your pharmacy. While there will be publications and presentations as a result of this study, only group characteristics will be published and presented. Your name, name of the study sites or name of the participants will not be used. We assure you **complete confidentiality.** All data collected as part of this study will be kept **anonymous** and will in no way be linked to any identifiers. All information will be kept with no attached identifiers in a locked file. It is important to note that your decision to provide consent and the participation of the pharmacist and technician in this study are completely voluntary. Your decision to participate or not to participate will in no way affect your relationship with your employers or with the University of Wisconsin-Madison.

We will contact you personally in a few days to request your cooperation and answer any questions you may have. We thank you for your consideration.

Sincerely,

Bupendra Shah RPh, MS
Doctoral Candidate
Email: bkshah@pharmacy.wisc.edu
Ph: 404-542-9318

Betty Chewning, PhD
Associate Professor
Email: bachewning@pharmacy.wisc.edu
Ph: 608-263-4878

Appendix F: Pharmacist Consent Form

Dear Pharmacist,

You are invited to participate in a research study about your working environment and its effects on your practice behaviors. Specifically, we are interested in understanding how factors in your working environment (such as workload, technician attitudes, pharmacy culture, customer time pressure and behavior) influence your practice behaviors such as interaction with patients, satisfaction with your job and turnover intentions. For our research, we have randomly selected community pharmacies across eight counties in Wisconsin. Your pharmacy was selected as one of the sites and your manager has provided us with the permission to contact you for consent. .

What will your participation involve?

Your participation will involve a personal interview with the researcher and filling out a survey questionnaire. Your participation will require no more than 10 minutes of your time. The researcher will carry out interviews at a time that is convenient to you. During this visit to the pharmacy, the researcher may also make observations about the patient's behavior when interacting with you.

Are there any risks to you?

We would like to assure you that there are no risks to your participation in this study. It is important to note that your decision to provide consent and participate in this study is completely voluntary. We would like to assure you **complete confidentiality.** All data collected as part of this study will be kept **anonymous** and will in no way be linked to any identifiers. Your decision to participate or not to participate will in no way affect your relationship with your employers or with the University of Wisconsin-Madison.

How will confidentiality be protected?

While there will be publications and presentations as a result of this study, your name or the name of the study sites will not be used. Only group characteristics will be published and presented. If you have any questions about your rights as a research participant you should contact the Social and Behavioral Sciences Institutional Review Board at 608-263-2320.

Are there any benefits to you?

The results of this study will help us identify work environment variables that affect pharmacists' practice behaviors. Our understanding of such variables will enable us to develop strategies that can be used to improve your quality of work life. If you have any questions about the research project please contact Bupendra Shah at 608-262-6534 or Betty Chewning at 608-263-4878.

Thank you,

Bupendra Shah RPh, MS	Betty Chewning, PhD
Doctoral Student	Associate Professor

Consent: I, agree to participate in the research project described above. My signature also indicates I have received a copy of this consent form.

_____(Signature) _____ (Date)

Appendix G: Pharmacist Work Environment Survey

A Pharmacist Survey on Pharmacy Work Environment

INSTRUCTIONS:

1. **This survey asks for your opinions about different aspects of your job at this pharmacy. It will take about 5 minutes to complete.**
2. **Please answer all the questions or statements by filling in the appropriate circle. Your responses will remain confidential and will only be presented in an aggregated manner.**
3. **If you would like a brief summary of results, please contact Bupendra Shah at 404-542-9318 or email: bkshah@pharmacy.wisc.edu**

SECTION I: About You

1. Gender: O Male O Female
2. Age: _____yrs.
3. Typically, how many actual **hours per week** do you work in this pharmacy? _____Hours.
4. Typically, how many staff is present during your work schedule?
   _____# of Pharmacists _____# of Technicians
5. Typically, how many prescriptions do **you personally** check or dispense during a busy and a non-busy day?
   _____Rx/**Busy** day
   _____Rx/**Non-Busy** day
6. The year you got your practice license: _____ (e.g. 1980)
7. Do you serve as a mentor for pharmacy students at this site: O Yes O No

SECTION II: Patient Services: Please indicate your agreement with following statements by filling in the appropriate circle.

	Strongly Disagree ▼	Disagree ▼	Neutral ▼	Agree ▼	Strongly Agree ▼
a. The physician is better qualified than the pharmacist to advise patient about their medications.....	①	②	③	④	⑤
b. It takes too much time to counsel patients on the medications they receive.....	①	②	③	④	⑤
c. Most patients are more interested in receiving quick and inexpensive service from their pharmacist than advice	①	②	③	④	⑤
d. It is essential for the pharmacist to advice patients about potential side effects that their drugs may cause.....	①	②	③	④	⑤
e. A prescription's label and auxiliary labeling contains all the information about the drug that the patient should receive from the pharmacist.....	①	②	③	④	⑤
f. Patients receive the necessary information about the safety of their medications from their prescriber.....	①	②	③	④	⑤
g. There should be legal restrictions on what the pharmacist is allowed to tell patients about medications	①	②	③	④	⑤
h. It is unethical to discuss with a patient the therapeutic purpose of his or her prescriptions.....	①	②	③	④	⑤
i. When the pharmacist is very busy, it is ok for the technician to hand the prescription to the patient.....	①	②	③	④	⑤
j. When the patient does not have questions for the pharmacist, it is ok for the technician to hand the prescription to the patient.....	①	②	③	④	⑤
k. When the patient is in a hurry, it is ok for the technician to hand the prescription to the patient.....	①	②	③	④	⑤
l. It is not important for the pharmacist to open the prescription bottle and show it to the patient.....	①	②	③	④	⑤
m. It is illegal for technicians to hand the prescription to the patient	①	②	③	④	⑤
n. Pharmacist provided patient counseling is not important for enhancing patient safety	①	②	③	④	⑤

SECTION III: About Your Patients: Please indicate your agreement with the following statements.

	All of the time ▼	Most of the time ▼	Sometimes ▼	Rarely ▼	Never ▼
. Customers/patients at this pharmacy seem to be in a rush when they pick up their medications.....	①	②	③	④	⑤
. Picking up their medications seems to be a real burden on the time of my customers/patients.....	①	②	③	④	⑤

SECTION IV: Patient Safety at Your Pharmacy:

1. Number of checks made for each prescription so that the right patient gets the right prescription:

   Only manual checks (Does not involve any use of technology): _____# of checks/Rx
   Technology checks (Such as scanning Rx and matching it with the bottle):_____# of checks/Rx

2. **In the past 12 months,** how many dispensing errors have occurred at your pharmacy? _____

SECTION V: About Your Pharmacy: Mark your answer by filling in the circle.

