

**Pharmacy Personnel Assessments of Workflow
Associated with Medication Therapy Management
Conducted During Transitions-of-Care**

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Executive Summary

Pharmacists are known for their expertise with medications and are the first medical professionals that many patients seek for their day-to-day concerns. The importance of understanding one's medication and having appropriate oversight over the regimen cannot be understated. There exists a method, known as Medication Therapy Management (MTM), with which pharmacists can ensure medication therapy safety and appropriateness via patient interview and receive reimbursement from third-party payers like insurance companies. However despite this, MTM is not a widely known service amongst eligible patients.

This study focuses on the process of MTM in UK Healthcare outpatient clinics and works to determine the main barriers between the idea and implementation of MTMs. Survey data was collected from ambulatory care pharmacists regarding their opinions on MTMs in order to determine whether or not a workflow solution would address the current lack. The responses regarding the barriers collected suggest that there is opportunity for a process-driven solution in the realm of outpatient MTM and that a newly developed workflow could facilitate the introduction of MTM into different realms of patient care such as during the transitions-of-care period. Additionally, utilizing time estimates, a time saving process has the potential to reduce the institutional cost of conducting MTMs by nearly half – possibly allowing the service to become profitable from a solely financial standpoint. The study highlights both the desire for pharmacists to provide a service they find value in as well as some of the external factors regarding MTM that will need to be addressed on a whole.

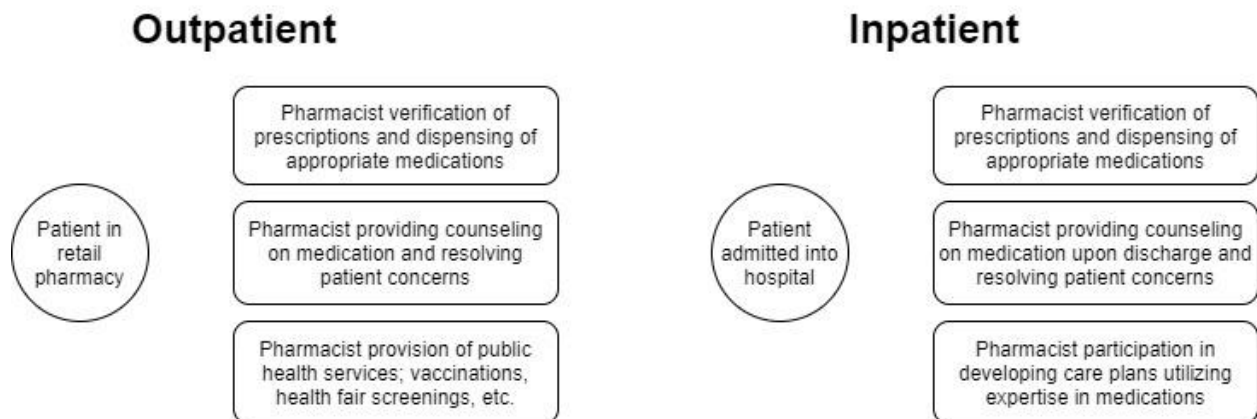
Background

The field of healthcare is ever growing, as is the push towards proactive patient care. Patients are now expected by their healthcare team of medical professionals to invest and participate in their own care rather than observing from the sidelines (Barry et al., 2012). The previous doctor-patient relationship, where decision making rested solely in the hands of the doctor, has changed due to patient dissatisfaction related to decisions they disagree with or were not informed about; both of which subsequently led to failure of therapy (Vermeire et al., 2001). As the number of sources for information grows in both print media and on the internet, the question of whether or not this movement towards patient engagement will be beneficial comes down to health literacy. Health literacy refers to “a set of skills that people need to function effectively in the health care environment” (Berkman et al., 2011). These skills include but are not limited to the following: the ability to read and understand text, to locate and interpret information in a document, to use quantitative information for tasks, to follow directions on medication regimen and to speak and listen effectively (Berkman et al., 2011). According to various studies, low health literacy has not only been associated with increased hospitalizations, but also with lower ability to take medication appropriately and lower probability of engaging in preventative services (Berkman et al., 2011).

To combat low health literacy and promote movement towards patient-oriented care, pharmacists are being asked to take increasingly larger roles in patient-centered care by leveraging any extra time the patient may have, to further educate them on their medications. Pharmacists are traditionally seen as experts of medication but are

perceived differently based on where patients encounter them. In the outpatient setting, meaning locations such as retail stores or long-term care clinics, pharmacists are often seen solely as dispensers of medication, despite being the first contact for patients' health questions and the last check of clinical appropriateness for medications. Inpatient (or hospital) pharmacists may be relatively unknown to the public but have an equal part in a patient's care as outpatient pharmacists – some will perform a similar job duty of checking and dispensing medications while others will work with doctors to develop plans of care for patients. Although the push for pharmacy involvement is new, the process is not – traditionally there are three prime questions used to address new prescriptions a patient has received, namely; “what did your doctor tell you the medication is for”, “how did your doctor tell you to take the medication”, and “what did your doctor tell you to expect” (Wertheimer, 1996). These three questions would eventually grow into the concept now known as Medication Therapy Management (MTM).

Figure 1: Outpatient vs. Inpatient pharmacist-patient interaction



Medication Therapy Management

The history of MTM dates back to the 1990's where it was referred to as "pharmaceutical care". A consensus definition for MTM was established in 2005 by the American Pharmacists Association (APhA), a national pharmacist organization, and in 2008 billing codes became available for providers to receive monetary compensation or "reimbursement" for these services (Viswanathan et al., 2015). Providers are distinctly defined medical professionals who are given the ability to bill governmental programs such as Medicare and Medicaid – the definitions of a "provider" varies from state to state. Medicare, the government provided health insurance for the elderly and disabled, established laws in order to further the provision of MTM to the patients it covers. Within Medicare there are different "parts" offered by the government: Part D involves coverage for prescription medication and pharmacy benefits in the outpatient setting (Centers for Medicare & Medicaid Services, 2017).

Under the Centers for Medicare and Medicaid Services (CMS), the Administrative Committee of the Federal Register established drug utilization management, quality assurance, and medication therapy management programs via 42 CFR 423.153. From this, the current definition of MTM has been established {Table 1}. Insurance companies who contract with CMS to provide specifically defined MTM programs in exchange for reimbursement are termed "Part D sponsors". These MTM programs are designed for certain Medicare Part D patients who have various complex medical conditions or are on a significant amount of medications {Table 1}. MTM involves a large variety of services

including immunizations, anticoagulation management, and medication therapy reviews (Viswanathan et al., 2014).

