POSITIVE DEVIANTS FOR MEDICATION THERAPY MANAGEMENT: A MIXED-METHODS COMPARATIVE CASE STUDY OF COMMUNITY PHARMACY PRACTICES

by

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A Thesis

Submitted to the Faculty of Purdue University

In Partial Fulfillment of the Requirements for the degree of

Master of Science

Department of Pharmacy Practice

West Lafayette, Indiana

August 2019

THE PURDUE UNIVERSITY GRADUATE SCHOOL
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In dedication to:

My Lord & savior,

To whom provides my strength and guidance, I am forever grateful for your unmerited favor.

The love of my life,

Thank you for always believing in me and being by my side throughout this journey.

My parents,

Thank you for inspiring me to be who I am today and for your endless support and prayers.

My sister,

For being my number one fan and source of motivation.

Mama,

Thank you for always pushing the importance of education and your daily prayers speaking greatness into my life. May your soul forever rest in peace.

"It takes a village!"

ACKNOWLEDGMENTS

First and foremost, I would like to express my deepest thanks to my advisor Dr. Margie E. Snyder for her continuous support, time, and expertise. Her guidance helped me through every triumph and challenge I faced in the research and writing of this thesis. I am so blessed to have such a genuine, passionate, transparent, and knowledgeable mentor.

I would also like to thank the rest of my graduate committee: Drs. Karen Hudmon and Alan Zillich for their inquisitiveness, wisdom, encouragement, and for always challenging me to view my research from various perspectives.

Additionally, I would like to thank my co-authors: Dr. Leslie Lake for her instrumental role in securing support from our pharmacy partner organization and her contributions to quantitative data procurement and Drs. Celena Strohmier, Amanda Gourley, and Ashli Ray for their contributions to qualitative data collection and analysis.

I would like to extend my sincere gratitude to the Department's amazing support staff: Mr. Brandon Butram, Ms. Melinda Schultz, Katheryn Rodenbach, and Ms. Janis Metzler for providing the essential technical and administrative support to fulfil this thesis.

Lastly, I humbly acknowledge the support I received from the Indiana Clinical and Translational Sciences Institute funded, in part by Award Number TL1TR001107 (A. Shekhar, PI) from the National Institutes of Health, National Center for Advancing Translational Sciences, Clinical and Translational Sciences Award. The content of this thesis is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health. In addition, I acknowledge the Hook Drug Foundation and the Lilly Endowment, Inc. for providing the financial support for my fellowship program and scholarship for my MS degree.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

US	United States
MTPs	medication therapy problems
MTM	medication therapy management
CMS	Centers for Medicare & Medicaid Services
Part D	Medicare prescription drug plan
MA-PDs	Medicare advantage prescription drug plans
CMR	comprehensive medication review
TMR	targeted medication review
PQA	Pharmacy Quality Alliance
AHRQ	Agency for Healthcare Research and Quality
PD	positive deviant
CCM	chronic care model
CRP	community resources and policy
HSO	health system organization
PSMS	patient self-management support
DSD	delivery system design
DS	decision support
CIS	clinical information systems
HTN	hypertension
RAS	renin angiotensin system
PDC	proportion of days covered
SD	standard deviation
TIP	Targeted Intervention Program
IPPE	Introductory Pharmacy Practice Experiences
APPE	Advanced Pharmacy Practice Experiences
FTE	full time equivalent
APhA	American Pharmacists Association
PGY-1	post-graduate year 1
GED	General Education Diploma

ABSTRACT

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Degree Received: August 2019
Title: Positive Deviants for Medication Therapy Management: A Mixed-Methods Comparative Case Study of Community Pharmacy Practices
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Background

More than 90% of individuals aged 65 years or older in the United States (US) are taking at least one prescription medication, and more than 40% are taking five or more prescription medications. The potential for non-adherence and risk of medication therapy problems (MTPs) increases with the use of multiple medications. To enhance patient understanding of appropriate medication use, improve medication adherence, and reduce MTPs, the Centers for Medicare & Medicaid Services (CMS) launched Medication Therapy Management (MTM) services as part of Medicare Prescription Drug (Part D) policy; however, "best practices" for achieving positive MTM outcomes are not well understood.

Objectives

This study had two objectives. The first objective was to identify and explain reasons for concordance and discordance between a) consistently high, moderate, and low performing pharmacies and b) pharmacies that improve or worsen in performance overtime. The second objective was to generate hypotheses for strategies that contribute to community pharmacies' ability to achieve high performance on widely accepted MTM quality measures.

Methods

This comparative mixed-methods, case study design incorporated two complementary conceptual models. First, an adaptation of the Positive Deviance (PD) model explains reasons for deviations in MTM quality measure performance among community pharmacies and informs study design. Second, the Chronic Care Model (CCM) guided data collection and analysis. Data consisted of pharmacy/staff demographics and staff interviews. When appropriate, quantitative and qualitative data were analyzed within and across pharmacy MTM performance (i.e., high, moderate, low) or

change-in-performance (i.e., consistent, improved, worsened) categories using descriptive statistics and cross-tabulation respectively. MTM performance component measures used to evaluate and rank pharmacy MTM performance mirrored measures under Domain 4 (Drug Safety and Accuracy of Drug Pricing) of the 2017 CMS Medicare Part D Plan' Star Rating measures.

Results

Across the sample of eligible pharmacies (N = 56), MTM performance composite scores varied by 21.3%. Of the five component scores, the *Comprehensive Medication Review (CMR)* component score had the highest percent variation (88.3%). Pharmacy staff at 13 pharmacies of the 18 pharmacies selected as case study sites participated in interviews, yielding a 72.2% case pharmacy participation rate. Of the 13 pharmacies, five were categorized as high performers, four were moderate performers, and four were low performers. Of the 39 pharmacy staff approached across all pharmacies, 25 participated in interviews, yielding a 64.1% participation rate. Interviewees included 11 pharmacists, 11 technicians and three student interns. Eight strategies were hypothesized as positively (7) or negatively (1) contributing to pharmacies' MTM performance. Hypotheses generated were organized by CCM elements and included: *Delivery System Design (DSD)* – Having a high degree of technician involvement with MTM activities; Inability to meet cultural, linguistic, and socioeconomic needs of patients (negative); Having sufficient capacity to provide CMRs to patients in person compared to telephone alone; Pharmacy staff placing high priority on addressing MTM activities*; Clinical Information Systems (CIS)* – Faxing adherence-related MTP recommendations and calling providers on indication-related MTP recommendations; Technicians' use of CISs to collect/document information for pharmacists; Using maximum number of available CISs to identify eligible MTM patients; *Health System Organizations (HSO)* – Strong pharmacist-provider relationships and trust. No hypotheses were generated for the remaining three CCM elements.

Conclusions

A total of eight strategies were hypothesized as contributing to community pharmacies' ability to achieve high performance on MTM quality measures. Notable strategies were related to three of the six chronic care model elements. Future research should engage stakeholders to assist with prioritizing hypotheses to be statistically tested in a larger representative sample of pharmacies.

CHAPTER 1. INTRODUCTION

In the United States (US), more than 90% of individuals aged 65 years or older are taking at least one prescription medication, and more than 40% are taking five or more prescription medications.[1] In 2016, annual costs for medication-related morbidity and mortality due to medication therapy problems (MTPs) cost the US $528.4 billion.[2] Furthermore, preventable MTPs affect more than seven million patients and cost the US almost $21 billion annually across all health care settings.[3] In 2006, the Centers for Medicare & Medicaid Services (CMS) launched the Medication Therapy Management (MTM) program as part of Medicare Prescription Drug (Part D) policy. MTM is a service, often provided by community pharmacists, specifically offered by Medicare Part D plans and Medicare Advantage prescription drug plans (MA-PDs) to enhance medication use and prevent MTPs among the older adult population in the US with complex health needs.[4] The MTM eligibility criteria changes from year to year. Minimum criteria for eligibility have ranged from beneficiaries having two to three chronic conditions, taking two to eight prescription medications, and anticipated to spend $3,000 – $4,044 on prescriptions annually.[5] The MTM program must include, at minimum, an annual comprehensive medication review (CMR) and quarterly targeted medication reviews (TMRs). A CMR is a health service that involves 1) collecting patient information, 2) assessing medication use and identifying MTPs, 3) creating a list of prioritized MTPs, and 4) developing a plan for resolving MTPs. Pharmacists are the most common providers of these services with 100% of plans reporting they utilize pharmacists as MTM providers.[4]

CMS m quality of Part D plans' in four domains using a five-star rating system. The fourth domain, "Drug safety and accuracy of drug pricing," includes a range of MTM quality measures endorsed by the Pharmacy Quality Alliance (PQA). Historically, these quality measures have included percent of beneficiaries adherent to medications used to treat select disease states, receiving a CMR, taking medications as indicated, and taking safer medications based on risk factors. Performance on each quality measure is awarded a star rating (1 being the lowest, 5 being the highest) and the individual measure Stars' are then aggregated at the domain level. Community pharmacies are incentivized to positively influence Medicare Part D Star Ratings through inclusion in Medicare Part D plans' preferred pharmacy networks, providing a steady access to patients.[6]

However, delivery of MTM services in the community pharmacy setting continues to reveal barriers for successful implementation. [7,8] The most common barriers reported include insufficient time, staff, and/or training, difficulties with billing and documentation of MTM, and competing interests of dispensing-related activities. [7,8]

Largely due to a general lack of sound scientific evidence, strategies for optimizing MTM delivery performance relevant to Star Rating measures have not been identified. In 2014, the Agency for Healthcare Research and Quality (AHRQ) conducted a comparative effectiveness review and meta-analysis of MTM interventions studies across various outpatient settings.[9] The researchers concluded that overall descriptions of intervention characteristics and implementation strategies were inconsistent (e.g., due to variation in settings and specific interventions) and lacked detail.[9] Additionally, AHRQ suggested that more rigorous approaches are needed when evaluating implementation of MTM delivery strategies, and these strategies should "fit within the context of the real-world," specifically mentioning use of the Positive Deviance (PD) model.[9] Despite AHRQ's findings, to our knowledge there are no studies that have applied the PD model to evaluate the delivery of MTM services. The PD model is a systematic approach to exploring reasons for deviations in performance among healthcare organizations in similar contexts.

Our previous research produced substantial preliminary information for this study and further confirms usefulness of applying a PD approach to evaluating pharmacy performance on MTM.[10-12] Snyder and colleagues applied the Chronic Care Model (CCM) as a conceptual framework to examine components of MTM delivery across varying types of MTM practices. In that study, the external environment (e.g., state and payer mix) was identified as an influencing factor in the variation observed in the delivery of MTM.[12] Additionally, Adeoye and colleagues identified three factors that were associated with pharmacies' performance on MTM when delivered in a similar context (i.e., midwestern supermarket community pharmacy chain) including pharmacists' attitudes, pharmacy technician level of education, and number of technician hours worked per week. However, research methods used in these preliminary studies did not facilitate identification of MTM delivery strategies that contributed to high performance on MTM quality measures in the community pharmacy setting. [10-12] Thus, there is a need to delineate specific MTM delivery

strategies that are consistent with high performance on MTM quality measures using a systematic approach.

This study had two objectives. The first objective was to identify and explain reasons for concordance and discordance between a) consistently high, moderate, and low performing pharmacies and b) pharmacies that improve or worsen in performance overtime. The second objective was to generate hypotheses for strategies that contribute to community pharmacies' ability to achieve high performance on widely accepted MTM quality measures.

CHAPTER 2. METHODS

2.1 Design Overview

To identify and explain underlying reasons for concordance and discordance between community pharmacies that vary in performance on MTM quality measures, we applied a comparative mixed-methods case study design. Comparative case studies allow for comparisons within and across contexts (i.e., community pharmacies) conducive to understanding the factors influential to the success of a service or policy (i.e., MTM services), subsequently informing the development of tailored interventions to support the achievement of positive outcomes.[13] To accomplish this, we utilized quantitative methods to contextualize qualitative findings.

