

Report of the 2009-2010 Professional Affairs Committee

Pharmacist Integration in Primary Care and the Role of Academic Pharmacy

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According to the Bylaws of the AACP, the Professional Affairs Committee is to study:

issues associated with professional practice as they relate to pharmaceutical education, and to establish and improve working relationships with all other organizations in the field of health affairs. The Committee is also encouraged to address related agenda items relevant to its Bylaws charge and to identify issues for consideration by subsequent committees, task forces, commissions, or other groups.

COMMITTEE CHARGE

President Jeffrey Baldwin charged the 2009-10 American Association of Colleges of Pharmacy (AACP) Standing Committees to consider the role of the pharmacist in primary healthcare and identify the public policy, workforce, education and advocacy issues associated with advancing pharmacists' contributions to systems of primary care. The Argus Commission, Advocacy and Professional Affairs standing committees focused on the pharmacist's role in primary care. How will/do pharmacists integrate their unique expertise as medication use specialists into primary care delivery to improve patients' lives? Their work is grounded in the Institute of Medicine definition for primary care and the Joint Commission of Pharmacy Practitioners (JCPP) Vision Statement for Pharmacy Practice 2015:

- "Primary care is the provision of integrated, accessible healthcare services by clinicians who are accountable for addressing a large majority of personal healthcare needs, developing a sustained partnership with patients, and practicing in the context of family and community;"¹
- "Pharmacists will be the healthcare professionals responsible for providing patient care that ensures optimal medication therapy outcomes,"²

Specifically, the 2009-10 Professional Affairs Committee is charged to:

- Examine the evidence for pharmacists' integration in primary care practice in the community in the context of partnership with patients and healthcare service providers.
- Provide analysis of current and potential care delivery models.

BACKGROUND

Healthcare reform is a topic at the forefront of concern for Congress, the public and healthcare professionals. The primary care workforce is comprised of a diverse complement of health professionals

with direct patient care provided by allopathic and osteopathic physicians, nurse practitioners, physician assistants, and registered nurses. Pharmacists are among the health professionals with growing responsibilities in the provision of patient care services within the primary care environment.³ Others include social workers, medical assistants, and nutritionists. An adequate supply of all healthcare professionals will be required to meet the future demand for services and many recent publications reflect a growing concern for the workforce supply fulfilling this demand.⁴ It is important that pharmacists are considered in legislation related to the future of the health professions workforce and future healthcare policy. To determine how pharmacists may influence healthcare reform, a critical review of the evidence of pharmacists' involvement in primary care service delivery is necessary.

In the early 1990s, the concept of pharmaceutical care emerged and took hold.⁵ Healthcare reform, as pressing then as it is now, embraced pharmacists offering pharmaceutical care as the most vital contribution pharmacists could make in primary care to produce positive patient outcomes. Providing pharmaceutical care meant that pharmacists should enter into a partnership with patients, be accountable for drug therapy outcomes along with other healthcare providers, manage drug therapy, and coordinate the "continuum of drug therapy."⁶ Several barriers to providing pharmaceutical care were identified, including lack of continuity between institutional and community pharmacy practice settings, lack of technology allowing pharmacists to take a greater responsibility for drug therapy outcomes and the lack of reimbursement for provision of pharmaceutical care.⁶ AACP previously investigated the role of pharmacists in primary care in 1994.⁷ Following the outcomes of the committee's research, the following policies⁸ were adopted by the Association at that time, in addition to two previous related policies concerning ambulatory care:

AACP believes that pharmacy faculty have a responsibility to use their experience to examine and document the effectiveness of pharmacist-provided pharmaceutical care as an essential element of primary care. (Source: Professional Affairs Committee, 1994)

AACP supports the position that pharmaceutical care is pharmacy's most essential and integral contribution to the provision of primary care. (Source: Professional Affairs Committee, 1994)

AACP encourages its member colleges and schools to develop or enhance relationships with other primary care professions and educational institutions in the areas of practice, professional education, research, and information sharing. (Source: Professional Affairs Committee, 1994)

AACP supports the teaching and clinical application of core competencies in primary care health services delivery which are community-based and fully interdisciplinary. (Source: Professional Affairs Committee, 1994)

Pharmacy education has the major responsibility to assist the profession to accomplish its mission for society. In keeping with the transition of healthcare from the acute care to the ambulatory care environment, pharmacy education must continue its efforts to encourage and assist the profession to provide clinical pharmacy services in the ambulatory environment. (Source: Professional Affairs Committee, 1990)

AACP supports residencies and certificate programs that develop advanced clinical and administrative knowledge and skills in the delivery of comprehensive pharmacy services in the ambulatory care setting. (Source: Professional Affairs Committee, 1989)

To foster the growth of pharmacists in primary care, AACP developed a number of policy statements supporting pharmaceutical care, recommending adaptation of curricula and instructional approaches for primary care, encouraging interdisciplinary education among colleges and schools of pharmacy, calling for more research documenting the effectiveness of pharmaceutical care and eliminating barriers in providing primary healthcare through the previously mentioned, Association-adopted policy statements.⁸

Pharmacists have a significant role in the delivery of primary care services. In 1996, the Institute of Medicine (IOM) defined primary care as the “provision of integrated, accessible healthcare services by clinicians who are accountable for addressing a large majority of personal healthcare needs, developing a sustained partnership with patients, and practicing in the context of family and community.”⁹ Essential elements of this definition relate to the function of patient care, not necessarily who is the provider of such care. Pharmacists are trained to provide personalized patient-centered care for an array of patient-specific needs. Likewise, pharmacists may pursue credentialing to specialize in therapy for specific disease states, attain an advanced level of practice or participate in state-specific expansion of their scope of practice. Examples include recognition as a Certified Diabetes Educator (CDE),¹⁰ attainment of Board of Pharmacy Specialties (BPS) post-licensure certifications,¹¹ completion of the American Pharmacists Association (APhA) *Pharmacy-Based Immunization Delivery* certificate training program¹² and recognition as a Clinical Pharmacist Practitioner in North Carolina¹³ or as a Pharmacist Clinician in New Mexico.¹⁴ The scope of patient care services provided by pharmacists includes preventive care (e.g., immunizations), self-care, disease-state management, and medication therapy management (MTM).¹⁵ All of these services require some degree of sustained partnerships with patients. Arguably, community pharmacists are the most accessible healthcare professionals to the general public. Considering the core functions needed in primary care, pharmacists provide unique and complementary aspects related to the optimal use of medications. Though not universally recognized formally as primary care providers for reimbursement purposes, the number of pharmacists interested in and actively pursuing a future as a pharmacist offering primary care services is increasing.¹⁶

A team of interdisciplinary health professionals, including pharmacists, is essential for the appropriate provision of primary care services. The IOM Committee on the Future of Primary Care recommended the use of interdisciplinary teams in an effort to enhance the quality, efficiency, and responsiveness of primary care.⁹ The Patient Centered Primary Care Collaborative (PCPCC) embraces this model of the Patient Centered Medical Home (PCMH) concept, where a physician-led team of patient care providers collaborate to utilize specialized knowledge and skills of each unique provider to provide optimal patient care. The PCPCC funds pilot programs to further demonstrate innovation in primary care and many programs integrate pharmacists and MTM in primary care practice.¹⁷

The targeted patient populations for the PCMH model are patients with chronic diseases. As expected, pharmacotherapy is a key treatment strategy for chronic diseases in primary care with 28% of patients age 65 years or older being prescribed five or more chronic medications.¹ Patient-specific medication burden, including number of medications per patient and cost of medications, for Americans is likely to continue to increase due to many factors (e.g., innovations in treatment, aging of the “Baby Boomer” population, increased life expectancy). Moreover, this increasing medication burden escalates the complexity of pharmacotherapy regimens, resulting in a greater potential for misuse of medications, adverse drug events (ADE), and medication-related problems (MRP).¹⁸ The ideal approach to patient care is an interdisciplinary model that includes a pharmacist who assures that patient-specific medication therapy-related needs are safely, efficiently, and accurately met in a cost-effective manner.

METHODOLOGY

In response to its charge, the Committee employed a three-pronged strategy to identify evidence regarding pharmacists' integration in primary care practice: (1) conducting a PubMed® search of the published literature, (2) issuing a *Call for Successful Practices* to the AACP membership,¹⁹ and (3) reviewing an American Society of Health-System Pharmacists (ASHP) resource²⁰ addressing the value of pharmacists in ambulatory patient care settings. Once identified, the committee conducted an analysis of the literature to identify current models for primary care service delivery and the potential models for pharmacists' integration in primary care in the future.