Table 1: Requirements of an MTM program

Per §423.153(d), a Part D sponsor must have established an MTM program that...
<ul style="list-style-type: none"> • Is designed to ensure that covered Part D drugs prescribed to targeted beneficiaries are appropriately used to optimize therapeutic outcomes through improved medication use • Is designed to reduce the risk of adverse events, including adverse drug interactions, for targeted beneficiaries • May be furnished by a pharmacist or other qualified provider • May distinguish between services in ambulatory and institutional settings • Must be developed in cooperation with licensed and practicing pharmacists and physicians
Targeted Beneficiaries are enrollees in sponsor’s Part D plan who meet all of the following
<ul style="list-style-type: none"> • Have multiple chronic diseases, with three chronic diseases being the maximum number a Part D plan sponsor may require for targeted enrollment • Are taking multiple Part D drugs, with eight Part D drugs being the maximum number of drugs a Part D plan sponsor may require for targeted enrollment • Are likely to incur (for 2012 and subsequent year) an amount greater than or equal to \$3000 in annual Part D drug costs, increased by the annual percentage specified in §423.104(d)(5)(iv) – [annual percentage increase for each year is equal to the annual percentage increase in the consumer price index for all urban consumers for the 12-month period ending in July of the previous year]

Legal Information Institute. (2015, February 12). 42 CFR 423.104. From https://www.law.cornell.edu/cfr/text/42/423.104#d_5_iv (Last accessed on 12/13/17).

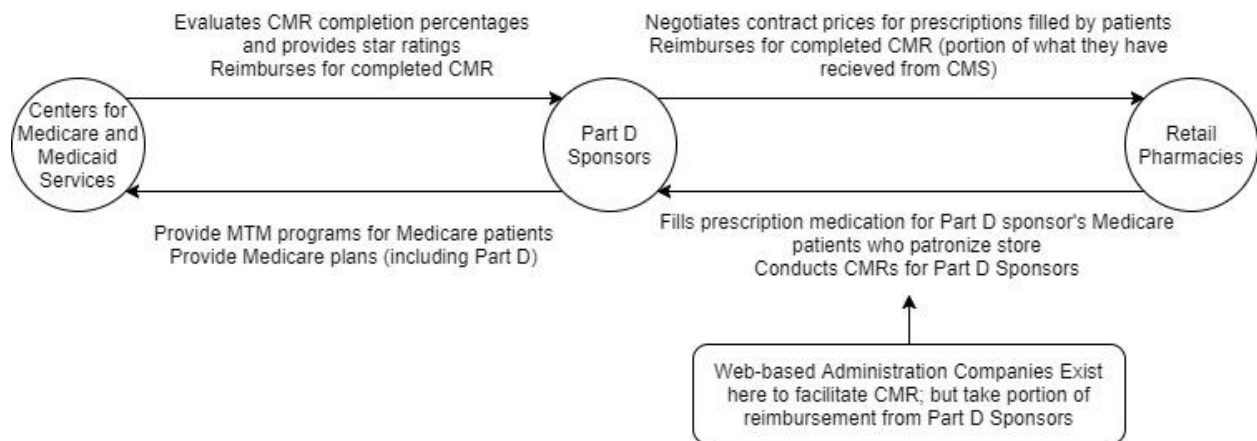
Comprehensive Medication Reviews

One of the key services within the larger category of MTM are Comprehensive Medication Reviews (CMRs). A CMR is an involved process where the patient’s medication history, current regimen, medication problems, and needed interventions are compiled into one take-home packet. CMS has an expected definition for this but does not outline the requirements to the same degree as it has with MTM. The take-home packet is officially termed the “MTM Program Standardized Format” or Form CMS-10396. This packet is the

physical set of documents that CMS requires be delivered to the patient in order for either the pharmacist or the Part D sponsor to collect reimbursement (Centers for Medicare & Medicaid Services 2012). A typical CMR begins with reaching out to the patient with the offer and a brief description of the process. If the offer is accepted, the pharmacist will conduct an interview with the patient to confirm the patient's current medication history, screen this developed list for any interactions or safety concerns, and address any concerns that the patient may have regarding their medication. Although the interview may occur over the phone, it is preferable to have it take place in-person given potential miscommunication through lack of non-verbal cues. The process on a whole can take from thirty to ninety minutes dependent on the complexity of a patient's case. If the offer is declined or the patient is unable to be reached with at least three attempts, then the pharmacist will note this for documentation as well.

This service is increasingly being recognized as beneficial for preventing adverse drug events, improving patient understanding, and aiding appropriate medication usage (Viswanathan et al., 2014). Additionally, Part D sponsors have a strong financial incentive to encourage pharmacists to complete these CMRs. Part D sponsors are evaluated by CMS on the percentage of eligible patients whom have received the service. These ratings take the form of "star ratings" which are used by Medicare patients when deciding upon a Part D health insurance plan and company. Despite this, the service has not become a frequent part of pharmacists' workload due to the onerous steps involved and inadequate reimbursement obtained.

Figure 2: Insurance and Pharmacy Network



Whereas Part D sponsors are being evaluated by CMS on CMR completion percentages, retail pharmacies are only loosely tied into the star-rating system. Retail pharmacies are involved in a Part D sponsor's network as the sponsor will designate specific pharmacies the patient must pick-up their medications from in order to have them covered by the sponsor's Medicare plan. Thus if a Part D sponsor's star rating is negatively affected, it follows that fewer patients would want to select the sponsor's particular Medicare plan and the designated pharmacies would receive fewer patients. As such, Part D sponsors will often use CMR completion percentage as a negotiating tool with their contracted retail pharmacies. However, for a retail pharmacy, potential losses in revenue via contract along with the additional revenue provided by the Part D sponsors for conducting CMRs have not proved to be crucial for daily operations.

