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Evaluation of Pharmacists' Work in a Physician-Pharmacist Collaborative Model for the Management of Hypertension

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Abstract

Study Objective—Physician-pharmacist collaborative models have been shown to improve the care of patients with numerous chronic medical conditions. Team-based health care using integrated clinical pharmacists provides one opportunity to improve quality in health care systems that use population-based financing. In November 2015, the Centers for Medicare and Medicaid Services (CMS) requested that the relative value of pharmacists' work in team-based care needs to be established. Thus, the objective of this study was to describe the components of pharmacists' work in the management of hypertension with a physician-pharmacist collaborative model.

Design—Descriptive analysis of the components of pharmacists' work in the Collaboration Among Pharmacists and Physicians To Improve Outcomes Now (CAPTION) study, a prospective, cluster randomized trial.

Measurements and Main Results—This analysis was intended to provide policymakers with data and information, using the CAPTION study model, on the time and intensity of pharmacists' work to understand pharmacists' relative value contributions in the context of CMS financing and population management aims. The CAPTION trial was conducted in 32 community-based medical offices in 15 U.S. states and included 390 patients with multiple cardiovascular risk factors. Blood pressure was measured by trained study coordinators in each office, and patients were included in

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the study if they had uncontrolled blood pressure. Included patients were randomized to a 9-month intervention, a 24-month intervention, or usual care. The goal of the pharmacist intervention was to improve blood pressure control and resolve drug therapy problems impeding progress toward blood pressure goals. This intervention included medical record review, a structured assessment with the patient, collaboration to achieve goals of therapy, and patient follow-up. The two intervention arms (9 months and 24 months) were identical the first 9 months, and that time frame is the focus of this workload evaluation. Pharmacists completed study encounter forms for every patient encounter and estimated time spent in pre-visit, face-to-face care, and post-visit activities. Among the 390 patients, there were 2,811 encounters with pharmacists that involved 3.44 hours/patient for face-to-face care visits plus 1.55 hours/patient for pre-visit and post-visit work. Intensity of work was reflected in interventions to resolve drug therapy problems with patients (43% of encounters) and with physicians (1,169 recommendations, of which physicians accepted 1,153 [98.6%]), resulting in improvement of patients' blood pressure goals achieved (from 0% at baseline to 43% at 9 months based on the primary study endpoint).

Conclusion—Pharmacists provided extensive interventions to patients with hypertension. This analysis provides a framework for health systems, provider groups, and payers to measure pharmacists' work in value-based financing and population management.

Keywords

hypertension management; pharmacist management; blood pressure control

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As a result of the Affordable Care Act (ACA), the numbers of people with health insurance and expanded Medicaid coverage in many states has increased.[1,2] Even before the ACA was enacted, serious concerns existed about a shortage of primary care physicians and other health care providers. Leaders have promoted more effective implementation of non-physician providers, including pharmacists, to address these care gaps.[1,2] Smith et.al. discussed the need to include pharmacists in new care model delivery within Accountable Care Organizations (ACOs) and integrated care teams.[2]

Stating the value proposition of pharmacist integration in team-based care is needed, especially with the wide variations in payment methods among insurers. New team-based care models will require more sophisticated evaluations of pharmacists' work within team-based care, especially those embedded in primary care practices. One variation includes medication therapy management (MTM) services compensation limited to the time a pharmacist spends face-to-face with a patient, either in person or during telephonic and tele-video interactions. Other compensation systems encompass the pharmacist's pre-visit preparation, time caring for the patient, and post-visit time for care plan development, documentation, and dissemination of the pharmacist's recommendations to the primary care physician. For instance, a Resource-Based Relative Value Scale has been used to reimburse pharmacists in the Minnesota Medicaid MTM Program since 2006.[3]

Employment of pharmacists within private physicians' offices and health care systems is increasing due to care delivery and payment reform models. The fact that the Centers for Medicare and Medicaid Services (CMS) has not been authorized by Congress to recognize pharmacists as providers within the Medicare Part B eligible provider list constrains the

clinical contributions of pharmacists. It should be noted that CMS has taken actions to recognize pharmacists' contributions in team-based care while awaiting Congressional authorization in the Social Security Act, such as clarification of billing for pharmacists' services "incident to" care provided by physicians.[4]