To begin the investigation, the Committee members conducted a PubMed® search, using MeSH® terms, and identified 275 articles related to pharmacists in primary care practice. The MeSH® strategy had four core components: “pharmacists,” “primary care practice in the community,” “examining evidence,” and “analyzing care delivery models.” “Pharmacists” is a MeSH® term, so including it in the search was straightforward. It was necessary, however, to identify MeSH® terms that captured the other components. For each, the Committee listed words/phrases that were relevant to it and then identified which were MeSH® terms, which map to other MeSH® terms, and which do not map. Through this process, the Committee developed a list of MeSH® terms that were used in the PubMed® search (Appendix A). Committee members acknowledged that many examples of pharmacists in primary care may not be published in the literature, thus hindering discovery of the complete body of evidence. To address this gap and capture models specifically including academic pharmacy involvement that might otherwise have been missed, a *Call for Successful Practices* was released to the AACP membership. A total of 28 academic pharmacy-affiliated practices responded to the *Call* and submitted detailed practice reports. While the Committee's work was underway, ASHP released a document²⁰ as part of its Pharmacy Practice Model Initiative. This document includes references that augmented results of the PubMed® search. In total, the three-pronged search strategy identified 368 reports (Table 1). Of these, 217 reports were excluded because they a) did not describe a model or present outcomes of pharmacist integration in primary care practice (n=115); b) were reports from a practice outside of the United States or Canada (n=64); c) predated 1993, the date of the 1994 Professional Affairs Committee work⁷ which included a literature search on this topic (n=20); or d) were not accessible to the Committee members in the time allocated for the study (n=18). In summation, 151 reports were included for the Committee's consideration.

To analyze relevant reports and identify current practice models, criteria were developed to systematically code information presented in each report. A template was provided for committee members to standardize the coding practices and each article was coded by Committee members to tabulate key aspects of the practice environment, types of clinicians involved in the practice, academic partnerships, healthcare service(s) provided, evaluation methodology, and outcomes of the service(s). An abbreviated version of these findings is presented in Appendix B.

TABLE 1: Search Results

Source	Number of Reports		
	Identified	Excluded	Included
PubMed® Search	275	199	76
AACP <i>Call for Successful Practices</i>	28	0	28
ASHP <i>Value of Pharmacy in Patient Care Document</i>	65*	18	47
Total	368	217	151

*22 articles that were also identified in the PubMed® search are not included in this count.

Limitations

Several limitations affect the evidence presented in this report. First, multiple investigators conducted the coding of the reports, therefore, inter-rater reliability, inter-rater agreement, or concordance among raters could affect the findings. Second, any search strategy, particularly a complex one such as this, is difficult and likely to produce irregularities in replicability. To combat this, the committee established a glossary (Appendix A) to define terms used in this report as well as those used in the MeSH[®] strategy, identifying leading resources or the PubMed[®] definitions for each term. In this same vein, PubMed[®] MeSH[®] term searches are exploding searches, meaning the established hierarchy of terms and the subgroups for those terms are all scanned for related material.²¹ The hierarchy of these terms and subgroups is constantly evolving and can generate or eliminate different articles based on the order of the MeSH[®] terms and the date of the search. This may have excluded articles that should be included and included some articles that were not appropriate matches (these were eliminated during the review of the search strategy findings before coding). Third, articles were coded to identify whether the report included collaborative drug therapy management (CDTM) only if the authors explicitly stated such in the article. Fourth, unless explicitly stated in the article, an academic partnership may not be recognized in the coding of the reports. Fifth, additional registries of pharmacists in related practice settings were identified but were not included in the coding due to the project timeline and resources. Among those excluded from this study are: MTM Central through APhA,²² the National Association of Chain Drug Stores (NACDS) Foundation Patient Care Database²³ and the Patient Safety and Clinical Pharmacy Services Collaborative (PSPC).²⁴ Finally, the Committee members limited the search strategy to those articles published after the last AACP Professional Affairs Committee-led literature search on this topic in 1994.⁷ The majority of coded articles reflect published reports from 2000-2009 with a marginal number prior (2 in 1996 and 4 from 1999) and the *Call for Successful Practices*¹⁹ reflects information from 2009.

CURRENT MODELS

Evidence of the pharmacist's role in primary care services are summarized in Appendix B of this report. A total of 151 unique reports were identified and are summarized in this Appendix. The majority include patient-centered care related to management of prevalent chronic primary care diseases (e.g., diabetes, hypertension, dyslipidemia). However, many involved patient-centered care related to other subspecialty areas of ambulatory care (e.g., oncology, hepatitis, tuberculosis). All reports were categorized by the practice environment in which the care occurred. These four categories are: ambulatory care/clinics, community pharmacy, integrated, and other models (e.g., long-term care setting, managed care, etc).

Defining Current Models

While dispensing functions were a common feature of community pharmacy sites, other patient care services consisted of MTM services, disease state management services (DSMS) and educational programs. Ambulatory care/clinics were predominantly multidisciplinary in nature. These clinics were affiliated with institutional health-systems, university-affiliated systems, integrated health-systems, the U.S. Department of Veterans Affairs system, community health centers, and also private outpatient clinics. Patient care activities included provision of direct patient care, DSMS, MTM services, and educational programs. Other sites included patient care models that were based out of managed care organizations, pharmacy benefits managers, long-term care settings, and home care settings. The patient care services provided at these sites were consistent with services already described.

Model frequency. In total, 81 models (~54%) were categorized as ambulatory care/clinic, 29 models (~19%) were categorized as community pharmacy, 33 models (~22%) were categorized as integrated and 8 (~5%) models were categorized as other. The majority of reports described varying degrees of collaboration between pharmacists and physicians and/or other healthcare professionals, while others alluded to utilizing standards of care, study protocols or other guidelines to guide clinical decisions.

Models that provided clinical services under a CDTM protocol were located in urban, rural and suburban areas.

Study quality. The reports described in the literature that were evaluated have varying degrees of scientific rigor. Publications were primarily descriptive reports of a practice model involving pharmacists providing patient-centered care. A total of 63 of the reports in Appendix B used an experimental design. Of the 63 that used an experimental design, 34 were quasi-experimental and used a variety of study methodologies (i.e., retrospective pre- and post-comparisons, not randomized, no control group).

Academic contributions. Significant relationships between academia and the various models of patient-centered care were described. A total of 105 of the 151 reports identified had a college/school of pharmacy faculty member as an investigator. Likewise, a pharmacy faculty member was the provider of patient-centered care in 69 of these 151 reports. As would be expected, the majority of these models were sites for experiential training of student pharmacists. A total of 46 reports noted use as residency training or experiential education site with another 5 reporting connections to another health professions education school. Additionally, a minority of models described how student pharmacists are integrated into the provision of patient care.

Study outcomes. Clinical, humanistic, and economic outcomes were described within these practice models. Nearly every model described clinical outcomes as the key component of their results. Collectively, these reports strongly demonstrated that practice models of pharmacists providing patient care provided clinical benefits. Of the 137 reports evaluating clinical outcomes, over 60% of the reports demonstrated improved outcomes, either related to baseline parameters or when compared to a control group. A total of 66 reports evaluated humanistic outcomes and in general demonstrated improvements in patient satisfaction, quality of life and/or improved patient knowledge. Of the 33 reports evaluating economic outcomes, over 50% demonstrated reductions in medication costs, medical costs, or visits to the emergency department. Overall, evidence demonstrates that these models of patient care are beneficial through improving control of chronic diseases, appropriate use of pharmacotherapy, or promotion of health and wellness.