2.2 Conceptual Models

We incorporated two complementary conceptual models. First, adapted for MTM, the PD model was applied to identify community pharmacies exhibiting varying performance on MTM quality measures.[14] In recent years, health services research has applied PD methods to identify reasons for deviations in health care and/or inform the design of future implementation strategies to address variability in the delivery of health care.[15] As adapted for health care, the Bradley et al. PD model suggests that knowledge pertaining to strategies to improve health outcomes is accessible through existing organizations that consistently demonstrate high performance.[14] To provide an operational model for addressing study objectives, this study applied specific steps outlined by Bradley and colleagues within the context of MTM services delivered in the community pharmacy (Figure 1).

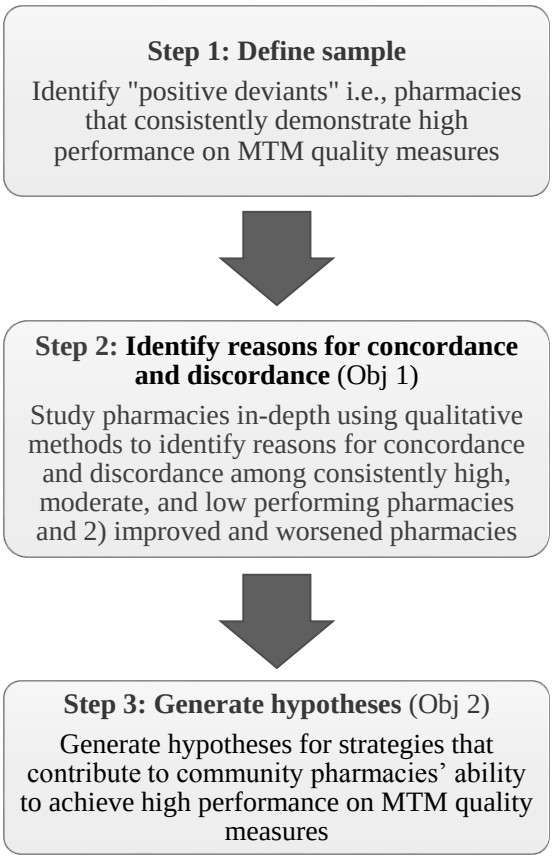


Figure 1. Positive Deviance Model for MTM Services

Secondly, Wagner's CCM was adapted and applied to frame data collection and analysis (Figure 2). As MTM services primarily focus on optimizing health outcomes of the chronically ill aging population, the CCM provides a useful framework for examining strategies for MTM delivery in relation to MTM performance measures. The CCM,previously used as an evidence-based model of primary care for multiple chronic medical conditions,[16-19] is composed of six core elements characterizing support for patient-centered care including community resources and policy (CRP), the health system organization (HSO), patient self-management support (PSMS), delivery system design (DSD), decision support (DS), and clinical information systems (CISs). The CCM suggests evidence-based strategies that are necessary to improve in each of these core elements. Descriptions of these evidence-based strategies are available online.[18] Per the CCM, these strategies used effectively and in combination, "foster productive interactions between informed patients who take an active part in their care and providers with resources and expertise," yielding improved outcomes. For this study, the application of the CCM was intended to facilitate identification of strategies that contribute to these productive interactions, ultimately contributing to pharmacies' performance on the primary outcome of interest (i.e., MTM quality measures).

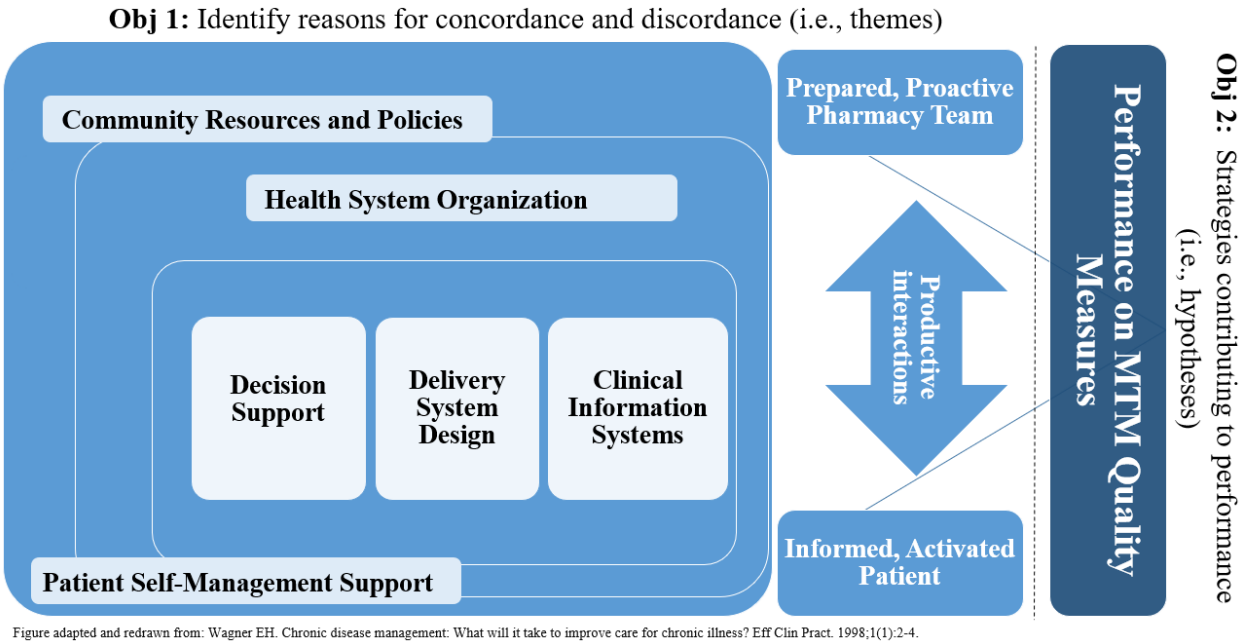


Figure 2. Chronic Care Model for Identifying Strategies Contributing to Pharmacy Performance on MTM Quality Measures

2.3 Study Population

The study population consisted of pharmacy staff employed by a Midwestern division of a national supermarket-community pharmacy chain. The company has participated in MTM since it was first introduced as a part of Medicare Part D, however it continues to enhance its focus on MTM in the community pharmacy workflow process. All pharmacists, pharmacy technicians, and student interns are expected to participate in MTM in some capacity. Pharmacists are the main clinical providers of MTM services to patients; technicians and student interns assist the pharmacist with non-clinical tasks. These non-clinical tasks could include identifying MTM-eligible patients linked to the pharmacy prescription fulfilment software clinical queues, creating patient notes to offer MTM services to eligible patients, explaining the service to patients at pick up or via telephone, and faxing pharmacists' recommendations to physicians.

Only pharmacy locations in Indiana (N=94) were considered for this study. This sampling method was selected based on the premise of the PD model being an approach to examining healthcare organizations within similar contexts.[14,15] Participants were pharmacy staff members (i.e., pharmacists, student interns, or pharmacy technicians) at eligible pharmacy locations. To be eligible, they had to have completed and/or supported the completion of two or more MTM cases (CMR or TMR) at their pharmacy location within the past year at time of eligibility screening.

2.4 Procedures

2.4.1 Pharmacy Performance

To identify our sample of eligible pharmacy locations, we stratified community pharmacies into high, moderate, and low performance categories using widely accepted MTM quality measures. To accomplish this, our pharmacy partner (LML) first ranked the Indiana pharmacy locations (N=94) within the supermarket-community pharmacy chain based on a 6-month (July – December 2017) MTM quality performance composite score, which was calculated by taking the mean of the five summated component scores, each computed for the six-month time-period. The composite score was created to summarize pharmacy performance on the five component measures that mirror the Pharmacy Quality Alliance (PQA)-endorsed MTM quality measures used by CMS to evaluate Medicare Part D plans through the Stars Program.[20] The

component scores were based on measures D11 – D15 under Domain 4 (Drug Safety and Accuracy of Drug Pricing) of the 2017 CMS Medicare Part D Plans' Star Rating measures.[20,21] These are quantifiable and widely accepted measures of quality performance on MTM services.[14,20] It is worth noting, the CMR completion rate measure specifically measures a Plan's MTM program. However, the other four measures are influenced by MTM services (in specific, TMRs). Therefore, throughout this document these measures collectively are referred to as "MTM quality measures."

Definitions and data sources for the MTM quality measures that were used to report component scores are listed in Table 1. Component and composite scores were reported as a percentage that could range from 0% to 100%. The *Diabetes, Hypertension (HTN) and Cholesterol Medication Adherence* component score measures and the *High-Risk Medication (HRM)* component score measure were recorded for each pharmacy from performance data reported through the Pharmacy Quality Solutions' (PQS) Electronic Quality Improvement Platform for Plans and Pharmacies (EQuIPP) dashboard. Pharmacy Quality Solutions (PQS) is the most commonly used provider of medication-related performance management services, with 95% of community pharmacies using their services.[22] The EQuIPP dashboard is one of the services PQS offers. The dashboard provides benchmarked medication-related performance data (e.g., MTM quality measure performance data) to health plans and pharmacies.[22] Lastly, the *CMR Completion Rate* component score was recorded from data reported through the company's internal net effective rate (NER) metric.

Table 1. Sources and Definitions for MTM Performance Component Score Measures

	MTM Performance Component Score Measures				
	Medication Adherence for Diabetes Medications	**Medication Adherence for HTN (RAS antagonists)**	**Medication Adherence for Cholesterol (Statins)**	**High Risk Medication (HRM)[a]**	**Comprehensive Medication Review (CMR) Completion Rate**
Definitions	Percentage of beneficiaries taking oral diabetes medications who have high adherence (PDC > 80% for the individual)	Percentage of beneficiaries taking RAS antagonists medications who have high adherence (PDC > 80% for the individual)	Percentage of beneficiaries taking statin medications who have high adherence (PDC > 80% for the individual)	Percentage of beneficiaries ≥ 65 years of age receiving a medication who are considered at high-risk for an adverse drug-related event	Percentage of CMRs provided to beneficiaries out of all available CMRs attributed to the pharmacy
Source	EQuIPP	EQuIPP	EQuIPP	EQuIPP	Company internal NER metric

Abbreviations: HTN=hypertension; RAS=renin angiotensin system; PDC=proportion of days covered; NER=net effective rate

[a] The HRM core was reverse-coded to reflect a positive association with higher values

2.4.2 Purposive Sample of Eligible Pharmacies

To create a purposive sample of pharmacies, our pharmacy partner (LML) further grouped the ranked list of pharmacies into quintiles. For this study, which aimed to identify underlying reasons for concordance and discordance, pharmacies were selected from the first (n=19), third (n=18) and fifth (n=19) quintiles of the ranked list. This process created categories of pharmacies representing high, moderate, and low performance on the MTM quality measures, respectively. Pharmacies within these three categories (N=56) were eligible for case selection.

2.4.3 Case Selection

An additional level of purposive sampling was used for case selection. Each case represented a single pharmacy site. Case selection occurred using three iterative steps: 1) One researcher (KSH), unblinded to site performance, selected three pharmacy locations from each of the three performance categories. According to Rose and colleagues, it is important to maximize the contrast between sites in different performance categories.[15] Therefore, we selected extreme cases using a top-down approach for selecting from the first quintile, middle-out approach for the third quintile, and bottom-up approach for the fifth quintile, 2) The researcher (KSH) sent blinded information on the nine pharmacy locations to the researcher (OAA), who was responsible for participant recruitment for qualitative interviews from eligible pharmacy sites and, 3) The researcher (KSH) repeated steps 1 and 2, as needed, until theoretical saturation (i.e., the point where no new codes were created[23]) was achieved during qualitative data collection.