Physician-pharmacist collaboration in which pharmacists are integrated within the physician's office has been an effective strategy to improve blood pressure (BP) control.[5–7] A meta-analysis[8] and systematic review[9] confirmed that pharmacists can significantly improve BP control, but these authors concluded that comparative effectiveness studies are still needed to evaluate the costs associated with these improvements

Most research involving physician-pharmacist collaboration has been conducted in carefully controlled efficacy trials, usually in academic settings.[5] Prior to the Collaboration Among Pharmacists and Physicians To Improve Outcomes Now (CAPTION) study,[101112] it was not known whether similar interventions could be implemented in diverse, community-based, primary care offices, especially with high numbers of minority populations. It was important to evaluate this care model in minority populations since hypertension causes more heart disease, strokes, and kidney disease in racial minorities than in Caucasians.[13] Racial minorities and individuals in lower socioeconomic groups also achieve lower BP control rates, and treatments are suboptimal.[14]

The aim of this analysis was to describe the components of pharmacists' work in the CAPTION study. The goal of the pharmacist intervention in the CAPTION trial was to improve BP control and resolve drug therapy problems impeding progress toward BP goals. The term pharmacists' work is used consistent with physicians' work measurements.[15] Measuring workload contributions of all health care team members, including pharmacists, is important to improving organizational efficiency in alternative payment systems.

This analysis describes the pharmacists' work component of a collaborative model between physicians and pharmacists to improve and sustain BP improvements in community-based primary care medical offices that served a population of patients with multiple cardiovascular risk factors. This analysis is intended to provide policymakers with data and information, using the CAPTION study model, on the time and intensity of pharmacists' work to understand pharmacists' relative value contributions in the context of CMS financing and population management aims outlined in the CMS Payment Taxonomy Framework.[16]

Methods

CAPTION Trial Design, Setting, and Patient Population

The CAPTION trial was a cluster randomized prospective trial conducted in 32 primary care offices, with 15 owned and/or operated by private health systems and 17 owned and/or operated by academic health centers.[10] The CAPTION trial methods,[11] results,[10] and specifics of the pharmacists' intervention[12] have previously been published. The present analysis describes an a priori planned descriptive evaluation of pharmacists' work in the CAPTION trial that can be used by policymakers who are designing payment structures for

pharmacists' services; however, some CAPTION design elements, medical office features, and pharmacists' activities are included in this analysis to provide context for the analysis of pharmacists' work.

The purpose of the CAPTION study was not to determine if the collaborative model was effective since numerous other studies have demonstrated the effectiveness of the collaborative model.[8,17–19] Rather, CAPTION was an implementation trial to determine whether the model would be scaled up in a large number of diverse offices. The purpose of the study was to evaluate if physician-pharmacist teams could be implemented in community-based medical offices to improve blood pressure control and were as effective in reducing BP in minority populations (97% of minorities were either African-American or Hispanic) compared with non-Hispanic Caucasians. This analysis focuses on the work performed by pharmacists in the intervention group.

This study was conducted from 2008–2013 and was approved by the University of Iowa Institutional Review Board (IRB) and the IRBs overseeing the individual sites. The offices were randomized to either a brief (9-month [11 offices]) or sustained (24-month [9 offices]) intervention arm (total of 20 intervention offices) or to a control (12 offices).[10] The brief and sustained interventions were identical for the first 9 months. The original grant application and protocol prespecified the 9-month time period for the primary outcome and was, therefore, the endpoint for the study of pharmacists' work components.