Study highlights. Systematic reviews of pharmacist involvement in diabetes care found a significant improvement in overall patient care in adults with type 1 or 2 diabetes mellitus.^{25,26} In the majority of studies, A1c decreased by at least 0.5% in the pharmacist intervention groups. Likewise, greater improvements were seen when pharmacists had broader authority to manage drug therapy as compared to providing drug regimen reviews and education alone. It was also noted that pharmacists with additional training were more likely to have the authority to manage medications. Patient knowledge and adherence to medication therapy improved as a result of the intervention in some studies.²⁵ Cost savings were also projected relative to delaying or preventing diabetes complications by improving glycemic control.²⁶

Evaluations of pharmacist involvement in the care of patients with hypertension found a positive effect on patient care.^{25,27} Overall blood pressure was lower and more patients achieved blood pressure targets as determined by national guidelines when pharmacists were involved in the management of hypertension.^{25,27} Other interventions that were found to significantly decrease blood pressure include patient education and drug regimen review.²⁷ A significant increase in patient knowledge of their disease was also observed.²⁵

FUTURE MODELS

Benefits of Pharmacists in Primary Care

When clinical pharmacists perform medication review and intervene to improve drug therapy, patient care improves. Altavela and colleagues found a significant improvement in several medication-related problems, including adherence, indication for which no drug therapy was being prescribed, sub-optimal medication choice and lack of cost-effective medication through medication therapy reviews by the clinical pharmacist in a capitated system. There were net cost savings in patient care for the group as a result of these interventions.²⁸

Pharmacists have demonstrated clinical, humanistic and economic benefits in improving patient care for a number of chronic diseases. Pharmacists receive extensive education in identifying medication-related problems and therapeutic appropriateness (ensuring safety and efficacy) of medications. When pharmacists are a part of the healthcare team, more patients achieve treatment goals and adhere to prescribed medication regimens.^{27,29} Additionally, fewer ADEs and medication errors occur when pharmacists are involved in the treatment decision-making process.^{30,31,32}

Drivers for a New Model of Patient Care

In transitioning to a new model of patient care, several factors should be considered to help redesign the current system into one that is more efficient and that can better meet the needs of our patients. These factors are highlighted below.

Access. Accessing healthcare is challenging for some patients because of barriers that currently exist, preventing or limiting patient access to providers. Common barriers to care may include: limited appointment availability or difficulty in navigating office telephone recordings to schedule appointments, escalating insurance premiums, high deductibles, and the shortage of primary care providers. Furthermore, these barriers may be amplified if the patient trying to access care belongs to a minority group such as being mentally or physically disabled or non-English speaking, or if the patient is in need but has limited or no health insurance coverage. Grumbach has argued that ideally, in order to improve patient access to the healthcare system, providers and services should come directly to the patient in a manner that is “convenient, timely, reliable, and culturally appropriate.” This may include moving clinics closer to where patients reside or offering telephone or email visits (telemedicine) in place of face-to-face office appointments.³³

Aging population. As the “Baby Boomer” population ages, the need for patient care services will increase. Pharmacists need to be prepared to meet these demands. Colleges and schools of pharmacy must also structure their curricula to effectively educate and train graduates for the growing practice demands and provide leadership to advance our profession. As the practice of pharmacy advances and evolves, the profession must be unified with a strategic vision.^{34,35} In 2005, JCPP adopted a vision for the profession of pharmacy to engage stakeholders in pharmacy and focus efforts around a shared vision for pharmacist accountability for optimized medication use. This vision for practice is incorporated into the most recent revision of the AACP CAPE Educational Outcomes and the Accreditation Standards and Guidelines for Professional Programs in Pharmacy Leading to the Doctor of Pharmacy Degree, thereby influencing curricula. The individual member organizations of JCPP, including AACP, are working to implement that vision so that it becomes daily practice in service to patients.²

Healthcare reform. Our current healthcare system is one that mainly provides acute or episodic care to millions of Americans but fails to sufficiently address the needs of patients with chronic medical conditions who are in need of preventative services. Urgent care and emergency rooms also fail to provide adequate care to patients in need as these settings are often overcrowded and expensive. Medical

care should be organized, integrated, and delivered by a multidisciplinary team of professionals including physicians, nurses, pharmacists, and medical assistants such as in a PCMH.³⁶

In a recent editorial, Lipton presented evidence from three studies to illustrate that interprofessional team-based care can enhance the quality of care and improve patient outcomes. However, whether interprofessional team-based care can reduce healthcare utilization and cost remains to be seen.³⁷ The PCMH, therefore, represents an extension of interprofessional care and the concept has been endorsed by 18 physician organizations including the American Medical Association, the American College of Cardiology and the American College of Chest Physicians. Furthermore, legislation passed by Congress aimed at overhauling the country's healthcare system incorporates the medical home concept and would allow for increased utilization of the service basing the PCMH on tested examples for patient self-management and pharmacists integration in primary care such as the Asheville Project,³⁸ the Diabetes 10 City Challenge³⁹ and the Veterans Administration models for patient care delivery.

Workforce capacity. The need for pharmacists providing primary care services will continue to grow particularly due to the aging of the population and the need for multiple medication therapy regimens to manage chronic medical conditions as previously discussed. Furthermore, the need for pharmacists providing direct dispensing activities has declined as the use of pharmacy technicians, automation, and information technology becomes more widely implemented and efficient over time thus allowing the pharmacist to transition away from this task while retaining the oversight responsibility.

In 2001, a workforce study estimated that approximately 30,000 full-time pharmacists were providing primary care services (defined as managing simple and complex medicine use in ambulatory patients) but that approximately 165,000 full-time pharmacists would be needed by the year 2020 to provide these services to roughly 325 million Americans.⁴⁰ Primary care services may be defined as providing patient assessment, patient and provider consultations regarding medication use, and therapeutic drug monitoring. While not all patients require primary care pharmacy services, those that require more intensive drug therapy management due to either multiple medications or more complex medication regimens will be in need of a pharmacist to provide such services as part of the care provided in a PCMH.

Experiential education. In order to help advance pharmacy practice and operate within a PCMH model, colleges and schools of pharmacy may need to incorporate modifications to their existing curricula that demonstrate how pharmacists can integrate themselves into this new healthcare setting and how to function within an interdisciplinary team of physicians, nurses, and other healthcare practitioners. Furthermore, experiential education coordinators and directors may need to identify and/or develop new practice sites and models for introductory and advanced pharmacy practice experiences that incorporate the pharmacist as a member of the PCMH or similar primary care setting. Participation from national associations and organizations will be necessary to address the training needs of the pharmacy profession.^{35,41}

Graduates from accredited colleges or schools of pharmacy must perform at their highest level of training to help ensure optimal patient care within this evolving model. Our graduates are able to provide patient-centered care, work in interdisciplinary teams, and employ evidenced-based practice, medical informatics, and quality improvement measures. This effort is strengthened by AACP through the adopted policy statement from the work of the 2007 Academic Affairs Committee:⁸

The mission of pharmacy education is to prepare graduates who provide patient-centered care that ensures optimal medication therapy outcomes and provides a foundation for specialization in

specific areas of pharmacy practice; participation in the education of patients, other healthcare providers, and future pharmacists; conduct of research and other scholarly activity; and provision of service and leadership to the community.

According to Grumbach, pharmacists should therefore not focus solely on dispensing but, instead, they should be counseling patients on their medication regimens and leading initiatives to reduce medication errors.³³ The expansion of postgraduate year 1 and year 2 residency programs will also need to continue to increase to meet the expected demands for direct patient care.³⁵ Pharmacy graduates that elect to pursue postgraduate residency programs should train as members of an interprofessional, interdisciplinary team if not already doing so.

Quality measures. In order to achieve optimal outcomes, patients and their families/caregivers must become integral members and advocates for their own healthcare. In addition, having advanced access to health information and support will encourage effective participation in care and decision making.⁴² Patients should become involved in the planning, design, and the improvement of operations and their families/caregivers should be encouraged to participate at a level that they are comfortable with.^{33,42} As a new model of pharmacy develops in the future, continuous quality improvement and evaluation of that new model must occur so that refinements can be made and the model can be improved upon.⁴³

Visualizing the Future Model of Patient Care

There is a multitude of stakeholders in the advancement of the profession of pharmacy including patients, other health professionals, the federal government, private insurance plans, health maintenance organizations, and pharmacy benefit managers. Many factors appear likely to encourage an expanded professional role for pharmacists in primary care including: effecting drug therapy outcomes through collaborative practice disease state management programs, expanding use of technology and technicians in the dispensing process, increasing demand for drug information from other healthcare providers and patients, creating pharmacogenomic designed drug regimens, and expanding practice roles and responsibilities in the community, ambulatory, long-term care, and home care settings.^{15,35} According to Erstad in a recently published opinion piece, “pharmacists must define their own destiny rather than wait for others to define it for them.”⁴³ Therefore, it is imperative that pharmacists take an active role in driving and shaping the envisioned future of the profession.²