Outpatient CMRs

Currently, CMRs are mainly conducted in the outpatient setting – retail pharmacies encourage their pharmacists to offer CMRs to patient over the phone and during all points of patient-pharmacist contact. Web-based administration companies such as OutcomesMTM or Mirixia contract with multiple Part D sponsors to provide an efficient way to connect pharmacy service to a source of revenue. These companies will compile a broad summary of what the patient is likely taking – in normal course of business, pharmacies request reimbursement from Part D sponsors for the drugs dispensed that are covered by the patient’s insurance plan. From the compiled record of dispenses, an estimation of the patient’s medication history is derived. This list is not necessarily complete as the patient may be taking over-the-counter or prescription medications that were not billed to a Part D sponsor. With this preliminary list, the web-based administration companies provide a web form for pharmacies to validate with patient information after the patient interview portion has been completed. The pharmacist notes any interventions made, as well as concerns brought up by the patient, in the form. The web-based administrative companies then take all information submitted by the pharmacist and reshape it into the MTM Program Standardized Format as required by CMS. At this point, the pharmacist is responsible for delivering this constructed take-home packet to the patient.

Each of the Part D sponsors will review the web forms submitted by the web-based administration companies and pass on a portion of the larger reimbursement to them.

These companies in turn pass a portion of their reimbursement onto pharmacies as fee for the legwork. The portion that pharmacies receive ends up being around \$50-100 (OutcomesMTM, 2017). Considering that OutcomesMTM reported a Return-on-Investment per pharmacist-identified cost-savings intervention of \$656.39 in its 2016 MTM Trends Report, the \$50-100 given per patient can be argued as inadequate for the work's value (OutcomesMTM, 2016).

Outpatient retail pharmacists have the most patient interaction opportunities out of all facets of the profession. However, as stated before, the provision of CMRs is not a heavily marketed service by retail pharmacies. This is because the reimbursement fails to make up for the lack of available time and interest in CMRs for both the pharmacist and the patients. Additionally, there is an ongoing time struggle between patients who demand that their medications be affordable and filled quickly versus pharmacists who are obligated to ensure clinical appropriateness and safety. Patients will often not see the benefit in a service such as CMR given that benefits are typically not immediate, whereas the hassle of an in-depth interview is readily apparent – the scheduling of time, the previously described process of compiling a medication list, the attention that a medically complicated patient requires, etc. Pharmacists may instead focus on the medication checking and dispensing side of the job in order to appease their customers – even those who recognize the patient benefits in CMRs may be hesitant to devote time to it given that they are not correctly incentivized.

Inpatient CMRs

CMS utilizes a different payment program with Medicare for the inpatient setting. Instead of Part D, Medicare Part B covers services provided by the hospital, durable medical equipment, as well as some preventative services. Programs similar to CMRs have been suggested as valuable initiatives in the inpatient setting. Although CMS allows Pharmacist Clinicians to receive Medicare Part D reimbursement, CMS does not currently recognize Pharmacist Clinicians as healthcare providers eligible for Medicare Part B reimbursement, thus hospitals often must work with third-party payers to ensure that reimbursement for MTM services is possible (UNM Medical Group, 2014).

Inpatient pharmacists have a different angle with relation to patient care as their degree of patient interaction is limited to the patient's stay in the hospital. Pharmacists have similar time pressures as their retail counterparts but are not confronted as often by the patient. The hospital would be an ideal setting for CMRs given that the patient is more readily available for consultation, their medication history is up-to-date pursuant to other pharmacy-related services, and consultation with other providers regarding complex interventions is facilitated by proximity. The patient is unable to leave as placed discharge orders do not mean that the patient is allowed to physically leave the hospital; a pharmacist conducting a CMR at this time would have a captive audience here, bypassing the time issue that arose in the outpatient scenario. The main issue with CMRs in the inpatient setting is the complete lack of reimbursement from Medicare for pharmacist work. As mentioned before, pharmacists are not eligible for reimbursement from Medicare Part B due to lack of provider status and Part D does not apply to the inpatient setting.

Transitions of Care

The time between a patient's hospital stay after discharge (hospital orders that declare a patient fit for leaving the hospital) and returning to home is defined as the "transitions of care" period. Transitions of care represents the transference of responsibility from the inpatient providers to the patient and their primary care provider. This time frame proves to be fraught with errors given that patients will have "prescription medicines commonly altered at this transition point" with "[s]elf-care responsibilities [that] also increase in number and importance" (Kripalani et al., 2007). According to Kripalani et al., 49% "of hospitalized patients experience at least 1 medical error in medication continuity, diagnostic workup, or test follow-up". When looking specifically at adverse drug events, they are reported to occur in 19-23% of patients. Due to the barriers present in the outpatient realm and difficulty faced in the inpatient setting, this alternative time period has been suggested for conducting these MTM services.

This short time period technically falls under the outpatient realm. The responsibility of the patient's care has been transferred from the hospital staff to the patient's primary care provider despite the fact that the patient physically resides in the hospital. Patients often remain in their room and are not allowed to leave until final preparations by various hospital staff have been made as discharge orders put in by a doctor only signify the need for staff to arrange follow-up appointments, transportation, financial matters, printing and preparation of all papers, and a final discussion with the patient to ensure understanding (UpToDate, 2017). Although the proposal of CMR in this time frame is relatively unexplored, the idea of pharmacy providing a service during this time frame is not.

Hospital-based retail pharmacies, those which serve an outpatient population but are either affiliated or owned by the hospital center, have developed programs to provide recently discharged patients with their first dose of new medications (UK HealthCare Pharmacy Services, 2017). The provision of a CMR during this same period would thus be conducting an outpatient service. This combines the benefits of both the outpatient and inpatient settings to negate the detriments of each – the patient is available for this service given their physical location in the hospital and pharmacists are able to receive reimbursement according to Part D MTM guidelines.

The remaining issues with providing CMR services during the transitions of care timeframe includes the pharmacist's availability to conduct them and the financial benefit of the service itself. From a strictly financial standpoint, each successfully conducted CMR will net a pharmacy between \$50 and \$100 (OutcomesMTM, 2017). Adding the factors of time required to aggregate a patient's medication history, interview, develop a relevant action plan, and submit the documentation, the premium of a pharmacist's time may outweigh the current dollar amount provided. This calculation is slightly blunted by the fact that hospital-based pharmacies are often interested in long-term patient health given that it may reduce hospital costs in other areas – shown by values such as Return-on-Investment (OutcomesMTM, 2016). One example of this cost is patient readmission, where CMS will reduce Medicare payments for hospitals with excess readmissions (Centers for Medicare & Medicaid Services, 2015). The overall goal would be to distribute the work needed by dividing a transitions-of-care CMR into portions that can be conducted via a pharmacy technician against portions that require a pharmacist's

expertise. This would allow for pharmacists to efficiently allocate their time while ensuring that the venture remains profitable for the hospital.