In this pharmacy.....	All of the time ▼	Most of the time ▼	Sometimes ▼	Rarely ▼	Never ▼
1. People support one another	①	②	③	④	⑤
2. We have enough trained staff to handle the workload	①	②	③	④	⑤
3. When a lot of work needs to be done quickly, we work together as a team to get the work done	①	②	③	④	⑤
4. People treat each other with respect	①	②	③	④	⑤
5. Pharmacists work longer hours than is best for patient care	①	②	③	④	⑤
6. More untrained technicians are used than is best for patient care	①	②	③	④	⑤
7. Staff will freely speak up if they see something that may negatively affect patient care	①	②	③	④	⑤
8. Staff feel free to question the decisions or actions of those with more authority	①	②	③	④	⑤
9. It is just by chance that serious mistakes don't happen	①	②	③	④	⑤
10. When the pharmacist(s) get(s) really busy, others help out	①	②	③	④	⑤
11. Staff are afraid to ask questions when something does not seem right	①	②	③	④	⑤
12. Pharmacists work in "crisis mode" having to do too many things	①	②	③	④	⑤
13. Patient safety is never sacrificed to get more work done	①	②	③	④	⑤
14. We have patient safety problems	①	②	③	④	⑤
15. The procedures and systems are good at preventing errors from happening	①	②	③	④	⑤
16. Pharmacy management provides a work climate that promotes patient safety	①	②	③	④	⑤
17. The actions of pharmacy management show that patient safety, not productivity, is a top priority	①	②	③	④	⑤
18. Pharmacy management seems interested in patient safety only after an adverse event happens	①	②	③	④	⑤

SECTION VI: Grade

Give your pharmacy an overall grade on..	Excellent ▼	Very Good ▼	Acceptable ▼	Poor ▼	Very Poor ▼
a. The environment for patient safety	①	②	③	④	⑤
b. The counseling provided to the patients	①	②	③	④	⑤

SECTION VII: Workload

1. During **regular** times, how would you rate the level of workload in your pharmacy?

- O Very High (Often unmanageable with the number of staff present)
- O High (Staff is just able to manage it)
- O About Right (Staff is able to manage it comfortably)
- O Low (Staff has too much time at hand)

2. During **busy** times, how would you rate the level of workload in your pharmacy?

- ↄ Very High (Often unmanageable with the number of staff present)
- ↄ High (Staff is just able to manage it)
- ↄ About Right (Staff is able to manage it comfortably)
- ↄ Low (Staff has too much time at hand)

SECTION VIII: Ability of Staff: Rate the ability of your current staff (technicians) in handling problems (e.g. insurance problems)

- O Not at all able (You end up handling most problems)
- O A little able (They handle the easy problems, you handle the tough ones)
- O Somewhat able (They are able to handle most problems, not all the problems)
- O Very able (They are able to handle all the problems)

SECTION IX: Satisfaction with Your Job and Career in Pharmacy

In general, how satisfied are you with:	Very Dissatisfied ▼	Dissatisfied ▼	Neither ▼	Satisfied ▼	Very Satisfied ▼
a. your present job	①	②	③	④	⑤
b. the progress that you are making towards the goals that you set	①	②	③	④	⑤
c. the chance your job gives you to engage in patient care	①	②	③	④	⑤
d. your present job in light of your career expectations	①	②	③	④	⑤
e. your present job when you consider expectations you had when you took the job.....	①	②	③	④	⑤

SECTION X: Future Work Plans

How likely is that you will:	Very Unlikely ▼	Somewhat Unlikely ▼	Neutral ▼	Somewhat Likely ▼	Very Likely ▼
a. think about leaving your current employment within the next year.....	①	②	③	④	⑤
b. search for other employment within the next year	①	②	③	④	⑤
c. actually leave the current employment within the next year.....	①	②	③	④	⑤

Appendix H: Technician Consent Form

Dear Technician,

You are a very important and integral part of the pharmacy team that influences the services provided by the pharmacist. Therefore, we would like to invite you to participate in our study about the influence of pharmacists' practice behavior. Specifically, we are interested in understanding how factors in your working environment influence pharmacists' practice behaviors such as interaction with patients, satisfaction with their job and turnover intentions. For our research, we have randomly selected community pharmacies across eight counties in Wisconsin. Your pharmacy was selected as one of the sites and your manager has provided us with the permission to contact you for your consent to participate in the study.

What will your participation involve?

Your participation will involve a personal interview with the researcher and filling out a survey questionnaire. Your participation will require no more than 10 minutes of your time. The researcher will carry out interviews at a time that is convenient to you.

Are there any risks to you?

We would like to assure you that there are no risks to your participation in this study. It is important to note that your decision to provide consent and participate in this study is completely voluntary. We would like to assure you **complete confidentiality.** All data collected as part of this study will be kept **anonymous** and will in no way be linked to any identifiers. Your decision to participate or not to participate will in no way affect your relationship with your employers or with the University of Wisconsin-Madison.

How will confidentiality be protected?

While there will be publications and presentations as a result of this study, your name, name of the study sites or name of the pharmacist participating in the study will not be used. Only group characteristics will be published and presented. If you have any questions about your rights as a research participant you should contact the Social and Behavioral Sciences Institutional Review Board at 608-263-2320.

Are there any benefits to you?

The results of this study will help us identify work environment variables that affect pharmacists' practice behaviors. Our understanding of such variables will enable us to develop strategies that can be used to improve the quality of your work life. If you have any questions about the research project please contact Bupendra Shah at 608-262-6534 or Betty Chewning at 608-263-4878.

Thank you,

Bupendra Shah RPh, MS Doctoral Student	Betty Chewning, PhD Associate Professor

Consent: I, agree to participate in the research project described above. My signature also indicates I have received a copy of this consent form.

_____(Signature) _____ (Date)

Appendix I: Technician Work Environment Survey

A Technician Survey on Pharmacy Work Environment

INSTRUCTIONS:

1. **This survey asks for your opinions about different aspects of your job at this pharmacy. It will take about 10 minutes to complete.**
2. **Please answer all the questions or statements by filling in the appropriate circle. Your response will remain confidential and will only be presented in an aggregated manner.**
3. **If you would like a brief summary of results, please contact Bupendra Shah at 404-542-9318 or email: bkshah@pharmacy.wisc.edu**

SECTION I: About You

1. Gender: O Male O Female
2. Age: _____yrs.
3. Ethnic or Racial Background: _____
4. Are you a certified technician: O Yes O No
5. Have you worked in another pharmacy before? O Yes O No
6. How long have you worked at this pharmacy? _____yrs.
7. Typically, how many actual hours per week do you work in this pharmacy? _____Hours.