Care Model Description

All offices employed clinical pharmacists embedded in the office to provide care and to serve as an educator for primary care residents and staff physicians. An analysis of the practice network prior to this study demonstrated that the majority of the offices (85.4%) had employed pharmacists for 6 or more years.[20] That analysis also found that the network pharmacists had been in their current medical office with the following distribution: <1 year 7.4%, 1–5 years 39.6%, 6–10 years 34.6%, > 10 years 18.5%.[20] The average site had 1.7 pharmacists, with each spending 2.3 days/week in the office (0.8 full-time equivalents). None of the intervention pharmacists dispensed medications or filled prescriptions; rather, their primary roles were patient management and physician education. Patient revenue was used to cover pharmacists' salaries in 21% of the practice sites, and half of the pharmacists used Current Procedural Terminology (CPT) Evaluation and Management codes incident to physician services for billing. Revenue from these pharmacists' services in 2005 were < $25,000, $25,000–$49,000, or $50,000 or over in 67%, 19%, and 14% of practice sites, respectively.[20]

These offices were not clinics within a hospital but were located in communities or adjacent to their community hospital. Most of the offices (85%) were associated with family medicine residency programs, and pharmacists spent about 35% of their time educating family medicine residents on appropriate prescribing and pharmacotherapy decision making.

Hypertensive patients in the offices in the control group received their usual care. Pharmacists in the control group offices did not meet with hypertensive study patients. Rather, they were advised to avoid making recommendations for any study patient except to

provide general drug information to the physician. The control group offices included a distracter intervention, and these pharmacists cared for patients with asthma instead.[21]

The physician-pharmacist teams in the 20 offices that were randomized to the intervention are the focus of this analysis. Patients were included if they had uncontrolled BP as defined by the 2003 national guidelines.[22] Trained study coordinators employed within medical offices collected all BP measurements, demographics, and other data from the patients in all three study arms at baseline and at 9 months. Once all the baseline data were collected by the study coordinator in the intervention offices, the pharmacist was alerted that the patient had been enrolled.

The pharmacist intervention included medical record review and a structured assessment with the patient, including the following: medication history; assessment of progress toward BP goals; patient knowledge of BP medications, dosages, and timing, and potential adverse drug events; and other barriers to BP control (e.g., adverse drug events, nonadherence, and health literacy). The suggested intervention included structured face-to-face visits at baseline, 1, 2, 4, 6, and 8 months; a telephone call at 2 weeks from the baseline visit; and additional visits if BP remained uncontrolled. However, because this study was designed to be implemented within the pharmacists' other usual duties, the pharmacists were not required to strictly follow these timelines and were free to modify the schedule. The pharmacist created a care plan with recommendations for the physician to adjust therapy. The study did not provide specific protocols, but, instead, the pharmacists were instructed to follow the current national BP guidelines.[22] Most pharmacist communication with the physician was face to face, with some communication via e-mail. Recommendations to physicians were based on the following BP goals[22]: <140/90 mm Hg for uncomplicated hypertension or <130/80 mm Hg for patients with diabetes mellitus or chronic kidney disease.

Recommendations to patients focused on achieving treatment goals and resolving drug therapy problems. However, the pharmacists also made recommendations related to lifestyle modifications such as improving diet and exercise, moderating alcohol intake, and stopping smoking. Pharmacists completed a clinical encounter form following each patient interaction that included the following: time spent with patients reported by using CPT MTM services codes, time spent in pre- and post-visit activities, current BP and BP medications, changes recommended to physicians and patients, and whether physicians accepted or modified the pharmacist's plan (supplemental Appendix 1).

The analysis questions addressed in the description of the pharmacists' work in this study were as follows:

1. What is pharmacists' work in providing care for patients enrolled in the CAPTION trial? This question is intended to describe the broad, overarching responsibilities of pharmacists working in collaborative physician practices in the CAPTION study.
2. What are the technical dimensions of pharmacists' work providing care for patients enrolled in the CAPTION trial? This question is intended to describe specific

interventions and activities of pharmacists in the study to achieve goals of therapy and resolve drug therapy problems.

3. What are the pharmacists' work input resources (e.g., pre-, intra-, and post-service components) of collaboration in the CAPTION study? This question is intended to describe the resource inputs of pharmacists' work in the study in terms of time and intensity of services.