With the passage of the recent health reform legislation, many of these variables come together in the prescribed PCMH model for patient care. One PCMH model that has gained widespread attention is the Bauhaus “Form Follows Function” Approach, so named from the guiding principle of the German Bauhaus school of crafts and architecture.³³ The guiding tenant of this model is that the structure of a program would follow logically from its intended purpose. The idea, as applied to healthcare, is that healthcare delivery would be designed around basic societal needs with several key principles in mind: (1) healthcare professionals would utilize their training and skill to the fullest extent, (2) each healthcare delivery system would be focused on its epidemiological makeup, (3) healthcare facilities would be designed to optimize efficiency and flow, (4) money would be spent to maximize the delivery of quality healthcare, (5) patients are active participants in their own healthcare, and (6) PCMHs serve as the foundation for this delivery model. This approach calls for pharmacists as an important component of PCMHs, engaging in direct patient care to utilize their skill and knowledge in educating patients and improving patient safety.³³

The future model of pharmacy practice is not likely to become one standard satisfying all areas of practice given the diversity within the profession (e.g. critical care, oncology, transplantation, community, etc). However, there should be several standardized core components within these

individual practice models that are consistent with positive outcomes in the larger model of pharmacy practice. These core components should include: a focus on accountability, the medication use process, patient-centered outcomes and quality of life.⁴³ In addition to these core components, Davis and colleagues have proposed 7 characteristics to benefit the future of patient-centered primary care practice: 1) access to care, 2) patient engagement in care, 3) information systems that support high quality care, practice based learning, and quality improvement, 4) coordination of care, 5) integrated and comprehensive care, 6) routine patient feedback, and 7) publically available information on practices. While some of these components may be costly to implement for a given practice, a majority incorporate some of these components already while approximately 20% of practices incorporate most of these components.⁴⁴ Regardless of the model of pharmacy practice of the future, the pharmacist is still a key provider for delivering patient-centered care as the medication expert.

Challenges and Barriers

Looking ahead, the largest challenges affecting pharmacists' integration in primary care practice center on a lack of payment for pharmacist-provided care and a lack of patient awareness of the benefit pharmacist-provided care can provide. Experience in the primary care setting has shown that pharmacist provision of patient care services may be underutilized unless the payment structure encourages collaboration.⁴⁵ Other providers, such as physicians, should not perceive a decline in reimbursement when referring patients to pharmacists. Literature also cites lost opportunities to improve patient care when there is a lack of compensation for pharmacist services or when providers and patients do not have a full understanding of the services pharmacists can provide.^{45,46,47} Additionally, not every state offers patients and pharmacists the benefits of CDTM agreements; 46 states currently have CDTM,⁴⁸ and, at this time, most pharmacists do not have access to patient medical records when providing a new medication to a patient.

One example of overcoming these barriers is demonstrated by the advancement of pharmacists and primary care providers for patients with diabetes. Though not accepted in all states, integrating pharmacists in diabetes management programs and clinics, using CDTM and allowing pharmacists to have access to patient medical records, is observed over and over again as providing a greater patient care experience and improving key health indicators and quality of life for the patient. Pharmacists with advanced practice training and education, like a CDE, are equipped to practice in this disease and drug therapy management role and received payment for providing patient care services. Pharmacists working directly with ambulatory clinics or in community pharmacies affiliated with, or in close proximity to, a physician office have greater success in patient recruitment and achieving positive clinical outcomes by practicing through CDTM agreements, accessing patient records and performing as an accountable member of an interprofessional, interdisciplinary patient care team.

Role for Pharmacists

In any future model of healthcare, pharmacist roles should include patient evaluation for identification and resolution of medication-related problems and working one-on-one with the patients to achieve guideline-driven goals of therapy. The benefits of pharmacist involvement in disease state management and improvement in patient care outcomes are established in the literature as documented in this report. Pharmacists are vital members of the PCMH team managing medication therapy related to primary care. Academic pharmacy should continue to support and encourage student development and research in advancing pharmacists' role in primary care.

CONCLUSION

In consideration of the charge to the 2010 Professional Affairs Committee, the enacted AACP policy statements⁸ and the JCPP 2015 Vision Statement,² the Committee extends the following recommendations and suggestions in an effort to build upon the work from 1994⁷ and have the Academy serve as the leader for the research agenda for pharmacists in primary care. With the burgeoning effort in Congress to support healthcare professionals and drive the United States healthcare system toward one of improved access to quality and affordable patient care with improved health outcomes, pharmacists stand poised to expand their role in primary care and assist with these new efforts.

RECOMMENDATIONS OF THE COMMITTEE

Recommendation 1. AACP should collaborate with health professions associations and other key stakeholders to facilitate and influence the expansion of pharmacists' contributions in primary care service delivery.

Recommendation 2. AACP membership should assume leadership for articulating the research agenda for documenting and analyzing the integration of pharmacists in primary care practice.

Recommendation 3. AACP should collaborate with pharmacy associations to adopt a common language used to describe pharmacists' involvement in primary care service delivery for documentation and analysis in reporting.

Recommendation 4. AACP should partner to facilitate or support the development and maintenance of a registry that documents the clinical, humanistic, and economic outcomes of pharmacists practicing in primary care.

Recommendation 5. AACP should advocate for the engagement and enhanced visibility of members and member institutions in primary care practice and showcase models through appropriate programming, products and services.

Suggestion 1. Colleges and schools should design or expand experiential education in such a way as to permit students to train in practice environments consistent with a future model of interprofessional, interdisciplinary, patient-centered care.

Suggestion 2. Colleges and schools should promote and support postgraduate residency training to further advance pharmacists in primary care practice.

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APPENDIX A

While crafting this report, it was determined that several terms needed a base definition for both the discussion in the report and the search strategy parameters as the vocabulary surrounding these terms, some new and some established, varied between sources. Definitions for the terms pertaining to the report language and the search strategy are detailed below.

Glossary of Report Terms

Term	Definition	Reference
Clinical Pharmacy	Health science discipline in which pharmacists provide patient care that optimizes medication therapy and promotes health, wellness, and disease prevention	American College of Clinical Pharmacy. The definition of clinical pharmacy. <i>Pharmacotherapy</i> 2008;28:816–817.
Medication Therapy Management	Medication therapy management is a distinct service or group of services that optimize therapeutic outcomes for individual patients	Bluml BM. Definition of medication therapy management: development of professionwide consensus. <i>J Am Pharm Assoc.</i> 2005;45:566-572.
Patient Centered Medical Home	Physician-led team of patient care providers collaborate to utilize specialized knowledge and skills of each unique provider to provide optimal patient care	Patient-Centered Primary Care Collaborative. Available at: http://www.pcpc.net . Accessed November 22, 2009.
Pharmacist	A person licensed to engage in the practice of pharmacy.	Council on Credentialing in Pharmacy. Scope of Contemporary Pharmacy Practice: Roles, Responsibilities, and Functions of Pharmacists and Pharmacy Technicians. Available at: http://www.pharmacycredentialing.org/ccp/Contemporary_Pharmacy_Practice.pdf . Accessed April 20, 2010.
Preventive Care	Avoidance of disease in asymptomatic adults	Hayward RSA, Steinberg EP et al. Preventive care guidelines: 1991. <i>Ann Intern Med.</i> 1991;114:758-783.
Primary Care	Primary care is the provision of integrated, accessible health care services by clinicians who are accountable for addressing a large majority of patients, and practicing in the context of family and community	Donaldson MS, Yordt KD, Lohr KN, Vanselow NA, eds. <i>Primary care: America's Health in a New Era</i> . Washington, D.C., National Academy of Science. 1996:1-12.
Self-care	People being responsible for their own health and well-being through staying fit and healthy, physically, mentally and where desired, spiritually	Wilkinson A, Whitehead L. Evolution of the concept of self-care and implications for nurses: a literature review. <i>Int J Nurs Stud.</i> 2009;46:1143-1147.