2.4.4 Pharmacy Recruitment

For each selected case pharmacy site, researchers (OAA, AKG, CAS, ARR) attempted to approach at least one eligible pharmacist, pharmacy technician and student intern via telephone by going down the list of pharmacy staff, before concluding the selected case pharmacy site was non-participatory. Details regarding this process for participant-level recruitment are described below in 2.3.5. Only case pharmacy sites having at least one pharmacy staff member participate in qualitative data collection were included in subsequent qualitative and comparative analyses.

2.4.5 Participant Recruitment

All Indiana pharmacists employed by the Midwestern division of a national supermarket-community pharmacy chain were notified of this study by upper-level administration via a division wide e-mailing system. Pharmacists were asked to share the email with their pharmacy staff (i.e., pharmacy technicians and student interns). To inquire about interest in participation and to verify a list of pharmacy student interns and technicians who met inclusion criteria, researchers (OAA, AKG, CAS, ARR) called pharmacy managers at the selected case pharmacy sites. The specific number of attempts was not documented; however, a maximum of four attempts to approach (i.e., contacted staff member via telephone to screen for willingness to participate) a pharmacy staff member was permitted. After four attempts, the staff member was considered unreachable and was not included in subsequent analyses. Less than four attempts were made when either the staff member declined or was unavailable for the duration of the data collection period. Researchers scheduled a time to conduct qualitative data collection and obtain informed consent with willing eligible participants outside of working hours. For each case pharmacy site, researchers maintained a log of the number of pharmacy staff provided by the pharmacy partner (LML) and the number of pharmacy staff confirmed as eligible and approached to participate in this study.

2.4.6 Pilot Testing, Qualitative Data Collection, and Researcher Training

Qualitative data collection occurred through semi-structured interviews with pharmacy staff at selected case pharmacy sites. One researcher (OAA) conducted pilot interviews with one pharmacist, one pharmacy technician, and one student intern employed at an ineligible pharmacy location to elicit feedback on content and logistics of interview guide. We conducted pilot interviews with pharmacy staff at ineligible pharmacy locations to maximize our potential participant pool. Edits (i.e., adding examples for clarity) were made and resulted in the final semi-structured interview guide (Appendix A).

Semi-structured interviews were conducted with willing eligible pharmacy staff during the months of July to December of 2018. One researcher (OAA) conducted most interviews (84.0%) while another trained researcher (CAS) conducted the remaining interviews (16.0%) when there was a conflict of interest (i.e., OAA knew/worked with the pharmacy staff member in the past) or conflict

with scheduling. Prior to participating in data collection, the researcher (CAS) received training in data collection methods by the researcher (OAA) experienced in conducting semi-structured interviews. All interviews were conducted by telephone and audio-recorded. Each interview lasted approximately 20 to 60 minutes. As compensation for participation in the interview, pharmacists received a $40 gift card and technicians/student interns received a $20 gift card. All gift cards were for use at the company where the staff were employed. To minimize potential bias, researchers (OAA, AKG, CAS, ARR) conducting interviews and analyzing data were blinded to pharmacies' performance during interviews, and initial qualitative data analysis.[15]

2.4.7 Quantitative Data Collection

Quantitative data collection occurred both prior and after qualitative data collection (Figure 3). As suggested by PD literature,[14,15] evidence of variation in performance on the measure should be established. Our pharmacy partner (LML) provided percent variation of component and composite scores within performance categories (i.e., high, moderate, and low) and across the overall sample of eligible pharmacies (N=56). We provide details on how percent variation was computed in the quantitative analysis section.

To characterize participating case pharmacy sites, our pharmacy partner (LML) provided internally reported pharmacy-level demographics for all eligible pharmacies during the previously defined 6-month sample identification period (July – Dec 2017). These data included number of full-time pharmacists, number of store-assigned student interns and technicians, total number of technician hours worked, and number of technicians with level 1, 2, or 3 company training. The third level is the highest level of internal certification training the company provides and incudes more advanced clinical services training.

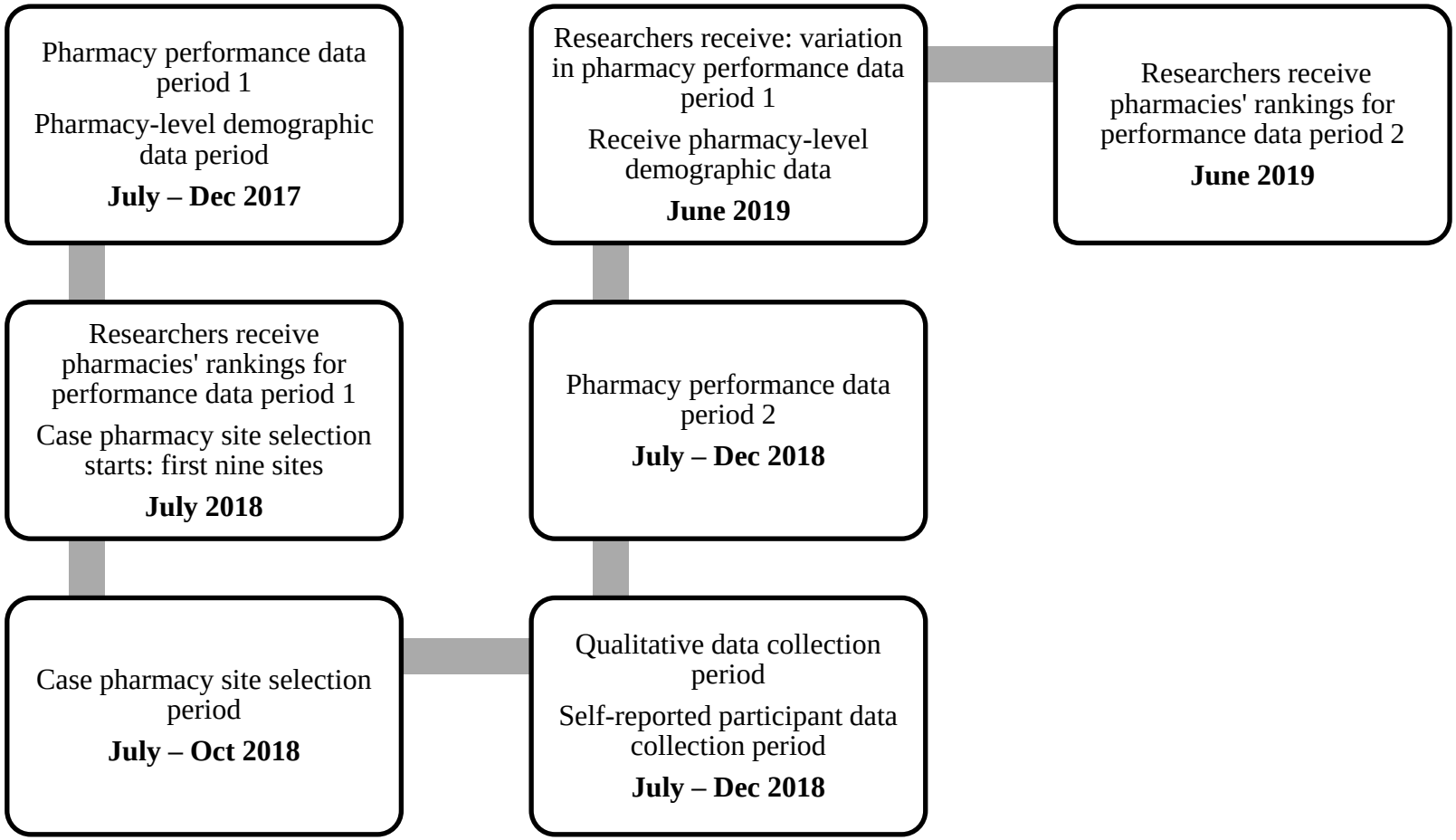


Figure 3. Timeline for Qualitative and Quantitative Data Collection

Upon data becoming available, our pharmacy partner (LML) executed a second performance data pull and provided pharmacy performance data for all eligible pharmacies during time of data collection (July – Dec 2018). Data were recorded using the same process described previously. We used these data to identify any changes in performance among participating case pharmacies that occurred between the sample identification (July 2017 – Dec 2017) and data collection (July 2018 – Dec 2018) period. Pharmacies were then grouped into one of seven change-in-performance cohorts representing three overarching change-in-performance categories 1) consistent 2) improved and 3) worsened. These change-in-performance groupings informed subsequent quantitative and comparative analyses (Table 2).

Table 2. Change-in-Performance Cohort Definitions by Change-in-Performance Categories

	Objective 1a.	**Objective 1b.**	
	Consistent	**Improved**	**Worsened**
High	Participating pharmacy locations categorized as a high performing pharmacy during sample-identification period AND data collection period	Not applicable	Participating pharmacy locations categorized as a high performing pharmacy during sample-identification period AND performance ranking worsened by $\geq$ 1 quintile during data collection period
Moderate	Participating pharmacy locations categorized as a moderate performing pharmacy during sample-identification period AND data collection period	Participating pharmacy locations categorized as a moderate performing pharmacy during sample-identification period AND performance ranking improved by $\geq$ 1 quintile during data collection period	Participating pharmacy locations categorized as a moderate performing pharmacy during sample-identification period AND performance ranking worsened by $\geq$ 1 quintile during data collection period
Low	Participating pharmacy locations categorized as a low performing pharmacy during sample-identification period AND data collection period	Participating pharmacy locations categorized as a low performing pharmacy during sample-identification period AND performance ranking improved by $\geq$ 1 quintile during data collection period	Not applicable

Definitions: sample identification period (July – December 2017); data collection period (July – December 2018)

Finally, to characterize pharmacy staff participants, closed-ended self-reported demographic information was collected verbally at the end of interviews and recorded in Qualtrics software (Qualtrics LLC, Provo, UT). Demographic information collected included participant age, gender, race/ethnicity, education/training, experience with MTM, role in practice, years of experience in current role, and hours spent/week on MTM related tasks (Appendix B). This portion of the

interview was not audio recorded. This study was approved by the Institutional Review Board for the Purdue University Human Research Protection Program.

2.5 Qualitative Data Analysis

An external transcription service transcribed all audio-recorded interviews verbatim. To ensure accuracy, a study researcher (CAS) reviewed all transcriptions. Prior to data analysis, researchers (CAS, ARR, and AKG) received training on analytical methods by a researcher (OAA) experienced in analyzing qualitative data. Analysis of qualitative data occurred through an iterative process, and therefore the collection and early stages of analysis occurred concurrently to assist in the identification of areas where further probing during the interviews and/or further refining interview guides was warranted. For early stages of analysis, we applied a method developed by Maietta termed "Sort and Sift, Think and Shift."[24] This method incorporates strategies (e.g., quotation identification and data inventory, episode profiles, memo-writing) to become familiarized with data in initial stages of analysis. Subsequently, two pairs of analysts (OAA and AKG, CAS and ARR) independently coded an equal number of transcripts using NVivo 12 Pro.[25] An abductive approach guided code structure development. First, we deductively (i.e., elements from interview guide conceptual framework) categorized data at a broad-code level. Descriptions of CCM element definitions used for broad-code structure development are available online.[18] Discrepancies within pairs of researchers' coding were resolved through discussion. Next, we inductively (i.e., data from interview responses) created sub-codes within each broad-code. Each of the four coders individually sub-coded an equal number of transcripts that were initially coded within our pairs during the broad-code analysis stage. We logged key decisions via an audit trail and codebook and met to discuss any discrepancies on a weekly to biweekly basis.