Evaluation of Pharmacists' Work

The description of pharmacists' work in this analysis was framed in the context of four key historical developments. The first frame of reference is the approach developed by Hsiao and colleagues in 1988 to describe the dimensions of physicians' work.[15,23,24] The second aspect includes the determinants of pharmacists' work in conducting a pharmacotherapy assessment, such as the number of medications, the number of medical conditions for which a patient is taking medications, and the number of drug therapy problems a patient is experiencing.[25] The third frame of reference encompasses current health reporting nomenclature for MTM services. The time-based CPT MTM services codes assigned in 2006 for use by pharmacists appear in Table 1.[??] The fourth key aspect relates to current and future compensation approaches for pharmacist integration in health care teams consistent with category 3 (e.g., alternate payment models built on fee-for-service architecture) and category 4 (e.g., population-based payment) of the CMS Payment Taxonomy Framework.[3,26–28]

The work component reflects the complexity, intensity, time, judgment, training, and resources used to perform a procedure or service.[15,23,24] Measurements of physicians' work have found that pre-visit and post-visit work accounts for 33% of total work.[24] In this study, pharmacists recorded the amount of time spent in pre- and post-visit activities, as well as intra-service or face-to-face time spent with patients.

Data for analysis were derived from the pharmacist encounter forms for the hypertension intervention arm of the study (supplemental Appendix 1). Two authors (B.J.I. and D.E.B.) were contracted consultants as originally prespecified in the grant application and were not members of the CAPTION study team. Therefore, they were required to obtain database files provided by a data and resource sharing plan through the CAPTION Data Coordinating Center (DCC). The pharmacists' work analytical file was created by decoding and resorting Excel (Microsoft Corp., Redmond, WA) spread sheet files provided by the DCC and through use of the 242-page CAPTION data dictionary. The pharmacists' work analytical file was constructed to contain the following data elements for each individual patient:

- MTM services CPT codes arranged by each encounter
- Visit type
- Number of hypertension-related medications, number of cardiovascular-related medical conditions (e.g., coronary artery disease, myocardial infarction, heart failure, coronary artery bypass grafting, stent placement, angina, transient ischemic attack, stroke, peripheral artery disease, hyperlipidemia)

- Progress toward goals
- Number and type of adverse drug events
- Number and type of interventions to resolve drug therapy problems
- Total number of recommendations made to physicians and patients
- Recommendations accepted by physicians

The intra-service or face-to-face time spent caring for patients in the study was reported by pharmacists (using MTM services CPT codes 99605, 99606, and 99607), and time spent in pre-visit and post-visit services was reported on the pharmacist encounter form.

Results

The original CAPTION study enrolled 401 patients in the intervention group, but 11 patients terminated the study without pharmacist intervention. Patient demographics and balance between study arms appears elsewhere.[10,29] This analysis of pharmacists' work includes the 390 patients with at least one pharmacist intervention who were enrolled between March 2010 and June 2011. Table 2 displays the demographic and racial-ethnic distribution of the 390 study patients from the pharmacists' workload analysis groups. Of the total sample, 225 (57.7%) of patients were from racial or ethnic minority groups. Of the minority population, 159 (70.7%) were African-American and 59 (26.2%) were Hispanic or Latino. A large percentage of patients had annual incomes ≤ $25,000 (49%) or had Medicaid (14%) or free care/self-pay (11%). Of note, over 50% had diabetes or chronic kidney disease; the list of comorbid medical conditions among the patients at baseline is presented in Table 3.

There were 390 initial patient encounters (i.e., code 99605) and 2,421 established patient encounters (i.e., code 99606), for an average of 6.2 follow-up encounters/patient. These 2,811 encounters with pharmacists involved a total of 3.44 hours/patient for face-to-face care visits. In terms of additional 15-minute increments of face-to-face time spent with a patient (i.e., code 99607), there were 474 CPT code 99607 encounters recorded in conjunction with the initial patient encounters (i.e., in conjunction with CPT code 99605), and 2,087 CPT code 99607 encounters recorded in conjunction with the established patient encounters (i.e., code 99606). In addition, 2,226 follow-up encounters (92%) were conducted face to face, whereas 195 (8%) were conducted as telephonic visits. Pharmacists spent an average of approximately 33 minutes/patient face-to-face time during the initial encounters, and 28 minutes/patient on average in face-to-face time during each follow-up encounter. Total face-to-face time with patients is displayed in Table 4.