PubMed® Search Strategy Terminology (MeSH® Terms)

Term	Definition
Ambulatory Care	Health care services provided to patients on an ambulatory basis, rather than by admission to a hospital or other health care facility. The services may be a part of a hospital, augmenting its inpatient services, or may be provided at a free-standing facility
Ambulatory Care Facilities	Those facilities which administer health services to individuals who do not require hospitalization or institutionalization
Community Health Centers	Facilities which administer the delivery of health care services to people living in a community or neighborhood

Community Mental Health Centers	Facilities which administer the delivery of psychologic and psychiatric services to people living in a neighborhood or community
Community Pharmacy Services	Total pharmaceutical services provided to the public through community pharmacies
Continuity of Patient Care	Health care provided on a continuing basis from the initial contact, following the patient through all phases of medical care
Disease Management	A broad approach to appropriate coordination of the entire disease treatment process that often involves shifting away from more expensive inpatient and acute care to areas such as preventive medicine, patient counseling and education, and outpatient care. This concept includes implications of appropriate versus inappropriate therapy on the overall cost and clinical outcome of a particular disease
Evaluation Studies (Publication Type)	Works consisting of studies determining the effectiveness or utility of processes, personnel, and equipment
Medication Therapy Management	Assistance in managing and monitoring drug therapy for patients receiving treatment for cancer or chronic conditions such as asthma and diabetes, consulting with patients and their families on the proper use of medication; conducting wellness and disease prevention programs to improve public health; overseeing medication use in a variety of settings
Models, Organizational	Theoretical representations and constructs that describe or explain the structure and hierarchy of relationships and interactions within or between formal organizational entities or informal social groups
Outcome and Process Assessment	Evaluation procedures that focus on both the outcome or status (OUTCOMES ASSESSMENT) of the patient at the end of an episode of care - presence of symptoms, level of activity, and mortality; and the process (ASSESSMENT, PROCESS) - what is done for the patient diagnostically and therapeutically
Outpatient Clinics, Hospital	Organized services in a hospital which provide medical care on an outpatient basis
Patient-Centered Care	Design of patient care wherein institutional resources and personnel are organized around patients rather than around specialized departments
Pharmaceutical Services	Total pharmaceutical services provided by qualified pharmacists. In addition to the preparation and distribution of medical products, they may include consultative services provided to agencies and institutions which do not have a qualified pharmacist
Pharmacists	Those persons legally qualified by education and training to engage in the practice of pharmacy
Primary Health Care	Care which provides integrated, accessible health care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of family and community
Professional Practice	The use of one's knowledge in a particular profession. It includes, in the case of the field of biomedicine, professional activities related to health care and the actual performance of the duties related to the provision of health care
Program Development	The process of formulating, improving, and expanding educational, managerial, or service-oriented work plans (excluding computer program development)
Program Evaluation	Studies designed to assess the efficacy of programs. They may include the evaluation of cost-effectiveness, the extent to which objectives are met, or impact

APPENDIX B

To access the full codebook regarding the classification and coding of articles identified in this search strategy please visit, <http://www.aacp.org/governance/COMMITTEES/professionalaaffairs/Pages/ProfessionalAffairsCommitteeReports.aspx>.

To access the full compendium of responses to the 2010 *Call for Successful Practices: College/School Involvement with Pharmacists Integration in Primary Care Practice* please visit, <http://www.aacp.org/resources/education/Pages/SuccessfulPracticesinPharmaceuticalEducation.aspx>

Year	Report	Brief Description of Report	Academic Pharmacy Connection	Outcomes Studied
Ambulatory Care/Clinic Models				
2009	Choe HM, Bernstein SJ, Mueller BA, Walker PC, Stevenson JG, Standiford CJ. Pharmacist leads primary care team to improve diabetes care. <i>Am J Health Syst Pharm.</i> 2009;66:622-4.	Randomized study conducted in a general medicine clinic that included 80 patients with diabetes in collaboration with PCPs (internal medicine)	Faculty as investigator; faculty as service provider; residency training site	Clinical
2009	Ferris State University, Cognitive Disorders Clinic. <i>Call for Successful Practices.</i> Available at: http://www.aacp.org/resources/education/Pages/SuccessfulPracticesinPharmaceuticalEducation.aspx . Accessed May 1, 2010.	*Description of a practice model in a cognitive disorder clinic that serves 150 patients/year in collaboration with a neurologist, neuropsychologist, care coordinator, and social worker	Faculty as investigator; faculty as service provider	Clinical; humanistic
2009	Ferris State University, Internal Medicine Clinic. <i>Call for Successful Practices.</i> Available at: http://www.aacp.org/resources/education/Pages/SuccessfulPracticesinPharmaceuticalEducation.aspx . Accessed May 1, 2010.	Description of a practice model in an internal medicine clinic that provides MTM for patients in collaboration with PCPs (internal medicine/pediatrics), nurses (RN, LPN), a social worker, diabetic educator and referral coordinator	Faculty as service provider; experiential education site	Clinical; humanistic
2009	Hogg W, Lemelin J, Dahrouge S, Liddy C, et al. Randomized controlled trial of anticipatory and preventive multidisciplinary team care for complex patients in a community-based primary care setting. <i>Can Fam Physician</i> 2009;55:e76-85.	Outcomes evaluation conducted in a community practice that included 240 patients with 4 disease states and collaboration of a multidisciplinary team	Academic connection to nursing school and medical school	Clinical; humanistic
2009	Last JP, Kozakiewicz JM. Development of a pharmacist-managed latent tuberculosis clinic. <i>Am J Health Syst Pharm.</i> 2009;66:1522-3.	Descriptive study conducted in a hospital-affiliated ambulatory care clinic that included 80 patients with tuberculosis and collaboration of PCPs, pulmonologists and infectious disease specialty physicians	Residency training site	Clinical
2009	Palm Beach Atlantic University. <i>Call for Successful Practices.</i> Available at: http://www.aacp.org/resources/education/Pages/SuccessfulPracticesinPharmaceuticalEducation.aspx . Accessed May 1, 2010.	*Description of a practice model in an ambulatory care clinic that serves patients at its 4 sites in collaboration with a full interdisciplinary, interprofessional health care team	Faculty as investigator; faculty as service provider; residency training site; experiential education site	Clinical; humanistic
2009	Pottie K, Haydt S, Farrell B, Kennie N, et al. Pharmacist's identity development within multidisciplinary primary health care teams in Ontario; qualitative results from the IMPACT project. <i>Res Social Adm Pharm.</i> 2009;5:319-26.	Description of pharmacist integration into 7 different family practices, where the pharmacists wrote narrative reports describing their experiences and commented on their identity, influence, value and professionalism	Academic connection to medical school	Humanistic
2009	Touro University. <i>Call for Successful Practices.</i> Available at: http://www.aacp.org/resources/education/Pages/SuccessfulPracticesinPharmaceuticalEducation.aspx . Accessed May 1, 2010.	*Description of a practice model in a university-based clinic that serves patients at its 2 sites in collaboration with physicians (family, internal medicine, pediatrics) and nurse (NP)	Faculty as service provider; experiential education site	Clinical; humanistic