Midway through sub-code analysis, we calculated Krippendorff's alpha (kalpha) using SPSS v. 24[26] and an SPSS macro[27] to estimate inter-coder reliability and identify areas for further discussion. To accomplish this, we used 10 lines of data from one transcript chosen at random via the Excel RANDBETWEEN function. The kalpha reliability estimate accounts for subjective decisions made for coding at the nominal level of measurement for any number of coders.[27] Kalpha estimates range from zero to one, with a 0 indicating absence of reliability and a 1.0 indicating perfect reliability. There is little consensus regarding minimal acceptable Kalpha.[28] Some scholars

have suggested a minimum Kalpha value of 0.41[29]; Krippendorff suggested a minimum value of 0.67 as acceptable inter-coder reliability.[30] However, Krippendorff proposes that researchers should use more or less conservative thresholds depending on the study methods and the research objective. [28,30] We selected 0.41 as a minimum threshold of inter-coder reliability, because our study objectives were addressed at the thematic level, in which all coders agreed upon emergent themes.

Finally, preliminary themes relating to MTM delivery by adapted CCM elements were derived using a two-phase approach. First, we used the NVivo Cluster Analysis Wizard[25] to perform a cluster analysis of sub-codes within each broad-code. Sub-codes were clustered by word similarity using Pearson's correlation coefficients. Then, analysts (OAA, AKG, CAS, ARR) created and reached consensus on preliminary themes guided by cluster analysis findings and supporting interview data.

2.6 Quantitative Data Analysis

For quantitative analysis, the analyst (OAA) was unblinded to pharmacy performance and change-in-performance status allowing for quantitative results to be stratified by pharmacy performance (i.e., high, moderate, and low) or change-in-performance (i.e., consistent, improved, worsened) categories when appropriate.

First, to assess variation in eligible pharmacies' (N = 56) component and composite scores at time of sample identification (July – Dec 2017), our pharmacy partner (LML) computed percent variations within the three performance categories and across the entire sample of pharmacies. Percent variation was calculated by taking the difference between the highest and lowest component and composite score for each performance category (high, moderate, or low) and the overall sample.

Then, to characterize the case pharmacy sites at time of sample identification, we used Excel 2019 to compute descriptive statistics (i.e., median, range, mean, standard deviation, count, and frequency) on internally reported participating case pharmacy characteristics across the three performance categories of high, moderate, or low.

To characterize pharmacy staff participants at the time of the data-collection period (July – Dec 2018), we utilized Excel 2019 and SPSS v. 24[26] to compute descriptive statistics (mean, standard deviation, count, and frequency) for self-reported participant demographic responses across the three change-in-performance categories of consistent, improved, worsened.

2.7 Comparative Analysis

For comparative analysis, the analyst (OAA) cross-tabulated sub-coded data with change-in-performance cohorts to further refine preliminary themes, which analysts (OAA, AKG, CAS, ARR) then created and reached consensus on final major themes. To accomplish this, the Framework method developed by the National Centre for Social Research was applied using NVivo's Framework Matrices function.[31] Key findings from cross-tabulation further informed preliminary themes, creating the final major themes. From the final major themes, hypotheses were generated for strategies that contribute to community pharmacies' ability to achieve high performance on the primary outcome measure (i.e., MTM quality measures).

CHAPTER 3. RESULTS

3.1 Variation in Eligible Pharmacies' Performance

Across the sample of eligible pharmacies (N=56), composite scores varied by 21.3% (Table 3). More variation was observed in certain types of component scores compared to others. Of the five component scores, the *Comprehensive Medication Review* component score had the highest percent variation (88.3%), whereas the *High-Risk Medication* component score had the lowest percent variation (6.9%).

Table 3. Variation in Eligible Pharmacies' Component and Composite Scores

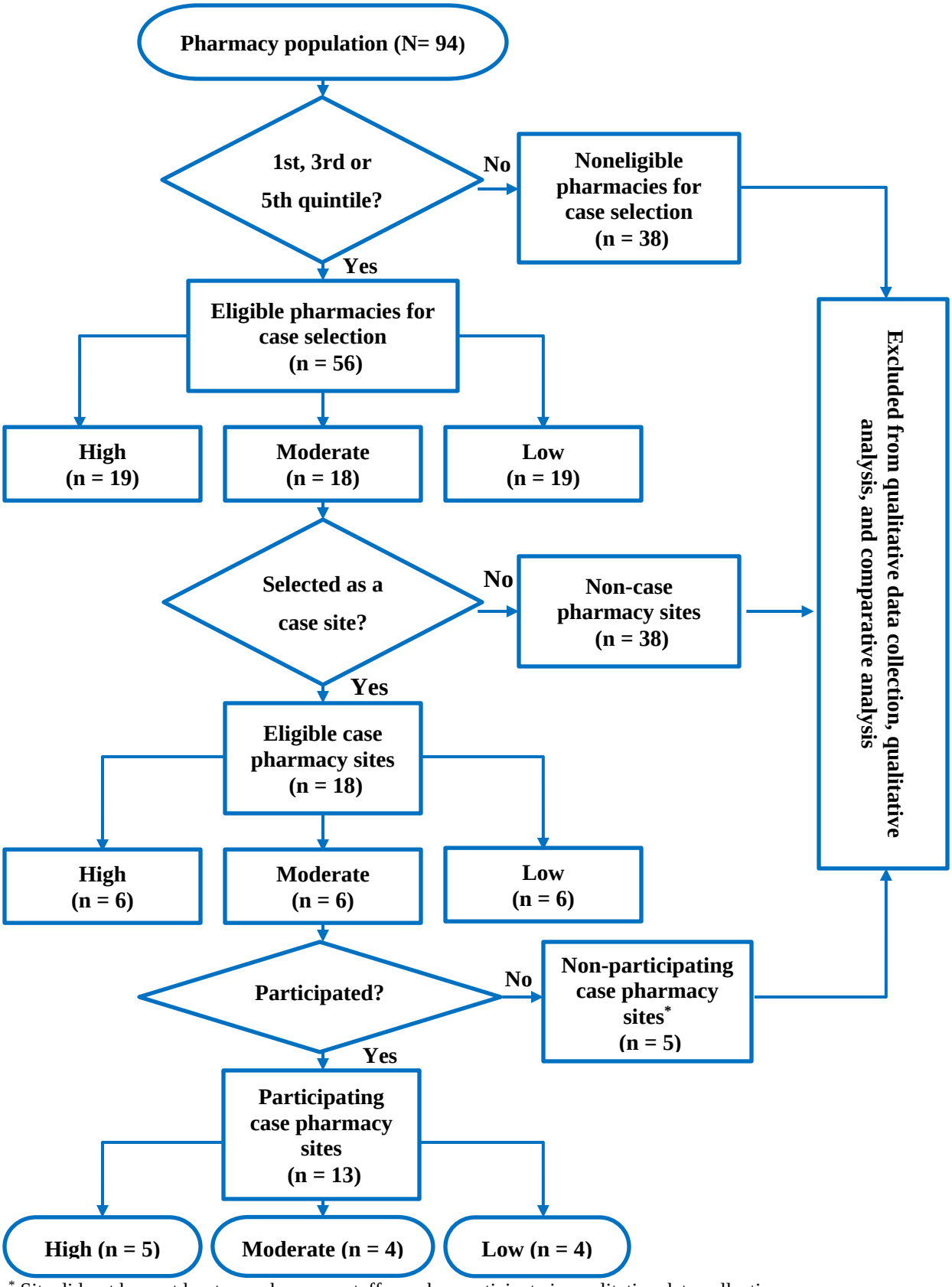
	Medication Adherence for Diabetes Medications Component Score Percent (%) Variation	**Medication Adherence for HTN Component Score Percent (%) Variation**	**Medication Adherence for Cholesterol Component Score Percent (%) Variation**	**High Risk Medication (HRM) Component Score Percent (%) Variation**	**Comprehen-sive Medication Review (CMR) Completion Rate Component Score Percent (%) Variation**	**Composite Score Percent (%) Variation**
High (n = 19)	15.9	12.1	11.3	4.7	29.3	5.0
Moderate (n = 18)	8.2	6.4	5.9	6.9	26.1	2.0
Low (n = 19)	14.6	7.6	8.4	5.4	44.4	9.2
Overall Sample (n = 56)	17.9	12.5	13.2	6.9	88.3	21.3

Variation in component and composite scores were calculated by taking the difference between highest and lowest component/composite scores for each performance category (high, moderate, low) and the overall sample during the sample-identification period (July – Dec 2017).
Abbreviations: HTN = hypertension

3.2 Case Pharmacy Sites

We present quantitative (descriptive statistics) results first, to provide context for qualitative and comparative analysis results. Of the 56 eligible pharmacies, we identified 18 case pharmacy sites for recruitment and 13 pharmacies had at least one staff member participate in a semi-structured

interview, yielding a 72.2% pharmacy participation rate (Figure 4). Of the 13 pharmacies, five were categorized as high performers, four were moderate performers, and four were low performers during the sample identification period (July – Dec 2017). All other pharmacies were excluded from qualitative data collection, qualitative data analysis, and comparative analysis.



* Site did not have at least one pharmacy staff member participate in qualitative data collection

Figure 4. Flow Diagram of Eligible Case Pharmacy Sites Participating in Qualitative Data Collection

3.2.1 Participating Case Pharmacy Site Characteristics

During the 6-month sample identification period, the median number of full-time pharmacists was 2.0 for each of the three participating case pharmacy performance categories. High performing pharmacies had the lowest number of store-assigned technicians (median [range] of 7.0 [2.0]), total weekly technician hours (mean [SD] of 150.9 [34.9]), weekly pharmacist overlap hours (5.6 [2.9]), and the highest proportion of pharmacies hosting at least one IPPE (40.0%) or APPE student (40.0%). Whereas low performing pharmacies had the lowest number of store-assigned student interns (median [range] of 0 [1.0]), and highest number of level three technicians (median [range] of 7.5 [6.0]) (Table 4).

Table 4. Participating Case Pharmacy Characteristics by Performance Category

	High (N=5)	**Moderate** (N=4)	**Low** (N=4)
Number of FTE pharmacists[a] median (range)	2.0 (1.0)	2.0 (1.0)	2.0 (0)
Number of store-assigned technicians[b] median (range)	7.0 (2.0)	8.0 (2.0)	11.0 (3.0)
Weekly total technician hours worked[c] mean (SD)	150.9 (34.9)	185.8 (66.2)	267.2 (40.4)
Level of technician training			
Number of level 1 trained technicians median (range)	1.5 (2.0)	1.0 (1.0)	1.0 (3.0)
Number of level 2 trained technicians median (range)	0 (1.0)	0.5 (1.0)	2.0 (3.0)
Number of level 3 trained technicians median (range)	4.0 (5.0)	6.0 (4.0)	7.5 (6.0)
Number of store-assigned student interns median (range)	1.0 (1.0)	1.0 (1.0)	0 (1.0)
IPPE student(s)[d] n (%)	2.0 (40.0)	1.0 (25.0)	0 (0)
APPE student(s)[e] n (%)	2.0 (40.0)	1.0 (25.0)	0 (0)
Weekly pharmacist overlap hours[f] mean (SD)	5.6 (2.9)	13.2 (17.5)	17.4 (7.4)

[a] Number of FTE pharmacists = number of FTE ($\geq$ 36 hours/week) pharmacists (including pharmacy managers) across case pharmacies within each performance category during the 6-month sampling period
[b] Number of store-assigned technicians = number of store-assigned technicians across case pharmacies within each performance category during the 6-month sampling period (July – Dec 2017)
[c] Weekly total amount of technician hours worked across case pharmacies within each performance category during the 6-month sampling period (July – Dec 2017)
[d] Number of pharmacies within each performance category hosting at least one IPPE student during the 6-month sampling period (July – Dec 2017)
[e] Number of pharmacies within each performance category hosting at least one APPE student during the 6-month sampling period (July – Dec 2017)
[f] Weekly pharmacist overlap = mean weekly hours of pharmacists overlap across cases within each performance category over the 6-month period (July – Dec 2017)

3.2.2 Case Pharmacy Sites' Change-in-Performance Status

During the data collection period (July – Dec 2018), changes-in-performance for case pharmacy sites ranged from an increase or decrease of one to three quintiles. Of the 13 case pharmacy sites, four pharmacies exhibited consistent performance, four pharmacies' performance improved, and five cases' performance worsened.

