
Exploring Pharmacists' Role in a Changing Healthcare Environment

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EXECUTIVE SUMMARY

Over the last several years, the healthcare environment has seen a great deal of change. As unsustainable healthcare costs persist, stakeholders are ever more focused on value. Increases in healthcare costs have typically not resulted in improvements in quality, and may be related to inefficiencies and variation in care delivery. At the same time, there is a corresponding expansion of information—both in the way evidence is generated and in the way it is stored and shared—that is poised to facilitate quality improvement, cost savings, and collaboration among providers. In this environment, three related trends are shaping the market today:

- 1) **Health plans** are seeking savings through more cost-effective benefits, partnerships and integration, and increased risk-sharing arrangements with providers.
- 2) **Providers** are focused on delivering higher value services, with an increased appreciation of coordinated care and an interdisciplinary team approach that extends beyond institutional walls.
- 3) **Patients** are becoming more engaged healthcare consumers as a result of better access to their own health information, transparency of health plan and provider ratings, and greater exposure to the true costs of care.

The value imperative requires a clear understanding of how each type of healthcare provider can contribute to more cost-effective patient care. This white paper focuses on understanding the types of services that pharmacists can provide, and how a shifting landscape may affect the demand for these services in the future.

Role of Pharmacists

Historically, pharmacists' role in healthcare centered around dispensing medications in accordance with a prescription, and providing a final check to ensure accurate delivery of medications to patients. Although they receive training in preventive care, health and wellness, and patient education, pharmacists have traditionally leveraged their clinical knowledge to review prescribed drug regimens to prevent inappropriate dosing and minimize drug interactions. Pharmacists' roles have expanded over time to include more direct patient care, such as primary care and disease management services, and their roles continue to evolve today.

Now more than ever, team-based healthcare is gaining traction in the United States. As pharmacists continue to collaborate as part of a patient's team of providers, it is important to understand the types of services they provide, their capacity to meaningfully improve care and, ultimately, how these services can align with the changing healthcare environment. To that end, we have sought to carefully explore evidence on pharmacist services through a structured literature review of systematic reviews and recently published primary research articles to consider how these services might

be deployed in patient care. To focus this assessment, we identified a set of four key pharmacist services and one care delivery arrangement discussed in the most recent primary research articles published in the United States: medication management; medication reconciliation; preventive services (screening and immunization); education and behavioral counseling; and collaborative care models.

Summary of Key Findings

The evidence base on pharmacist services is growing and spans multiple therapeutic areas and settings including community pharmacies, physician offices, ambulatory/ outpatient clinics, inpatient settings, and long-term care (LTC) settings. Many of the pharmacist services explored in this paper have been shown to improve therapeutic outcomes, adherence to medications, or reduced downstream healthcare costs, as follows:

- *Because accountable care organizations (ACOs) manage the entirety of care for a patient, they may look to integrate pharmacist-provided **medication management** to improve medication adherence and clinical outcomes, while potentially reducing costs.*
 - Medication management conducted by pharmacists has been shown to improve medication adherence and clinical outcomes for patients with chronic diseases such as diabetes, hypertension, cardiovascular disease, and hyperlipidemia, among others.¹⁻⁹
 - Some recent research also has indicated that pharmacist-provided medication management can be cost saving,^{5,10-12} and more contemporary evidence on these services within evolving delivery systems will further inform stakeholders.
- *Pharmacist-provided **medication reconciliation** can help reduce medication discrepancies and may be an important component of improving transitions of care moving forward.*
 - Pharmacist-provided medication reconciliation can detect and reduce medication discrepancies, and can reduce related adverse drug events and/or subsequent healthcare utilization.¹³⁻¹⁷
 - Comprehensive transitions of care programs that utilize pharmacist-provided medication reconciliation will be especially important in the post-hospital discharge setting for patients at elevated risk of rehospitalization.
- *Payers and policymakers should explore ways to leverage pharmacists' accessibility in the community to provide **preventive care services**, especially within alternative payment and delivery models such as ACOs and patient-centered medical homes (PCMHs).*

- Pharmacists are effective in delivering immunization services and can contribute to increased vaccination rates through 1) identification of vaccine candidates, and 2) provision of more convenient immunization services.¹⁸⁻²¹
- Pharmacists can provide a number of screening services²² and, given their community presence, can also serve as a platform for public health initiatives.
- *Pharmacist-provided **educational and behavioral counseling** can contribute to better outcomes in chronically ill patients, and can also support broader health and wellness in the population.*
 - Pharmacist-provided education and behavioral counseling improves medication adherence and therapeutic outcomes in patients with chronic conditions.²³⁻³² Additionally, evidence shows that pharmacists can play roles in improving overall health in areas such as tobacco cessation and weight management.³³⁻³⁵
 - Pharmacist-provided counseling also can be a key component of other types of pharmacist interventions that have been shown to improve outcomes.
- ***Collaborative care models** that include a pharmacist can help alleviate some of the demand for physician-provided care, and also facilitate access to primary care services, especially those related to medication management.*
 - Collaborative team-based care, facilitated by agreements and protocols, has been shown to improve therapeutic outcomes in areas such as diabetes, hypertension, dyslipidemia, and anticoagulation.^{20,36-46}
 - Recent evidence suggests that the addition of a pharmacist in a collaborative, team-based setting can improve performance against quality indicators and national health goals.^{20,46}

As the landscape continues to evolve toward more coordinated, cost-effective, and team-based care, future research should focus on comprehensively describing the specific interventions provided by pharmacists and the unique value they can provide. With the need for increased access to care and the market moving toward more integrated delivery models, new research evaluating how pharmacist services affect immediate and downstream care costs, particularly as part of health care teams, will continue to inform providers and policymakers on optimal patient care practices.