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2009	The University of Arizona. <i>Call for Successful Practices</i> . Available at: http://www.aacp.org/resources/education/Pages/SuccessfulPracticesinPharmaceuticalEducation.aspx . Accessed May 1, 2010.	*Description of a practice model in a community health center that, since its inception, has served the needs of 2,000 patients, providing MTM for patients at 3 sites in collaboration with internist/family physicians	Residency training site; experiential education site	Clinical; humanistic
2009	University of Arkansas for Medical Sciences, AHEC. <i>Call for Successful Practices</i> . Available at: http://www.aacp.org/resources/education/Pages/SuccessfulPracticesinPharmaceuticalEducation.aspx . Accessed May 1, 2010.	Description of a practice model in a community health center that serves 12,000 patients with multiple chronic care needs at its 2 sites in collaboration with a full interdisciplinary, interprofessional health care team	Faculty as investigator; faculty as service provider; residency training site; experiential education site	Clinical; humanistic
2009	University of Arkansas for Medical Sciences, Women's Clinic. <i>Call for Successful Practices</i> . Available at: http://www.aacp.org/resources/education/Pages/SuccessfulPracticesinPharmaceuticalEducation.aspx . Accessed May 1, 2010.	Description of a practice model in a university-based clinic that serves patients with diabetes in collaboration with physicians (Ob/GYN), a nurse (NP), dietician, social worker, lactation specialist, and radiology technician	Faculty as service provider; residency training site; experiential education site	Clinical; humanistic
2009	University of Charleston. <i>Call for Successful Practices</i> . Available at: http://www.aacp.org/resources/education/Pages/SuccessfulPracticesinPharmaceuticalEducation.aspx . Accessed May 1, 2010.	Description of a substance abuse and chemical dependency free clinic treating 15-30 addiction and psychiatric disorder patients in collaboration with primary care doctors	Faculty as investigator; faculty as service provider; residency training site; experiential education site	Clinical; humanistic
2009	University of Colorado Denver. <i>Call for Successful Practices</i> . Available at: http://www.aacp.org/resources/education/Pages/SuccessfulPracticesinPharmaceuticalEducation.aspx . Accessed May 1, 2010.	*Description of a practice model in a university-based clinic that serves patients in collaboration with a large, diverse interdisciplinary, interprofessional health care team	Faculty as investigator; faculty as service provider; residency training site; experiential education site	Clinical; humanistic
2009	The University of Georgia. <i>Call for Successful Practices</i> . Available at: http://www.aacp.org/resources/education/Pages/SuccessfulPracticesinPharmaceuticalEducation.aspx . Accessed May 1, 2010.	Description of a practice model in an ambulatory care clinic that serves patients with multiple chronic care needs at its multiple sites in collaboration with physicians, nurses and residents	Faculty as investigator; faculty as service provider; residency training site; experiential education site	Clinical; humanistic
2009	University of Minnesota, Duluth. <i>Call for Successful Practices</i> . Available at: http://www.aacp.org/resources/education/Pages/SuccessfulPracticesinPharmaceuticalEducation.aspx . Accessed May 1, 2010.	*Description of a practice model in an ambulatory care clinic that serves patients in collaboration with a PCP (family physician, internal medicine), PA, and nurse (NP)	Faculty as service provider; experiential education site	Clinical; humanistic
2009	University of Minnesota, Minneapolis. <i>Call for Successful Practices</i> . Available at: http://www.aacp.org/resources/education/Pages/SuccessfulPracticesinPharmaceuticalEducation.aspx . Accessed May 1, 2010.	*Description of a practice model in an ambulatory care clinic that serves 600 patients/week with multiple chronic care needs in collaboration with a PCP (family physician), nurse (RN, NP), social worker and psychiatrist	Faculty as service provider; residency training site; experiential education site	Clinical; humanistic
2009	University of North Carolina at Chapel Hill. <i>Call for Successful Practices</i> . Available at: http://www.aacp.org/resources/education/Pages/SuccessfulPracticesinPharmaceuticalEducation.aspx . Accessed May 1, 2010.	*Description of a practice model in a university-based clinic that serves 14,600 patients with multiple chronic care needs in collaboration with 23 attending physicians, 70 resident physicians, 3 clinical faculty pharmacists, an ambulatory care pharmacy resident, 2 PAs, a NP, 13 nurses, 5 care assistants, a social worker and a nutritionist	Faculty as investigator; faculty as service provider; residency training site; experiential education site	Clinical; humanistic
2009	The University of Oklahoma. <i>Call for Successful Practices</i> . Available at: http://www.aacp.org/resources/education/Pages/SuccessfulPracticesinPharmaceuticalEducation.aspx . Accessed May 1, 2010.	*Description of a practice model in a university-based clinic that serves 500 patients/month in collaboration with a family physician and dietician	Faculty as service provider; residency training site; experiential education site	Clinical; humanistic

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2009	University of Southern California, International Travel Clinic. <i>Call for Successful Practices</i> . Available at: http://www.aacp.org/resources/education/Pages/SuccessfulPracticesinPharmaceuticalEducation.aspx . Accessed May 1, 2010.	*Description of a practice model in a university-based clinic that serves 342 patients/year, as the patients prepare for international travel, in collaboration with physicians	Faculty as service provider; experiential education site	Clinical; humanistic
2009	University of Southern California, Rheumatology Clinic. <i>Call for Successful Practices</i> . Available at: http://www.aacp.org/resources/education/Pages/SuccessfulPracticesinPharmaceuticalEducation.aspx . Accessed May 1, 2010.	Description of a practice model in an ambulatory care clinic that serves 50 patients/day with depression in collaboration with a rheumatologist	Faculty as service provider; experiential education site	Clinical; humanistic
2009	University of Southern California, Senior Health Clinic. <i>Call for Successful Practices</i> . Available at: http://www.aacp.org/resources/education/Pages/SuccessfulPracticesinPharmaceuticalEducation.aspx . Accessed May 1, 2010.	Description of a practice model in a university-based clinic that serves patients with geriatric care needs in collaboration with 5 geriatricians, a fellow in geriatric medicine, a geriatrics PA, 2 neuropsychologists, 2 geriatrics clinical pharmacists, a geriatrics social worker, a neurologist, a rheumatologist and a rehabilitation specialist	Faculty as investigator; faculty as service provider; residency training site; experiential education site	Clinical; humanistic
2009	The University of Tennessee, Pharmacy and Medical Schools Clinic. <i>Call for Successful Practices</i> . Available at: http://www.aacp.org/resources/education/Pages/SuccessfulPracticesinPharmaceuticalEducation.aspx . Accessed May 1, 2010.	*Description of a practice model in a university-based clinic that serves patients with multiple chronic care needs in collaboration with a medical director, 5 attending physicians, 27 internal medicine residents, 3 faculty pharmacists, a nursing director, and 2 nurses	Faculty as investigator; faculty as service provider; residency training site; experiential education site	Clinical; humanistic
2009	The University of Tennessee, Pharmacy Clinic. <i>Call for Successful Practices</i> . Available at: http://www.aacp.org/resources/education/Pages/SuccessfulPracticesinPharmaceuticalEducation.aspx . Accessed May 1, 2010.	*Description of a practice model in a university-based clinic that serves patients with diabetes and other chronic conditions in collaboration with physicians (family, internal medicine)	Faculty as investigator; faculty as service provider; residency training site; experiential education site	Clinical; humanistic
2009	University of Toronto, Antimicrobial. <i>Call for Successful Practices</i> . Available at: http://www.aacp.org/resources/education/Pages/SuccessfulPracticesinPharmaceuticalEducation.aspx . Accessed May 1, 2010.	Description of a practice model in a university-based clinic that serves patients in collaboration with physicians (family, internal medicine), nurses (NP) and blood technicians	Faculty as investigator; faculty as service provider	Clinical; humanistic
2009	University of Toronto, Geriatric. <i>Call for Successful Practices</i> . Available at: http://www.aacp.org/resources/education/Pages/SuccessfulPracticesinPharmaceuticalEducation.aspx . Accessed May 1, 2010.	Description of a practice model in an ambulatory care clinic that serves patients in collaboration with a physician, nurses and a psychogeriatrician	Faculty as investigator; faculty as service provider	Clinical; humanistic
2009	University of Toronto, Hamilton. <i>Call for Successful Practices</i> . Available at: http://www.aacp.org/resources/education/Pages/SuccessfulPracticesinPharmaceuticalEducation.aspx . Accessed May 1, 2010.	Description of a practice model at a community health center that serves 30,000 patients/year at its 2 sites in collaboration with a full interdisciplinary, interprofessional health care team	Faculty as service provider; residency training site; experiential education site	Clinical; humanistic
2009	University of Toronto, Taddle Creek. <i>Call for Successful Practices</i> . Available at: http://www.aacp.org/resources/education/Pages/SuccessfulPracticesinPharmaceuticalEducation.aspx . Accessed May 1, 2010.	Description of a practice model in a community health center that serves patients in collaboration with a full interdisciplinary, interprofessional health care team	Residency training site; experiential education site	Clinical; humanistic
2009	University of Toronto, University Health Network. <i>Call for Successful Practices</i> . Available at: http://www.aacp.org/resources/education/Pages/SuccessfulPracticesinPharmaceuticalEducation.aspx . Accessed May 1, 2010.	Description of a practice model in a community health center that serves 12,000 patients in collaboration with a full interdisciplinary, interprofessional health care team	Faculty as service provider; residency training site; experiential education site	Clinical; humanistic