3.3 Case Pharmacy Site Staff Participants

The a) number of staff provided to researchers by the pharmacy partner (LML) for each case pharmacy site, b) number of staff confirmed as eligible for the study and approached by researchers, c) number of staff who participated in interviews, and d) participation rates are summarized by pharmacy staff role and pharmacy change-in-performance category in Table 5. The number of pharmacy staff screened by researchers for eligibility and the total number of staff who were confirmed as eligible but not approached by researchers (and reasons for this) were not documented and, therefore, not reported. No more than four attempts were made; however, the specific number of approach attempts were not documented

Table 5. Pharmacy Staff Participation Rates, by Staff Role and Change-in-Performance Category

Number of staff provided by pharmacy partner				Number of staff confirmed to be eligible and approached by researchers[a]				Number of participating staff				Participation rate (%) [b,c]			
RPh	Tech	Stu	Total	RPh	Tech	Stu	Total	RPh	Tech	Stu	Total	RPh	Tech	Stu	Total
Consistent															
11	23	2	36	7	3	0	10	3	3	0	6	42.9	100.0	not applicable	60.0
Improved															
10	34	3	47	6	6	2	14	2	4	2	8	33.3	66.7	100.0	57.1
Worsened															
12	27	5	44	6	8	1	15	6	4	1	11	100.0	50.0	100.0	73.3

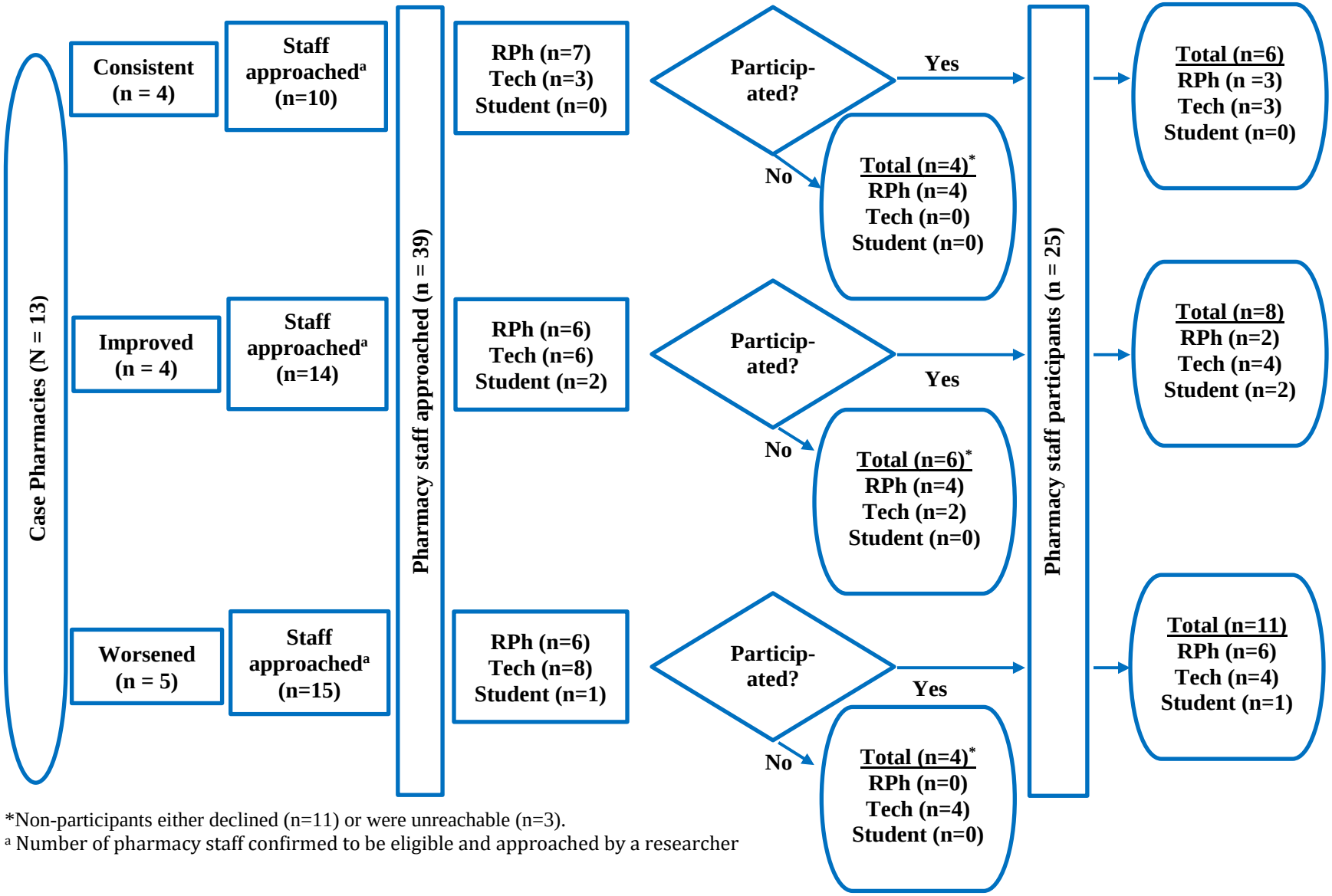
Abbreviations: RPh = pharmacist; Tech = technician; Stu = student intern

[a] total number of staff ultimately screened for eligibility and/or confirmed as eligible but not approached by researchers is unknown

[b] participation rate defined as the number of participants divided by the number of staff confirmed as eligible and approached by investigators

[c] participation data only provided for participating case pharmacy sites; non-participating case pharmacy sites were not included given participation rates were zero by default

Of the 39 pharmacy staff confirmed as eligible and approached, 25 pharmacy staff participated in an interview, yielding an overall pharmacy staff participation rate of 64.1%. Researchers conducted interviews with a range of one to three staff members at each case pharmacy site. Pharmacy staff interviewed included 11 pharmacists, 11 pharmacy technicians, and three student interns. Six participants were in the consistent performance category, eight in the improved performance category, and 11 in the worsened performance category (Figure 5).



*Non-participants either declined (n=11) or were unreachable (n=3).
[a] Number of pharmacy staff confirmed to be eligible and approached by a researcher

Figure 5. Flow Diagram of Pharmacy Staff Participants (25 participated of 39 approached; 64.1%) at Case Pharmacy Sites Participating in Data Collection

3.3.1 Case Pharmacy Site Participant Characteristics

Pharmacies in the improved performance category had the highest proportion of technician (50.0%) and student intern (25.0%) participants whereas the worsened performance category had the highest proportion of pharmacist participants (54.5%) (Table 6). The consistent category had an equal proportion of females to males, and the improved and worsened categories had a greater proportion of female participants (50.0% and 100.0% respectively). Most participants across the three categories were white and non-Hispanic/Latino. More participants in consistent and worsened performance categories reported spending 3-4 hours per week on MTM tasks (66.7% and 45.4%, respectively) and more participants reported spending 1-2 hours per week in the improved category (50.0%). Participants in the consistent performance category were older (mean [SD], 37 [14.0]) compared to other categories. Participants in the worsened performance category had the most years of employment with their pharmacy (mean [SD], 9 [7.0]) and years of MTM experience (4 [7.0]). The majority of pharmacy technician and student intern participants' highest level of education was at least some college for each of the three categories. For each of the three categories, at least 50.0% of pharmacists and pharmacy managers held a PharmD degree, less than 35.0% held an APhA MTM Certificate, and more than 40.0% held an APhA Pharmacist and Patient-Centered Diabetes Care Certificate.

Table 6. Participant Characteristics by Change-in-Performance Category

Participant Type	**Characteristic**	**Consistent** N = 6	**Improved** N = 8	**Worsened** N = 11
All participants	**Role** n (%)			
	Pharmacist	3 (50.0)[a]	2 (25.0)[b]	6 (54.5)[c]
	Technician	3 (50.0)	4 (50.0)	4 (36.4)
	Student Intern	0 (0)	2 (25.0)	1 (9.1)
	Gender n (%)			
	Male	3 (50.0)	3 (37.5)	0 (0)
	Female	3 (50.0)	5 (62.5)	11 (100.0)
	Race n (%)			
	White[d]	6 (100.0)	8 (100.0)	9 (81.8)
	Ethnicity n (%)			
	Non-Hispanic/Latino	6 (100.0)	8 (100.0)	11 (100.0)
	Hours spent providing MTM each week n (%)			
	0	0 (0)	0 (0)	1 (9.1)
	1 – 2	2 (33.3)	4 (50.0)	4 (36.4)
	3 – 4	4 (66.7)	2 (25.0)	5 (45.4)
	5 or more	0 (0)	2 (25.0)	1 (9.1)
	Age in years mean (SD)	37 (14)	31 (7.9)	35 (9.0)
	Years employed at pharmacy mean (SD)	8 (8.0)	6 (5.3)	9 (7.0)
	Years of MTM experience mean (SD)	2 (2.0)	3 (3.1)	4 (7.0)
Participant Type	**Characteristic**	**Consistent** N = 3 n (%)	**Improved** N = 6 n (%)	**Worsened** N= 5 n (%)
Pharmacy technician/ student intern	**Highest level of education** n (%)			
	High school diploma/GED	1 (33.3)	1 (16.7)	0 (0)
	Some college	2 (66.7)	3 (50.0)	3 (60.0)
	Associate's degree	0 (0)	0 (0)	1 (20.0)
	Currently completing PharmD	0 (0)	2 (33.3)	1 (20.0)

Table 6 continued

Participant Type	Characteristic	Consistent N = 3 n (%)	Improved N = 2 n (%)	Worsened N = 6 n (%)
Pharmacist	**Pharmacy Degree Completed** n (%)			
	B.S.Pharm	0 (0)	1 (50.0)	2 (33.3)
	PharmD	3 (100.0)	1 (50.0)	3 (50.0)
	Both B.S. Pharm and PharmD	0 (0)	0 (0)	1 (16.7)
	Additional education/degree completed n (%)			
	PGY-1 Residency	0 (0)	1 (50.0)	1 (16.7)
	Other	0 (0)	1 (50.0)	----------
	None	3 (100.0)	0 (0)	5 (83.3)
	National pharmacy organization certifications obtained[e] n (%)			
	APhA Pharmacist and Patient-Centered Diabetes Care Certificate	2 (66.7)	2 (50.0)	3 (42.9)
	APhA Immunization Certificate	3 (100.0)	4 (100.0)	7 (100.0)
	APhA MTM Certificate	1 (33.3)	1 (25.0)	2 (28.6)

[a] Consistent performance category had two pharmacist participants who were pharmacy managers (33.3%)
[b] Improved performance category had two pharmacist participants who were pharmacy mangers (25.0%)
[c] Worsened performance category had four pharmacist participants who were pharmacy managers (36.4%)
[d] Other races included Black and Asian
[e] N for national certifications includes student interns: consistent (N = 3), improved (N= 4), worsened (N = 7)

3.4 Preliminary Themes

A total of 34 sub-codes were used to code data pertaining to the six CCM elements. Inter-coder reliability was acceptable (kalpha – 0.54), suggesting acceptable agreement among coders.[28,29] Theoretical saturation was presumed to be met as there were no new codes being created at the midpoint of the coding period and coders had adequate coding agreement.