THE UNIVERSITY of WISCONSIN MADISON

SECTION II: About Patient Services: Please indicate your agreement with the following statements. Mark your answer by filling in the circle.

	Strongly Disagree ▼	Disagree ▼	Neutral ▼	Agree ▼	Strongly Agree ▼
a. The physician is better qualified than the pharmacist to advise patient about their medications.....	①	②	③	④	⑤
b. It takes too much time to counsel patients on the medications they receive.....	①	②	③	④	⑤
c. Most patients are more interested in receiving quick and inexpensive service from their pharmacist than advice	①	②	③	④	⑤
d. It is essential for the pharmacist to advice patients about potential side effects that their drugs may cause.....	①	②	③	④	⑤
e. A prescription's label and auxiliary labeling contains all the information about the drug that the patient should receive from the pharmacist.....	①	②	③	④	⑤
f. Patients receive the necessary information about the safety of their medications from their prescriber.....	①	②	③	④	⑤
g. There should be legal restrictions on what the pharmacist is allowed to tell patients about medications	①	②	③	④	⑤
h. It is unethical to discuss with a patient the therapeutic purpose of his or her prescriptions.....	①	②	③	④	⑤
i. When the pharmacist is very busy, it is ok for the technician to hand the prescription to the patient...	①	②	③	④	⑤
j. When the patient does not have questions for the pharmacist, it is ok for the technician to hand the prescription to the patient.....	①	②	③	④	⑤
k. When the patient is in a hurry, it is ok for the technician to hand the prescription to the patient.....	①	②	③	④	⑤
l. It is not important for the pharmacist to open the prescription bottle and show it to the patient.....	①	②	③	④	⑤
m. It is illegal for technicians to hand the prescription to the patient	①	②	③	④	⑤
n. Pharmacist provided patient counseling is not important for enhancing patient safety.....	①	②	③	④	⑤

SECTION III: About Your Patients: Please indicate your agreement with the following statements.

	All of the time ▼	Most of the time ▼	Sometimes ▼	Rarely ▼	Never ▼
a. Customers/patients at this pharmacy seem to be in a rush when they pick up their medications.....	①	②	③	④	⑤
b. Picking up their medications seems to be a real burden on the time of my customers/patients.....	①	②	③	④	⑤

SECTION IV: About Your Pharmacy: Mark your answer by filling in the circle.

In this pharmacy.....	All of the time ▼	Most of the time ▼	Sometimes ▼	Rarely ▼	Never ▼
1. People support one another	①	②	③	④	⑤
2. We have enough trained staff to handle the workload	①	②	③	④	⑤
3. When a lot of work needs to be done quickly, we work together as a team to get the work done	①	②	③	④	⑤
4. People treat each other with respect	①	②	③	④	⑤
5. Pharmacists work longer hours than is best for patient care	①	②	③	④	⑤
6. More untrained technicians are used than is best for patient care	①	②	③	④	⑤
7. Staff will freely speak up if they see something that may negatively affect patient care	①	②	③	④	⑤
8. Staff feel free to question the decisions or actions of those with more authority	①	②	③	④	⑤
9. It is just by chance that serious mistakes don't happen	①	②	③	④	⑤
10. When the pharmacist(s) get(s) really busy, others help out	①	②	③	④	⑤
11. Staff are afraid to ask questions when something does not seem right	①	②	③	④	⑤
12. Pharmacists work in "crisis mode" having to do too many things	①	②	③	④	⑤
13. Patient safety is never sacrificed to get more work done	①	②	③	④	⑤
14. We have patient safety problems	①	②	③	④	⑤
15. The procedures and systems are good at preventing errors from happening	①	②	③	④	⑤
16. Pharmacy management provides a work climate that promotes patient safety	①	②	③	④	⑤
17. The actions of pharmacy management show that patient safety, not productivity, is a top priority	①	②	③	④	⑤
18. Pharmacy management seems interested in patient safety only after an adverse event happens	①	②	③	④	⑤

SECTION V: Grade

Give your pharmacy an overall grade on..	Excellent ▼	Very Good ▼	Acceptable ▼	Poor ▼	Very Poor ▼
a. The environment for patient safety	①	②	③	④	⑤
b. The counseling provided to the patients	①	②	③	④	⑤

SECTION VI: Workload

3. During **regular** times, how would you rate the level of workload in your pharmacy?

- O a. Very High (Often unmanageable with the number of staff present)
- O b. High (Staff is just able to manage it)
- O c. About Right (Staff is able to manage it comfortably)
- O d. Low (Staff has too much time at hand)

4. During **busy** times, how would you rate the level of workload in your pharmacy?

- ↄ a. Very High (Often unmanageable with the number of staff present)
- ↄ b. High (Staff is just able to manage it)
- ↄ c. About Right (Staff is able to manage it comfortably)
- ↄ d. Low (Staff has too much time at hand)

SECTION VII: Satisfaction with Your Job and Career in Pharmacy

In general, how satisfied are you with:	Very Dissatisfied ▼	Dissatisfied ▼	Neither ▼	Satisfied ▼	Very Satisfied ▼
a. your present job	①	②	③	④	⑤
b. the progress that you are making towards the goals that you set	①	②	③	④	⑤
c. the chance your job gives you to engage in patient care	①	②	③	④	⑤
d. your present job in light of your career expectations	①	②	③	④	⑤
e. your present job when you consider expectations you had when you took the job.....	①	②	③	④	⑤

SECTION VIII: Future Work Plans

How likely is that you will:	Very Unlikely ▼	Somewhat Unlikely ▼	Neutral ▼	Somewhat Likely ▼	Very Likely ▼
a. think about leaving your current employment within the next year.....	①	②	③	④	⑤
b. search for other employment within the next year	①	②	③	④	⑤
c. actually leave the current employment within the next year.....	①	②	③	④	⑤

THANK YOU FOR YOUR PARTICIPATION

Appendix J: Patient Consent Form

Dear Patient,

You are invited to participate in a research study about your interaction with the pharmacist. Specifically, we are interested in understanding how pharmacists' work environment such as workload and time pressure affects their encounter with you as well as their job satisfaction and turnover intention. For our research, we have randomly selected community pharmacies across eight counties in Wisconsin. This pharmacy was selected as one of the sites and the manager has given us permission to contact you for your consent to participate in the study.

What will your participation involve?

Your participation will involve providing the researcher consent to observe your interaction with the pharmacist and filling out a survey questionnaire. Your participation will require no more than 5 minutes of your time.

Are there any risks to you?

We would like to assure you that there are no risks to your participation in this study. It is important to note that your decision to provide consent and participate in this study is completely voluntary. We would like to assure you **complete confidentiality.** All data collected as part of this study will be kept **anonymous** and will in no way be linked to any identifiers. Your decision to participate or not to participate will in no way affect your relationship with your employers or with the University of Wisconsin-Madison.

