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Patient Perceptions of Medication Therapy Management Targeted for Adherence following the Provision of Influenza Immunizations by Student Pharmacists: Preliminary Findings

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PATIENT PERCEPTIONS OF MEDICATION THERAPY MANAGEMENT
TARGETED FOR ADHERENCE FOLLOWING THE PROVISION OF INFLUENZA
IMMUNIZATIONS BY STUDENT PHARMACISTS: PRELIMINARY FINDINGS

by
Logan Harrison Ramsey

A thesis submitted to the faculty of The University of Mississippi in partial fulfillment of
the requirements of the Sally McDonnell Barksdale Honors College.

Oxford
May 2014

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From beginning exploratory research to writing the final sentence, the support and encouragement provided by my family and friends was unfailing. Without them, none of my success would have been possible. I wish to dedicate this thesis to my parents, Larry and Connie Ramsey.
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ABSTRACT

LOGAN H. RAMSEY: Patient perceptions of medication therapy management targeted for adherence following the provision of influenza immunizations by student pharmacists: Preliminary findings
(Under the direction of Ashley W. Ellis)

Objective: To examine patients’ opinions of clinical pharmacy services, especially Medication Therapy Management (MTM), following the administration of influenza immunization.

Methods: The McLean Institute for Public Service and Community Engagement at the University of Mississippi funded a service-learning project for student pharmacists to administer influenza immunizations to medically underserved patients. The project was conducted at a clinic for uninsured patients in Southaven, Mississippi but was open to the public. Patients (n=52) received an influenza immunization followed by a personal medication record during the observation period. Students, under the supervision of a licensed pharmacist, then provided a medication review and Drug Adherence Work-Up (DRAW) to identify adherence problems. A survey was administered to patients regarding services received. Demographics and beliefs on pharmacists’ roles were also assessed.

Results: 30% of the sample reported a household income below $15,000 and 33% lacked health insurance. However, most patients attempt to obtain a flu shot every year (M=4.22; Likert scale 1 to 5). 97% indicated trust in pharmacists’ abilities as clinical providers. 63% of patients (n=33) reported taking 1 or more prescription medications daily, with a mean number of 3.6 medications. Medication adherence problems were identified in approximately half (49%) of patients. Respondents noted “forgetting” as the primary relevant issue. Two-thirds of patients (65%) were not aware of pharmacist-provided
MTM. Overall, 80% of patients found the combined immunization and MTM a beneficial service (M=4.38; Likert scale 1 to 5). 74% would visit a community pharmacy to receive further MTM services in the future.

**Conclusions**: While survey results indicate low awareness of MTM, a significant number of patients experienced medication adherence issues. Pharmacy visits for annual influenza immunizations may provide an excellent opportunity for pharmacists to implement the model in this study and provide MTM or adherence services.
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CHAPTER I

Introduction

History of Vaccination

As civilizations developed, the human race made the shift towards centralized agrarian societies, and pathogens evolved to spread illness from one human to the next.\textsuperscript{1} Living in close proximity and sharing water supplies within cities increased the severity of infectious viruses and bacteria to “epidemic” levels.\textsuperscript{1} One such epidemic included the debilitating and highly lethal \textit{Variola major} virus, more commonly known as smallpox. At one point, fatality rates for smallpox rose to 60\% in adult victims and 80\% within infected infants.\textsuperscript{2} By the 18\textsuperscript{th} century, smallpox related illness caused 400,000 deaths in Europe every year.\textsuperscript{2}

Fortunately, Edward Jenner – an English physician and scientist – conceived an idea to cure this infectious disease in 1796.\textsuperscript{2} Jenner chose to deliberately infect a patient with the cowpox virus.\textsuperscript{2} After experiencing a mild form of cowpox illness, the patient recovered within the span of a week. A few months later, Jenner exposed the patient to the live, active smallpox virus. As Jenner hypothesized, the young male showed resistance to the virus and did not develop any symptoms of the smallpox disease.\textsuperscript{2} Thus, the preventative health service of immunization was invented.

Approximately two centuries after Jenner’s investigation, all known cases of the smallpox disease were eliminated in 1977 through the implementation of universal
vaccination. Despite eradication of smallpox, however, the battle against infectious diseases is far from won. In particular, the influenza virus causes serious illness and even death every year. The Centers for Disease Control and Prevention notes that annual influenza vaccinations are especially important for protecting those at risk for complications, such as elderly patients, young children, and pregnant women. Based on data from 2012-2013, seasonal flu vaccination coverage in the United States averaged 56% for children and 42% for adults with 73,130 collected specimens positive for infection with influenza virus.

**History of American Pharmacy**

While medical advancements such as vaccinations moved forward, the profession of pharmacy developed concurrently. By the early 1700s in New England, a substantial amount of “apothecary shops” started up in communities and provided numerous plant-based medications to patients. In the year 1752, Jonathan Roberts became the first dedicated apothecary at the nation’s earliest hospital in Pennsylvania. The expanding responsibilities of the apothecary set the precedent for two primary roles in modern day pharmaceutical care: community pharmacy and institutional pharmacy.

Following the conclusion of the Revolutionary War, apothecaries and druggists started working with numerous chemicals for their medicines including sulfuric acid, a chemical still commonly used for pharmaceutical purposes today. In 1821, the foundation of the Philadelphia College of Pharmacy provided the first professional school of instruction for pharmacists. The profession of pharmacy became more distinct and
separate from medicine with the establishment of the American Pharmaceutical Association (APhA) in 1852. The University of Mississippi, recognizing the need for pharmacy education, established the state’s first and only School of Pharmacy on September 24, 1908. The initial School of Pharmacy consisted of seven faculty members and only 15 students. After 108 years of growth, the School of Pharmacy currently includes 114 faculty members and over 350 professional students striving to advance the profession of pharmacy.

*Modern Roles of the Pharmacist*

As modern health care providers, pharmacists are critical for maintaining public health and wellness. Combining medical and professional skills with the knowledge of immunization procedures, pharmacists can act as powerful advocates for preventative health care measures such as immunizations. As part of the continued endeavor to increase influenza vaccination rates, community pharmacists who receive the appropriate training are uniquely placed to intervene and provide clinical immunization services.

Below average access to primary care remains a significant barrier for underserved patients especially in rural locations. According to the Mississippi State Department of Health, 75 out of 82 counties in Mississippi are currently designated as Health Professional Shortage Areas (HPSA). Pharmacists are in a position to fill the primary care gap with clinical services such as immunizations and Medication Therapy Management (MTM). Medication Therapy Management includes clinical services such as disease state management, Medication Therapy Reviews, and medication plans.
focusing on adherence and safety. Pharmacists are among the most accessible members of the health care team. According to The National Association of Chain Drug Stores, the majority of Americans (93%) live within 5 miles of a community pharmacy, and the average distance to a retail pharmacy is only 1.26 miles. Patients are able to visit retail pharmacies without an appointment and receive counseling for their medication related problems. Patients can also seek readily available immunization services in all 50 states.