I. INTRODUCTION

Context

The healthcare environment is evolving rapidly, and health plans and providers are exploring ways to deliver more cost-effective care that improves patient outcomes in response to persistent cost pressures. This has led to experimentation with some familiar tools like capitation and limited provider networks; it also includes newer options such as ACOs and using quality measures to align payment with quality and accountability standards.

As these changes occur and stakeholders respond, three key trends are shaping the market:

- 1) **Health plans** are seeking savings through more cost-effective benefits, partnerships and integration, and increased risk-sharing arrangements with providers.
- 2) **Providers** are focused on delivering higher value services, with an increased appreciation of coordinated care and an interdisciplinary team approach that extends beyond institutional walls.
- 3) **Patients** are becoming more engaged healthcare consumers as a result of better access to their own health information, transparency of health plan and provider ratings, and greater exposure to the true costs of care.

All of these dynamics are in play as the insured population grows. Due to the healthcare coverage expansion, 20 million new lives are expected to enter the insurance market by 2015, with further projected increases in enrollment thereafter.⁴⁷ Presently, demand for healthcare services is expected to surpass supply in many areas across the country. In light of this, payers, providers, and policymakers are considering strategies to deliver more efficient care. Leveraging the implementation of electronic health records (EHRs) is one way to facilitate this efficiency, while creating the capacity for providers to more readily access medical information about the patient. While recent policy efforts have incented the use of health information technology (HIT), standardized, interoperable systems between different providers across settings are still the exception rather than the rule.

The shifting landscape requires a clear understanding of how each provider can contribute to collective system goals and how best to deploy each member of the healthcare team to effectively meet patient needs. In this context, we examine the growing role of pharmacists as a potential way to meet these demands while contributing to positive health outcomes. The purpose of this white paper is to explore the role for pharmacist services in this changing landscape, as plans and other providers take on different levels of risk, forge new partnerships, respond to more information, and prioritize high-value care.

Evolving Role of Pharmacists in the Context of Healthcare Reform

Historically, pharmacists' role in healthcare centered around dispensing medications in accordance with a prescription, and providing a final check to ensure accurate delivery of medications to patients. Pharmacists have traditionally leveraged their clinical knowledge to review prescribed drug regimens to prevent inappropriate doses and minimize drug interactions. Since the 1970s, pharmacists have performed drug regimen reviews for patients in the LTC setting to meet federal mandates placed on facilities.⁴⁸ Some pharmacists' roles have expanded to include more direct patient care. For instance, since the 1960s, pharmacists have provided primary care and disease management services within certain government healthcare programs (e.g., Veterans Affairs, Department of Defense, and Indian Health Service).^{40,49}

Through their focused training in pharmacotherapy and medication use, pharmacists provide services to support the appropriate use of medications in a myriad of settings, including community pharmacies, physician offices, ambulatory/outpatient clinics, inpatient settings, and LTC settings. Research has explored pharmacists' direct patient-care activities in these settings, and across a number of different therapeutic areas, including diabetes, heart failure, asthma, anticoagulation, HIV and oncology, among others.^{3,8,50-54}

Some payers are playing a decisive role in leveraging these services. Medicare and certain state Medicaid programs have established arrangements that empower pharmacists to provide medication management to patients with multiple chronic conditions. Some integrated delivery networks (IDNs) like Kaiser Permanente deploy clinical pharmacists to perform direct patient care activities including medication management, laboratory monitoring, and direct patient counseling,^{36,39,55} and can serve as a model for integrated pharmacist-provided patient care as part of a larger healthcare team. Investments in HIT can facilitate these expanded roles, enabling pharmacists to be a more contributory part of the team providing patient care, through enhanced access to real-time patient medical information.

Now more than ever, team-based care is gaining traction in the United States. In 2013, the American College of Physicians (ACP) asserted the following:

*Although physicians have extensive education, skills, and training that make them uniquely qualified to exercise advanced clinical responsibilities within teams, well-functioning teams will assign responsibilities to advanced practice registered nurses, other registered nurses, physician assistants, clinical pharmacists, and other health care professionals for specific dimensions of care commensurate with their training and skills to most effectively serve the needs of the patient.*⁵⁶

This team mentality, with clear acknowledgement of a role for pharmacists, is slowly seeping into the broader consciousness. In the media and academic journals, there are reports that frame the contribution of pharmacists in new care delivery models.⁵⁷⁻⁵⁹ The policy environment also is shifting. For example, in recently proposed rule changes for Medicare Part D, the Centers for Medicare & Medicaid Services (CMS) reaffirms that MTM programs, which are largely provided by pharmacists, can “strengthen the Part D program and improve its overall value.”⁶⁰ Additionally, in a 2013 guidance, CMS recognized MTM as a quality improvement activity as part of its guidance to the marketplace in calculating the medical loss ratio (MLR) for insurers.⁶¹

II. APPROACH

This white paper is focused on understanding the types of services that pharmacists can provide and how a shifting landscape may affect the demand for these services in the future. To that end, we have sought to carefully explore evidence on pharmacist services. While this paper is not a formal systematic literature review, we have assessed previously published systematic reviews and evaluated the most recent published literature to inform our insight on how these services might be deployed in patient care now and into the future.