The NVivo cluster analysis revealed sub-codes clustered into 15 clusters based on wording similarity (Pearson's correlation coefficients). Upon initial analysis (blinded), 10 preliminary themes were identified for consideration in subsequent comparative analysis.[23] Emergent preliminary themes consisted of distinct strategies that appeared to vary across case pharmacy sites. Cluster and preliminary theme counts are summarized by CCM element (Table 7).

Table 7. Clusters and Preliminary Themes Counts by Chronic Care Model Element

CCM element	**Clusters**	**Themes**
Health System Organization (HSO)	2	2
Delivery System Design (DSD)	4	3[a]
Clinical Information Systems (CIS)	2	2
Patient Self-Management Support (PSMS)	2	1[b]
Decision Support (DS)	4	1[c]
Community Resources and Policy (CRP)	1	1
Total	15	10

[a] Did not consider one of the clusters for thematic analysis because only three quotes were represented and had no substantial inferences

[b] All clusters were collapsed into one theme as there was no distinct variation in types of PSMS strategies used and did not warrant separating out types of PSMS strategies

[c] All clusters were collapsed into one theme as there was no distinct variation in types of DS strategies used and did not warrant separating out types of DS strategies

3.5 Data Integration and Comparison: Major Themes

The NVivo Framework Matrices facilitated identification of distinct thematic differences across the pharmacy change-in-performance cohorts (unblinded to performance). This resulted in the further refinement of the 10 preliminary themes into eight emergent major themes. These eight major themes consisted of discrete strategies that appeared to vary across the pharmacy change-in-performance cohorts and hypothesized as contributing to community pharmacies' ability to achieve high performance on MTM quality measures (Table 8). The major themes were organized by CCM elements and variation observed across the seven pharmacy change-in-performance cohorts is interpreted and described below.

Table 8. Comparative Analysis of Themes across Change-in-Performance Categories

Overarching themes by CCM Element	**Themes by Change-in-Performance Categories** (Distinct strategies)		
	Consistent (high, moderate, low change-in-performance cohorts)	**Improved** (moderate and low moderate change-in-performance cohorts)	**Worsened** (high and moderate change-in-performance cohorts)
Health System Organization **Definition:** Create a culture, organization and mechanisms that promote effective provision of MTM services[18]			
Theme 1: *Extent of pharmacist-provider relationships*	**High** Strong pharmacist-provider relationships and trust positively contributes to MTM quality measures	* No discrete strategies identified	Absence of pharmacist-provider relationships negatively contributes to MTM quality measures
	Low Absence of pharmacist-provider relationships negatively contributes to MTM quality measures		
Delivery System Design **Definition:** Assure the delivery of effective and efficient MTM services to diverse patients[18]			
Theme 2: *Addressing cultural, linguistic, and socioeconomic needs of patients*	**High** * No discrete strategies identified	* No discrete strategies identified	Inability to meet the unique needs of patients negatively contributes to MTM quality measures
	Low Inability to meet the unique needs of patients negatively contributes to MTM quality measures		

Overarching themes by CCM Element	Themes by Change-in-Performance Categories (Distinct strategies)		
	Consistent (high, moderate, low change-in-performance cohorts)	**Improved** (moderate and low moderate change-in-performance cohorts)	**Worsened** (high and moderate change-in-performance cohorts)
Theme 3: *Degree of technician involvement with MTM services*	* No discrete strategies identified	Technician involvement with scheduling/preparing paperwork (e.g., generating patient medication list) for CMRs and assisting with discussion of 30 to 90-day prescription conversions with patients/providers positively contributes to MTM quality measures	Minimal technician involvement with scheduling/preparing paperwork (e.g., generating patient medication list) for CMRs and assisting with discussion of 30 to 90-day prescription conversions with patients/providers negatively contributes to MTM quality measures
Theme 4: *Capacity to conduct CMRs in person vs. telephone*	**High** Sufficient capacity to provide CMRs to patients in person positively contributes to MTM quality measures	* No discrete strategies identified	Insufficient capacity to provide CMRs to patients in person and/or limiting CMRs to telephone method only negatively contributes to MTM quality measures
Theme 5: *Priority level of MTM services*	**High** Placing high priority on addressing MTM services daily by majority of team members positively contributes to MTM quality measures	Placing low priority on addressing MTM services and only waiting to address when staffing/timing is ideal negatively contributes to MTM quality measures	Placing low priority on addressing MTM services and only waiting to address when staffing/timing is ideal negatively contributes to MTM quality measures
	Moderate Placing low priority on addressing MTM services and only waiting to address when staffing/timing is ideal negatively contributes to MTM quality measures measure		

Overarching themes by CCM Element	**Themes by Change-in-Performance Categories** (Distinct strategies)		
	Consistent (high, moderate, low change-in-performance cohorts)	**Improved** (moderate and low moderate change-in-performance cohorts)	**Worsened** (high and moderate change-in-performance cohorts)
	Low Placing low priority on addressing MTM services and only waiting to address when staffing/timing is ideal negatively contributes to MTM quality measures measure		
Clinical Information Systems (CISs) Definition: Organize patient and population data to facilitate efficient and effective MTM delivery[18]			
Theme 6: *Proportion of available CISs pharmacists use to identify patients eligible for MTM services*	**High** Using maximum number of available CISs to identify eligible patients positively contributes to MTM quality measures	* No discrete strategies identified	Using a lower proportion of available CISs to identify eligible patients negatively contributes to MTM quality measures
	Low Using a lower proportion of available CISs to identify eligible patients negatively contributes to MTM quality measures		
Theme 7: *Technicians' use of CISs to collect/document information for pharmacists to assess medication adherence*	* No discrete strategies identified	Technicians' use of CISs to collect/document information for pharmacists to assess medication adherence positively contributes to MTM quality measures	* No discrete strategies identified

Overarching themes by CCM Element	Themes by Change-in-Performance Categories (Distinct strategies)		
	Consistent (high, moderate, low change-in-performance cohorts)	**Improved** (moderate and low moderate change-in-performance cohorts)	**Worsened** (high and moderate change-in-performance cohorts)
Theme 8: *Methods used to communicate adherence vs. indication MTPs to providers*	**High** Faxing adherence MTP recommendations (e.g., 30 to 90-day prescriptions) and calling providers on indication MTP recommendations (e.g., initiating statin therapy) positively contributes to MTM quality measures	* No discrete strategies identified	Faxing providers on indication MTPs negatively contributes to MTM quality measures
Patient Self-Management Support Definition: Empower and prepare chronically-ill patients to manage their health and health care[18]			
* No discrete strategies identified as emergent themes			
Decision Support **Definition:** Promote MTM practices that are consistent with scientific evidence and patient preferences[18]			
* No discrete strategies identified as emergent themes			
Community Resources and Policy Definition: Mobilize community resources (e.g., programs, partnerships, policy) to meet needs of chronically ill patients[18]			
* No discrete strategies identified as emergent themes			

3.5.1 Health System Organization

Theme 1: Extent of pharmacist-provider relationships

Pharmacies in the consistent (high) cohort attributed success of MTM provision to the strong pharmacist-provider relationships they had built, while pharmacies in the consistent (low) and worsened (high, moderate) cohorts described the current absence of strong pharmacist-provider relationships but the desire to have them.

- *"…I work in a pretty small town, so we have a pretty close network of providers and pharmacies... we communicate pretty frequently with the same people. We know the doctors, we know the nurses… we know the nurse practitioners so... because we know each other so well, there is a trust there between ourselves... probably the most common [MTM service] here over the last six months to a year is identifying statin use for diabetic patients… so we had to kind of work with the providers and explain to them, we are probably going to send you a lot of requests for things like this, and you know, we had a lot of success with it…But we are fortunate to have a good team we all work together…to make sure we are filling in the gaps of care…"* Consistent (high)

- *"…it would be nice if we could contact their providers, but since we can't, sometimes I have to give the patient information to ask and let the providers call me back and say, well, isn't that a thing you would ask me... and I'm like, well, I would love to, but how do I get hold of you?…they are so busy too…"* Worsened (high)

3.5.2 Delivery System Design

Theme 2: Addressing cultural, linguistic, and socioeconomic needs of patients

Participants at pharmacies in the consistent (low) and worsened (high, moderate) cohorts described difficulties in providing MTM services to their unique patient population needs. They also expressed a desire for additional resources to address patient needs.

- *"…with our drive through environment in the store that I work at... [patients] are on the go, they are busy, they want to be quick… They don't want to answer these extra questions even... when it comes to the MTM services, they don't want their time taken up, you know…They are just there to pick up their medications, and it is hard to have them follow-up…I say, well, when you have a moment, give us a call...I try to give them that opportunity…but it is few and far between do I actually get that phone call back…I feel that they would have a better time if they had an app to do everything…[laughter]"* Worsened (moderate)

- *"...I have frequently…Spanish-only-speaking patients, I will look for ways to translate, otherwise I will...write it in their own language…I have some ability of my own. I have… a bilingual technician…on occasion I manage to do [a CMR] by myself to a degree, but for the most part need the technician to be there…In that case, I would have them translate entirely…To be honest, I need to have a Burmese technician because I have...a larger Burmese population in my store, and…we can only do so much, and that is very difficult because it is not easy to find resources on as far as learning even small bits of the language."* Consistent (low)

- *"Like I said before, we have a lot of homebound people. Demographically it is a lower income area, so a lot of people don't have cars, a lot of people don't have the money to come to the pharmacy…"* Consistent (low)

Theme 3: Degree of technician involvement with MTM services

Participants at pharmacies in the improved (moderate, low) cohorts indicated having technicians being more involved with scheduling/preparing paperwork (e.g., generating patient medication lists) for CMRs and communicating 30- to 90-day prescription conversions to patients/providers; however, pharmacist participants at pharmacies in the worsened (high, moderate) cohorts mentioned minimal technician involvement with MTM activities.

- *"I would say, hey, [patient name] has an MTM, will you please…[put a] medication list together…if [the technicians] are slow and I am swamped, they do know how to print a [medication list] or...the other CMR worksheet from [MTM platform B] and give it to me if need be…So anything that they do are workups…for the CMRs…"* Improved (moderate)

- *"Most of the time, [the technicians] will get the information to the pharmacist…we try to like schedule the…CMRs around their lives, so they don't feel so inconvenienced by it."* Improved (low)

- *"Well...[technicians] are getting better...um...We have two technicians in particular that will flag patients whenever they are in the queue that the patient has an MTM, so they will flag them and see what that is and what they need to ask, and if it has to do with that medication that they are working on or not… I will say out of all of [the MTM services], techs do [30 - 90-day conversions]."* Improved (low)

- *"I would say that at my store it is primarily the pharmacist completing the MTM tasks. Unfortunately…technicians don't always stop to read all the notes at [pick-up…our technicians are pretty much focused on dispensing…They are not super comfortable doing any of the CMR or MTM services."* Worsened (high)

- *"…my technician will open [the MTM opportunity] up but the majority of the time they do not know how to handle the MTM… It is basically the pharmacists.* Worsened (moderate)

Theme 4: Capacity to conduct CMRs in person vs. telephone

Participants at pharmacies in the consistent (high) cohort indicated having more success with conducting CMRs in person vs. telephone and participants at pharmacies in the consistent (low) and worsened (high, moderate) cohorts typically conducted CMRs via telephone with minimal success but also expressed concern with inadequate capacity (e.g., time) to complete (unscheduled) CMRs in person when the patient comes into the pharmacy.