More than 150,000 pharmacists have undergone training to administer many immunizations including the annually recommended influenza shot. As stated by the Centers for Disease Control (CDC), between 5 and 20 percent of the United States population becomes infected with the influenza virus annually. Throughout the past 3 decades, influenza related deaths have ranged from 3,000 to 49,000 each year. Patients who decide to receive the influenza vaccine can benefit financially through decreased visits to the doctor and less time off work. More importantly, immunizations can prevent unnecessary death caused by the influenza virus and associated secondary illness such as pneumonia.

In addition, best practices indicate “vaccine providers…should consider observing patients (with patients seated or lying down) for 15 minutes after vaccination to decrease the risk for injury.” Pharmacists can use the suggested 15 minute waiting period after providing an influenza vaccine to engage the patient in further clinical services, such as Medication Therapy Management including a Personal Medication Record (PMR). While MTM is generally provided during a scheduled appointment, MTM services may be provided for walk-in patients, similarly to the provision of influenza immunizations.
The overall focus in MTM shifts from simply dispensing the prescription to providing patient-based care through clinical pharmacy services.\textsuperscript{16}

Another important aspect of MTM includes the chance to assess and improve patients’ medication adherence. According to the Network for Excellence in Health Innovation, as many as 2 billion occurrences of medication non-adherence are preventable annually.\textsuperscript{17} As a result, $290 billion in health care costs is wasted every year due to medication non-adherence.\textsuperscript{17} While medications have the potential to effectively treat a multitude of problems, approximately 50\% of patients do not correctly take their medications.\textsuperscript{17} Though taking a prescription medication might appear simple enough, Brown and Bussell explored the nature of medication adherence and found the issues “extremely complex.”\textsuperscript{18}

Brown and Bussell also point out that treating medication adherence requires an individualized approach because each patient has different issues and behaviors.\textsuperscript{18} Assessment of adherence comes from two primary sources. Subjective information may be uncovered by directly questioning the patient, patient’s family, and physicians.\textsuperscript{18} Objective information is obtained from counting pills, checking the number of pharmacy refills, and using electronic medication monitoring systems.\textsuperscript{18} Pharmacists have the ability to directly monitor medications dispensed while also providing individualized adherence management through engaging the patient in MTM services.

\textit{Mississippi Delta and Health Disparities}

The lack of proper medication adherence results in decreased overall health outcomes and increased patient mortality.\textsuperscript{18} Potential causes that lead to lower levels of
adherence include several patient based factors. Significant reasons underlying non-adherence include “lack of understanding their disease, lack of involvement in the decision making process, and suboptimal medical literacy.”18 Approximately 90 million people in the United States have medical literacy that is deemed inadequate.19 Examples of low health literacy include inability to interpret a prescription drug bottle label, not understanding medical education brochures, confusion regarding doctor's directions and consent forms, and difficulty negotiating complex health care decisions.20

The correlation between low medical literacy and health disparities continues to be explored, especially in areas of economic poverty. Zoellner et al. reported that 64% of residents in the Mississippi Delta function at the lowest tiers of literary capability.21 The population within the Mississippi Delta consists of a higher than average percentage of African Americans and increased prevalence of chronic diseases such as diabetes and cardiovascular disease.21 Zoellner et al. conclude, “Mississippi is one of the most health disparate regions in the United States.”21

According to Cossman, only 12% of the primary care physicians working in Mississippi are practicing in the Delta, although almost 20% of the state’s population resides in this region.22 The lack of providers in the Delta creates even more barriers to access for primary care services. As health care professionals search for new methods to combat the health disparities present in Mississippi, pharmacists are available as highly accessible and trusted sources of health management.

The roles required of pharmacists have changed greatly over time, from apothecary dispensing functions to modern clinical provider. As the practice of pharmacy continues to change within the health care system, utmost importance remains centered
on the oath that every pharmacist takes to “apply knowledge, experience, and skills to the best of my ability to assure optimal outcomes for my patients.” Pharmacists have the ability to step in and fill the primary care gap present in underserved areas. This study is important in the field of pharmacy practice because it seeks information on ways pharmacists can impact and improve the lives of patients they serve. In particular, this study investigates the possibility of using clinical services, such as immunizations, to further engage with patients and uncover more serious medication issues, including non-adherence.
CHAPTER II

Literature Review

Previous research studies have considered both pharmacist-provided immunizations and medication therapy management. Numerous studies have inquired about patient perceptions on clinical pharmacy services including MTM. However, studies have rarely focused on MTM targeted towards underserved areas such as the Mississippi Delta. Few to none have considered patient opinions regarding conjointly provided MTM and immunization services.

Pharmacist Provision of Influenza Immunizations

Pharmacists initially began the administration of immunizations as part of standard community practice in 1994. By 2002, less than a decade later, the American College of Physicians and American Society of Internal Medicine announced official endorsement of pharmacist-provided immunizations. In a 2012 publication, Murphy et al. evaluated the amount of pharmacist-provided immunizations at Walgreen’s community pharmacies in medically underserved areas (MUAs). Based on their findings, 43% of the United States population (132 million people) lives in areas designated as “medically underserved” with below average access to primary care services. The highest amount of MUAs (78%) was found within the state of Mississippi.
The current state of health care in the United States, specifically within Mississippi, requires serious attention. When almost 80% of the state does not have adequate access to primary care, the costs associated with treating chronic diseases such as diabetes and cardiovascular disease (CVD) will inevitably rise. The lack of access to preventive health services such as immunizations creates further problems. When too few people receive the influenza immunization, herd immunity cannot be achieved. Herd immunity is defined as “the resistance of a group to attack by a disease because of the immunity of a large proportion of the members…so not everyone in a population needs to be immunized to eliminate disease.” Thus, fewer patients obtaining immunizations in Mississippi will result in more of the population contracting the influenza virus.

Through the use of community pharmacists as immunization providers, Walgreen’s pharmacies in the study by Murphy et al. supplied influenza vaccinations to 33,951 patients in MUAs in Mississippi. Steyer et al. concur with the information obtained through the Walgreen’s study by determining pharmacists have the ability to substantially increase the amount of patients who can obtain and receive the influenza immunization each year.

Though pharmacists can offer better availability and access to immunizations, the perception and willingness of patients to utilize this service must also be considered. Based on data from the Department of Health and Human Services, only 26% of children between the ages of 5 and 12 received the influenza vaccine in 2008. Pharmacists have the opportunity to educate parents about vaccination benefits for children and increase the rates of immunization among young age groups.
A cross-sectional descriptive study conducted by Deshpande et al. questioned parents regarding pharmacist provision of the influenza vaccine to their children. This study further supported the accessibility of pharmacists as immunization providers: 98% of parents stated their child received the vaccination without making a prior appointment. Approximately 3 out of 4 parents indicated the desire to utilize a pharmacy again for their child’s influenza shot next year. The results from the study conducted by Deshpande et al. are consistent with similar studies, such as Grabenstein, Guess, and Hartzema’s finding that “respondents vaccinated by a community pharmacists were satisfied with the experience and would recommend it to others.”