At the University of Kentucky Chandler Medical Center, the transitions-of-care CMR is currently being explored as a viable realm for CMRs. In doing so, the University of Kentucky aims to improve patient outcomes while increasing total reimbursement received ensuring the long-term viability of providing CMRs. Given the undeveloped nature of CMR application in this timeframe, there have not yet been proven methods for providing these services. The nature of this research stems from the need to develop one such possible method in order to address the remaining issue of financial sustainability and potential additional health benefits that may result. The first step of this research involves polling pharmacists in the retail setting about the significance of CMRs in order to identify potential barriers that will counteract this process.

Problem Statement

Both the outpatient and the transitions-of-care realm will be considered. Although the patient health benefits and the financial benefits for Part D sponsors are widely known, CMRs have not become widely used in the outpatient area. This research endeavors to pin down the most influential reasons as to this non-use. These barriers fall into a few broad categories. First, there is the question of value, both on the side of the pharmacist and the side of the patient. The perceived value of the service in both parties in terms of health or financial benefit could largely affect the amount of CMRs provided. Logically, patients who understand the benefits would be more likely to request the service and pharmacists would be more likely to seek out patients who need them. Secondly, the time needed to conduct a CMR is a potential significant barrier. A service that requires preparatory work in addition to an interview consumes time that a retail pharmacist could use otherwise with checking prescriptions, patient counseling, or working out insurance issues, not to mention the time burden on the patient themselves. Communication and patient interaction is the third proposed barrier which comes into play in contacting patients, informing them of the service, and within the interview itself. This is not as readily apparent as value or time however the importance of patient engagement and participation in the process merits lack of these as potential problems. Finally from the perspective of the pharmacist, insufficient resources or a lack of understanding of the process can prevent effective utilization of CMRs. All of these problems carry over from the current retail setting to the transitions-of-care setting and thus are important to address before implementation of any new process.

Literature Review

The literature around this inquiry of developing a workflow for Medication Therapy Management programs in the outpatient, transitions-of-care setting has not been previously explored. There have been previous studies that look into the benefit of MTM (which have subsequently been used to justify the requirement placed by the Centers for Medicare and Medicaid), however these are limited to the efficacy and outcomes provided from these programs in the pure outpatient setting. The general lack of studies regarding the efficacy of MTMs is likely due to confounding factors. A patient who has received an MTM service such as a CMR will more than likely have more providers and other interventions attempted at the same time given that having multiple chronic conditions is listed as a requisite to be a targeted beneficiary per Medicare. To provide a better understanding of the topic, specific references have been highlighted as core sources (Table 2).

Table 2: Key Literature Cited

Author(s)	Document	Date	Background Relevance to Capstone
Centers for Medicare and Medicaid Services	Medication Therapy Management: https://www.cms.gov/Medicare/Prescription-Drug-Coverage/PrescriptionDrugCovContra/MTM.html	10 / 2017	Definition of MTM program including professional guides and memos for hospitals, providers, and patients. Contains what the US government requires of third-party payers in order to obtain reimbursement and the benefits they receive in doing so.
Kripalani, Jackson, Schipper, Coleman	Promoting effective transitions of care at hospital discharge: a review of key issues for hospitalists	09 / 2007	Looks into the effects of transitioning patients from hospital to outpatient care; the consequences and strategies to improve the process. Denotes medication reconciliation as an effective method to improve patient care during TOC.

UNM Medical Group, INC.	Medication Therapy Management	07 / 2014	Different states have different regulations on the definition of a “medical provider”. This protocol contains the method for billing for an institution in New Mexico, a state which has such modified definitions for pharmacists, via a variety of inpatient settings via CPT codes which are applied to Medicare Part D.
Vermeire, Hearnshaw, Royen, Denekens	Patient adherence to treatment: three decades of research. A comprehensive review.	10 / 2001	Literature review on terminology differentiating compliance, concordance, and adherence; discusses the results of poor adherence on patient health in general. Does not contain any studies or statistical analysis but references and summarizes the effects of multiple studies and provides background as to potential role for MTM.
Viswanathan et. al.	Medication therapy management interventions in outpatient settings: a systematic review and meta-analysis	01 / 2015	Meta-analysis determining effect of outpatient MTM on various health outcomes vs standard of care. Study observed statistically significant improvement in medication appropriateness and adherence in terms of doses taken. However, evidence was insufficient to determine significant effect on health outcomes. Provides evaluation on methods to improve future analysis, explanation of difficulty in isolating benefits, as well as methods to improve MTM process.

Research Design

The purpose of this study is to evaluate a proposed workflow for conducting CMRs and analyze the effects of the constructed survey tool on this workflow. However, given that the implementation of the survey tool is reliant on the institution rather than personal research, a survey tool was also utilized to capture pharmacist opinions towards MTMs in an attempt to provide usable data. Both surveys were constructed in REDCap (Research Electronic Data Capture) – a web-based application developed by Vanderbilt University specifically for capturing data used in research studies (REDCap, 2017). The survey consisted of three distinct portions. The first section focused on beliefs regarding barriers to conducting MTMs with a question asking participants to rank their top three perceived barriers. The second section was for pharmacists who have conducted MTMs to estimate the time needed for the process. Finally, the third section utilized a Likert Scale to evaluate various statements regarding the effect of MTM's on pharmacists and patients. The breakdown of the survey is attached (Appendix A). In terms of analysis, these results were used to gauge the need for a new workflow for MTMs.

The workflow tool will serve as a hassle-free and efficient manner for gathering responses. Participants do not need any log-in credentials given that the tool uses a universal web address. Additionally, the tool contains a wide range of programmed question formats such that it is relatively easy for an administrator to use in case the need for further tool development arises. The survey tool was designed in order to shift a portion of the workload from pharmacists to pharmacy technicians and overcome the barrier of additional technological burden for the pharmacists. In doing so, it is hoped that

pharmacists will engage in more CMRs due to the lessened time burden. This proposed workflow would however increase the overall workload of pharmacy technicians. This program is in plans to be piloted with patients treated by physicians in the cardiovascular clinic at UK Healthcare who were designated by OutcomesMTM (the third-party web application connecting insurance companies and UK Healthcare) as needing a CMR.