How will confidentiality be protected?

While there will be publications and presentations as a result of this study, your name, name of the study sites or name of the pharmacist participating in the study will not be collected or used. Only group characteristics will be published and presented. If you have any questions about your rights as a research participant you should contact the Social and Behavioral Sciences Institutional Review Board at 608-263-2320.

Are there any benefits to you?

The results of this study will help us identify work environment variables that affect pharmacists' practice behaviors. Our understanding of such variables will enable us to develop strategies that can be used to improve your interaction with the pharmacist. If you have any questions about the research project please contact Bupendra Shah at 608-262-6534 or Betty Chewning at 608-263-4878.

Help us help you!

Thank you,

Bupendra Shah RPh, MS Doctoral Student	Betty Chewning, PhD Associate Professor

Oral Consent:

For researcher use only:
1. Ask patient if they are willing to participate in the study? Yes No
2. Ask patient if they are willing to provide consent to observe their interaction with pharmacist? Yes No

Appendix K: Patient Interview Questionnaire

I. Age: _____yrs.

II. For how long have you been filling your prescriptions at this pharmacy? _____

III. Please answer the following questions by placing an **(X)** wherever appropriate:

1. What type of prescription did you fill at this pharmacy **today**?
   □ New □ Refill □ Both (New and Refill)
   a. For the medications that you filled today, how long are you supposed to take them?
   □ Less than 3 months □ 3-6 months □ More than 6 months
   b. For the refill medications that you filled today, how long have you been taking them?
   (If you filled only a new prescription, skip this question and go to question number 2)
   □ Less than 6 months □ 6- 12 months □ More than a year
2. Did the pharmacist provide any information **today** about any of your prescriptions?
   □ Yes □ No (If No, go to question number 3)
   a. If yes, what type of information?
   □ Written □ Oral □ Both
   If any information provided **orally**, did the pharmacist provide information about:
   1. Side effects □ Yes□ No
   2. Interactions with food/other drugs □ Yes □ No
   3. Directions for use □ Yes□ No
3. **Today**, did the **pharmacist ask** you question (s) about your medications? □ Yes □ No
4. **Today**, did **you ask** the pharmacist question(s) about your medications? □ Yes □ No
5. For the medicine(s) you filled, how important was it for you to get counseled by the pharmacist **today** on:

	Extremely Important ▼	Very Important ▼	Somewhat Important ▼	A Little Important ▼	Not at all Important ▼
a. Side effects of the medicine.....	①	②	③	④	⑤
b. Interactions with food/other drugs	①	②	③	④	⑤
c. Directions for use.....	①	②	③	④	⑤

6. **Today**, what was the extent of privacy while you and your pharmacist were talking?

Total Privacy ***Some Privacy*** ***No Privacy***

6 5 4 3 2 1 0

7. **Today**, how rushed were you feeling while you and your pharmacist were talking?

Extremely Rushed ***Somewhat Rushed*** ***Not at all Rushed***

6 5 4 3 2 1 0

8. **Today**, how satisfied were you with the talk that you had with your pharmacist?

Extremely Satisfied ***Somewhat Satisfied*** ***Not at all Satisfied***

6 5 4 3 2 1 0

Appendix L: General Observation Tool

Pharmacy ID: _____ Date: _____
Location: _____ Time: _____

1. Is the pharmacy a 24-hour pharmacy? □ Yes □ No
2. Does the pharmacy have a drive-thru'? □ Yes □ No
3. Does the pharmacy have a dedicated counseling area? □ Yes □ No

If yes,

   a. Do you notice a pharmacist standing around it? □ Yes □ No
   b. Are there signs that identify the counseling area? □ Yes □ No

4. Does the pharmacy have a waiting area? □ Yes □ No

If yes, are there any educational materials in the seating area? □ Yes □ No

Subjective Assessment of Busyness: (Ask Pharmacist every hour)

Hr 1:

Extremely Busy		Somewhat Busy			Not at all Busy	
6	5	4	3	2	1	0

Hr 2:

Extremely Busy		Somewhat Busy			Not at all Busy	
6	5	4	3	2	1	0

Hr 3:

Extremely Busy		Somewhat Busy			Not at all Busy	
6	5	4	3	2	1	0

Hr 4:

Extremely Busy		Somewhat Busy			Not at all Busy	
6	5	4	3	2	1	0

Hr 5:

Extremely Busy		Somewhat Busy			Not at all Busy	
6	5	4	3	2	1	0

Appendix M: Patient Specific Observation Tool

Pt. #_____

Pharmacy ID: _____ Date:_____
Location: _____ Time:_____

1. Busyness:
   a. Number of customers waiting in the prescription area: _____
2. Extent of privacy in the counseling area

Extremely Private			Somewhat Private		Not at all Private	
6	5	4	3	2	1	0

3. Prescription Transfer:
   a. Did the pharmacist transfer the prescription to the patient? □ Yes □ No
4. Show and Tell:
   a. Did the pharmacist make a final verification by opening the prescription bag/bottle and showing it to the patient? □ Yes □ No
5. Does the pharmacist provide any information? □ Yes □ No
   a. If yes, type of information? Only Written Oral Both
   b. If any oral information provided, did the pharmacist provide information about:
      i. side effects □ Yes □ No
      ii. interactions □ Yes □ No
      iii. directions for use □ Yes □ No
6. Does the pharmacist ask the patient any question(s) about medications? □ Yes □ No
   a. If yes, type of question(s):
   Do you have any questions? Other Closed Open
7. Did the patient ask the pharmacist any questions?
   a. □ Yes-Prior to RPh Information Provision
   b. □ Yes- After RPh Provided Information
   c. □ No
8. Total Pharmacist-Patient Interaction Time: _____seconds.