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2009	University of Washington. <i>Call for Successful Practices</i> . Available at: http://www.aacp.org/resources/education/Pages/SuccessfulPracticesinPharmaceuticalEducation.aspx . Accessed May 1, 2010.	*Description of a practice model in a university-based clinic that serves patients with multiple chronic care needs at 7 sites in collaboration with physicians (family, internal medicine), nurses (NP) and medical residents	Faculty as investigator; faculty as service provider; residency training site; experiential education site	Clinical; humanistic
2009	Vazquez SR, Campbell J, Hamann G, George C, Sprabery L. Anticoagulation clinic workflow analysis. <i>J Am Pharm Assoc</i> . 2009;49:78-85.	Process assessment conducted in a hospital outpatient clinic that included 250 patients on anticoagulation therapy and collaboration with physicians, medical assistants, and lab staff	Faculty as investigator; residency training site; experiential education site	Economic
2009	Wayne State University. <i>Call for Successful Practices</i> . Available at: http://www.aacp.org/resources/education/Pages/SuccessfulPracticesinPharmaceuticalEducation.aspx . Accessed May 1, 2010.	*Description of a practice model in an ambulatory care clinic that serves patients with diabetes at 3 sites in collaboration with 12 physicians, 8 medical assistants, and 2 pharmacists	Faculty as investigator; faculty as service provider; residency training site; experiential education site	Clinical; humanistic
2008	Altavela JL, Jones MK, Ritter M. A prospective trial of a clinical pharmacy intervention in a primary care practice in a capitated payment system. <i>J Manag Care Pharm</i> . 2008;14:831-43.	Quasi-experimental study conducted in an internal medicine practice that included 343 patients and pharmacist provision of medication recommendations to physicians	Cannot determine or not reported	Clinical; economic
2008	Anaya JP, Rivera JO, Lawson K, Garcia J, Luna J Jr, Ortiz M. Evaluation of pharmacist-managed diabetes mellitus under a collaborative drug therapy agreement. <i>Am J Health Syst Pharm</i> . 2008;65:1841-5.	*Quasi-experimental study conducted in a hospital-affiliated ambulatory care clinic that included 110 patients with diabetes and PCP collaboration	Faculty as investigator; faculty as service provider	Clinical; economic
2008	Carver M, Carder J, Hartwell L, Arjomand M. Management of mineral and bone disorders in patients on dialysis: a team approach to improving outcomes. <i>Nephrol Nurs J</i> . 2008;35:265-70.	Description of a team approach in a dialysis center that included patients with chronic kidney disease and mineral and bone disorders and collaboration of an interdisciplinary, interprofessional health care team	Cannot determine or not reported	Clinical
2008	Divine H, Nicholas A, Johnson CL, Perrier DG, Steinke DT, Blumenschein K. PharmacistCARE: description of a pharmacist care service and lessons learned along the way. <i>J Am Pharm Assoc</i> . 2008;48:793-802.	Description of a pharmacist practice model conducted in an ambulatory care clinic that included 322 total patients with diabetes and other cardiovascular diseases	Faculty as service provider; residency training site; experiential education site	Clinical; humanistic
2008	Irons BK, Seifert CF, Horton NA. Quality of care of a pharmacist-managed diabetes service compared to usual care in an indigent clinic. <i>Diabetes Technol Ther</i> . 2008;10:220-6.	*Quasi-experimental study conducted in a community health center that included 92 patients with diabetes	Faculty as investigator; faculty who directs services; faculty as service provider	Clinical
2008	Isetts BJ, Schondelmeyer SW, Artz MB, Lenarz LA, Heaton AH, Wadd WB, Brown LM, Cipolle RJ. Clinical and economic outcomes of medication therapy management services: the Minnesota experience. <i>J Am Pharm Assoc</i> . 2008;48:203-11.	Quasi-experimental study that included 285 patients receiving MTM services in 6 clinics in collaboration with an interprofessional team	Faculty as investigator	Clinical; economic
2008	Johnson CL, Nicholas A, Divine H, Perrier DG, Blumenschein K, Steinke DT. Outcomes from DiabetesCARE: a pharmacist-provided diabetes management service. <i>J Am Pharm Assoc</i> . 2008;48:722-30.	Non-experimental observational study conducted at a university-based clinic that included 101 self-insured patients with diabetes and risk for CVD	Faculty as investigator; faculty who directs services; faculty as service provider	Clinical; humanistic

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2008	Leal S, Soto M. Chronic kidney disease risk reduction in a Hispanic population through pharmacist-based disease-state management. <i>Adv Chronic Kidney Dis.</i> 2008;15:162-7.	*Description of a community health center ambulatory care clinic that included 601 Hispanic patients with diabetes that were referred for pharmacist care in collaboration with PCPs	Faculty as investigator; faculty as service provider	Clinical
2008	Mehos BM, Saseen JJ, MacLaughlin EJ. Effect of pharmacist intervention and initiation of home blood pressure monitoring in patients with uncontrolled hypertension. <i>Pharmacotherapy.</i> 2000; 20:1384-1389.	Randomized controlled study conducted in a university-affiliated ambulatory care clinic that included 36 patients with uncontrolled hypertension and physician collaboration	Faculty as investigator; faculty as service provider	Clinical, humanistic
2007	Brooks AD, Rihani RS, Derus CL. Pharmacist membership in a medical group's diabetes health management program. <i>Am J Health Syst Pharm.</i> 2007;64:617-21.	Outcome evaluation in an ambulatory care clinic that included 707 patients with diabetes in 12 sites and collaboration with a physician, nurses, and dietician	Faculty as investigator; faculty as service provider; experiential education site	Clinical
2007	Chisholm MA, Spivey CA, Mulloy LL. Effects of a medication assistance program with medication therapy management on the health of renal transplant recipients. <i>Am J Health Syst Pharm.</i> 2007;64:1506-1512.	Outcome evaluation conducted in a university-based hospital that included 36 renal transplant patients and physician collaboration	Faculty as investigator; faculty as service provider	Clinical; humanistic
2007	Horberg MA, Hurley LB, Silverberg MJ, et al. Effect of clinical pharmacists on utilization of and clinical response to antiretroviral therapy. <i>J Acquir Immune Defic Syndr.</i> 2007;44:531-539.	Observational study of 1,571 HIV-infected patients in primary care clinics with and without a clinical pharmacist and other health professionals	Faculty as investigator	Clinical; economic
2007	Joy MS, Candiani C, Vaillancourt BA, Chin H, Hogan SL, Falk RJ. Reengineering clinical operations in a medical practice to optimize the management of anemia of chronic kidney disease. <i>Pharmacotherapy.</i> 2007;27(5):734-44.	Description of a clinical pharmacy service focused on anemia management, conducted in a university-affiliated ambulatory care clinic, that included 128 patients with chronic kidney disease and collaboration of nephrologists and PCPs	Faculty as investigator; faculty as service provider	Clinical
2007	Lloyd KB, Thrower MR, Walters NB, et al. Implementation of a weight management pharmaceutical care service. <i>Ann Pharmacotherapy.</i> 2007;41(2):185-192.	Outcome evaluation conducted in a campus-based pharmaceutical care clinic that included 289 patients enrolled in a weight management program	Faculty as investigator	Clinical
2007	Loughlin SM, Mortazavi A, Garey KW, Rice GK, Birtcher KK. Pharmacist-managed vaccination program increased influenza vaccination rates in cardiovascular patients enrolled in a secondary prevention lipid clinic. <i>Pharmacotherapy.</i> 2007;27(5):729-33.	Outcome evaluation conducted in an ambulatory care clinic that included 742 secondary prevention patients and physician collaboration	Faculty as investigator; residency training site; experiential education site	Clinical
2007	March K, Mak M, Louie SG. Effects of pharmacists' interventions on patient outcomes in an HIV primary care clinic. <i>Am J Health Syst Pharm.</i> 2007;64(24):2574-8.	Description of a clinical practice in a community health clinic that provides care to 34 patients with HIV who are referred for pharmacist care in collaboration with PCPs	Faculty as investigator; residency training site; experiential education site	Clinical; humanistic
2007	Murray MD, Young J, Hoke S, et al. Pharmacist intervention to improve medication adherence in heart failure: a randomized trial. <i>Ann Intern Med.</i> 2007;146(10):714-725.	Randomized controlled evaluation conducted in 314 patients with heart failure in a pharmacist- or other provider-managed group	Faculty as investigator	Clinical; economic
2007	Stroup JS, Rivers SM, Abu-Baker AM, Kane MP. Two-year changes in bone mineral density and T scores in patients treated at a pharmacist-run teriparatide clinic. <i>Pharmacotherapy.</i> 2007;27(6):779-788.	Description of a pharmacist-managed teriparatide clinic in a private endocrinology office that included 60 patients with osteoporosis and collaboration of an endocrinologist	Faculty as investigator; faculty as service provider	Clinical