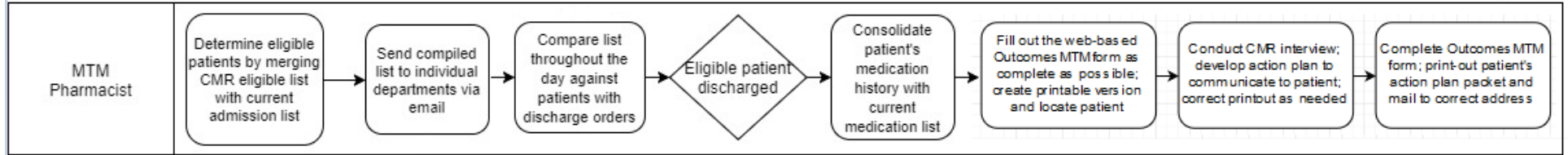
Previous Workflow

The term “previous workflow” is utilized to describe the workflow that is to be replaced by the proposed tool. A graphic has been included to help delineate between the previous and proposed workflows [Figure 3, Panel A]. Hospital-admitted patients are targeted for CMR when their discharge orders have been placed. On a twice-weekly basis, a pharmacist merges the CMR eligible list provided from OutcomesMTM with the current inpatient list – this allows the pharmacist to determine which CMR eligible patients are currently in the hospital. They then consolidate the patient’s admitting medication history and any changes to their medication regimen that have been made during their stay. The pharmacist then fills out the form on the OutcomesMTM web-application with this information, creates a printable version and conducts the CMR with the patient by their bedside – they would correct any errors, fill out any missing information, as well as convey any medication-related problems that are present along with their recommended interventions for the patient. Afterwards the pharmacist completes the OutcomesMTM form using the information they had obtained from the interview and sends the patient (or designated recipient) their action plan packet.

Figure 3: Previous and Proposed Workflows

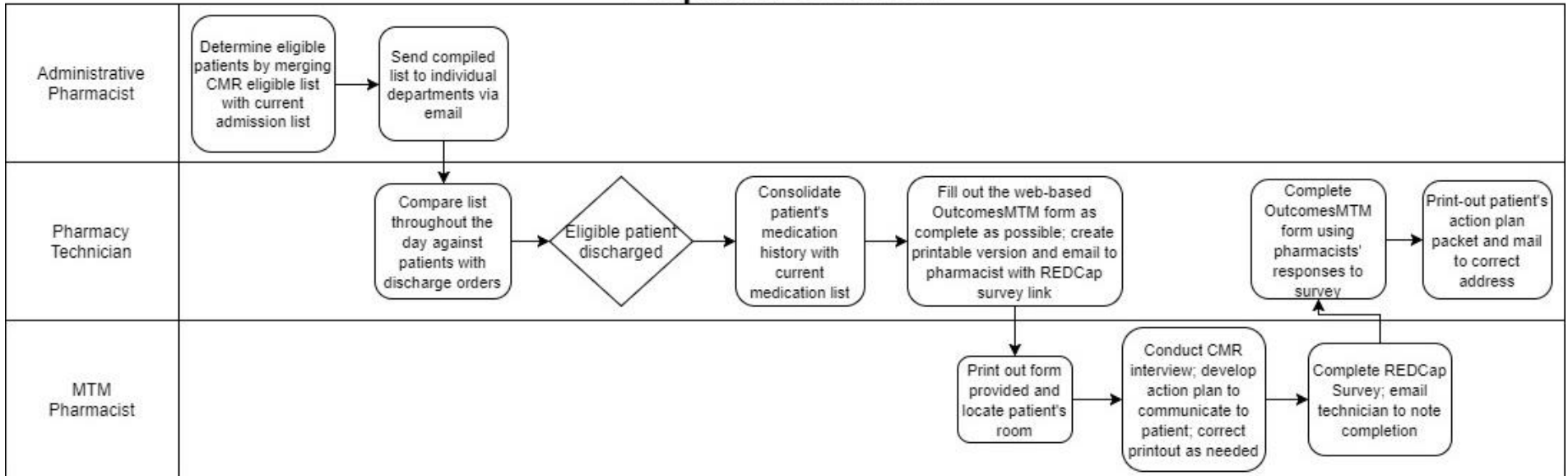
A.

Previous Workflow



B.

Proposed Workflow



Piloted Workflow

The piloted workflow differs from the one above with the inclusion of the REDCap survey tool and utilization of a pharmacy technician [see Figure 3, Panel B]. In this figure, the administrative pharmacist may at times act as the MTM pharmacist as well. After consolidating the patient's medication history, the technician would email both the printable OutcomesMTM form and the REDCap survey link to the responsible pharmacist. After the pharmacist conducted the CMR, they would utilize the REDCap survey tool to provide the relevant information and notify the designated technician of its completion. Using the results from the REDCap survey, the technician would complete and submit the OutcomesMTM form, then send the patient (or designated recipient) their action plan packet.

Data Collected

Following implementation of the piloted workflow, the time required for completion of MTM's was compared against the predicted times from the opinion survey as well as the recorded time from the sample pharmacist for Previous Workflow processes. Data analysis will focus mainly on the data obtained from the pharmacist opinion survey with time data used to determine if the Piloted Workflow is in fact an overall benefit to the process.

Results

The survey was sent out via a listserv for UK Healthcare “Ambulatory Pharmacists” with two weeks allotted for response time. Of the potential 36 pharmacists eligible to answer, there were 19 responses collected for a response rate of 52.8%. The survey results are listed below by survey section.

Section 1: Barrier Identification

An initial question asked the respondent if they believed there were any barriers to conducting MTMs. If yes, the survey asked the pharmacists to rank the top three barriers in the list in order of significance. These barriers have been classified relative to the problem to which they relate. The following table provides the number of times each barrier was ranked. All 19 pharmacists provided responses for this section. The total score was calculated via a linear weight; each rank #1 counted as 3 points, #2 as 2 points, and #3 as 1 point.