An additional 36,267 minutes of pre-visit and post-visit time were recorded (11,397 minutes in pre-visit and 24,870 minutes in post-visit time). This represents, on average, 4.05 minutes of pre-visit and 8.85 minutes of post-visit time per encounter. The pre- and post-visit time represented 31% of pharmacists' work. Therefore, the sum total of all three components resulted in a total time estimate of pharmacists' work of 116,847 minutes (1,947 hours), or 4.99 hours/patient/9 months (3.44 hours/patient for face-to-face care visits plus 1.55 hours/patient for pre- and post-visit work).

Intensity of Work to Resolve Drug Therapy Problems

Patients had 2,811 pharmacist encounters (average 0.58/patient/month). There were significantly more dose increases or medication additions in the intervention group (2.6 ± 2.5) than the control group (0.8 ± 0.9, p=0.0001). More specific detail of the types of drug therapy changes in the control and intervention groups have previously been published.[12] The 390 patients had 858 comorbid medical conditions (Table 3). These patients took 897 antihypertensive medications. Medications used to treat other comorbid medical conditions were not recorded.

A total of 443 pharmacist recommendations were made to start a new antihypertensive medication, and there were 283 recommendations to discontinue antihypertensive medications. Pharmacists made 329 recommendations to increase the dose and 94 recommendations to decrease the dose of antihypertensive medications. Of the 1,169 recommendations made to alter drug therapy, physicians accepted 1,153 (98.6%).

Pharmacists also intervened directly with patients to resolve drug therapy problems impeding progress toward goals of therapy. Patient interventions focused on medication adherence (43.2% of encounters) and lifestyle changes.

Safety

Policies from the National Heart, Lung, and Blood Institute required the investigators to report any hospitalization or emergency department visit as a serious adverse event (drug related or other event). That policy resulted in most reported events having no relationship to the study. There were no significant differences in the frequency of any adverse events when comparing the intervention and control groups.[10] However, adverse events were reported by patients that were addressed by intervention pharmacists. There were 392 adverse events reported including 328 events (83.7%) not related to the use of medications (e.g., cellulitis, pneumonia, alcoholism leading to pancreatitis). There were 64 adverse events that may have been related to the use of medications. The four most frequently reported adverse events were pain (e.g., pain other than chest pain, such as back, shoulder, or knee pain), chest pain, shortness of breath, and gastrointestinal events (e.g., diarrhea, constipation, dyspepsia). Interventions related to these 64 reported adverse drug events are displayed in Table 5. Medical monitors and a Data and Safety Monitoring Board determined that no significant difference in adverse events was noted in the intervention group compared to the control group (p=0.500). Many of the adverse events in the study were due to disease progression and were not related to adverse drug events.

Results expressed in terms of the analysis questions are summarized as follows:

1. What is pharmacists' work in providing care for CAPTION patients? The following results of this analysis indicated that the primary responsibilities of pharmacists working in collaborative practices in the CAPTION study were to help patients achieve goals of therapy and to resolve drug therapy problems impeding patients' progress toward goals:

- Pharmacists determined that 12.3% of patients were at BP goal on initial assessment, despite uncontrolled BP assessed by the study coordinators' structured measurements at the time of study enrollment.
- Pharmacists provided patient-specific drug therapy problem resolution recommendations at 1,214 (43%) of patient encounters.
- Pharmacists provided 1,169 drug therapy problem resolution recommendations to physicians, with an acceptance rate of 98.6%.