- *"You know, we certainly try calling patients from time to time too, but sometimes you get a hold of people, sometimes you don't...so you never really know what you are going to get…but when they are there, we just ask, hey, do you have some time to sit down with us and go through your medication list [CMR], I would like to kind of talk with you, see how things are going, are you having issues, anything you would like to change... all those kinds of questions. We are lucky with our patient population... they are generally really receptive to that…We have had pretty decent success with that…"* Consistent (high)

- *"…a CMR does not happen right at pick-up... either myself or the staff [pharmacist], will, you know, just do MTM calls…most of the calls that go out to patients are unanswered..."* Worsened (moderate)

- *"…being able to do it while the customer comes in has some advantages and disadvantages. The advantages are that we don't have to cold call down a big list. The down side, we have less control over when we can get hold of a patient, basically whenever they decide to come in. If they are in a busy time or just…any number of things…"* Consistent (low)

Theme 5: Priority level of MTM services

Only participants at pharmacies in the consistent (high) cohort made a concerted effort to place addressing MTM services daily by majority of team members as a high priority; whereas participants at pharmacies in all other cohorts placed addressing MTM services as a lower priority and primarily waited to address them when staffing and timing was ideal.

- *So…our mission kind of from the start is to try and get our whole team involved on it, we try to make it daily when we can. So, we do our best to start with it in the morning, but unfortunately…sometimes it is just not practical to have that approach, so you really just try to make room for it when you can…you know, assess the situation of your queues, your prescriptions and work flow...once you get to the point where you've got everything covered for the next couple of hours…okay, I am caught up well enough right now, I am going to*

try to get some MTM work done. Usually if you are looking...you can find a point in the day where you are fairly well caught up and you can get some of it done." Consistent (high)

- *"Most of the time to do [MTM services], we really have to have overlap between the other pharmacist and myself. Otherwise it is trying to balance out with helping customers that are showing up and it is almost impossible to do."* Consistent (low)

- *"I [student intern] typically do all of them, because [the pharmacist] likes when I am there and I will do all the MTM's whenever [patients] come to pick up, and then I will work on Tips too…"* Improved (low)

- *"…mostly [MTM services are addressed] when the pharmacist has a free opportunity or when I am there at work, most of the time it is like student intern hours are kind of like extra…So basically, there is an extra person kind of hanging around. Like 5-9 basically so I will go in and make some of the phone calls…We usually stop calling around 6 or 7, because you don't want to call too late and wake the patients up."*
  Worsened (high)

3.5.3 Clinical Information Systems

At the time of this study, most pharmacist participants mentioned having access to three different CISs to identify patients eligible for MTM services. This included two MTM vendor platforms (referred to as MTM platform A and B throughout this paper) and the pharmacy's proprietary prescription software system housing a "clinical queue" and an MTM symbol that appears throughout the prescription fulfillment process. The software allows for partial integration with MTM platforms and feed in of MTM opportunities directly from Medicare Part D plans.

Theme 6: Proportion of available CISs used to identify patients eligible for MTM services

Participants at pharmacies in the consistent (high) cohort used all three CISs, in contrast, participants at pharmacies in the consistent (low) and worsened (high, moderate) cohorts preferred using one of the CISs over the others.

- *so our computer [prescription software] systems that we use in our pharmacy are designed to flag eligible patients who are eligible for MTM services, be those CMR or TIP… there is information that is loaded in from [MTM platform B] and [MTM platform A]... and it will tell us to go to one of those respective platforms to take care of the [CMR or TIP]... those are definitely our primary sources for identifying eligible patients…"*
  Consistent (high)

- *"[MTM platform B] is my preferred way of working and it is the most user friendly. [MTM platform A] is an option… I use that the least because I find... it is not very user friendly…"*
  Consistent (low)

- *"…I am more likely to log on to the [MTM platform B] than into the [pharmacy prescription software system] Clinical Queue to find the patients that we are targeting…"*
  Worsened (high)

Theme 7: Technicians' use of CISs to collect information and assess medication adherence

Technicians at pharmacies in the improved (moderate, low) cohorts mentioned leveraging the prescription software system and MTM platforms to collect information necessary for pharmacist to assess patients' adherence to medications.

- *"[as a technician] I can go on [MTM platform B] and it says this person is …late to refill, so I will... have to switch back to [prescriptions software system], and see when the last time they got their prescription refilled… so then... the pharmacist usually puts like a… counseling note in there to say, the last time you got it filled was a late refill… "[when documenting in the MTM platform]… You pick the pharmacist that you are working with and they will come over and okay for me to bill it."* Improved (moderate)

Theme 8: Methods used to communicate adherence vs. indication MTPs to providers

Participants at pharmacies in the consistent (high) cohort indicated having most success with technicians faxing on adherence related MTPs. (e.g., 30 to 90-day prescriptions) and pharmacists

calling providers on indication related MTPs (e.g., initiating statin therapy); whereas participants at pharmacies in the worsened (high, moderate) cohorts experienced minimal success with faxing providers on indication related MTPs.

- *"We actually have a section on the computer in the program that we can print off… the 90-day conversion. If the person only has like 30 tablets in their prescription and they find out they can get 90 at the same price, I will ask them if they have enough medication to get them through for a couple of days so that we can contact the doctor and try to get a 90-day supply. I will print that request off and generally it has all of the information on it. Sometimes I will put a note on there that insurance pays 90 days for the same price and would you please send over a new prescription. Luckily all of our prescribers are very good at doing that."* Consistent (high)

- *"I think most commonly [recommendations to providers] is going to be a phone call. They are pretty reliable about... if we leave them a voicemail, they usually get back to us by the end of the day or early the next morning and that is always good enough for what we are doing. So, I think the most success we have had is by phone call."* Consistent (high)

- *"…we send faxes [to communicate to providers], but I don't feel like the faxes work real well."* Worsened (high)

- *"We also have a communication feature with our clinical stuff in the [prescription software system], where I can print off a form… like statins is one that I can fill out and basically request the prescriber talk to their patient about using a statin… and I don't think I have ever seen a doctor actually respond on that form."* Worsened (moderate)

3.5.4 Patient Self-Management Support

No discrete patient self-management support strategies were identified as emergent themes across the seven change-in-performance cohorts. Participants in each cohort discussed the value of strong pharmacy staff-patient relationships and using a range of strategies to promote medication adherence (e.g., alarms, refill reminders, pill boxes, auto refill, 90-day prescriptions, medication

synchronization, pharmacy application, delivery services) based on unique patient factors. Generally, participants felt high risk medication use was the hardest MTP to address because most patients/physicians are unwilling to change therapy. The primary post CMR self-management support tool used was the mandated “patient takeaway.”

3.5.5 Decision Support

No discrete strategies for using decision support resources were identified as emergent themes across the seven cohorts. The extent to which company, MTM platforms and/or tertiary resources were used by staff for evidence-based decision support and sharing evidence-based information with patients varied across cohorts; however, if tertiary resources were used it was typically a resource provided by the company.

3.5.6 Community Resources and Policy

Referrals to community resources did not appear to have distinguishing patterns across the seven cohorts. Generally, many participants felt referrals to community resources were not a component of MTM services; however, if community resources were mentioned it typically pertained to medication disposal sites, coupons/discount cards, and company sponsored health screenings and immunization clinics. Some participants also mentioned their go-to disease-based resources (e.g., diabetes education classes) but would find value in having more resources to refer patients to (e.g., mental disease resources). Most participants agreed with the adherence measure being a good quality measure but desired a better way to determine the quality of a CMR; however, few had suggestions for an alternative way to measure the quality of a CMR.

CHAPTER 4. DISCUSSION

Through our systematic application of the PD approach and CCM, we discovered distinct strategies that we hypothesize as contributing to community pharmacies' ability to achieve high performance on an MTM quality measure composite score. Our MTM quality measure composite score was composed of five MTM quality measure components scores[20] that community pharmacies are considered to influence more directly through provision of MTM services. AHRQ's review of MTM effectiveness yielded inconsistent results, which researchers partially attributed to use of potentially contradictory outcome measures (e.g., morbidity, mortality, health care use, medication optimization, health care use) and lack of rigorous evaluation methods.[9] Our findings are important to inform attempts for sustainability of national health care efforts' to optimize medication use among the older adult population and have several community pharmacy practice and MTM policy implications. Below we discuss the eight hypotheses generated from this study. The discussion consists of practice and policy considerations for the generated hypotheses organized by CCM elements.

4.1 Hypotheses Generated

First, two hypotheses generated from HSO and CIS CCM elements were interrelated and pertained to pharmacy staff-provider relationships, trust, and methods used for communication.

1. Strong pharmacist-provider relationships and trust positively contributes to performance on MTM quality measures (HSO)
2. Faxing adherence MTP recommendations (e.g., 30- to 90-day prescriptions) and calling providers on indication MTP recommendations (e.g., initiating statin therapy) positively contributes to performance on MTM quality measures (CIS)

As anticipated, our results suggested that strong pharmacist-provider relationships and trust positively contributed to community pharmacies' ability to achieve high performance on MTM quality measures. Consistently high performing pharmacies stressed the value of building relationships and trust with providers and priming providers by communicating major changes to

MTM services. These findings are supported by previous research in the physician-community pharmacist collaboration (PCPC) space.[32] Bardet and colleagues' review of PCPC models concluded that there were key elements that persisted across all models including trust and communication.[32] However, our results suggested that effective communication can be difficult to achieve in larger cities with numerous providers in the area. In such settings, it is important to be strategic in methods used to communicate MTM recommendations to providers. We propose faxing adherence-related MTP recommendations (e.g., 30- to 90-day prescription conversions) and calling providers on indication-related MTP recommendations (e.g., initiating statin therapy) positively contribute to community pharmacies' performance on MTM quality measures. This aligns with results from a previous intervention study that found improved adherence to hypertension and cholesterol medication upon faxing MA-PD beneficiary providers 90-day prescription approvals in combination with patient refill reminders.[33]

Second, three hypotheses generated from DSD and CIS CCM elements were interrelated and encompassed both technician and pharmacist involvement with MTM.

3. Having a high degree of technician involvement with MTM activities positively contributes to performance on MTM quality measures (DSD)
4. Technicians' use of CISs to collect/document information for pharmacists to assess medication adherence positively contributes to performance on MTM quality measures (CIS)
5. Using maximum number of available clinical information systems to identify eligible MTM patients positively contributes to performance on MTM quality measures (CIS)

Technician involvement with scheduling/preparing paperwork (e.g., generating patient medication list) for CMRs, assisting with discussion of 30- to 90-day prescription conversions with patients/providers, and using CISs to collect/document information related to patients' medication adherence positioned pharmacies to improve performance on MTM quality measure composite scores. Technician involvement with MTM has been studied extensively.[7,10,34-37] In a recent systematic review of literature, authors described the most commonly reported technician driven MTM activities.[34] Our findings extend upon describing technician involvement in MTM activities

and postulates specific activities that positively contribute to performance on MTM quality measures. Interestingly, technician involvement with generating patient medication lists was least likely (5%) to be described among studies reviewed.[34] This points to the importance of having CISs available to support technicians in performing MTM activities. Furthermore, although cumbersome, we found that pharmacists at consistently high performing pharmacies used the maximum number of available CISs available to identify MTM eligible patients. In lower performing pharmacies, pharmacist's rationale for preference of using one CIS over another was primarily due to usability issues with certain CISs. This aligns with our previous work on usability and usefulness of MTM vendor platform generated alerts for CMRs, in which challenges with display/interface were commonly noted.[38] Nevertheless, it is important to note that limiting the number of CISs used to identify patients could lead to missed opportunities negatively effecting community pharmacy performance on MTM quality measures.

Third, another hypothesis generated from the DSD CCM element was concerning pharmacies' inability to meet the unique needs of patients.

6. Inability to meet cultural, linguistic, and socioeconomic needs of patients negatively contributes to performance on MTM quality measures (DSD)

Pharmacies categorized as consistently low performing or exhibiting worsened performance overtime faced challenges with cultural, linguistic, and socioeconomic needs of patients. If using professional interpreters is not feasible, mobile/web-based applications can potentially help mitigate cultural and linguistic barriers. In a recent evaluation of 15 iPad-compatible language translation applications, Panayiotou et al. found that some applications were potentially suitable for conversations that allow preset phrases to be translated in the healthcare setting.[39] Future research should evaluate use of similar applications in the context of MTM services in the community pharmacy setting.