Table 3: Barrier Perception Ranking (n=19)

Barriers	Related Problem	Times ranked #1	Times ranked #2	Times ranked #3	Total Score
Difficulty Integrating MTMs into Normal Pharmacy Workflow	Time	4	5	1	23
Time Required of Pharmacy Personnel to Conduct MTM	Time	3	3	3	18
Difficulty in Engaging Patients	Communication	3	2	2	15
Difficulty in Contacting Patients due to Social Issues	Communication	4	0	2	14
Insufficient Patient Interest	Value	1	2	3	10
Time Required of Patient to Conduct MTM	Time	2	1	1	9
Lack of Private Counseling Area	Resource	1	1	1	6
Difficulty in Identifying Eligible Patients	Resource	0	2	0	4
Lack of Interface of Pharmacy System (i.e. Scriptpro) with Outcomes	Resource	1	0	1	4
Insufficient Patient Financial Benefit	Value	0	0	3	3
Complex Web-Submission Interface (i.e. Outcomes MTM)	Resource	0	1	0	2
Lack of Pharmacy Resources and Support	Resource	0	1	0	2
Unfamiliarity with MTM process	Resource	0	1	0	2
(Other) "Financial gain from completing an MTM - hard to understand the utility with such nominal payment; time to conduct an MTM does not justify the 'payment'"	Time/Value	0	0	1	1
Parking and Transportation Issues for Patients with Appointments	Resource	0	0	1	1
Insufficient Patient Health Benefit	Value	0	0	0	0

Table 4: Barrier Perception Ranking: Respondents and Total Score (n=19)

Pharmacist	Score for Communication	Score for Resource	Score for Time	Score for Value	Highest Problem
1	0	1	3	2	Time
2	0	0	5	1	Time
3	0	0	5	1	Time
4	1	2	3	0	Time
5	1	2	3	0	Time
6	3	0	3	0	Communication / Time
7	0	5	1	0	Resource
8	0	1	5	0	Time
9	1	0	5	0	Time
10	0	2	4	0	Time
11	3	2	0	1	Communication
12	0	5	1	0	Resource
13	0	0	5.5*	0.5*	Time
14	3	0	0	3	Communication / Value
15	5	1	0	0	Communication
16	3	0	2	1	Communication
17	3	0	2	1	Communication
18	3	0	1	2	Communication
19	3	0	2	1	Communication
Total	29	21	50.5	13.5	Time

*Respondent provided a response in "Other" that is classified as both time and value based.

Section 2: Timing

This section of the survey requested respondents who had previously conducted an MTM to estimate the time needed for each step in the process. Of the 19 respondents, one provided no response, one answered no, and one answered yes but did not provide any times.

Table 5: Average Estimated Time for MTM Process (n=16)

Step in Process	Average Time (minutes)	Standard Deviation (\pm minutes)	Minimum Estimate (minutes)	Maximum Estimate (minutes)
Attain Patient Engagement	16.25	9.4	5	30
Pre-Interview Preparation	25.63	17.4	5	60
Patient Interview	30	14.61	10	60
Documentation and Submission	20	10.17	10	45
Total Process	91.875	30.28	30	180

Section 3: Barrier Statements

The third and final section of the survey contained a variety of statements designed to reflect the barriers of Section 1. The questions were set-up via a 5-point Likert Scale with results as follows. Of the 19 survey respondents, the sixteen who completed Section 2, also completed this portion of the survey. Note: Reversed questions are denoted and have had both their question and responses in table reversed to reflect this such that all results of “Strongly Disagree” and “Disagree” reflect indication of the topic as a barrier. Total Score in this Section was calculated in a similar fashion to Table 3, with Strongly Disagree selections meriting a score of 5, Disagree equivalent to a score of 4, etc.

Table 6: Barrier Perception via Likert Scale Statements (n=16)

Statement	Related Problem	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Total Score
[Reversed] Reimbursement for MTMs <i>does</i> match the work required.	Time / Value	5	8	3	0	0	66
Patients understand the importance of MTMs.	Communication / Value	6	5	4	1	0	64
[Reversed] With third party payers holding back reimbursement based on MTM performance, there is <i>not</i> strong financial incentive to complete MTMs.	Value	5	7	1	3	0	62
My colleagues have a positive disposition towards MTMs.	Value	2	6	6	2	0	56
[Reversed] There are <i>not</i> more efficient methods of providing patient care than MTMs.	Time	2	5	8	1	0	56
From a solely financial standpoint, MTMs are profitable.	Value	2	2	7	5	0	49
[Reversed] The process of documentation <i>does not</i> require too much time for MTMs to be beneficial.*	Time / Value	1	6	4	4	0	49*
Conducting MTMs is a beneficial use of my time.	Time / Value	1	1	5	6	3	39
[Reversed] MTMs <i>are</i> a useful component of a pharmacist's responsibilities.	Value	1	1	3	10	1	39
Because of the lack of provider status, MTMs provide a strong opportunity for pharmacists to directly affect patient care.*	Value	0	2	4	8	1	37*
APPE students and interns should be assigned to do more MTMs.	Resource	1	0	4	7	4	35
[Reversed] MTMs <i>will</i> be an important part of a pharmacist's activities in the future.	Value	1	0	4	7	4	35
MTMs are a vital portion of patient care.	Value	0	2	2	8	4	34
More MTMs would be conducted if pharmacists only needed to conduct the patient interview and develop the action plan.	Time	0	0	5	7	4	33
I fully understand the process of conducting MTMs.	Resource	0	1	0	8	7	27

*One of the sixteen respondents chose not to provide a response to this statement. Total score for this statements is artificially lower as a result.

Table 7: Barrier Perception via Likert Scale Statement: Respondents and Average Score (n=16)

Pharmacist	Score for Communication (1 statement)	Average Score for Resource (2 statements)	Average Score for Time (5 statements)	Average Score for Value (11 statements)
1	5	3	4	3.55
2	4	2	3.2	3.09
3	5	2	4.6	4.55
4	4	2	3.2	2.45
5	4	2	3.4	3.09
6	4	2.5	2.6	2.8*
7	5	1	3.2	3.27
8	3	1.5	2.6	2.64
9	3	1.5	2.8	2.91
10	3	2	2.6	2.73
11**	-	-	-	-
12	2	2.5	2.6	2.73
13**	-	-	-	-
14	5	2.5	3.6	3.45
15	3	1.5	2.25*	2.4*
16	5	2	3.4	3.45
17	5	1	2.4	3.09
18	4	2	2.6	2.45
19***	-	-	-	-
Total Average	4	1.94	3.07	3.04

*Average calculated with one less field due to non-response.

**Pharmacists who did not provide response; number designation kept for consistency.

Discussion

Overall this survey was helpful in elucidating the barriers towards conducting CMRs at the University of Kentucky. Utilizing the total score, the top barriers that emerged were based on time and communication rather than value or resource.