**Medication Therapy Management**

After almost 20 years of routinely provided immunizations by pharmacists, many patients are prepared to accept pharmacists as an available and trusted source for vaccination services. However, newly developed clinical pharmacy services are also becoming prevalent in community pharmacy settings. In particular, medication therapy management as a pharmacy practice service model could enable pharmacists to provide more extensive care for patients.

Lemay notes that, with the busy atmosphere common for many pharmacies, MTM offers the pharmacist direct, undisturbed communication with their patient. For pharmacists wishing to implement MTM services in their practice, the American Pharmacists Association (APhA) and the National Association of Chain Drug Stores (NACDS) determined the five core elements needed in an MTM service model (Table 1).
Table 1: Core Elements of Medication Therapy Management

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<tr>
<td>1</td>
<td>Comprehensive Medication Review (CMR)</td>
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<tr>
<td>2</td>
<td>Personal Medication Record (PMR)</td>
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<tr>
<td>3</td>
<td>Medication-related Action Plan (MAP)</td>
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<tr>
<td>4</td>
<td>Intervention and/or referral</td>
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<td>5</td>
<td>Documentation and follow-up</td>
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CMR appears as the first and most prominent feature of MTM. When performing a CMR, the pharmacist should review the patient’s current medications, both prescription and over-the-counter, with the goal of improving the drug therapy outcome. The pharmacist then begins the PMR including information such as the patient’s name, date of birth, emergency contact, primary physician, allergies, and current medications the patient is taking. After looking for potential drug therapy problems (DTPs), the next step for the pharmacist includes suggesting solutions to any problems uncovered via the MAP. The patient may then utilize the MAP in future visits with his or her physician. Both PMR and MAP should be updated as often as possible to reflect changes in the patient’s drug therapy.

Upon completing the first 3 steps, the pharmacist may choose an intervention by communicating directly with the patient about DTPs and adherence or by contacting fellow health care providers such as the patient’s physician. In some instances, the pharmacist might refer a patient to a particular health professional. For example, the pharmacist could send a patient with type II diabetes mellitus to meet with a dietician. Finally, a pharmacist should thoroughly document the patient care services completed.
during the MTM session. Proper documentation allows the patient’s physician to understand the pharmacist’s recommendations, upholds professional accountability for the pharmacist, and further supports the value placed on pharmacist-provided MTM.\textsuperscript{16}

Previous investigations have sought patient preferences regarding MTM services provided to Medicare Part D beneficiaries. According to data gathered by Hong et al., Medicare beneficiaries in Memphis, TN cited the associated cost with MTM as their greatest consideration.\textsuperscript{23} Another primary concern was choosing the optimal practice setting for MTM services. Participants in the study valued MTM services provided by pharmacists in face-to-face encounters over alternative settings such as via telephone or at their home.\textsuperscript{23} Participants reacted most favorably to MTM sessions lasting approximately 15 minutes.\textsuperscript{23} This indication in patient preferences suggests that pharmacists can use the short time period after immunizations, around 15 minutes, to offer medication therapy management to patients visiting a community pharmacy.

Lauffenburger et al. conducted qualitative investigations to uncover themes in patient preferences and opinions on MTM. When considering experiences receiving MTM, the primarily older adult participants recited the following benefits of MTM: comprehensive personalized care, medication review to increase effectiveness of medications, and interceding with health plans.\textsuperscript{25} As previously reported Hong et al., participants in the study by Lauffenburger also cited cost of MTM as the most prominent barrier to receiving the service.\textsuperscript{25} In rural, medically underserved areas like Mississippi, pharmacists must be especially sensitive to how the cost of MTM might affect the patient’s willingness to obtain clinical pharmacy services. An important goal for
improving MTM accessibility should include finding ways to make MTM an affordable service while maintaining financial viability for the pharmacist.

MTM and Health Disparities

MTM shows promise for increasing patient adherence levels, but MTM also allows the pharmacist opportunity to improve disease state management for chronic illnesses like diabetes. Only a few studies have examined the effect of MTM on underserved and minority patients. Congdon et al. evaluated the effect of MTM on diabetic, underserved Hispanic patients by checking their glycated hemoglobin levels, commonly known as A1C.35 For patients with A1C values below 9%, there was small change in hemoglobin levels post-MTM services.35 However, for patients with A1C above 9%, the majority of patients (94%) show significant decrease in A1C levels averaging from 10.9% down to 8.8%.35

While a single MTM visit did not produce significant changes in A1C levels, patients who return to obtain multiple MTM visits also showed a significant decline in A1C.35 The trend suggested a correlation between increased MTM visits and better disease management of diabetes.35 When providing immunization services, pharmacists can use the opportunity to initiate an MTM encounter. However, scheduling follow-up MTM services appears important for substantial impact on diabetes management.

Taylor, Byrd, and Krueger also studied the effect of pharmacy services on patients with hypertension, diabetes, dyslipidemia, and anticoagulation therapy. Taylor, Byrd, and Krueger also targeted underserved patients; however this study took place in rural Alabama. The intervention in this study included MTM-style medication reviews, disease
education, and patient training for inhalers, glucometers, and pill boxes. After 12 months of intervention services, the patients displayed significantly improved control of hypertension, hemoglobin A1C, and LDL cholesterol levels. It is also worth noting that medication adherence scores in the intervention group increased by 15%. Clearly, clinical pharmacy practice services have the capability to dramatically improve health outcomes and management of disease states, even specifically in disadvantaged populations.

The topic of health disparities is especially important when considering the Mississippi Delta, which has double the national poverty rate and a 38% obesity rate. The poverty and obesity are undoubtedly factors in the very high incidence of diabetes found in the Delta. Ross and Bloodworth conducted research at 13 community pharmacies in a total of nine Delta counties to study the impact of a patient-centered health care model (PCHC) on rural communities. Initially, the Delta Pharmacy Project study only included Medicaid beneficiaries between 18 and 64 but expanded to include all patients over the age of 18 years old. The PCHC was strongly based on both specialized and general MTM services. Pharmacists engaged the patients with face-to-face MTM services, including CMR, and followed the core elements set out by the APhA. In total, 468 patients joined the MTM program supported by the Delta Pharmacy Project over a period of 2 years.

Specific to medication adherence, the Delta Pharmacy Project discovered non-adherence issues in 58% of patients. The study also measured blood pressure, cholesterol levels, and A1C with significant decreases observed over time on these measures. From an economic standpoint, the MTM interventions reduced costs by
decreasing emergency room visits, hospitalizations, and physician appointments for patients.\textsuperscript{37} The Delta Pharmacy Project further validated the apparent health care problems and disparities present in the Mississippi Delta. While this is preliminary data, the research conducted by Ross and Bloodworth also confirmed the ability of pharmacists to positively influence health outcomes in rural Mississippi.\textsuperscript{37} The study did not, however, inquire about patient perceptions regarding the MTM services received at the community pharmacies.