Researchers have produced a large volume of studies on pharmacist services over the last three decades, evaluating various types of pharmacist services and employing a range of research design approaches. Recent systematic reviews have captured most of the salient research. Therefore, the first step of our analysis was to assess the dominant peer-reviewed systematic and narrative review articles published over the past 10 years. Given that systematic reviews cover a finite period of time, we also sought information from more contemporary, peer-reviewed studies. Thus, the second step of our inquiry was a search of the PubMed/MEDLINE database for U.S.-based research published between 2010 and 2013 that addressed the impact of pharmacist services on: medication adherence, clinical outcomes, mortality, healthcare utilization, costs, and patient satisfaction. To focus on studies that better allow for causal inference and for a better appreciation of tradeoffs between options, we limited our assessment to comparative studies of moderate-to-high design quality.

Once this supplemental search of the literature was compiled and reviewed, we considered the role of distinct pharmacist services in light of the three identified trends in health plan, provider, and patient behaviors. Drawing on expertise in the evolving healthcare delivery landscape and the evidence base identified in our assessment of the literature, we contemplated how pharmacist services might be utilized to meet patient needs in the near future.

III. EXAMINING THE PUBLISHED EVIDENCE

Pharmacist services have received a great deal of focus from the research community, both in published examples of programs that have been established to deliver these services, as well as more rigorous comparative studies evaluating their impact on patient outcomes. Over the past 10 years, a large number of review articles have reported on a vast number of studies that have evaluated the effect of pharmacist interventions on a number of outcomes, including various clinical endpoints, healthcare utilization, medication adherence, and cost.^{22,50,51,62-116} Studies have spanned a number of disease areas, including cardiovascular disease,^{62,66,72,73,86} diabetes,^{72,86,91,98,105} hypertension,^{75,90} chronic kidney disease,^{82,84} mental health,^{77,95} and heart failure,^{100,106} among others. Study designs have generally ranged from non-randomized observational studies with or without comparison groups, to randomized controlled trials (RCTs).

Results from a number of systematic reviews that each pool data from multiple studies have reported favorable effects of pharmacist services on patient outcomes including blood pressure, LDL cholesterol, and hemoglobin A1c,^{51,63,65,68,72,90,91,101} while other meta-analyses have sometimes reported inconsistent or inconclusive findings, noting the challenges in identifying a sufficient number of studies that evaluate quality of life or consistent measures of adherence in the disease areas under study.^{102,103} Two recent review articles provided a broad evaluation of pharmacist services specifically in the United States, one on clinical and patient-related outcomes, and one on cost outcomes. Chisholm-Burns *et al.* examined comparative studies published through 2009 that evaluated pharmacists involved in direct patient care across a number of patient-related outcomes (i.e., therapeutic, safety, or humanistic outcomes).⁵⁰ The settings of care varied, with most interventions occurring in outpatient/ambulatory care/community settings, followed by inpatient/institutional settings, home care, emergency department/urgent care, and other settings. In pooled analyses, they found significant positive effects on therapeutic outcomes such as hemoglobin A1c, LDL and blood pressure, as well as medication adherence, patient knowledge, and quality of life.

In a separate review article, Chisholm-Burns *et al.* examined studies published through January 2009, evaluating the economic outcomes of pharmacist services in the United States.⁵¹ Positive and/or mixed findings, where a positive outcome was noted for at least one economic endpoint, were seen in a majority of the studies. The authors characterized findings from the remaining articles as unclear or showing no impact. Investigators recognized the need for more research evaluating the economic effects of pharmacist interventions employing: better study designs; direct measurements of all sources of medical costs; inclusion of costs for pharmacy programs; and incorporation of patients' willingness to pay.

With the goal of providing a general overview of pharmacists' impact on patient outcomes, many review articles have focused on broadly defined pharmacist interventions, often without specific distinctions as to how or what type of service pharmacists were providing. To focus this assessment, we identified a set of four key pharmacist services and one particular care delivery arrangement discussed in recent primary research published in the United States:

1. Medication management
2. Medication reconciliation
3. Preventive care services (screening and immunization)
4. Education and behavioral counseling
5. Collaborative care models

For the purposes of this assessment, we defined the five interventions using dominant descriptions from the literature (Table 1). In the following sections, we discuss the health-care environment and describe the general evidence base for each pharmacist service in greater detail, investigating the potential role for these pharmacist services now and in the near future. Though these sections primarily focus on the recent evidence, we have drawn our overall assessment from the broader evidence base as reported through an inclusion of review articles published over the past 10 years. Furthermore, although pharmacists provide direct patient care in a number of different settings and therapeutic areas targeting acute conditions as well as chronic diseases (diabetes, hypertension, cardiovascular disease, HIV, anticoagulation, oncology, etc.), we focused our assessment of the evidence on broader pharmacist services, and acknowledge that these services can affect care delivery across a variety of settings and therapeutic areas.