1. Difficulty Integrating MTMs into Normal Pharmacy Workflow (Time; 23)
2. Time Required of Pharmacy Personnel to Conduct MTM (Time; 18)
3. Difficulty in Engaging Patients (Communication; 15)
4. Difficulty in Contacting Patients due to Social Issues (Communication; 14)
5. Insufficient Patient Interest (Value; 10)
6. Time Required of Patient to Conduct MTM (Time; 9)

It is important to note that there were more categories for the barriers of resource and value but that the sum of the categories would still not displace time and communication as the top barriers in this regard [see Table 4]. The difference between the top two barriers reflects a small potential distinction in the fix needed in the MTM process. Difficulty in integrating MTMs into the normal workflow indicates that the pharmacists believe an efficient process can exist that will allow them to conduct MTMs with their current workload. That being said, even without this distinction, the pharmacists heavily rank issues with the MTM's process over needing additional resources to incorporate MTMs normally. Barriers number 3 and 4 indicate that pharmacists are not as concerned over the applicability or use of MTMs.

Utilizing the total score measure with Section 3 representing statements of barriers, a similar trend emerges. Based on the average total score of 48, any scores below this represent an overall agreement with the statement and lowered significance of the barrier. The most contested statements are as follows:

1. Reimbursement for MTMs does match the work required. (Time/Value; 66)
2. Patients understand the importance of MTMs. (Communication/Value; 64)
3. With third party payers holding back reimbursement based on MTM performance, there is not strong financial incentive to complete MTMs. (Value; 62)
4. There are not more efficient methods of providing patient care than MTMs. (Time; 56)
5. My colleagues have a positive disposition towards MTMs. (Time; 56)

These statements do not directly scale with the rankings of the survey's first section as these statements add the consideration of problems with pharmacy reimbursement and third-party involvement in MTMs. The respondents maintain their desire for better patient outreach and understanding of the benefits (shown by number 2) as well as their belief that the process is beneficial (shown by number 4 and 5). Given that the statements were not equally weighted for the representative problems, the average Likert Scale rating must be used for comparison between the barriers.

- Communication; 1 Statement = 4
- Time; 5 Statements = 3.07
- Value; 11 Statements = 3.04
- Resource; 2 Statements = 1.94

The averages show that time and value considerations remain more important than those for the amount of pharmacy given resources at hand. Together, both sections seem to indicate that the

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problems for MTM that a pharmacy department can internally address in order to have more widespread utilization are the time needed to conduct a CMR along with communication with the patients. I believe that the proposed workflow strikes at the heart of this issue and will prove useful for these concerns. The tool developed correctly pinpoints time as a factor, and although communication needs to be worked on as well, the new workflow is an internal process that can be implemented without patient input.

The answers that the pharmacists provided for the first and third sections of the survey did not show any statistically significant correlation with their estimation of MTM process time in the second section. Linear regression utilization total estimated time separately against rank score from the first section and average score from the third section did not show any significant p-values, nor high R-square values.

Figure 4: Linear Regression: Total Time vs. Rank Score

<i>Regression Statistics</i>				
Multiple R	0.276954			
R Square	0.076704			
Adjusted R Square	-0.23745			
Standard Error	42.19848			
Observations	16			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	38.51176	68.18928	0.564777	0.582629
Rank Score Communication	11.43104	15.12577	0.755733	0.464386
Rank Score Resource	11.78628	12.08226	0.975503	0.348566
Rank Score Time	8.533923	12.99282	0.656818	0.523695
Rank Score Value	0	0	65535	#NUM!

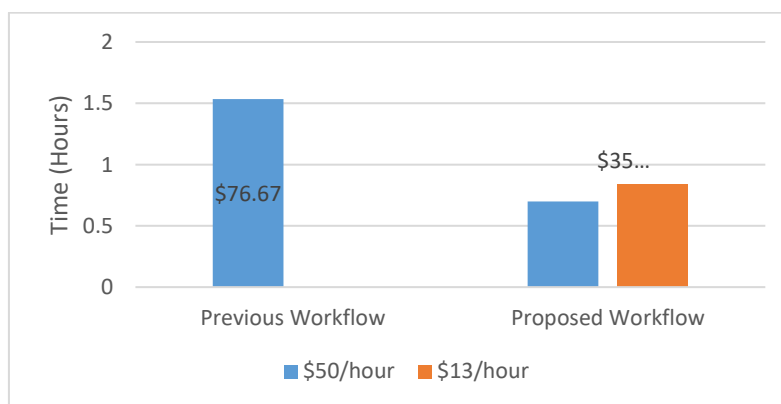
Figure 5: Linear Regression: Total Time vs. Statement Average Score

<i>Regression Statistics</i>				
Multiple R	0.39972128			
R Square	0.159777102			
Adjusted R Square	-0.145758498			
Standard Error	42.04533127			
Observations	16			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	87.1414252	71.8864	1.21221	0.250826
Statement Communication Average Value	-14.81162735	15.65929	-0.94587	0.36453
Statement Resource Average Value	5.057105822	24.29886	0.208121	0.838938
Statement Time Average Value	-33.83117581	41.13095	-0.82252	0.428249
Statement Value Average Value	51.9238278	44.30084	1.172073	0.265927

With regards to the estimations of time for the process, the average estimation for a complete CMR was around 92 minutes, with only 30 minutes designated as time spent during a patient interview. If the pharmacist is considered needed for the patient interview and half of the time spent in pre-interview preparation (e.g. reviewing the patient profile), then the average time split between technician and pharmacist would be about 50 minutes to 42 minutes respectively. At an average salary of \$13 per hour for a pharmacy technician and \$50 per hour for a pharmacist, the cost of an MTM via previous workflow of ~\$77 drops to ~\$46 per patient.

Figure 6: Cost per Average MTM Conducted



Conclusion

This study collected survey data regarding pharmacist opinions on barriers towards conducting CMRs and has shown two major problem areas to focus on. Pharmacists appear to have a good understanding of the benefits of CMRs and would be willing to incorporate it into their workflow for the benefit of the patient. The developed tool that is awaiting implementation should prove to be useful in alleviating the issue of time allotment. However, although the tool will reduce the time spent by pharmacists on each CMR, there is no guarantee that this saved time will be “reinvested” into CMRs or if it will be used to address the many other demands. Additionally, the noted concerns with patient communication will likely require patient input to improve as they involve transferring the pharmacist’s understanding of value of the CMR to the patient.