Appendix N: Characteristics of Nonparticipating Pharmacies

ID	Pharmacy Type	Location County Urban/ Rural Status	No. of Rx filled/ day	No. of Employees reported by manager		No. of Hours Open/ Week	Reason for Refusal
				RPh	Technicians		
1	Mass Merchandiser	Metro-other	225	2	1	64	Not interested
2	Grocery	Metro-other	200	2	1	58	Owner change
3	Mass Merchandiser	Metro	200	3	7	82	Corporate issues
4	Independent	Metro	150	2	6	52	Issues with UW
5	Traditional Chain	Metro	275	2	6	92	Corporate issues
6	Independent	Metro	100	3	1	54	Not interested
7	Franchise	Rural	175	2	2	61	Owner change
8	Mass Merchandiser	Rural	225	2	6	59	Corporate issues
9	Traditional Chain	Rural	300	4	6	168	Corporate issues

Appendix O: Characteristics of Participating Pharmacies

ID	Pharmacy Type	Location County Urban/ Rural Status	No. of Rx filled/ day	No. of Employees reported by manager		No. of Hours Open/ Week
				RPh	Technicians	
1	Traditional	Metro-other	200	3	6	88
2	Independent	Metro-other	250	4	3	62
3	Independent	Metro-other	75	5	3	68
4	Mass	Metro-other	20	2	1	63
5	Independent	Metro-other	115	3	3	63
6	Traditional	Metro-other	100	3	3	88
7	Traditional	Metro-other	150	4	7	88
8	Mass	Metro-other	100	2	1	63
9	Mass	Metro-other	150	4	4	77
10	Mass	Metro-other	200	3	3	68
11	Mass	Metro	150	2	7	59
12	Traditional	Metro	150	3	3	87
13	Mass	Metro	150	3	3	68
14	Traditional	Metro	250	2	3	87
15	Traditional	Metro	300	2	4	87
16	Mass	Metro	80	2	2	68
17	Independent	Metro	50	3	1	59
18	Traditional	Metro	40	2	2	88
19	Mass	Metro	75	5	6	77
20	Independent	Metro	150	4	3	62
21	Traditional	Rural	250	2	7	88
22	Independent	Rural	150	1	2	59
23	Independent	Rural	120	1	4	59
24	Mass	Rural	150	4	6	68
25	Mass	Rural	150	5	7	68
26	Traditional	Rural	200	2	6	88
27	Independent	Rural	60	1	1	59
28	Traditional	Rural	140	2	3	92
29	Independent	Rural	125	4	2	68
30	Independent	Rural	200	3	6	68

Appendix P: Employee Response Rates at Participating Pharmacies

Pharmacy ID	No. of Employees Reported by Manager		Pharmacist Response Rate	Technician Response Rate	Patient Response Rate	
	RPh*	Technicians**	No. of RPh Participated (% Response)	No. of Technicians Participated (% Response)	No. of Patients*** Approached	No. of Patients Enrolled (% Response)
1	3	6	1 (33%)	3 (50%)	16	12 (75%)
2	4	3	3 (75%)	3 (100%)	15	12 (80%)
3	5	3	4 (80%)	3 (100%)	14	12 (86%)
4	2	1	2 (100%)	1 (100%)	15	12 (80%)
5	3	3	2 (66%)	3 (100%)	13	12 (92%)
6	3	3	3 (100%)	2 (66%)	20	12 (60%)
7	4	7	4 (100%)	6 (85%)	23	12 (52%)
8	2	1	1 (50%)	1 (100%)	20	12 (60%)
9	4	4	2 (50%)	2 (50%)	18	12 (66%)
10	3	3	3 (100%)	3 (100%)	17	12 (71%)
11	2	7	2 (100%)	3 (45%)	26	12 (46%)
12	3	3	3 (100%)	3 (100%)	24	12 (50%)
13	3	3	2 (66%)	3 (100%)	23	12 (52%)
14	2	3	1 (50%)	1 (33%)	23	12 (52%)
15	2	4	2 (100%)	4 (100%)	23	12 (52%)
16	2	2	2 (100%)	2 (100%)	32	12 (38%)
17	3	1	2 (66%)	1 (100%)	17	12 (71%)
18	2	2	1 (50%)	1 (50%)	22	12 (55%)
19	5	6	4 (80%)	4 (66%)	26	12 (46%)
20	4	3	4 (100%)	3 (100%)	16	12 (75%)
21	2	7	2 (100%)	6 (85%)	19	12 (63%)
22	1	2	1 (100%)	1 (50%)	16	12 (75%)
23	1	4	1 (100%)	3 (75%)	16	12 (75%)
24	4	6	4 (100%)	5 (83%)	20	12 (60%)
25	5	7	3 (60%)	5 (71%)	27	12 (44%)
26	2	6	2 (100%)	2 (33%)	24	12 (50%)
27	1	1	1 (100%)	1 (100%)	22	12 (55%)
28	2	3	1 (50%)	1 (33%)	28	12 (43%)
29	4	2	3 (75%)	2 (83%)	19	12 (63%)
30	3	6	1 (33%)	4 (66%)	20	12 (60%)
Total	**86**	**112**	**67 (78%)**	**82 (73%)**	**614**	**360(62%)**

* Does not include "Floater" or "Filler" Pharmacists

** Includes Dispensing and Cashier Technicians but not clerks who sometimes help as Cashier Technicians

*** Only includes patients who were picking their own prescriptions; caregivers were excluded from the study

Appendix Q: Patient Participation Rate, Start Time and Hours Spent at Each Pharmacy

Pharmacy ID	Pharmacy Type	Start Time	Hours Spent	Patient Participation Rate	
				No. of Patients Approached	No. of Patients Enrolled (% Response)
1	Traditional	Evening	1	16	12 (75%)
2	Independent	Afternoon	4	15	12 (80%)
3	Independent	Afternoon	3	14	12 (86%)
4	Mass	Evening	5	15	12 (80%)
5	Independent	Evening	2	13	12 (92%)
6	Traditional	Morning	3	20	12 (60%)
7	Traditional	Evening	2	23	12 (52%)
8	Mass	Evening	1	20	12 (60%)
9	Mass	Evening	2	18	12 (66%)
10	Mass	Morning	2	17	12 (71%)
11	Mass	Afternoon	5	26	12 (46%)
12	Traditional	Morning	5	24	12 (50%)
13	Mass	Morning	4	23	12 (52%)
14	Traditional	Morning	4	23	12 (52%)
15	Traditional	Morning	3	23	12 (52%)
16	Mass	Morning	5	32	12 (38%)
17	Independent	Morning	3	17	12 (71%)
18	Traditional	Evening	3	22	12 (55%)
19	Mass	Afternoon	5	26	12 (46%)
20	Independent	Morning	3	16	12 (75%)
21	Traditional	Afternoon	3	19	12 (63%)
22	Independent	Afternoon	4	16	12 (75%)
23	Independent	Afternoon	4	16	12 (75%)
24	Mass	Afternoon	3	20	12 (60%)
25	Mass	Afternoon	6	27	12 (44%)
26	Traditional	Afternoon	2	24	12 (50%)
27	Independent	Morning	5	22	12 (55%)
28	Traditional	Afternoon	3	28	12 (43%)
29	Independent	Afternoon	3	19	12 (63%)
30	Independent	Afternoon	4	20	12 (60%)
Total			**102**	**614**	**360(62%)**