Table 1: Definitions and Examples of Current Practice for Pharmacist Services

PHARMACIST SERVICE	DEFINITION & ASSOCIATED SERVICES	EXAMPLES OF CURRENT PRACTICE
<p>Medication Management</p>	<ul style="list-style-type: none"> • Medication management, in the form of MTM, has been defined by the pharmacy profession as: <i>a distinct service or group of services that optimize therapeutic outcomes for individual patients that are independent of, but can occur in conjunction with, the provision of a drug product.</i>¹¹⁷ • Components of medication management typically include collecting medical and drug histories from patients, patient education, comprehensive medication review, medication monitoring, and provider outreach to relay recommendations for adjustments to drug therapy when necessary. 	<ul style="list-style-type: none"> • Since 2006, MTM has been a required part of the Medicare Part D benefit. Although requirements have evolved over the years, this program has generally targeted patients with multiple chronic conditions utilizing multiple Part D-covered drugs. • Pharmacist-provided medication management is also provided through Medicaid and commercial payers, and can vary from Part D MTM in scope of services and patients targeted. • Pharmacist-provided medication management has been implemented in private sector patient-centered medical homes (PCMHs) with pharmacists receiving payment for services rendered.¹¹⁸
<p>Medication Reconciliation</p>	<ul style="list-style-type: none"> • Medication reconciliation can be defined as: <i>the comprehensive evaluation of a patient's medication regimen any time there is a change in therapy in an effort to avoid medication errors such as omissions, duplications, dosing errors, or drug interactions, as well as to observe compliance and adherence patterns. This process should include a comparison of the existing and previous medication regimens and should occur at every transition of care in which new medications are ordered, existing orders are rewritten or adjusted, or if the patient has added nonprescription medications to [his or her] self care.</i>¹¹⁹ 	<ul style="list-style-type: none"> • The focus on reducing medication discrepancies during transitions of care has been growing. Medication reconciliation is a particularly important part of ensuring continuity of care during transitions across different settings. • Pharmacists in some care transition programs increasingly deploy more robust medication management in addition to obtaining accurate medication lists. • Medication reconciliation is a component of medication management, but also can be a stand-alone service. This practice may be evolving from solely reconciliation to more robust medication management. • Medication reconciliation can be provided by a number of healthcare practitioners, including pharmacists.

PHARMACIST SERVICE	DEFINITION & ASSOCIATED SERVICES	EXAMPLES OF CURRENT PRACTICE
Preventive Services (Screening and Immunization)	<ul style="list-style-type: none"> • Screening includes tests waived under the Clinical Laboratory Improvement Amendments, such as cholesterol and glycated hemoglobin measurements, and screening for infectious disease (e.g., <i>Streptococcus pneumoniae</i>, hepatitis C, HIV), among others. • Immunizations include pharmacist-administered vaccinations, as allowed by each state's scope of practice. 	<ul style="list-style-type: none"> • Pharmacists have recently taken more visible roles in preventive care, primarily as front line advocates for screening for major diseases and through the promotion and administration of vaccines.^{19,22} • Screening and vaccination by pharmacists are regulated by state law, and requirements and circumstances vary by state.
Education and Behavioral Counseling	<ul style="list-style-type: none"> • Some literature evaluates stand-alone counseling related to “health and wellness,” such as tobacco cessation, or related to a patient’s medication therapy with targeted goals of improving measures of medication use. • Pharmacist-provided education and behavioral counseling can occur as one component of other interventions. 	<ul style="list-style-type: none"> • Pharmacist-provided education and behavioral counseling can be implemented in a variety of settings. For instance, pharmacists have provided targeted counseling in ambulatory/outpatient settings, post-hospital discharge, and community pharmacy settings.^{24,26,120} • Pharmacy coaching programs have been used by private health plans in value-based insurance designs.²⁹
COLLABORATIVE CARE MODELS	DEFINITION & ASSOCIATED SERVICES	EXAMPLES OF CURRENT PRACTICE
Collaborative Drug Therapy Management	<ul style="list-style-type: none"> • Although the above services can be performed individually in collaboration with physicians or other providers, more formal collaborative care models have been defined in state practice guidelines to provide a mechanism for facilitating these services, in addition to enabling a broader scope of practice for pharmacists in close collaboration with physicians. • The principal type of arrangement is formally known as “collaborative drug therapy management” (CDTM), and is defined as a <i>collaborative practice agreement between one or more physicians and pharmacists wherein qualified pharmacists working within the context of a defined protocol are permitted to assume professional responsibility for performing patient assessments; ordering drug therapy-related laboratory tests; administering drugs; and selecting, initiating, monitoring, continuing, and adjusting drug regimens.</i>¹²¹ 	<ul style="list-style-type: none"> • Although the scope of CDTM can vary by state, 47 states allowed pharmacists to practice collaboratively with physicians through CDTM as of 2013.¹²² • CDTM models have been implemented in a variety of settings, spanning physician offices,^{46,123} Veterans Affairs Medical Centers,^{40,124} hospital outpatient clinics,⁴⁵ inpatient settings,¹²⁵ community pharmacies,¹²⁶ and pharmacy clinics.¹²⁷ • CDTM models have been deployed across a number of therapeutic areas, including diabetes,^{41,128} hypertension,^{36,129} dyslipidemia,^{40,42} heart failure,¹³⁰ and anticoagulation,^{45,125} among others.