The clinical and financial findings by Ross and Bloodworth concur with a previous experimental, longitudinal pre-post study on MTM outcomes known as The Asheville Project. This research project by Bunting and Cranor considered the following measurements of health status: blood pressure (systolic and diastolic) and cholesterol (LDL and total).\textsuperscript{38} For both of these measurements, the improvement in patient health status was statistically significant over the 5-year duration of the MTM study.\textsuperscript{38} The patient’s improved health status was reflected in a significantly decreased amount of cardiovascular (CV) events among the cohort.\textsuperscript{38} The definition of CV events included “myocardial infarctions (MIs), non-MI acute coronary syndromes (ACSs), strokes, transient ischemic attacks (TIAs), acute episodes of heart failure (HF), coronary artery bypass grafts (CABGs), percutaneous transluminal coronary angioplasty (PTCA), and peripheral vascular disease (PVD).”\textsuperscript{38}

Once again, the potential for MTM clinical services to improve health status was demonstrated in this research. The improvements following clinical pharmacy service programs are measurable and significant. The effect of targeting such clinical pharmacy services towards underserved populations requires further research consideration.
**MTM and Pharmaceutical Education**

While clinical community pharmacists innovate and incorporate MTM into the practice settings, pharmacy educators must also consider how courses in pharmacy school affect students’ ability to practice MTM. Galal et al. implemented a Medicare Part D elective course for 33 second-year (PY2) pharmacy students at the Thomas J. Long School of Pharmacy and Health Sciences. The focus of the study was measuring student pharmacists’ confidence and ability to provide MTM and influenza immunizations. After 88% of the students entering the class did not have previous experience with MTM provision, and 64% did not have experience in administering immunizations. After assisting 401 Medicare beneficiaries during 9 events, the student pharmacists’ show significant increases in confidence ratings for provision of both immunizations and MTM. Qualitative results from the students included that the course was “challenging but rewarding, eye-opening, and inspiring.” Students also found that applying knowledge from the course to patient care settings was a substantial benefit.

Student pharmacists who gain confidence in providing MTM and immunizations are better equipped to integrate clinical pharmacy practice services upon graduation. Pharmacy faculty and educators can consider the importance of implementing such courses within professional pharmacy degree programs.

**Summary**

After a thorough evaluation of the scientific literature relating to medication therapy management, pharmacist provision of immunizations, and the impact of MTM on health disparities, pharmacists are in a prime position to provide clinical services and
improve health outcomes for patients. The literature also strongly suggests that the benefits of MTM and immunizations are both tangible and significant. However, the sufficient literature does not exist that considers patient perceptions and beliefs on the value of these services when provided in rural locations. The goal of this thesis is to examine the participants’ thoughts and opinions, particular when located in a region of disadvantaged economic and health status.
Chapter III

Research Methodology

Research Design

The overall design of the study conducted for this thesis was exploratory and descriptive. In particular, the study sought to explore the patient perceptions of conjointly provided influenza immunizations and Medication Therapy Management targeted for adherence. Thus, it was determined that patients in the study should receive a clinical pharmacy intervention prior to the survey assessment. Second year (PY2) student pharmacists from the University of Mississippi School of Pharmacy provided the services as part of a service-learning grant from the McLean Institute for Public Service for Community Engagement. Funding from the McLean Institute allowed for provision of free influenza immunizations and associated supplies. Further financial support for the project came from the Sally McDonnell Barksdale Honors College.

The intervention began with a free influenza immunization at a clinic designated for uninsured patients in Desoto County, specifically located in Southaven, MS. Patients not taking any medications did not undergo MTM and simply completed a partial survey. However, for each patient taking prescription medications, the student pharmacists (under the supervision of a licensed pharmacist) engaged the patients in a medication review and provided a Personalized Medication Record (PMR) during the waiting period following immunization. Next, students administered the Drug Adherence Work-Up Tool (DRAW tool) provided by the Million Hearts® Initiative through the U.S. Department of Health
and Humans Services to identify any existing adherence issues for the patients. After the DRAW tool was completed, student pharmacists provided adherence-focused MTM services. Finally, patients completed a survey designed to assess perceptions regarding the services received during the event. Pharmacy faculty members and residents provided oversight and guidance during the event if students had any questions or problems providing the services. The project flow chart (Appendix B) provides a visual representation of the project.

The instrument used to measure patients’ opinions and perceptions was a paper-based survey provided in person. The patients completed the survey, which was approved by the Institutional Review Board at the University of Mississippi. Research emphasis was placed on the following objectives:

1) Determine patient perceptions of the roles of pharmacists, including trust in pharmacists as clinical providers.
2) Determine patients’ awareness of MTM.
3) Determine patients’ perceived benefit and satisfaction from the MTM services received during the intervention.
4) Compare patients’ non-adherence with MTM helpfulness.
5) Compare patients’ self-reported non-adherence with DRAW tool results.

Survey Development

The survey used in this study was designed to assess patients’ perceptions after receiving the clinical pharmacy services from student pharmacists. Because of the difficulty associated with obtaining follow-up surveys, especially without incentives, the
survey was administered immediately at the time of the intervention. According to Nulty, paper-based surveys provided substantially higher response rates than other formats. In particular, paper-based surveys gather stronger response rates than surveys sent out online.40

The survey used in this project (Appendix A) contained 25 items total. Many questions utilized the dichotomous measure of “yes” or “no.” The initial portion of the survey included nine questions focused on medication use and perceptions of pharmacists’ roles, with one open-ended qualitative measure. The next section provided a description of Medication Therapy Management to clarify the topic for patients. The following nine questions inquired about the MTM intervention, including another open-ended qualitative measure. Five of the MTM questions obtained Likert-type responses on a scale of 1 to 5 (strongly disagree to strongly agree). Two questions were related to flu immunizations. Finally, the survey included a section of five questions on demographic information.

The survey included measures adapted from a survey administered by Law, Okamoto, and Brock.24 Permission to use and modify the questions was obtained by contacting the principal investigator, Anandi V. Law, BPharm, PhD. Several faculty members and one resident at the University of Mississippi School of Pharmacy also reviewed the survey, providing further validation.

Questions regarding demographics were placed at the end of the survey for two purposes: first, because patients were screened based on prescription medication use rather than demographic information, and secondly to procure responses to the more important questions on adherence and MTM before patients became weary with the
survey. The survey endeavored to maintain an appropriate logical flow by beginning with questions on medication use and pharmacists’ roles before moving to questions about the MTM services.