2. What are the technical dimensions of pharmacists' work providing care for patients enrolled in the CAPTION trial? The technical dimensions of pharmacists' work in the trial included activities and interventions to achieve goals of therapy and resolve drug therapy problems including the following:

- Pre-visit work review of medical records and medication histories reported as 4.05 minutes, on average, per encounter.
- Post-visit work in documentation, care plan development, dissemination of pharmacists' recommendations to the primary care physician, and coordination of care reported as 8.85 minutes, on average, per encounter.
- Intra-service, or face-to-face, work providing structured assessments with patients, collaborating to achieve goals of therapy, and in patient follow-up reported across 2,811 encounters (92% face-to-face and 8% telephonic) including 390 initial encounters and 2,421 follow-up encounters.

3. What are the pharmacists' work input resources (e.g. pre-, intra-, and post-service components) of collaboration in the CAPTION study? The resource inputs of pharmacists' work in the CAPTION study included the following:

- Time spent with patients reported as 33 minutes, on average, per patient during initial encounters, and 28 minutes per patient, on average, during follow-up encounters.
- Time spent in pre- and post-visit activities represented 31% of pharmacists' work in this analysis.
- Total time spent in pre-, intra,- and post-service work was 116,847 minutes (1,947 hours), or 4.99 hours/patient/9 months.
- Representation of intensity of work related to patient complexity in achieving goals of therapy and resolving drug therapy problems in the patients including the following:
  - The large number of comorbid medical conditions (858)
  - 50–57% of the patients had diabetes and/or chronic kidney disease
  - The BP goals of therapy achieved increased from 0% at baseline to 43% at 9 months as measured by the study coordinators.
  - The considerable number of drug therapy problem recommendations made to patients (1,214) and physicians (1,169)

- 392 reported adverse events were assessed, including 64 that were possibly medication-related adverse events

Discussion

The objective of this analysis was to describe and measure pharmacists' work providing care in collaboration with physicians for patients with uncontrolled hypertension. The CAPTION study was built on an effective model of physician-pharmacist collaboration studied in carefully controlled efficacy studies.[17,18] However, the CAPTION study was unique because it was an implementation trial designed to determine if the pharmacist intervention would be adopted in a large number of diverse, community-based medical offices.

Although the CAPTION study focused on BP control, the population had many coexisting cardiovascular conditions, diabetes, and kidney disease. The complexity of patients has important health management implications to further support the value proposition of pharmacist integration in care delivery and financing reforms.

The fact that there were 2,811 pharmacist encounters with patients over a 9-month period demonstrates the extent and intensity of the pharmacists' services. The intensity likely relates to the complexity of these patients. A significant portion of pharmacists' time was spent resolving drug therapy problems directly with patients to improve medication safety and effectiveness and to improve medication adherence. Bodenheimer and Smith describe these as important roles for non-physician providers, such as pharmacists, as a strategy to address the physician shortage so that physicians can concentrate on resolving difficult diagnostic decisions, creating care plans and coordinating care for patients with complex illnesses, and helping people navigate end of life care.[1]

A distinctive feature of this analysis is that all pharmacists had been embedded within the medical offices for many years and likely had well-established collaborative relationships. The fact that 98.6% of the pharmacists' recommendations were accepted by physicians supports the conceptual model of physician-pharmacist collaborative practice teams. Among the 390 patients, there were 2,811 encounters with pharmacists that involved 3.44 hours/patient for face-to-face care visits plus 1.55 hours/patient for pre- and post-visit work over 9 months. The intensity of work is reflected in interventions to resolve drug therapy problems with patients (at 43% of encounters) and with physicians (1,169 recommendations).

Pharmacists' Work and Alternate Payment Models

This study draws on the foundational work conducted by Hsiao and colleagues in 1988[15,23,24] and current MTM services compensation architecture developed by the Minnesota Medicaid Program. A pharmacotherapy assessment performed by pharmacists for the purpose of evaluating the effectiveness and safety of a patient's medications was recognized in official health reporting nomenclature of CPT in 2006. The CPT codes for MTM services have been assigned a time-based infrastructure since inception. This is in comparison to an intensity-based, or resource-based relative value scale, coding infrastructure such as that used for CPT Evaluation and Management codes.