Appendix R: Participant Ratings on PAPR, TAPR and COPSC Scale Items

Item No.	Mean Ratings (SD) for Non-Dispensing Pharmacists (N=37)	Mean Ratings (SD) for Dispensing Pharmacists (N=30)	Mean Ratings (SD) for Non-Dispensing Technicians (N=52)	Mean Ratings (SD) for Dispensing Technicians (N=30)
revcro1 (Item 1)	4.05 (0.62)	3.77 (0.82)	3.71 (0.78)	3.90 (0.66)
revcro2 (Item 2)	4.30 (0.81)	4.13 (0.78)	4.25 (0.74)	4.27 (0.83)
revcro3 (Item 3)	3.11 (0.97)	2.77 (1.04)	2.77 (0.83)	2.90 (1.16)
cro4 (Item 4)	4.27 (0.92)	4.27 (1.20)	4.44 (0.85)	4.37 (1.03)
revcro5 (Item 5)	4.08 (1.01)	3.97 (1.19)	3.48 (1.20)	3.47 (1.20)
revcro6 (Item 6)	4.16 (0.69)	4.23 (0.50)	3.83 (0.98)	3.87 (0.86)
revcro7 (Item 7)	4.51 (0.61)	4.43 (0.86)	4.35 (0.62)	4.10 (0.61)
revcro8 (Item 8)	4.70 (0.46)	4.77 (0.43)	4.08 (0.97)	4.07 (0.69)
revcro9 (Item 14)	4.76 (0.43)	4.50 (1.07)	4.56 (0.57)	4.43 (0.77)
SUM of CR0-8 (Items 1-8)	**33.19 (2.72)**	**32.33 (3.11)**	**30.90 (3.24)**	**30.94 (2.53)**
SUM of Modified CRO subscale (CR0-9)	**37.95 (3.15)**	**36.83 (4.18)**	**35.46 (3.81)**	**35.37 (3.30)**
revqac1 (Item 9)	3.81 (1.15)	4.10 (1.18)	4.21 (1.04)	3.67 (1.37)
revqac2 (Item 10)	3.46 (1.30)	3.60 (1.40)	3.88 (1.18)	3.47 (1.46)
revqac3 (Item 11)	3.97 (1.07)	4.27 (1.04)	4.25 (0.88)	3.93 (1.11)
qac4 (Item 12)	3.35 (1.44)	3.67 (1.32)	3.96 (1.17)	3.00 (1.55)
qac5 (Item 13)	3.19 (0.91)	3.37 (1.13)	3.40 (1.00)	3.23 (0.97)
QAC subscale SUM	**17.08 (3.57)**	**17.67 (3.44)**	**17.79 (2.64)**	**17.30 (3.26)**
PAPR SUM	**55.03 (3.33)**	**54.50 (3.78)**	**Not Applicable**	**Not Applicable**
TAPR SUM	**Not Applicable**	**Not Applicable**	**53.25 (3.44)**	**52.67 (3.28)**
Teamwork1 (Item1)	4.19 (0.52)	4.40 (0.50)	4.06 (0.75)	4.13 (0.78)
Teamwork2 (Item 3)	4.24 (0.73)	4.30 (0.75)	4.21 (0.80)	4.47 (0.63)
Teamwork3 (Item 4)	4.30 (0.46)	4.47 (0.57)	3.96 (0.88)	4.33 (0.66)
Teamwork4 (Item 10)	4.19 (0.70)	3.77 (0.90)	4.29 (0.87)	4.70 (0.47)
Teamwork Subscale Sum	**16.92 (2.41)**	**16.94 (2.72)**	**16.52 (3.30)**	**17.63 (2.54)**
Staffing1 (Item2)	3.89 (0.77)	3.93 (0.69)	3.71 (1.05)	3.70 (1.12)
Staffing2 (Item 5)	3.62 (0.86)	3.83 (0.83)	3.48 (0.85)	3.77 (1.04)
Staffing3 (Item 6)	4.05 (0.88)	4.07 (0.83)	4.02 (0.83)	4.07 (0.79)
Staffing4 (Item 12)	3.51 (0.77)	3.53 (0.94)	3.48 (0.73)	3.53 (0.82)
Staffing Subscale Sum	**15.07 (3.28)**	**15.36 (3.29)**	**14.69 (3.46)**	**15.07 (3.77)**
Comm. Openness1 (Item 7)	4.08 (0.64)	3.93 (0.83)	3.90 (0.91)	4.23 (0.94)
Comm. Openness2 (Item 8)	3.70 (0.94)	3.90 (0.92)	3.19 (1.30)	3.90 (0.88)
Comm. Openness3 (Item 11)	4.03 (0.90)	4.03 (0.93)	4.10 (0.89)	4.43 (0.59)
Comm. Openness Subscale Sum	**11.81 (2.48)**	**11.86 (2.68)**	**11.19 (3.10)**	**12.16 (2.41)**
Mgmt. Support1 (Item 16)	4.27 (0.69)	4.27 (0.52)	4.40 (0.77)	4.60 (0.62)
Mgmt. Support2 (Item 17)	4.16 (0.87)	4.13 (0.63)	4.13 (1.17)	4.53 (0.68)
Mgmt. Support3 (Item 18)	4.24 (0.90)	4.03 (1.01)	4.17 (1.10)	4.31 (1.13)
Mgmt. Support Subscale Sum	**12.67 (2.46)**	**12.43 (2.16)**	**12.70 (3.04)**	**13.44 (2.43)**
COPSC Sum	**56.26 (5.23)**	**56.84 (5.47)**	**55.26 (4.19)**	**58. 64(3.14)**

Appendix S: Bivariate Relationship between Patient Demographics and Pharmacist Practice Behaviors

A. Patient Gender

New Rx (N=180)		Rx Transfer		Total
		No	Yes	
Patient Gender*	Male	1	79	80
	Female	8	92	100
Total		9	171	180
New Rx (N=180)		**Rx Show**		**Total**
		No	Yes	
Patient Gender	Male	72	8	80
	Female	84	16	100
Total		156	24	180
New Rx (N=180)		**Rx Info**		**Total**
		No	Yes	
Patient Gender	Male	4	76	80
	Female	8	92	100
Total		12	168	180
New Rx (N=180)		**Patient Assessment**		**Total**
		No	Yes	
Patient Gender	Male	64	16	80
	Female	73	27	100
Total		137	43	180
Refill Rx (N=180)		**Rx Transfer**		**Total**
		No	Yes	
Patient Gender	Male	14	51	65
	Female	27	88	115
Total		41	139	180
Refill Rx (N=180)		**Rx Show**		**Total**
		No	Yes	
Patient Gender	Male	60	5	65
	Female	104	11	115
Total		164	16	180
Refill Rx (N=180)		**Rx Info**		**Total**
		No	Yes	
Patient Gender*	Male	39	26	65
	Female	86	29	115
Total		125	55	180
Refill Rx (N=180)		**Patient Assessment**		**Total**
		No	Yes	
Patient Gender	Male	44	21	65
	Female	87	28	115
Total		131	49	180