IV. EXPLORING THE ROLE OF PHARMACIST SERVICES

Pharmacist-provided Medication Management

Healthcare Environment

In 2005, 133 million Americans had at least one chronic medical condition; by 2020, this number is expected to grow to 157 million, with 81 million individuals having multiple chronic illnesses.¹³¹ These patients typically face a higher likelihood of medical complications and incur higher overall treatment costs, while often having low rates of medication adherence.^{132,133} Improving medication adherence can raise quality and reduce costs for this population. In 2012, the Congressional Budget Office (CBO) published a guidance document with its estimate that medication adherence lowers overall medical cost: specifically, every 1.0 percent increase in the number of prescriptions filled by Medicare beneficiaries leads to a net decrease in medical spending of 0.2 percent.¹³⁴

Medication management is one of the key types of services pharmacists can provide. Pharmacists across many settings of care provide medication management in a number of different chronic conditions and therapeutic areas, including diabetes,⁵ dyslipidemia,⁵³ heart failure,⁸ asthma,⁵⁴ HIV,³ and oncology,⁵² among others. In addition to the general focus on chronic illnesses, a number of newer initiatives seek to optimize care for defined patient populations. For instance, CMS has established medication adherence quality measures in select therapeutic areas, as well as an overall care coordination measure. These are particularly meaningful in ACOs, delivery models that specifically seek to align financial incentives for a group of providers to deliver more coordinated patient care. At present, some ACOs integrate pharmacists for medication management and other services, and at least one community chain pharmacy launched three ACOs in New Jersey, Texas, and Florida.¹³⁵ As ACOs strive to improve patient outcomes and meet financial targets, services such as medication management, that improve medication adherence and medication-related quality metrics, are of great interest.

Evidence on Pharmacist-provided Medication Management

The majority of the literature on medication management that we assessed largely focused on MTM or similarly described services for chronic diseases in the community and/or ambulatory/outpatient care settings. RCTs have found that medication management has shown a positive result on controlling LDL cholesterol, hemoglobin A1c and blood pressure.^{1,2,44} Non-randomized, observational studies from the previous three years have generally supported these findings with positive results on therapeutic outcomes such as LDL, blood pressure, and hemoglobin A1c in addition to medication adherence.^{3-7,43,136} When evaluating endpoints such as symptom burden, quality of life, and adverse drug events, RCTs have been inconclusive largely due to the complexity of the

endpoints or weak links between the measured endpoints and medication use.¹³⁷⁻¹⁴¹ Studies of multicomponent medication management in the LTC setting have seen mixed findings with hospitalizations, with studies demonstrating either improvements or no demonstrable effects.^{10,142}

There is evidence to support medication management's positive impact on patient adherence to prescription medications. The Center for Medicare & Medicaid Innovation (CMMI) has funded the most comprehensive, rigorously designed study of medication management to date. In this research, Perloth *et al.* found that both adherence and the quality of prescribing were better for those receiving pharmacist-provided medication management.⁸ This effect was strengthened when comprehensive medication review conducted by a pharmacist was a part of the program. Some additional studies of medication management have demonstrated similarly positive effects on medication adherence,^{3,4,9} and others did not find strong associations.^{136,143,144}

Findings on the costs associated with pharmacist-provided medication management have varied, with some medication management interventions demonstrating lower downstream healthcare costs,^{3,11,12,145} and others showing inconclusive or mixed effects.^{3,9,146} In the LTC setting, Trygstad *et al.* estimated that the intervention led to drug cost-savings of approximately \$22 per member per month.¹⁰ In a study of a Medicare Part D MTM program, Wittayanukorn *et al.* calculated a return on investment (ROI) at \$1.67 per each \$1 spent, when considering both pharmacy and medical expenditures.¹¹ This is consistent with previous systematic reviews indicating positive returns on investment when evaluating broader cognitive pharmacist services as a whole, with up to \$4 in benefits expected for every \$1 invested in clinical pharmacy services.^{115,116} In addition to these data, further research evaluating program costs, downstream total medical costs, and ROI for pharmacist services provided within new payment and delivery models can further help to inform how pharmacist services can improve quality of care while maintaining or reducing costs. Implementing pharmacist-provided medication management within these new models will provide additional opportunity to study the financial impact of these services.

Recently published comparative studies indicate that pharmacist-provided medication management can be beneficial for patients, especially for those with multiple chronic conditions or complex medication regimens. This is consistent with the broader literature from the past decade that indicates that pharmacists can improve outcomes for patients across a broad array of therapeutic areas and settings. Perhaps not surprisingly, some newer services such as medication synchronization are incorporating aspects of medication management.¹⁴⁷ As new approaches and techniques to implement medication management continue to be explored, we expect that the evidence base focusing on innovative approaches will grow accordingly.

Looking forward, standardization in terminology could be a pivotal improvement in reporting and interpreting the research. As we reviewed the literature in this area, we noted that the types of interventions performed for medication management often varied in their reporting of scope and methods. As such, additional studies that describe a consistent set of well-defined interventions will improve insights on medication management for researchers and policymakers.