One uncertain characteristic of the MTM services time-based coding infrastructure among health insurers is whether or not it only accounts for the face-to-face visit or time spent with the patient in telephonic or tele-video encounters. Such determinations will be very important as team-based care becomes more common in new care delivery and alternate payment models. The pre-visit, face-to-face (or intra-service), and post-visit work required to conduct a comprehensive pharmacotherapy assessment has been established based on the number of medical conditions for which a patient is taking medications, number of medications, and number of drug therapy problems the patient is experiencing. In the Minnesota Medicaid Medication Therapy Management Program, the Minnesota Department of Human Services recognized the potential compensation flaw of time-based MTM services CPT codes. Rather than reimbursing pharmacists for the amount of time spent with a patient, the State of Minnesota compensates providers for effectiveness of care based on the intensity of work in achieving drug therapy treatment goals and resolving drug therapy problems using a resource-based relative value scale.[3]

The results of the present analysis provide a framework for describing pharmacists' team-based contributions within global payment systems (e.g., CMS payment taxonomy, category 4; population-based payment).[16] Policymakers and health administrators are facing the task of understanding and measuring team members' contributions toward the aims of better care and better health at lower costs. This study is intended to articulate pharmacists' workload components so that more sophisticated economic studies can be constructed to measure these contributions.

Although pharmacists considered other comorbid medical conditions and medications during encounters with patients, the time and intensity of care delivered focused primarily on hypertension and may not encompass a comprehensive MTM assessment to account for all of a patient's drug therapy treatment goals. Therefore, the pharmacists' work description of care could underreport work in providing comprehensive medication management.

This study, both in its design and results, provides pharmacists and pharmacists' employers with a tangible example of the value that pharmacists bring to health care settings. In this case, pharmacists played a vital role in improving a patient's cardiovascular health through collaborative patient care services that resulted in improved blood pressure management and control. Critical to the advancement of pharmacist-based clinical services and practice models is the ability to articulate the positive impact, clinically and economically, resulting from pharmacists' patient care services. The medical coding and code valuation processes each depend on the ability to understand the practice expense components involved with clinical services. These data help to articulate the pharmacists' practice expense elements in relation to the study results for this physician and pharmacist collaborative hypertension model. However, since all of the pharmacists had established relationships within the offices, these findings may not be generalizable to pharmacists developing a new practice.

Finally, this analysis is not a cost-benefit study and was not intended to report pharmacists' return on investment. It is recognized that impact on performance benchmarks and total cost of care will be important in health system decisions to employ pharmacists in value-based healthcare delivery and financing models

Policy Implications

This analysis will be valuable as ACOs and integrated care teams develop more efficient and effective interprofessional working relationships to deliver improved care.[1,2] Legislators are evaluating implementation of CMS Medicare Part B provider status for pharmacists within Medicare and Medicaid programs. While Congress considers the proposed legislation, the CMS is moving rapidly toward more quality-based bundled payment models. If Congress authorizes pharmacist provider status, this analysis may be beneficial in the process of determining the value of MTM services provided by pharmacists, consistent with processes utilized by the CPT Relative Value Scale Update Committee.[30]

As the number of physician-pharmacist collaborative practices continues to grow, there will be a need to include pharmacists as active qualified health care providers for the purposes of calculating physician practice expense direct costs. It is noted that the CMS direct practice expense input database contains the service-level costs in clinical labor based on the typical service furnished to Medicare beneficiaries. In a report in the Federal Register on November 16, 2015, the CMS stated that “we welcome more detailed information regarding the typical clinical labor costs involving pharmacists for particular PFS (Physician Fee Schedule) services.”[31] The data in the present analysis should help to address this request. Since the CMS invited input on valuing pharmacists’ direct practice expenses, the profession of pharmacy will need to move quickly to provide this input and provide additional documentation of pharmacists’ services in physician practices as a “typical service furnished to Medicare beneficiaries.” In 2007, the profession of pharmacy responded in a similar manner to an urgent national call for evidence of widespread availability of MTM services that resulted in migrating MTM services CPT codes from temporary to permanent status.[32] The present request by CMS should provide similar compensation streams.