B. Patient Age

New Rx (N=180)		**Rx Transfer**	
		No (N=9)	Yes (N=171)
	Mean Age (SD)	42.9 (17.7)	43.4 (15.2)
		Rx Show	
		No (N=156)	Yes (N=124)
	Mean Age (SD)	42.9 (15.3)	46.9 (15.5)
		Rx Info	
		No (N=12)	Yes (N=168)
	Mean Age (SD)	37.0 (15.3)	43.7 (15.3)
		Patient Assessment*	
		No (N=137)	Yes (N=43)
	Mean Age (SD)	41.4 (13.9)	50.0 (17.7)
Refill Rx (N=180)		**Rx Transfer**	
		No (N=41)	Yes (N=139)
	Mean Age (SD)	55.7 (14.0)	55.2 (13.3)
		Rx Show	
		No (N=164)	Yes (N=16)
	Mean Age (SD)	55.4 (13.2)	54.0 (15.9)
		Rx Info	
		No (N=125)	Yes (N=55)
	Mean Age (SD)	54.8 (13.3)	56.4 (13.7)
		Patient Assessment	
		No (N=131)	Yes (N=49)
	Mean Age (SD)	55.2 (13.7)	55.6 (12.7)

* significant at the p=0.05

C. Medication Type

New Rx (N=180)		Rx Transfer		Total
		No	Yes	
Medication Type	Acute	4	74	78
	Chronic	5	97	102
Total		9	171	180
New Rx (N=180)		Rx Show		Total
		No	Yes	
Medication Type	Acute	65	13	78
	Chronic	91	11	102
Total		156	24	180
New Rx (N=180)		Rx Info		Total
		No	Yes	
Medication Type	Acute	3	75	78
	Chronic	9	93	102
Total		12	168	180
New Rx (N=180)		Patient Assessment		Total
		No	Yes	
Medication Type	Acute	59	19	78
	Chronic	78	24	102
Total		137	43	180
Refill Rx (N=180)		Rx Transfer		Total
		No	Yes	
Medication Type	Acute	5	9	14
	Chronic	36	130	166
Total		41	139	180
Refill Rx (N=180)		Rx Show		Total
		No	Yes	
Medication Type	Acute	13	1	14
	Chronic	150	16	166
Total		163	17	180
Refill Rx (N=180)		Rx Info		Total
		No	Yes	
Medication Type	Acute	10	4	14
	Chronic	114	52	166
Total		124	56	180
Refill Rx (N=180)		Patient Assessment		Total
		No	Yes	
Medication Type	Acute	9	5	14
	Chronic	122	44	166
Total		131	49	180

Appendix T: Bivariate Relationship between Patient Demographics and Patient Question-Asking Behavior

A. Patient Gender

New Rx (N=180)		Patient Question-Asking Behavior		Total
		No	Yes	
Patient Gender*	Male	72	8	80
	Female	88	12	100
Total		160	20	180
Refill Rx (N=180)		**Patient Question-Asking Behavior**		**Total**
		No	Yes	
Patient Gender	Male	60	5	65
	Female	108	7	115
Total		168	12	180

B. Patient Age

New Rx (N=180)		**Patient Question-Asking Behavior**	
		No (N=158)	Yes (N=22)
	Mean Age (SD)	42.7 (15.1)	48.4 (16.0)
Refill Rx (N=180)		**Patient Question-Asking Behavior**	
		No (N=165)	Yes (N=13)
	Mean Age (SD)	55.4 (13.4)	53.9 (14.8)

C. Medication Type

New Rx (N=180)		Patient Question-Asking Behavior		Total
		No	Yes	
Medication Type	Acute	66	12	78
	Chronic	94	8	102
Total		160	20	180
Refill Rx (N=180)		**Patient Question-Asking Behavior**		**Total**
		No	Yes	
Medication Type	Acute	14	0	14
	Chronic	154	12	166
Total		168	12	180

Appendix U: Bivariate Relationship between Pharmacist Demographics and Patient Question-Asking Behaviors

A. Pharmacist Gender

New Rx (N=180)		Patient Question-Asking Behavior		Total
		No	Yes	
Pharmacist Gender	Male	72	6	78
	Female	88	14	102
Total		160	20	180
Refill Rx (N=180)		**Patient Question-Asking Behavior**		**Total**
		No	Yes	
Pharmacist Gender	Male	71	7	78
	Female	97	5	102
Total		168	12	180

B. Pharmacist Work Experience:

New Rx (N=180)	Patient Question-Asking Behavior		Total
	No	Yes	
Less than 15 years	80	10	90
15 years or More	80	10	90
	160	20	180
Refill Rx (N=180)	**Patient Question-Asking Behavior**		**Total**
	No	Yes	
Less than 15 years	82	8	90
15 years or More	86	4	90
	168	12	180

Appendix V: Bivariate Relationship between Pharmacist Demographics and Pharmacist Practice Behaviors

A. Pharmacist Gender

New Rx (N=180)		Rx Transfer		Total
		No	Yes	
Pharmacist Gender	Male	5	73	78
	Female	4	98	102
Total		9	171	180
New Rx (N=180)		Rx Show*		Total
		No	Yes	
Pharmacist Gender	Male	77	1	78
	Female	79	23	102
Total		156	24	180
New Rx (N=180)		Rx Info		Total
		No	Yes	
Pharmacist Gender	Male	2	76	78
	Female	10	92	102
Total		12	168	180
New Rx (N=180)		Patient Assessment*		Total
		No	Yes	
Pharmacist Gender	Male	67	11	78
	Female	70	32	102
Total		137	43	180
Refill Rx (N=180)		Rx Transfer		Total
		No	Yes	
Pharmacist Gender	Male	20	58	78
	Female	21	81	102
Total		41	139	180
Refill Rx (N=180)		Rx Show*		Total
		No	Yes	
Pharmacist Gender	Male	78	0	78
	Female	86	16	102
Total		164	16	180
Refill Rx (N=180)		Rx Info		Total
		No	Yes	
Pharmacist Gender	Male	53	25	78
	Female	72	30	102
Total		125	55	180
Refill Rx (N=180)		Patient Assessment		Total
		No	Yes	
Pharmacist Gender	Male	59	19	78
	Female	72	30	102
Total		131	49	180