Future directions with this research involve the collection of timing data for pharmacists conducting CMRs with both the “previous workflow” and the proposed workflow to compare against the estimated time data collected here. Comparison against each other would provide further clarification on financial savings by shifting of work from pharmacist to pharmacy technician. Additionally, research into methods of addressing the communication problem with patients would serve as a helpful addition to the efforts on the pharmacists’ side.

Limitations

This study's limitations center on the number of polled pharmacists. Although the sample size for this study was low, the survey respondents were highly representative of the target for the developed process. This survey does not poll the pharmacists who are considered for implementation in the new process, nor does it address the thoughts of pharmacy technicians or patients regarding the barriers to CMRs. Additionally, there are the traditional concerns with survey-based studies regarding the time needed for the voluntary survey and the resulting response amounts. This study also had a lack of directly timed data for the "previous workflow" given that only one pharmacist is currently conducting these MTMs.

In terms of analysis, the linear modeled total score used to determine barrier significance could be argued as not completely representative of pharmacist opinions given the relative nature of ranking. The method used of analysis is not a replacement for statistical analysis but provides the needed picture regarding whether or not to proceed with process implementation.

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Appendix A: Survey

--- Page 1 --- (Consent Script)

Hello! My name is Allan Tao, I am a PY4 student at UK and am conducting this survey to better understand pharmacy personnel opinions related towards the process of Medication Therapy Management (MTM). I am asking for your participation in this survey to aid me with my MPA capstone research project. If you voluntarily participate in this study you will be one of approximately 36 pharmacists at University of Kentucky HealthCare asked to do so.

You have been asked to participate in this survey because you are a pharmacist who may potentially be tasked with conducting MTMs in the Transitions-of-Care setting. This survey will take approximately 10 minutes to complete and will ask about your opinions related to the workflow process and significance of MTMs. Please note, the phrase “Medication Therapy Management” will be considered synonymous with “Comprehensive Medication Review” for the purposes of this survey. The information generated from this research will be used to inform ongoing local, regional and national discussions about the value of MTMs.

To ensure all responses to the first survey on pharmacists’ opinions are anonymous, a universal URL link has been provided to all participants. Results from REDCap will not denote any information as to respondents’ identity. Additionally, there are no queries as to your identity in the survey.

There are no known risks associated with completing this survey. Taking part in this survey research is completely voluntary. Your employment status will not be affected in any way, regardless of whether you participate or not. I am not employed by University of Kentucky HealthCare. If you choose not to participate, there will be no penalty or loss of benefits to you. If you do choose to participate, you are free to skip any survey question that you do not want to answer and you can discontinue the survey at any time. Although you will not personally benefit by completing the survey, the information that you provide may help inform ongoing discussions related to the significance of MTMs.

This study has been reviewed by the University of Kentucky Medical Institutional Review Board. If you have questions about this study, you may call myself at 859-559-5885 or my MPA capstone advisor, Karen Blumenschein at 859-257-5778. If you have any questions about your rights as a volunteer in this research, you may contact the staff in the Office of Research Integrity at the University of Kentucky at 859-257-9428 or toll free at 1-866-400-9428.

Thank you for your time and we appreciate your consideration in completing this survey.

Sincerely,

Allan Tao and Karen Blumenschein

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I understand the intent, potential risks, and anonymity of this survey and am willing to complete it.

- Yes
- No

{If no, will close survey}

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Do you believe there are barriers to conducting MTMs?

- Yes
- No

{If no, skip to page 4}

--- Page 3 ---

Which of the following do you believe are barriers to conducting MTMs? (Select the top three barriers in order of significance)

- Complex Web-Submission Interface (i.e. OutcomesMTM)
- Difficulty in Contacting Patients due to Social Issues
- Difficulty in Engaging Patients
- Difficulty in Identifying Eligible Patients
- Difficulty Integrating MTMs into Normal Pharmacy Workflow
- Insufficient Patient Financial Benefit
- Insufficient Patient Health Benefit
- Insufficient Patient Interest
- Lack of Interface of Pharmacy System (i.e. Scriptpro) with Outcomes
- Lack of Pharmacy Resources and Support
- Lack of Private Counseling Area
- Parking and Transportation Issues for Patients with Appointments
- Time Required of Patient to Conduct MTM
- Time Required of Pharmacy Personnel to Conduct MTM
- Unfamiliarity with MTM process
- Other:
 - o Free Text Box

--- Page 4 ---

Have you conducted an MTM in the past?

- Yes
- No

{If no, skip to page 3}

When attempting to recruit an eligible patient for an MTM, how much time (in minutes) is needed to attain patient engagement? Consider time required to initiate patient contact, to provide relevant information, and to schedule an interview.

When conducting an MTM, how much time (in minutes) is needed for pre-interview preparation? Consider time required to consolidate medication history and review patient profile.

When conducting an MTM, how much time (in minutes) is needed for the patient interview portion? Consider time required to conduct full interview as well as develop and communicate action plan.

When conducting an MTM, how much time (in minutes) is needed for documentation and submission process to a web-interface (i.e. OutcomesMTM). Consider time required to fill out web-form and send take-home packet to appropriate recipient.

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Please indicate your level of agreement/disagreement with the following statements using the scale shown below:

1	2	3	4	5
Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree

(each as an individual question)

- I fully understand the process of conducting MTMs.
- MTMs are a vital portion of patient care.
- Conducting MTMs is a beneficial use of my time.
- More MTMs would be conducted if pharmacists only needed to conduct the patient interview and develop the action plan.
- From a solely financial standpoint, MTMs are profitable.
- There are more efficient methods of providing patient care than MTMs.
- MTMs are not a useful component of a pharmacist's responsibilities.
- My colleagues have a positive disposition towards MTMs.
- Reimbursement for MTMs does not match the work required.
- Patients understand the importance of MTMs.
- The process of documentation requires too much time for MTMs to be beneficial.
- Because of the lack of provider status, MTMs provide a strong opportunity for pharmacists to directly affect patient care.
- MTMs will not be an important part of a pharmacist's activities in the future.
- APPE students and interns should be assigned to do more MTMs.
- With third party payers holding back reimbursement based on MTM performance, there is strong financial incentive to complete MTMs.