Key Takeaways on Medication Management

- Medication management conducted by pharmacists has been shown to improve medication adherence and clinical outcomes for patients with chronic diseases.
 - Because they manage the entirety of care for a given patient with an increased focus on safety and quality, ACOs may look to integrate pharmacist-provided medication management.
 - New research evaluating pharmacist-provided medication management should diligently identify and standardize reporting of all relevant component services being delivered within these programs, as this can help inform policy and quality improvement efforts.
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Pharmacist-provided Medication Reconciliation

Healthcare Environment

As many as 70 percent of patient care transitions result in medication discrepancies, with one-third of these being serious enough to lead to adverse drug events.¹⁴⁸⁻¹⁵² As the healthcare environment continues to prioritize quality, many high-profile organizations have highlighted the need for focused improvement on transitions of care for patients. For instance, the Joint Commission has designated medication reconciliation as a National Patient Safety Goal. Transitions of care also is a priority area for the Patient Centered Outcomes Research Institute (PCORI), which issued a targeted funding announcement (The Effectiveness of Transitional Care) for \$15 million in 2014.^{153,154} For all three types of CMS ACO programs (Medicare Shared Savings Program, Pioneer, and Advance Payment ACOs), a quality measure evaluates whether the physician documents medication reconciliation during a patient visit within 30 days of discharge from an inpatient facility.¹⁵⁵

Other important quality measures are indirectly related to medication review and reconciliation. For instance, CMS has established a Hospital Readmissions Reduction Program; this measures hospital facilities based upon unplanned readmissions for heart attack, heart failure, and pneumonia. Measures for chronic obstructive pulmonary disease (COPD) and total hip and knee replacement will be added in 2015. There also is an all-cause readmission measure in the Healthcare Effectiveness Data and Information Set (HEDIS), a

measure set that evaluates health plans, that assesses how many unplanned hospitalizations there are in a plan's enrollee population. The net effect is that both hospitals and health plans may have an incentive to avoid preventable medication errors or gaps in therapy, as hospitals face direct financial penalties through decreased reimbursement rates, and plans face benchmarking against their competitors.

Ensuring good transitions of care involves many stakeholders, and there are multiple points in the care continuum at which medication reconciliation is necessary. With advancements in and broader implementation of HIT, it becomes easier to review a patient's medication regimen, particularly for a pharmacist with access to the patient's EHR. In addition to reconciling medication lists, medication reconciliation can be one component of broader medication management activities. For instance, in one targeted program, a pharmacist provides initial medication review at the time of discharge and at 9 days and 25 days following the discharge to help improve adherence.¹⁵⁶ As patients transition between sites of care and providers, the pharmacist may be well positioned to see across patients' treatment plans, improve communication of treatment plans between settings, and directly engage patients to improve medication use.

Evidence on Medication Reconciliation

A number of studies have evaluated pharmacist-provided medication reconciliation as patients enter and leave LTC settings.^{13,14,87,157,158} Bookvar *et al.* saw that medication reconciliation was associated with lower odds of medication discrepancy-related adverse drug events.¹⁵⁸ Other studies have found decreases in some measures of healthcare utilization.^{13,14} In one study, Delate *et al.* observed fewer ambulatory care visits and lower mortality 60 days after discharge from a skilled nursing facility. However, there were no differences in subsequent emergency department (ED) visits or hospitalization.¹³ Other research has explored outpatient medication reconciliation in post-hospital discharge settings. In a study set in a PCMH, high-risk patients who received pharmacist-provided telephonic post-discharge medication counseling and reconciliation three to seven days after discharge experienced lower odds of hospital readmission. Researchers estimated the savings at \$35,000 per 100 patients.¹⁵⁹ Additional studies have corroborated lower downstream healthcare utilization such as ED visits or hospitalization, and others have reported no significant differences.^{15-17,24,31,159-162}

Evidence suggests that pharmacist- and physician-initiated medication reconciliation, when performed at the time of hospital admission, can prevent similar numbers of adverse drug events.¹⁶³ In some settings, it may be difficult for the primary provider to deliver this service efficiently. Therefore, future studies comparing pharmacist-provided medication reconciliation to similar services led by other types of providers could clarify where in the care continuum pharmacists can have the greatest effect on patient outcomes. Although evidence suggests there is particular promise for pharmacists in the post-hospital discharge setting, pharmacist-provided medication reconciliation should be

considered as a component of broader care transition programs to optimize medication use and safety. Pharmacists can likely play a significant role in improving the experience and outcomes of patients transitioning across care settings.

Key Takeaways on Medication Reconciliation

- Pharmacist-provided medication reconciliation can detect and reduce medication discrepancies. More comprehensive transitions of care programs may increase the benefits of medication reconciliation for patients.
 - Medication reconciliation may be especially important in the post-hospital discharge setting for patients at elevated risk of rehospitalization.
 - Future research should continue to evaluate the effects of pharmacist-provided medication reconciliation on therapeutic and economic outcomes, especially during patient transitions across care settings.
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Pharmacist-provided Preventive Care Services (Screening and Immunization)

Healthcare Environment

With an increased focus on a healthcare system that promotes wellness—not one that just treats the sick—many stakeholders are focusing on preventive and primary care services. To reinforce this, health plans are using population health measures related to vaccination and screening. HEDIS assesses many immunization measures, including child and adolescent immunization rates in commercial and Medicaid plans, rates of flu vaccinations for adults ages 18-64 in commercial plans, and rates of flu vaccinations for adults ages 65 and older in Medicare plans. In the Star Ratings program that evaluates Medicare Advantage plans, just over one-fifth of the measures are related to immunizations and screening.

These incentives encourage plans, healthcare systems, and individual providers to steer beneficiaries toward United States Preventive Services Task Force- (USPSTF) recommendations for population and symptomatic screening, as well as appropriate immunizations. Furthermore, patients are becoming more aware of access to preventive services. This has led to increases in vaccination rates, with pharmacists increasingly becoming important providers of vaccine administration. The public is likely aware of the broadened reach of pharmacists through educational materials and advertisements encouraging immunization.