**Drug Adherence Work-Up Tool**

For the purposes of assessing adherence, a cohesive and streamlined tool is essential for use in a community pharmacy practice setting. Doucette et al. developed the Drug Adherence Work-up Tool (DRAW) for use during pharmacist-provided MTM, specifically targeted for adherence. After implementing the tool, pharmacists in the study affirmed that using DRAW enabled better identification and resolution of medication adherence issues. DRAW considers the following factors affecting medication adherence: too many drugs or doses, forgetfulness, concern about medication, belief in medication effectiveness, medication costs and adverse effects. When attempting to provide MTM during an immunization visit, pharmacists can utilize DRAW as a streamlined method, especially in situations where adherence problems are suspected.

**Data Collection**

The sample used in this study was collected during October and November of 2013 at Desoto Health and Wellness Center in Southaven, MS. This location was deemed appropriate because of the underserved population targeted. According to the U.S. Department of Health and Humans Services, Southaven is designated as a medically underserved area of the state. While the clinic serves uninsured patients, the service event
was open and advertised to the public. With funding from the Sally McDonnell Barksdale Honors College, radio advertisements (Appendix C) went out on the air during the week prior to the event. The radio stations included IDIA-AM, WDIA-AM, and WEBL-FM. The purpose of radio advertising was to recruit a higher number of participants. Based on the RAOSOFT Sample Size Calculator, for a margin of error set at 10% and a 90% confidence level, the recommended sample size is 68. The McLean grant provided a total of 90 influenza immunization shots. The minimal risks to patients included soreness, redness, swelling, low-grade fever, and aches, as stated by the Centers for Disease Control and Prevention.

The primary selection criteria applied to patients was the use of prescription medications. Those who did not take prescription medications were not eligible to participate in MTM services. Before offering the survey to patients, student pharmacists followed a script (Appendix D) inquiring about willingness to participate in the study and required a minimum age of 18 years old. Following the survey, patients placed completed surveys in a confidential envelope.

Data Analysis

Following the final collection of surveys, data was coded numerically and directly entered in Microsoft Excel. For example, “yes” responses designated as the number 1, and “no” responses designated as the number 2. While all surveys collected did not include personal identifiable information, each survey and DRAW tool was labeled with a unique number. This facilitated the correct matching between surveys and DRAW tool results. Data was imported into IBM SPSS Statistics for Macintosh, Version 21. Only
questions from patients taking prescription medications were used for analysis of questions regarding MTM services.

The survey provided descriptive and qualitative information about patients’ opinions to assess Objectives 1, 2, and 3. The Likert-type questions offered descriptive ordinal data for ranking patients’ agreement or disagreement on a scale from 1 to 5 (strongly disagree to strongly agree. According to Sullivan and Artino, “the differences between ‘always,’ ‘often,’ and ‘sometimes’ on a frequency response Likert scale are not necessarily equal. In other words, one cannot assume that the difference between responses is equidistant even though the numbers assigned to those responses are.”42 Thus, the use of parametric tests (t-tests, analysis of variance, Pearson correlations, regression, etc.) was avoided in the analysis of Likert-type responses. Descriptive statistics such as means, medians, standard deviations, frequencies, and percentages was deemed more appropriate for analysis of Likert data.

For Objective 4, the data on self reported non-adherence and MTM helpfulness was analyzed with a Fisher’s Exact test with 2x2 contingency table. For Objective 5, dichotomous survey questions were grouped by DRAW tool response and self reported non-adherence for paired nominal data analysis with McNemar’s test. A $\alpha$-priori of 0.05 was chosen to indicate statistical significance.
Chapter IV

Results

Description of the Sample

In total, 53 patients received a free influenza immunization and the associated MTM services, if applicable. All patients participated in the survey. However, one survey was omitted from the analysis due to insufficient completeness. Thus, the effective response rate for the survey was 98% (52 of 53).

Table 2 contains a description of the sample based on characteristics obtained through the demographic questions from the survey. 85% of patients in the study were 45 years of age or older. Considering gender and ethnicity, the majority was female and Caucasian. Over one-third of patients (36.7%) reported a total household income below $25,000. 39.4% also reported having no form of health insurance.

Table 3 contains descriptions of medication use as reported by patients. The patients reported taking an average of 3.6 prescription medications per day. While 60.6% of patients claimed to have a method of remembering medications, approximately half (48.9%) experienced forgetfulness and non-adherence when taking their prescriptions. Furthermore, 70% visit a pharmacy with a frequency of at least once per month.
Table 2: Demographic Characteristics

<table>
<thead>
<tr>
<th>Age</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 – 24</td>
<td>3</td>
</tr>
<tr>
<td>25 – 34</td>
<td>0</td>
</tr>
<tr>
<td>35 – 44</td>
<td>12.1</td>
</tr>
<tr>
<td>45 – 65</td>
<td>63.6</td>
</tr>
<tr>
<td>65+</td>
<td>21.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>30.3</td>
</tr>
<tr>
<td>Female</td>
<td>69.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Caucasian</td>
<td>93.9</td>
</tr>
<tr>
<td>African American</td>
<td>6.1</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0</td>
</tr>
<tr>
<td>Asian</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total Household Income</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; $15,000</td>
<td>26.7</td>
</tr>
<tr>
<td>$15,000 - $24,999</td>
<td>10</td>
</tr>
<tr>
<td>$25,000 - $34,999</td>
<td>13.3</td>
</tr>
<tr>
<td>$35,000 - $49,999</td>
<td>16.7</td>
</tr>
<tr>
<td>$50,000 - $74,999</td>
<td>20</td>
</tr>
<tr>
<td>&gt; $75,000</td>
<td>13.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Health Insurance</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicare</td>
<td>6.1</td>
</tr>
<tr>
<td>Medicaid</td>
<td>0</td>
</tr>
<tr>
<td>Private provider</td>
<td>30.3</td>
</tr>
<tr>
<td>Medicare + Private</td>
<td>12.1</td>
</tr>
<tr>
<td>No insurance</td>
<td>39.4</td>
</tr>
</tbody>
</table>
Table 3: Characteristics of prescription medication use

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean number of prescription medications per day</strong></td>
<td>3.6</td>
</tr>
<tr>
<td><strong>Method of remembering medications</strong> (%)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>60.6</td>
</tr>
<tr>
<td>No</td>
<td>39.4</td>
</tr>
<tr>
<td><strong>Forget to take medications</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>48.5</td>
</tr>
<tr>
<td>No</td>
<td>51.5</td>
</tr>
<tr>
<td><strong>Frequency of pharmacy visits</strong></td>
<td></td>
</tr>
<tr>
<td>Once a month</td>
<td>53.3</td>
</tr>
<tr>
<td>More than once a month</td>
<td>16.7</td>
</tr>
<tr>
<td>Less than once a month</td>
<td>26.7</td>
</tr>
<tr>
<td>Unsure</td>
<td>3.3</td>
</tr>
</tbody>
</table>

**Objective 1: Determine patients’ perceptions of the roles of pharmacists, including trust in pharmacists as clinical providers**

The majority of respondents indicated they would visit a physician when experiencing medication problems, as shown in Table 4. However, 36.3% indicated they would visit a pharmacist either alone or in conjunction with other health care providers for resolution of medication issues. Interestingly, over 20% of patients would visit multiple health care providers for help with medication problems.
Table 4: Who would you visit if you had a problem with your medications?