Conclusion

This analysis describes pharmacists’ workload contributions in a collaborative interprofessional team-based care model using a frame of reference developed for the description of physicians’ work. The results of this analysis can be applied to stating the value proposition of pharmacist integration in new care delivery and financing models. The body of evidence in the value proposition suggests that pharmacist and physician collaboration in team-based care has the ability to positively impact national aims of better care, better health, and smarter spending. As health insurers continue moving toward CMS payment taxonomy categories 3 and 4, sustainable compensation models for pharmacist practitioners will likely include a combination of population-based payments to the health care team or organization in which they are employed.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

CPT Codes for Medication Therapy Management Services

CPT Code	Face-to-Face Time Spent with Patients
99605	Initial 15 minutes, new patient: medication therapy management service(s) provided by a pharmacist, individual, face-to-face with patient, with assessment and intervention if provided
99606	Initial 15 minutes, established patient
99607[a]	Each additional 15 minutes (list separately in addition to code for the primary service)

CPT = Current Procedural Terminology.

[a]Use 99607 in conjunction with 99605, 99606.

Source: American Medical Association. CPT 2014: current procedural terminology, professional edition. Chicago: American Medical Association, 2014.

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Table 2

Sex, Race, and Ethnicity of the Patients in the Pharmacists' Work Analysis

Characteristic	No. (%) of Patients (n=390)
Sex	
Male	159 (40.8)
Female	231 (59.2)
Race	
White	208 (53.3)
Black or African-American	159 (40.8)
Asian	6 (1.5)
American Indian/Alaska Native	4 (1.0)
Native Hawaiian/Pacific Islander	3 (0.08)
Declined to answer	10 (2.6)
Ethnicity	
Non-Hispanic or non-Latino	324 (83.1)
Hispanic or Latino	59 (15.1)
Unknown or declined to answer	7 (1.8)

Table 3

Baseline Comorbid Medical Conditions for the Patients Receiving the Intervention

Diagnosed Condition	No. (%) of Patients (n=390)[a]
Diabetes mellitus	193 (49.5)
Chronic Kidney Disease	26 (6.7)
Coronary Artery Disease	21 (5.4)
Congestive Heart Failure	13 (3.3)
Hyperlipidemia	228 (58.5)
Stroke or TIA	24 (6.2)
Peripheral Artery Disease	4 (1.0)
Asthma or COPD	71 (18.2)
Depression or Anxiety	119 (30.5)
Arthritis, DJD, or Chronic Pain	144 (36.9)
Seizures or Other Neurological Disorder	12 (3.1)
Liver Disease	3 (0.8)

TIA= transient ischemic attack; COPD=chronic obstructive pulmonary disease; DJD= degenerative joint disease.

[a]The sum of the percentages exceeds 100% because many patients had more than one condition.

Table 4

Time Spent Caring for Patients Face-to-Face with Intervention Pharmacists

Variable	Initial Patient Encounter	Follow-up Encounters
No. of encounters	390	2,421
CPT codes	99605 + 99607	99606 + 99607
Time spent face-to-face with patients	5,850 minutes (CPT code 99605) + 7,110 minutes (CPT code 99607)	36,315 minutes (CPT code 99606) + 31,305 minutes (CPT code 99607)
Subtotal	12,960 minutes (216 hours)	67,620 minutes (1,127 hours)

Total time spent face-to-face with patients = 80,580 minutes (1,343 hours), or 3.44 hours/patient.

CPT = Current Procedural Terminology.

Table 5

Interventions Involved in the 64 Reported Adverse Drug Events Possibly Related to Medication Use

Intervention	No. (%) of Adverse Drug Events (n=64)
Medication stopped	36 (56.3)
Watchful waiting/monitoring	17 (26.6)
Hospitalization	7 (10.9)
Physician intervention	2 (3.1)
Pharmacist intervention	2 (3.1)