As newer models of care proliferate, plans and providers are determining whether the pharmacist can essentially extend the setting of care into the community. Research is currently underway to evaluate the impact of integrating community pharmacy-provided medication management strategies into existing patient-centered care teams on health outcomes.¹⁶⁴ A potential result of this work is more efficient delineation of screening and immunization responsibilities across providers.

Evidence on Preventive Care Services

There is growing evidence to suggest that through their presence in the community, pharmacists improve access to vaccinations for the general public. This may be especially true among younger adult populations, who are less likely to access routine care with a physician.¹⁶⁵ A recent study observed greater increases in pneumococcal and herpes zoster vaccination rates in states where pharmacists can administer vaccinations compared to those states where they cannot.¹⁸ Higginbotham *et al.* discovered that pharmacists generated higher vaccination rates than other providers when they offered the same combination of education and an offer to vaccinate.¹⁹ Edwards *et al.* reported that pharmacists improved influenza and pneumococcal vaccination rates among patients with diabetes in a PCMH.²⁰ Another study suggested that pharmacists were helpful in identifying those who were eligible for vaccinations through electronic record review.²¹ Moving forward, pharmacists may be expected to play an increased role in assessing, adjudicating, and administering vaccines to various populations. Future research should focus on evaluating how pharmacists can provide these specific services in the evolving team-based care delivery models.

A number of studies have explored pharmacist screening for major diseases, including osteoporosis, cardiovascular disease, depression, hypercholesterolemia, and peripheral vascular disease, among others.²² These studies have indicated that pharmacists can feasibly deliver screening services. It is possible that more convenient access to pharmacists in the community will allow for more screening, perhaps intercepting diseases earlier in their course. Future studies should evaluate how pharmacists can target patients who are most likely to benefit from screening, as well as how to integrate screening efforts within the patient care team to provide streamlined, cost-effective care.

Key Takeaways on Preventive Care Services

- Pharmacists are effective in delivering immunization services and can contribute to increased vaccination rates through 1) identification of vaccine candidates, and 2) provision of more convenient immunization services.
 - Pharmacists can provide a number of screening services. Future research should highlight which patients are most likely to benefit from pharmacist-provided screening and how to integrate this practice with other services provided by the healthcare team.
 - ACOs and other new delivery models should explore ways to leverage pharmacists' accessibility in the community, both for their ability to screen and immunize patients and as a platform for public health initiatives. More research evaluating the clinical value of pharmacist-provided preventive care services within new healthcare delivery models is encouraged.
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Pharmacist-provided Education and Behavioral Counseling

Healthcare Environment

Counseling encompasses many things, ranging from discussion of therapeutic-specific goals (e.g., adherence, achievement of intermediate outcomes) to providing broader information on good health practices, such as weight management. As a key point of access for patients (during the medication dispensing process or otherwise), pharmacists have many opportunities for counseling patients, and can use this access to clarify or confirm patient understanding of physician-directed treatment regimens. Within many healthcare settings, targeting patients with specific conditions and comorbidities for enhanced counseling could lead to a well-informed patient population and more coordinated care. Pharmacists can also provide education about health and wellness issues or potential risk factors for disease. With patients growing more engaged in their care, this interaction with the pharmacist could help reinforce physician messages and positive behaviors.

Evidence on Education and Behavioral Counseling

Educational and behavioral counseling interventions are typically provided in tandem with other pharmacist services, though comparative studies in the past three years have evaluated these interventions in isolation. Regarding medication-focused interventions, studies have shown that pharmacist counseling is linked to better medication adherence²³⁻²⁶ as well as clinical measures such as hemoglobin A1c, blood pressure, lipids, and asthma control.²⁶⁻³² For example, Kraemer *et al.*²⁸ and Wertz *et al.*²⁹ examined the effect of education and coaching on patients with diabetes and hypertension, respectively, noting the potential for improved outcomes without explicit, structured collaboration with other providers. Other studies that evaluated interventions in collaboration with other providers (e.g., nurses, dieticians) saw improvements in hemoglobin A1c and blood pressure.^{27,32}

Research on pharmacist counseling to target smoking cessation and weight management shows that the pharmacist can be beneficial in helping patients achieve health goals.^{33-35,166} For instance, in a RCT conducted by Dent *et al.*, pharmacists were able to improve abstinence rates for smoking through face-to-face group counseling sessions with patients.³⁴ In another RCT by Ahrens *et al.* conducted in a community pharmacy setting, a diet and nutrition program combined with a dietary counseling intervention led by pharmacists was shown to reduce waist circumference, blood pressure, and triglyceride levels.³⁵

Overall, the evidence base points to a potential pharmacist role in supporting and educating patients as they set and achieve their health and wellness goals. Future work in this area should focus on how pharmacist-provided counseling and educational interventions augment the counseling provided by other members of the healthcare team, especially within newer care delivery models. It would be informative to

determine what additional benefits these services confer over standard practices, as well as whether they are linked to lower healthcare utilization and spending in the long term, as risk-based payment and delivery models are expanded in the marketplace.