<table>
<thead>
<tr>
<th>Who to Visit</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctor</td>
<td>51.5%</td>
</tr>
<tr>
<td>Pharmacist</td>
<td>21.2%</td>
</tr>
<tr>
<td>Nurse</td>
<td>3%</td>
</tr>
<tr>
<td>Nurse practitioner</td>
<td>3%</td>
</tr>
<tr>
<td>More than 1 of the above</td>
<td>21.2%</td>
</tr>
</tbody>
</table>

A clear majority believed pharmacists have the ability to manage and resolve medication related problems (Table 5). While patients preferred to visit a physician for medication problems, the belief in pharmacists’ capability to handle and resolve medication issues suggests patients would be open to receiving increased help from pharmacists.

Table 5: Do you believe that pharmacists can help manage and fix problems with your medications?

<table>
<thead>
<tr>
<th>Response</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>90.6%</td>
</tr>
<tr>
<td>No</td>
<td>9.4%</td>
</tr>
</tbody>
</table>

For the question on trust in pharmacists shown in Table 6, responses were analyzed from all patients who answered the question (n=50) because trust in pharmacists includes more factors than only prescription medication use. Every patient in the study indicated trust in pharmacists, which is consistent with prior Gallup polls placing pharmacists among the most highly trusted professions. A follow-up question inquired about trust in pharmacists pertaining to the Medication Therapy Review.
Table 6: In general, do you trust pharmacists?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>100%</td>
</tr>
<tr>
<td>No</td>
<td>0%</td>
</tr>
</tbody>
</table>

A strong majority trusted pharmacists as providers of MTR services (Table 7). In this case, those who answered the question (n=32) already received MTM services during the intervention. Because patients experienced first hand the provision of a Medication Therapy Review, the beliefs presented indicate trust in pharmacists as clinical providers of medication management services. Thus, based on the descriptive responses in this section, patients did trust pharmacists both overall and for provision of clinical services. Finally, qualitative themes were gathered from an open-ended question on expectations regarding pharmacists. The most reported expectation of pharmacist included the traditional roles of dispensing and counseling (Table 8).

Table 7: Do you trust pharmacists to provide a Medication Therapy Review?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>96.9%</td>
</tr>
<tr>
<td>No</td>
<td>3.1%</td>
</tr>
</tbody>
</table>

Table 8: When you visit a pharmacy, what do you expect the pharmacist to do?

<table>
<thead>
<tr>
<th>Expected Activity</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fill prescriptions</td>
<td>Most frequent theme (n=14)</td>
</tr>
<tr>
<td>Counsel and provide knowledge on side effects</td>
<td>Second (n=9)</td>
</tr>
<tr>
<td>Answer medication related questions</td>
<td>Third (n=8)</td>
</tr>
<tr>
<td>Prevent medication interactions / Friendly</td>
<td>Least frequent (n=2)</td>
</tr>
<tr>
<td>Project friendly attitude</td>
<td>Least frequent (n=2)</td>
</tr>
</tbody>
</table>
**Objective 2: Determine patients’ awareness of Medication Therapy Management**

Survey results indicate low awareness of MTM. Two out of three patients (66.7%) did not know about Medication Therapy Management prior to the service event. However, approximately half of the sample (48.5%) reported non-adherence as a medication issue. While many patients could benefit from MTM, particularly for adherence, the majority simply was not aware this clinical pharmacy service existed (Table 9).

| Table 9: Have you heard of the term Medication Therapy Management before today? |
|---------------------------------|---------|
| Yes                             | 33.3%   |
| No                              | 66.7%   |

**Objective 3: Determine patients’ perceived benefit and satisfaction from the MTM services received during the intervention.**

Three out of four patients (75%) perceived benefit after going through the MTM services provided at the intervention, as shown in Table 10. The positive feedback from patients suggests satisfaction with MTM even though most patients came into the study without prior awareness of these services. Though only 42% reported finding new ways to remember medication and increase adherence as a result of the service (Table 11), most patients (60.6%) indicated already having methods to remember medications before participating in the event. Further analysis between reported non-adherence and MTM helpfulness was conducted for Objective 4.
Table 10: Do you think you will benefit from the Medication Therapy Review?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>75%</td>
</tr>
<tr>
<td>No</td>
<td>25%</td>
</tr>
</tbody>
</table>

Table 11: Did the Medication Therapy Review help you find new ways to remember to take your medicine?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>42%</td>
</tr>
<tr>
<td>No</td>
<td>58%</td>
</tr>
</tbody>
</table>

Responses for the Likert-type items shown in Table 12 included a range from 1 (strongly disagree) to 5 (strongly agree). Overall, the Likert-type scores showed positive perceptions regarding the MTM services. The highest mean reflected perceived value in the Personal Medication Record given to each patient. About 64% of the sample reported increased understanding of accurate medication use as a result of the MTM intervention. Four out of five patients (80%) found benefit in the conjointly provided MTM and influenza immunization. Finally, 73% indicated willingness to visit their community pharmacy for further MTM services in the future. Finally, qualitative themes were gathered from an open-ended question on specific assistance provided by the MTM. The percentages of patients reporting the different themes are listed in Table 13.
Table 12: Likert-type responses rating satisfaction with MTM

<table>
<thead>
<tr>
<th>Question</th>
<th>Mean</th>
<th>Median</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Medication Therapy Review helped me understand how to properly use my prescription and over-the-counter medicines.</td>
<td>3.97</td>
<td>4</td>
<td>1.06</td>
</tr>
<tr>
<td>Getting my flu shot and Medication Therapy Review at the same time is a beneficial service.</td>
<td>4.36</td>
<td>5</td>
<td>1.14</td>
</tr>
<tr>
<td>I think the wallet card medication list provided by the pharmacist is a valuable tool.</td>
<td>4.64</td>
<td>5</td>
<td>0.99</td>
</tr>
<tr>
<td>I would visit my local community pharmacy to receive Medication Therapy Reviews in the future.</td>
<td>4.12</td>
<td>5</td>
<td>1.26</td>
</tr>
</tbody>
</table>

Most patients reported the counseling and information on side effects during MTM as beneficial. However, over 20% specifically noted the pharmacist’s assistance with increasing medication adherence. Isolated themes included cost management, choosing appropriate medications, decreasing complications, smoking cessation, and assessment of blood sugar and blood pressure.

Table 13: Can you please list some ways the Medication Therapy Review helped you?