* Chi-square significant at 0.05

B. Pharmacist Work Experience:

New Rx (N=180)	Rx Transfer		Total
	No	Yes	
Less than 15 years	5	85	90
15 years or More	4	86	90
	9	171	180
New Rx (N=180)	**Rx Show***		**Total**
	No	Yes	
Less than 15 years	69	21	90
15 years or More	87	3	90
	156	24	180
New Rx (N=180)	**Rx Info**		**Total**
	No	Yes	
Less than 15 years	7	83	90
15 years or More	5	85	90
	12	168	180
New Rx (N=180)	**Patient Assessment***		**Total**
	No	Yes	
Less than 15 years	59	31	90
15 years or More	78	12	90
	137	43	180
Refill Rx (N=180)	**Rx Transfer**		**Total**
	No	Yes	
Less than 15 years	23	67	90
15 years or More	18	72	90
	41	139	180
Refill Rx (N=180)	**Rx Show***		**Total**
	No	Yes	
Less than 15 years	77	13	90
15 years or More	87	3	90
	164	16	180
Refill Rx (N=180)	**Rx Info**		**Total**
	No	Yes	
Less than 15 years	63	27	90
15 years or More	62	28	90
	125	55	180
Refill Rx (N=180)	**Patient Assessment***		**Total**
	No	Yes	
Less than 15 years	57	33	90
15 years or More	74	16	90
	131	49	180

Table W Inter-Item Correlation Matrix for Items Used to Measure Pharmacist Attitude towards Pharmacist Role Scale [a]

PAPR	Item1	Item2	Item3	Item5	Item6	Item7	Item8	Item9	Item10	Item11	Item12	Item13	Item14
Item1	1.00												
Item2	0.14	1.00											
Item3	0.08	0.41	1.00										
Item5	0.12	0.26	0.21	1.00									
Item6	0.31	0.10	0.19	0.31	1.00								
Item7	0.21	0.08	0.18	0.06	0.30	1.00							
Item8	0.03	0.09	0.21	0.14	0.42	0.50	1.00						
Item9	0.17	0.39	0.32	0.45	0.18	0.14	0.41	1.00					
Item10	0.08	0.10	0.10	0.17	0.12	0.12	0.23	0.17	1.00				
Item11	0.03	0.22	0.22	0.21	0.06	0.07	0.09	0.09	0.73	1.00			
Item12	0.07	0.26	0.23	0.17	0.11	0.15	0.19	0.15	0.88	0.73	1.00		
Item 13	0.03	0.25	0.27	0.16	0.09	0.07	0.10	0.07	0.37	0.50	0.43	1.00	
Item 14	-0.01	0.11	0.04	-0.05	0.16	-0.06	-0.00	0.01	0.44	0.40	0.42	0.19	1.00

a- Item 4 was deleted during CFA

Appendix X: Inter-Item Correlation Matrix for Items Used to Measure Technician Attitude towards Pharmacist Role [a] (N=82)

Item	CRO2	CRO7	CRO8	CRO9	QAC1	QAC2	QAC3	QAC4	QAC5
CRO2	1.000								
CRO7	.145	1.000							
CRO8	.064	.396	1.000						
CRO9	.425	.431	.324	1.000					
QAC1	.219	.162	.007	.427	1.000				
QAC2	.102	.125	-.012	.394	.817	1.000			
QAC3	-.141	-.045	.027	-.250	-.638	-.591	1.000		
QAC4	.172	.162	.011	.389	.865	.835	-.634	1.000	
QAC5	.275	.258	-.015	.205	.160	.170	-.233	.218	1.000

a- Items 1,3,4,5, and 6 were deleted during confirmatory factor analysis

Table Y Inter-Item Correlation Matrix for Items Used to Measure Community Pharmacy Safety Culture Scale

COPSC	Item1	Item2	Item3	Item 4	Item5	Item6	Item7	Item8	Item9	Item10	Item11	Item12	Item13	Item14
Item1	1.00													
Item2	0.53	1.00												
Item3	0.58	0.49	1.00											
Item 4	0.65	0.45	0.55	1.00										
Item5	0.17	0.27	0.17	0.10	1.00									
Item6	0.37	0.41	0.54	0.34	0.39	1.00								
Item7	0.33	0.35	0.39	0.40	0.21	0.36	1.00							
Item8	0.30	0.17	0.32	0.31	0.27	0.33	0.58	1.00						
Item9	0.17	0.27	0.38	0.11	0.20	0.31	0.41	0.32	1.00					
Item10	0.27	0.13	0.27	0.34	0.21	0.16	0.21	0.13	0.18	1.00				
Item11	0.24	0.45	0.39	0.26	0.57	0.42	0.33	0.36	0.28	0.25	1.00			
Item12	0.32	0.46	0.45	0.34	0.00	0.28	0.48	0.23	0.27	0.18	0.26	1.00		
Item 13	0.29	0.35	0.40	0.28	0.21	0.29	0.29	0.17	0.27	0.08	0.32	0.68	1.00	
Item 14	0.23	0.53	0.30	0.30	0.26	0.34	0.22	0.18	0.17	0.19	0.33	0.47	0.35	1.00

Appendix Z: Item to Total Scale Correlations for Scales Whose Reliabilities Were Assessed by Cronbach's Alpha

Scale Name	Scale Item	Item-total Correlation Coefficient
PAPR (N=67)	Item 1 (CRO1)	0.16
	Item 2 (CRO2)	0.40
	Item 3 (CRO3)	0.36
	Item5 (CRO5)	0.31
	Item 6 (CRO6)	0.32
	Item 7 (CRO7)	0.21
	Item 8 (CRO8)	0.32
	Item 9 (CRO9)	0.36
	Item 10 (QAC1)	0.67
	Item 11 (QAC2)	0.62
	Item 12 (QAC3)	0.71
	Item 13 (QAC4)	0.44
	Item 14 (QAC5)	0.30
TAPR (N=82)	Item 2 (CRO2)	0.28
	Item 7 (CRO7)	0.30
	Item 8 (CRO8)	0.30
	Item 9 (CRO9)	0.55
	Item 10 (QAC1)	0.58
	Item 11 (QAC2)	0.77
	Item 12 (QAC3)	0.77
	Item 13 (QAC4)	0.72
	Item 14 (QAC5)	0.28
COPSC (N=149)	Item 1 (Teamwork 1)	0.56
	Item 3 (Teamwork 2)	0.66
	Item 4 (Teamwork 3)	0.55
	Item 10 (Teamwork 4)	0.43
	Item 2 (Staffing 1)	0.59
	Item 5 (Staffing 2)	0.39
	Item 6 (Staffing 3)	0.58
	Item 12 (Staffing 4)	0.58
	Item 7 (Communication Openness 1)	0.58
	Item 8 (Communication Openness 2)	0.46
	Item 11 (Communication Openness 3)	0.31

Item 16 (Management Support 1)	0.57
Item 17 (Management Support 2)	0.50
Item 18 (Management Support 3)	0.47