Key Takeaways on Education and Behavioral Counseling

- Pharmacist-provided education and behavioral counseling improves medication adherence and therapeutic outcomes in patients with chronic conditions.
 - Pharmacist-provided counseling also can be a key component of other types of pharmacist interventions that have been shown to improve outcomes.
 - More research is needed to understand how pharmacist-provided counseling services complement the services provided by other members of the healthcare team, and the specific pharmacist interventions that yield added benefits over standard practices delivered within these teams in the newly evolving models of care.
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Collaborative Care Models

Healthcare Environment

With the current impetus for team-based care, there is growing recognition of the pharmacist as an important contributor to the patient care process. Collaborative care models can be facilitated by protocols or agreements that explicitly delineate specific or expanded authority for pharmacists working under physician oversight. These agreements may allow for the initiation and administration of medications, dosage adjustments, ordering of laboratory tests, and more active monitoring of drug effectiveness and safety, in step with other members of the care team. Across any of these collaborative arrangements, access to EHRs is critical to facilitate efficient communication between providers and to optimize the delivery of pharmacist services.

One mechanism for facilitating collaborative care is through collaborative drug therapy management (CDTM).¹⁶⁷ CDTM can be instituted in a number of different settings and therapeutic areas. These models have been described for multiple conditions, including but not limited to, cardiovascular disease,¹⁶⁸ diabetes,⁴¹ hypertension,³⁶ oncology,^{169,170} anticoagulation,⁴⁵ insulin titration,¹²⁸ and antihypertensive or heart failure medication titration.^{39,129,130} For instance, Kaiser Permanente in particular offers a variety of pharmacist-provided clinical services using protocols for chronic conditions in areas such as anticoagulation, oncology, and antibiotic surveillance across outpatient, inpatient/hospital, and ambulatory care settings.¹⁷¹ As of the beginning of 2013, 47 states and the District of Columbia have authorized CDTM, with the specific functions and settings of care varying by state.¹²²

With the projected increase in demand for primary care services exceeding projected supply, shifting well-defined primary care services from physicians to pharmacists may be a viable strategy for meeting demand, especially in pervasive chronic disease areas. Delegating tasks such as drug therapy management, monitoring, and dose adjustments to pharmacists under a formalized protocol leverages the specialized pharmacotherapeutic expertise of pharmacists and may increase the capacity of other providers.

Evidence on Collaborative Care Models

Most comparative evaluations of CDTM have been set in the outpatient setting, and may involve a combination of physician offices, hospital ambulatory/outpatient care, community pharmacies, or home care settings. Recent RCTs of CDTM and similarly described arrangements have shown related improvements in clinical endpoints such as blood pressure, lipids, and hemoglobin A1c.³⁶⁻⁴⁰ Non-randomized, observational, comparative studies support these improvements in selected clinical outcomes for diabetes, dyslipidemia, and anticoagulation.⁴¹⁻⁴⁶ Furthermore, evidence suggests that the addition of a pharmacist in a collaborative, team-based setting can improve performance against quality indicators and national health goals. For instance, in a PCMH setting, Edwards *et al.* observed improvements in the American Diabetes Association standards of care (e.g., hemoglobin A1c, lipids, foot exam, eye exam referral, pneumococcal and influenza vaccination, urine albumin).²⁰ In another study among patients with diabetes, a greater percentage of patients with collaborative care teams met the Healthy People 2010 objectives for diabetes.⁴⁶

In a recent study that explored economic outcomes related to team-based care, a pharmacist-managed anticoagulation service led to fewer hospital admissions and ED visits. Accounting for operational and drug expenditure costs, researchers estimated savings of \$3,697 per patient.⁴⁵ This finding is consistent with previous review articles evaluating the economic benefits of cognitive pharmacist services overall.^{115,116} Additional studies evaluating downstream healthcare costs related to collaborative, team-based care across other disease areas should continue to be encouraged.

Collaborative care models that integrate pharmacists into the active management of a patient's drug regimen can improve patient care. As team-based care expands and the opportunity to leverage the services that can be delivered by pharmacists is considered, it is important that future research define and measure the precise pharmacist services delivered as part of the care team. This will be critical to understand what works best as well as to provide additional insight into how pharmacists can play a role in helping to address shortfalls in access related to the projected increased demand for patient care services. Consistent reporting of the types of interventions that are included and excluded will facilitate comparisons across studies and faster integration of beneficial services into practice.

Key Takeaways on Collaborative Team-Based Care

- Collaborative team-based care that includes a pharmacist has been shown to improve therapeutic outcomes, especially for chronic conditions such as diabetes.
 - Collaborative care models facilitated by agreements and protocols can help alleviate some of the demand for physician-provided care and also facilitate access to primary care services related to medication management.
 - Future studies should evaluate how collaborative care models can improve medication use measures, and how these configurations affect current and downstream healthcare costs.
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V. CONCLUSIONS

The evolving healthcare landscape provides new opportunities for pharmacists to deliver services to enhance medication use and engage patients to improve overall health. These services span areas of medication management, medication reconciliation, preventive care (screening and immunization), and patient education and behavioral counseling. The evidence around pharmacists' impact on clinical and economic outcomes is growing, and overall, points to improving therapeutic outcomes and reducing costs. As the landscape continues to evolve toward more coordinated, cost-effective, and team-based care, continued research that clearly reports the specific pharmacist services that are being evaluated and the impact these services have on patient outcomes and healthcare costs will continue to inform policymakers and all providers of care. As payment and delivery models such as ACOs and PCMHs become more prominent, they will further shape the opportunities for pharmacists to contribute their services to deliver more efficient patient care. Moving forward, it will be critical that reimbursement policies are aligned to incent appropriate utilization of pharmacist services in order to deliver the highest value healthcare to patients.

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