<table>
<thead>
<tr>
<th></th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counseling and knowledge of side effects</td>
<td>44.4%</td>
</tr>
<tr>
<td>Increase remembrance for taking medications</td>
<td>22.2%</td>
</tr>
<tr>
<td>Pharmacist knows what medications to prescribe</td>
<td>5%</td>
</tr>
<tr>
<td>Decrease medication complications</td>
<td>5%</td>
</tr>
<tr>
<td>Ensure complete control of medications</td>
<td>5%</td>
</tr>
</tbody>
</table>
Provide assistance with medication cost 5%
Smoking cessation services 5%
Assess blood sugar, blood pressure, and family history 5%

Objective 4: Compare patients’ non-adherence with MTM helpfulness.

Table 14 contains the results of a Fishers Exact statistical significance test used to analyze 2x2 contingency tables. For this objective, the test compared the patients’ response to non-adherence based on forgetfulness (Question 3) and MTM helpfulness in remembering new medications (Question 14).

<table>
<thead>
<tr>
<th>Forgetful</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Count</strong></td>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>% within Forgetful</td>
<td>73.3%</td>
<td>26.7%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>13</td>
<td>18</td>
</tr>
<tr>
<td>% within Forgetful</td>
<td>41.9%</td>
<td>58.1%</td>
</tr>
</tbody>
</table>

According to the Fisher’s Exact Test, there was a statistically significant difference between two groups (p < 0.01). Thus, those who reported “yes” to the question on forgetfulness were more likely to find the MTM service helpful (73.3% vs. 12.5%, respectively).
Objective 5: Compare patients’ non-adherence and DRAW tool efficacy.

Table 15 contains the results of McNemar’s Test and Cohen’s kappa coefficient as statistical measure of agreement between categorical items. For this objective, the test compared patients’ responses to non-adherence based on forgetfulness (Question 3) and the DRAW tool results (problem identified vs. no problem identified).

**Table 15: Forgetfulness vs. DRAW Tool**

<table>
<thead>
<tr>
<th></th>
<th>DRAW</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Forgetful</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>% of Total</td>
<td>30.3%</td>
<td>18.2%</td>
</tr>
<tr>
<td>No</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>% of Total</td>
<td>18.2%</td>
<td>33.3%</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>% of Total</td>
<td>48.5%</td>
<td>51.5%</td>
</tr>
</tbody>
</table>

Based on the Kappa value (0.27, p=0.12), there was not statistically significant agreement between the two approaches to detect potential problems with non-adherence. However, the results of the McNemar test (p > 0.99) suggest there is insufficient evidence to state that the proportion of patients rated as non-adherent is different between the DRAW tool and the forgetfulness question. A total of 30.3% of the responses indicated agreement between non-adherence and DRAW problem, and 33.3% indicated agreement in adherence and no DRAW problem. Thus, the overall level of agreement was 63.6%. Based on this analysis, no definitive statements can be made concerning the concordance or discordance of these two approaches.
Chapter V

Discussion and Implications

The primary purpose of this research project was to evaluate the current perceptions on adherence targeted medication therapy management as part of the influenza immunization administration workflow as reported by patients at a clinic for the medically underserved in Southaven, Mississippi. No prior studies in Mississippi provide a review of conjointly provided influenza immunizations and Medication Therapy Management.

Limitations

One limitation in this study was the small sample size. Despite radio recruitment and advertising at the free clinic, only 53 subjects participated in the event even though 90 free influenza immunizations were available for the project. Of those 53 subjects, only a smaller portion (n=33) took prescription medications. Statistical analysis of the study was at risk for failing to recognize statistical significance (Type II error). Thus, due to the small sample size, the ability to generalize the results discovered in the research is limited.

Secondly, any potential generalizations must consider the low diversity in patient demographics. The strong majority of patients who received the clinical services fell into the Caucasian ethnic category and female gender category.
Finally, the study did not ask the patients to distinguish between student pharmacists and registered pharmacists. It is unknown how the patients would distinguish perceptions between student pharmacists and pharmacy practitioners with greater levels of experience providing MTM services. Also, the variation in quality between the levels of service provided by different students was not taken into account. However, the student pharmacists used clearly defined MTM tools such as DRAW and completed MTM training prior to the intervention. Therefore, it is reasonable to believe the level of service provided by the student pharmacists was adequate or better.

**Discussion and Implications**

The patients in the study indicated generally favorable perceptions regarding the clinical services they received, as indicated in Table 12. A clear majority trusted pharmacists as providers of clinical services. While most qualitative expectations of pharmacists centered on dispensing medications, respondents affirmed pharmacists’ ability to manage and resolve medication related problems. Based on the survey, most patients would return for further MTM visits in the future. Although limited by small sample size and its exploratory nature, the preliminary results of this study suggest that pharmacy practitioners in the Mississippi Delta and other rural locations might expect positive attitudes from patients engaged in clinical pharmacy services. The sustainability of MTM implementation is also supported by the patient’s willingness to seek additional MTM in the future.

While survey results indicate relatively low awareness of MTM, a significant number of patients experienced medication adherence issues. The DRAW tool was
heavily focused on maintaining or increasing adherence. It follows that patients experiencing difficulty with adherence are prime candidates for adherence-targeted MTM services, as used in this study. Indeed, from the results obtained through the survey, patients who reported non-adherence due to forgetfulness reported greater benefit the MTM intervention than patients who did not report any forgetfulness.

The findings of this study relate to the use of pharmacist administered influenza immunizations in that most patients taking prescription medications attempted to obtain an influenza immunization every year. Many patients also visited their community pharmacy once per month, if not more often. Community pharmacies that offer and advertise influenza immunizations might consider the interaction with patients during the flu shot as an optimal opportunity to provide MTM and adherence services.

Based on the findings of this study, the following recommendation for use within community pharmacy settings may be considered. During the brief waiting period following the immunization, a pharmacist could initiate dialogue with the patient by offering to discuss the patients’ medications. If the patient indicates willingness to talk about their medications, the pharmacist might ask: “Do you feel like you have too many medications or too many doses per day?” or “Do you sometimes forget to take your medication on routine days?” Based on the patient’s response to these questions, the pharmacist should consider using the DRAW Tool to further engage with the patient and provide recommendations such as adherence or memory aids, daily alarms, specialized packaging, medication calendars and medication synchronization. The pharmacist could also consider providing a Personal Medication Record, as many patients in this study found the PMR quite beneficial. Further, another benefit of using the DRAW tool in a
pharmacy practice setting where more than one pharmacist or student pharmacist provides immunizations is that all patients would receive consistent adherence interventions due to the structured nature of the conversation with the patient.

However, if the patient does not indicate any forgetfulness or problems managing doses, adherence-focused MTM is less likely to provide substantial benefits for the patient. Some patients indicated no forgetfulness, but the student pharmacists still uncovered adherence problems with DRAW tool. Forgetfulness is only one aspect of medication adherence problems. Other issues including medication side effects and cost may also affect adherence. The other causes for non-adherence might contribute to the lack of agreement found in Table 15. MTM services related to medication cost and side effects might provide additional benefits for these patients.