Fourth, an additional hypothesis generated from the DSD CCM element was concerning the pharmacies' capacity to conduct CMRs in person.

7. Having sufficient capacity to provide CMRs to patients in person compared to telephone alone positively contributes to performance on MTM quality measures (DSD)

Conducting CMRs while the patient is already at the pharmacy reduces inefficiencies with attempting to reach patients by telephone. Community pharmacies are uniquely positioned to provide CMRs in-person compared to other types of MTM pharmacist providers (e.g., plan and MTM vendor in-house pharmacists). Results from our nationally representative research indicated that nearly 50% of CMRs provided by community pharmacists were provided in person to Medicare Part D beneficiaries.[40] This suggests there are substantial missed opportunities when pharmacies resort to solely providing CMRs via telephone. Future research should examine if effectiveness CMRs vary by method of CMR delivery.

Lastly, the final hypotheses generated from the DSD CCM element was one distinct to consistently high performing pharmacies; pharmacists placing high priority on addressing MTM services daily by majority of team members.

8. Majority of pharmacy staff placing high priority on addressing MTM activities positively contributes to performance on MTM quality measures

Similarly, results from a prior quantitative research indicated pharmacists' attitudes towards providing MTM services was associated with MTM completion rates.[10] Likewise, Bacci et al. found pharmacy staff were more motivated to deliver adherence-related services when they understood the importance of the service to the patient and organization.[41] Employers interested in improving pharmacy performance on MTM quality measures should foster a culture conducive to making MTM services a priority among pharmacy staff.

No hypotheses were generated pertaining to PSMS, CDS, and CRP CCM elements. This was largely due to extensive heterogeneity and homogeneity of strategies used across change-in-performance cohorts. This suggests that these strategies are a minimum standard for MTM provision (i.e., strategies used for PSMS) or strategies used minimally influence performance on MTM quality measures (i.e., strategies used for CRP and DS). Nevertheless, policy considerations

exist. For example, participants indicated that strategies used for addressing HRM use was minimal because most patients/physicians were unwilling to change therapy. However, Erickson et al. found that HRM star ratings were weakly correlated with Medicare beneficiary experience measures.[42] Yet, in 2018, CMS transitioned the HRM star ratings measure to a display measure, indicating a lower priority for Part D policy.[43] Additionally, many participants felt community resources were not a component of MTM services, and this aligns with our previous work which found regardless of practices' MTM maturity level, linkages to community resources were perceived as not being a part of MTM. This could be due to the lack of incentive for pharmacies to refer patients to community resources or not understanding the role for community resources in helping patients manage chronic conditions. The CCM specifies how "community programs can support or expand a health system's care for chronically ill patients, but systems often don't make the most of such resources.[18]" MTM policy should provide incentives and guidance on effective incorporation of community resources in MTM services.

4.2 Limitations

Although the MTM quality measures used in this study are widely accepted measures of quality MTM performance, the instability of MTM quality measures within sites over time was a limitation to this study. A year-to-date measurement period compared to the rolling 6-month performance period could result in more stable measures; however, year-to-date data were not readily available to our pharmacy partner (LML) in the EQuIPP dashboard and thus couldn't be used. Furthermore, the EQuIPP measures are not risk-adjusted for patients' sociodemographic factors. Risk-adjusted measures could have enhanced the credibility of between-site comparisons.

Due to scientific pragmatic and ethical considerations, we chose to alter our comparative analysis approach to evaluate strategies relative to change-in-performance categories (i.e., "longitudinal" approach) rather than the initial performance categories alone (i.e., cross-sectional approach). This post-hoc change-in-performance analysis approach limited the number of participants represented by each of the seven change-in-performance cohorts.

Another limitation of this study lies within the unknown transferability, because our sample includes only one specific supermarket-community pharmacy chain in one state; however, this

sampling method was based on the methods used (i.e., PD approach). Additionally, the PD approach prioritizes qualitative methods to explore variations in the provision of health services[15]; hence, data analysis was biased towards prioritizing qualitative data analytical methods.

Our study design applied the CCM to guide data collection and analysis. We could have considered another model to guide data collection and analysis. One option is Donabedian's (1988) Quality of Care model.[44] This Quality of Care model consists of three constructs for evaluating quality of care 1) causal linkages between the structural attributes of care settings, 2) processes of care, and 3) outcomes of care. Similarly, another option is the Framework for Performance Assessment in Primary Health Care (FPA-PHC).[45] This model consists of four levels for evaluating care 1) stewardship, 2) organizational structures and processes 3) processes of care and 4) intermediate outcomes. Applying another model (such as the ones mentioned) to guide data collection and analysis could result in different findings.

CHAPTER 5. CONCLUSION

A total of eight strategies were hypothesized as contributing to community pharmacies' ability to achieve high performance on MTM quality measures. Notable strategies were related to three chronic care model elements: health system organization, delivery system design, and clinical information systems. Future research should engage stakeholders to assist with prioritizing hypotheses to be statistically tested in a larger representative sample of pharmacies.

APPENDIX A. INTERVIEW GUIDE

Intro: Thanks for taking the time to speak with me today. This interview process will include two parts: a verbal interview which will be recorded followed by a brief survey which will not be recorded. The interview should not take longer than one hour. The survey will gather some basic demographic information. You don't have to answer anything that you don't want to. There's no right or wrong answers, we just want to know what you think. And if at any time you don't want to answer anything just say so.
I'll ask that you say no names, nor anything that can identify you or anybody else because this will be audio recorded. Anything you say is confidential.

So if it's ok with you, we can go ahead and start?

Before I start the recording, I'd like to set the stage for this interview and start with some background information you may or may not already know about MTM services provided primarily to the Medicare Part D population:

MTM quality is primarily measured on medication adherence (i.e. taking medications as prescribed) and medication safety. That's why many MTM services tend to have a strong focus on these areas. In specific, medication adherence pertaining to high cholesterol, high blood pressure, and diabetes medications and medication safety focusing on reducing the use of high-risk medication and the completion of Comprehensive Medication Reviews (CMRs). Although most [pharmacy name] pharmacies providing MTM have similar types of MTM opportunities, pharmacies tend to differ in how they deliver MTM. Today I want to learn more about how your pharmacy delivers MTM.

So, before I start the recording and move on to the interview questions, was there anything you'd like me to clarify?

I'm going to go ahead and start the recording now.
"This is _____, on (date) (subject ID) a (staff role)."

Ok so, **today I would invite you to be a story teller.** When I ask you a question I would like for you to tell me a story to supplement each of your responses, if possible, by telling me **the specific role (i.e. a pharmacist, technician or a student)** is in the story**, where** it takes place**, when** it happens, and **what** you are doing, thinking, or feeling.

Delivery System Design

Ice-breaker: So let's start off with you walking me through the process of MTM delivery at your pharmacy?

1. How are tasks distributed amongst pharmacy staff and team members related to MTM services, if at all?
2. What are key steps your pharmacy takes, if any, to help with successful completion of MTM cases?
3. How does your pharmacy work MTM into work-flow, if at all? (i.e. tasks related to both MTM delivery and dispensing)?
4. How do you determine extent/frequency of follow-up with MTM cases?

Decision Support

1. What tools/methods do you use, if any, to assist you with your role in MTM?
2. What resources/tools do you use with in the MTM platform, if any, to assist with completing your work (e.g., identifying eligible patients, scheduling appointments, med rec., addressing medication therapy problems etc.)?
3. What resources, if any, do you use to help prioritize your work related to MTM?

Patient Self-Management Support

1. What tools/methods, if any, do you use provide support for a patient's self-management of medication therapy problems?
2. What strategies/documents/resources, if any, do you provide patients during or after an MTM encounter to help them in their care?

Clinical Information Systems

1. What clinical systems (e.g., Outcomes, Mirixa, [pharmacy name] platforms), if any, do you use to identify eligible patients?
2. What documents, if any, do you use from clinical systems to facilitate MTM?
3. What modes/methods, if any, do you use to share information with patients and providers to coordinate care?
4. How do you follow up, if at all, with recommendations made to patients/providers?

Linkage to Community resources

1. In what ways, if any, do community resources play in providing MTM to your patients?

Health System (Organization)

1. In what ways, if any, does [pharmacy name] provide support in providing MTM services at your pharmacy?
2. In what ways, if any, does any level of management at [pharmacy name] support improvement of MTM at your pharmacy?

ii. What ways do you think your pharmacy could be more successful in providing MTM services?
1. **In a perfect world…**

iii. What would need to happen for you to be able to go from where you are now to where you could be in providing MTM?
1. See if touches on items pertaining to any of the CCM elements

Closing: To wrap up, at the beginning of this interview I made a statement of how the quality of MTM is currently measured. In what ways do you feel these are good measurements of quality MTM? How do you feel the quality of MTM should be measured for older adult patients, and why? Is there anything else you would like to tell me regarding the delivery of MTM at your pharmacy?

APPENDIX B. PARTICIPANT DEMOGRAPHIC EXIT SURVEY

1. Age in years _____

2. Gender: □1 Male □2Female □3Prefer not to answer

3. Ethnicity: □1 Hispanic/Latino □0 NOT Hispanic/Latino

4. Race:
   - □1 White
   - □2 Black/African-American
   - □3 Asian
   - □4 American Indian/Alaska Native
   - □5 Native Hawaiian or other Pacific Islander
   - □6 More than one Race

5. Job title:
   - □1 Pharmacist
   - □2 Pharmacy Student/Intern (go to question 11)
   - □3 Pharmacy Technician (go to question 12)
   - □4 Other: _____

6. Position held: (check all that apply)
   - □1 Manager
   - □1 Staff pharmacist
   - □1 Part-time pharmacist
   - □1 Other: _____

7. Pharmacy degree completed: □1 B.S. □2 PharmD □3 Both B.S. and PharmD

8. Year first licensed as a pharmacist in any state: _____

9. Additional education/degree completed: (check all that apply)
   - □1 None
   - □1 PGY-1 residency
   - □1 PGY-2 residency
   - □1 Fellowship
   - □1 Master's degree
   - □1 PhD degree
   - □1 Other:_____

10. Board certifications obtained: (check all that apply)
    - □1 None

□1 Board Certified Pharmacotherapy Specialist (BCPS)
□1 Board Certified Ambulatory Care Pharmacist (BCACP)
□1 Certified Diabetes Educator (CDE)
□1 Certified Geriatrics Pharmacist (CGP)
□1 Other: _____

11. National pharmacy organization certifications obtained
□1 None
□1 APhA Pharmacist and Patient-Centered Diabetes Care Certificate
□1 APhA Pharmacy-Based Lipid Management Certificate
□1 APhA Immunization Certificate
□1 APhA Medication Therapy Management Certificate
□1 Other: _____

12. Highest level of education completed (skip if "pharmacist"):
□1 High school diploma/GED
□2 Some college – Details _____;'
□3 2-year college degree (Associate's)
□4 4-year college degree (Bachelor's)
□5 Currently completing PharmD
□6 Other: _____

13. Do you currently have a valid national technician certification? (skip if "pharmacy student/intern" or "pharmacist"):
□0 No (go to question 15)
□1 Yes

14. What is the national technician certification that you have?
□1 PTCB
□2 Other_____

15. How long (in years) have you been employed at Kroger pharmacy? _____ years

16. How long (years) have you been providing/assisting with the delivery of MTM to patients?
_____ years

17. What is the average time you spend/week on MTM related tasks (please select one):
□1 Zero Hour
□2 1-2 Hour(s)
□3 3-4 Hours
□4 5 or More Hours

Please provide any additional comments regarding your background/training and experience in providing MTM services (CMRs and/or TMRs/tips (e.g., alerts or flags):

_____
_____

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