While influenza immunizations are a prime opportunity to engage patients, this is not the only occasion for pharmacists to offer clinical services. Pharmacists could also use routine pneumonia and shingles vaccines as a chance to offer MTM. Likewise, pharmacists also meet with patients for other services such as glucose monitoring and blood pressure check-ups. When providing clinical services, pharmacists have the opportunity raise awareness of MTM and potentially improve health outcomes by increasing medication adherence.

**Future Research Exploration**

This research project only considered the perceptions reported by patients undergoing this intervention. However, it did not collect information on how students perceived these services. Further exploration may inquire about the impact of pharmacy
practice interventions on students providing the services. Another interesting and unexpected finding was that over 20% of patients reported seeking medication assistance from multiple health care providers. Research regarding perceptions of inter-professional management of medication, especially in rural environments use may be an additional avenue of investigation in the future.

In the only omitted survey, the subject was Hispanic and communicated primarily in Spanish. In future studies, having a survey already translated into Spanish could provide an alternate method for obtaining surveys from participants who are not fluent in English. Also, this study did not evaluate patients’ willingness to pay for the services received. More research is likely necessary on the financial opinions of patients and potential compensation methods for pharmacists.

Finally, the intervention in this study combined the influenza immunization and MTM. Conducting future research with groups receiving only flu shots and only MTM versus the combined group would allow for in depth analysis of how patients in the Mississippi Delta distinguish between the benefits of these services.
REFERENCES


APPENDICES
APPENDIX A: SURVEY INSTRUMENT

Medication Review Questionnaire

You are invited to complete a brief survey on perceptions regarding pharmacist provided medication reviews and flu immunizations. This study is being conducted by a student in the Sally McDonnell Barksdale Honors College and University of Mississippi School of Pharmacy. This study has been reviewed by The University of Mississippi’s Institutional Review Board (IRB). If you have any questions, concerns, or reports regarding your rights as a participant of research, please contact the IRB at (662) 915-7482 or irb@olemiss.edu.

By completing this survey, you agree to allow the use of your information in this study. This is an anonymous survey. Please do not put your name on this sheet. You may choose not to answer some or all of the questions. We don’t believe any risks are involved in taking this survey. All information will remain confidential. When you are finished, please place your survey into the envelope labeled “survey collection.” Please consider each question honestly. Your opinion is very important. Thank you for your participation.

Please circle your answers:

1. How many prescription medications do you take per day? ________________

2. Do you have a way to remember you need to take a medication?

   Yes  No

3. Do you forget to take medications?

   Yes, once in a while  Yes, often  No

4. Do you know what you take each of your medications for?

   Yes  No  Partially

5. On average, how often do you visit a pharmacy?

   Once a month  More than once a month  Less than once a month  Unsure

6. When you visit a pharmacy, what do you expect the pharmacist to do?

   __________________________

7. Who would you go to if you had a problem with your medications?

   Doctor  Pharmacist  Nurse  Nurse Practitioner

Other: ________________________
8. Do you believe that pharmacists can help manage and fix problems with your medications?

| Yes | No |

9. In general, do you trust pharmacists?

| Yes | No |

10. Have you heard of the term Medication Therapy Management before today?

| Yes | No |

Please read the description of Medication Therapy Management below:

Medication Therapy Management has been created to help improve medication use. This could include:
- Help preventing missed doses
- Taking medications on time
- Knowing what medications are for
- Decreasing complications with medications and chronic health problems

Medication Therapy Review is a one-on-one visit with a pharmacist who reviews your medications and makes helpful suggestions. The pharmacist provided this medication review to you today, after you got a flu shot.

11. Do you trust pharmacists to provide a Medication Therapy Review?

| Yes | No |

12. Do you think you will benefit from the Medication Therapy Review?

| Yes | No |

13. If so, can you please list some ways the Medication Therapy Review helped you?

______________________________

______________________________

14. Did the Medication Therapy Review help you find new ways to remember to take your medicine?

| Yes | No |
15. Before today, where did you receive your most recent flu shot?

<table>
<thead>
<tr>
<th>Clinic</th>
<th>Hospital</th>
<th>Health Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharmacy</td>
<td>Work</td>
<td>I have never had a flu shot</td>
</tr>
</tbody>
</table>

**Check only one answer for each question:**

16. I try to get a flu shot every year.

Strongly agree  
Somewhat agree  
Neutral  
Somewhat disagree  
Strongly disagree

17. The Medication Therapy Review helped me understand how to properly use my prescription and over-the-counter medicines.

Strongly agree  
Somewhat agree  
Neutral  
Somewhat disagree  
Strongly disagree

18. Getting my flu shot and Medication Therapy Review at the same time is a beneficial service.

Strongly agree  
Somewhat agree  
Neutral  
Somewhat disagree  
Strongly disagree
19. I think the wallet card medication list provided by the pharmacist is a valuable tool.

Strongly agree
Somewhat agree
Neutral
Somewhat disagree
Strongly disagree

20. I would visit my local community pharmacy to receive Medication Therapy Reviews in the future.

Strongly agree
Somewhat agree
Neutral
Somewhat disagree
Strongly disagree

General information (please circle)

<table>
<thead>
<tr>
<th>Age:</th>
<th>18-24</th>
<th>25-34</th>
<th>35-44</th>
<th>45-65</th>
<th>Over 65</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Gender:</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>What is your race?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caucasian</td>
</tr>
</tbody>
</table>
### What is your total household income?

<table>
<thead>
<tr>
<th>Below $15,000</th>
<th>$15,000 to $24,999</th>
<th>$25,000 to $34,999</th>
</tr>
</thead>
<tbody>
<tr>
<td>$35,000 to $49,999</td>
<td>$50,000 to $74,999</td>
<td>Above $75,000</td>
</tr>
</tbody>
</table>

### What is your current health insurance status?

<table>
<thead>
<tr>
<th>Medicare</th>
<th>Medicaid</th>
<th>Private insurance</th>
<th>No insurance</th>
</tr>
</thead>
</table>
APPENDIX B: INTERVENTION FLOW CHART
APPENDIX C: RADIO RECRUITMENT

You are invited to a community health fair at Desoto Health and Wellness in Southaven on Saturday November 2 from 10am to 2pm. This event is hosted by the University of Mississippi School of Pharmacy and Funderburk's Pharmacy. For the first 90 people, 18 years and older, we are providing FREE flu shots! Also, don't forget to bring your prescription and over the counter medicine bottles with you for a free medication review. Please come Saturday, November 2, at Desoto Health and Wellness located at 8889 Northwest Dr. in Southaven. Call 662-393-9848 for more information.
Hello, I'm a student at the University of Mississippi. Would you be willing to take a brief survey regarding the medication management services you just received?

If "YES": Thank you. Are you at least 18 years old?

If “YES”: Great, please complete the survey and place it in the collection envelope.