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2006	Chisholm MA, Mulloy LL, Jagadeesan M, DiPiro JT. Impact of clinical pharmacy services on renal transplant patients' compliance with immunosuppressive medications. <i>Clin Transplant</i> . 2006;15(5):330-336.	Randomized study conducted at a university hospital that included 24 renal transplant patients and collaboration of a multidisciplinary team	Faculty as investigator; faculty as service provider	Clinical
2006	Isetts BJ, Schondelmeyer SW, Heaton AH, Wadd WB, Hardie NA, Artz MB. Effects of collaborative drug therapy management on patients' perceptions of care and health-related quality of life. <i>Res Social Adm Pharm</i> . 2006;2:129-42.	*Randomized trial conducted at a 6 primary care clinics that included 570 patients and physician collaboration	Faculty as investigator; faculty as service provider	Humanistic
2006	Morello CM, Zadvorny EB, Cording MA, Suemoto RT, Skog J, Harari A. Development and clinical outcomes of pharmacist-managed diabetes care clinics. <i>Am J Health Syst Pharm</i> . 2006;63:1325-31.	Outcome evaluation in an ambulatory care clinic that included 113 patients with diabetes at 2 sites and physician collaboration	Faculty as investigator	Clinical
2006	Scott DM, Boyd ST, Stephan M, Augustine SC, Reardon TP. Outcomes of pharmacist-managed diabetes care services in a community health center. <i>Am J Health Syst Pharm</i> . 2006;63:2116-22.	Randomized trial conducted at a community health center that included 150 patients with hypertension, diabetes, lipids and collaboration of a multidisciplinary team	Faculty as investigator; faculty as service provider	Clinical; humanistic
2006	Smith SR, Catellier DJ, Conlisk EA, Upchurch GA. Effect on health outcomes of a community-based medication therapy management program for seniors with limited incomes. <i>Am J Health Syst Pharm</i> . 2006;63:372-379.	Outcome evaluation of MTM services provided to 506 seniors	Faculty as investigator	Clinical; economic
2005	Kiel PJ, McCord AD. Pharmacist impact on clinical outcomes in a diabetes disease management program via collaborative practice. <i>Ann Pharmacother</i> . 2005;39:1828-1832.	Outcome evaluation of a pharmacist-coordinated diabetes management program that included 157 patients	Faculty as investigator	Clinical
2005	Malone M, Alger-Mayer SA, Anderson DA. The lifestyle challenge program: a multidisciplinary approach to weight management. <i>Ann Pharmacother</i> . 2005;39:2015-2020.	Analysis of an interprofessional weight loss program conducted in a outpatient clinic that included 90 patients managed by a physician, behavioral psychologist, and pharmacist	Faculty as investigator	Clinical; humanistic
2005	Odegard PS, Goo A, Hummel J, Williams KL, Gray SL. Caring for poorly controlled diabetes mellitus: a randomized pharmacist intervention. <i>Ann Pharmacother</i> . 2005;39:433-440.	Randomized study conducted in 8 university-based clinics that included 77 patients with diabetes comparing pharmacist intervention with usual care in collaboration with health care providers	Faculty as service provider; faculty as investigator	Clinical
2005	Rathbun RC, Farmer KC, Stephens JR, Lockhart SM. Impact of an adherence clinic on behavioral outcomes and virologic response in treatment of HIV infection: a prospective, randomized, controlled pilot study. <i>Clin Ther</i> . 2005;27:199-209.	Prospective, randomized evaluation of adherence that included 33 patients with HIV in pharmacist-managed or other provider-managed group	Faculty as investigator; faculty as service provider	Clinical
2005	Shane-McWhorter L, Oderda GM. Providing diabetes education and care to underserved patients in a collaborative practice at a Utah community health center. <i>Pharmacotherapy</i> . 2005;25:96-109.	*Retrospective comparison of pharmacist-provided diabetes care in an ambulatory care clinic versus a control clinic that included 352 patients with diabetes and collaboration with physicians and other physician extenders	Faculty as service provider; faculty as investigator	Clinical
2005	Stebbins MR, Kaufman DJ, Lipton HL. The PRICE clinic for low-income elderly: a managed care model for implementing pharmacist-directed services. <i>J Manag Care Pharm</i> . 2005;11:333-341.	Outcome evaluation of a pharmacist-led database review of 520 low-income, elderly patients	Faculty as investigator	Economic

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2004	Adler DA, Bungay KM, Wilson IB, Pei Y, Supran S, Peckham E, Cynn DJ, Rogers WH. The impact of a pharmacist intervention on 6-month outcomes in depressed primary care patients. <i>Gen Hosp Psychiatry</i> . 2004;26:199-209.	Randomized trial conducted in primary care practices that included 533 patients with depression in 9 sites and pharmacist-physician collaboration	Academic connection to medical school	Clinical
2004	Bungay KM, Adler DA, Rogers WH, McCoy C, Kaszuba M, Supran S, Pei Y, Cynn DJ, Wilson IB. Description of a clinical pharmacist intervention administered to primary care patients with depression. <i>Gen Hosp Psychiatry</i> . 2004;26:210-8.	Description of the pharmacist intervention in a randomized trial (see Adler 2004) conducted in primary care practices that included patients with depression in 9 sites and pharmacist-physician collaboration	Academic connection to medical school	Clinical
2004	Capoccia KL, Boudreau DM, Blough DK, Ellsworth AJ, Clark DR, Stevens NG, Katon WJ, Sullivan SD. Randomized trial of pharmacist interventions to improve depression care and outcomes in primary care. <i>Am J Health Syst Pharm</i> . 2004;61:364-72.	*Randomized trial conducted in a university-based family practice that included 74 patients with depression and collaboration of a large multidisciplinary mental health care team	Faculty as investigator; faculty as service provider; residency training site; experiential education site	Clinical; humanistic
2004	Farris KB, Côté I, Feeny D, Johnson JA, Tsuyuki RT, Brilliant S, Dieleman S. Enhancing primary care for complex patients. Demonstration project using multidisciplinary teams. <i>Can Fam Physician</i> . 2004;50:998-1003.	Description of a community-based primary health care team model that included 6 teams, 199 patients, and collaboration of a family physician, pharmacist, nurses, and a home care case manager	Faculty as investigator	Clinical
2004	Hilleman DE, Faulkner MA, Monaghan MS. Cost of a pharmacist-directed intervention to increase treatment of hypercholesterolemia. <i>Pharmacotherapy</i> . 2003;24:1077-1083.	Outcomes study of a pharmacist-led hypercholesterolemia intervention at primary care clinics that included 612 patients and physician collaboration	Faculty as investigator	Clinical; economic
2004	Leal S, Glover JJ, Herrier RN, Felix A. Improving quality of care in diabetes through a comprehensive pharmacist-based disease management program. <i>Diabetes Care</i> . 2004;27:2983-2984.	*Outcome study conducted in a community health center that included 199 patients with diabetes and collaboration of physicians and other health care providers	Faculty as service provider; faculty as investigator	Clinical
2004	Murray MD, Young JM, Morrow DG, et al. Methodology of an ongoing, randomized, controlled trial to improve drug use for elderly patients with chronic heart failure. <i>Am J Geriatr Pharmacother</i> . 2004;2:53-65.	Description of the methodology of a randomized trial (see Murray 2007) conducted in an academic medical center that included patients with heart failure and low health literacy	Faculty as investigator	Clinical; humanistic
2004	Odegard PS, Lam A, Chun A, et al. Pharmacist provision of language-appropriate education for Asian patients with asthma. <i>J Am Pharm Assoc</i> . 2004;44:472-477.	Retrospective evaluation of language appropriate asthma education for Asian patients at a community health center that included 32 patients with asthma and physician collaboration	Faculty as service provider; faculty as investigator	Clinical
2003	Borenstein JE, Graber G, Saltiel E, et al. Physician-pharmacist comanagement of hypertension: a randomized, comparative trial. <i>Pharmacotherapy</i> . 2003;23:209-216.	Outcomes study conducted an outpatient group practice that included 197 patients with hypertension	Faculty as investigator	Clinical; humanistic
2003	Ernst ME, Brandt KB. Evaluation of 4 years of clinical pharmacist anticoagulation case management in a rural, private physician office. <i>J Am Pharm Assoc</i> . 2003;43:630-636.	Outcome evaluation conducted at a primary care clinic that included 80 anticoagulation therapy patients and physician collaboration	Faculty as investigator	Clinical; humanistic
2003	Grant RW, Devita NG, Singer DE, Meigs JB. Improving adherence and reducing medication discrepancies in patients with diabetes. <i>Ann Pharmacother</i> . 2003;37:962-969.	Experimental study in an academically-affiliated community health center that included 462 patients with diabetes	Faculty as investigator; residency training site; Experiential education site	Clinical

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2003	Rothman R, Malone R, Bryant B, Horlen C, Pignone M. Pharmacist-led, primary care-based disease management improves hemoglobin A1c in high-risk patients with diabetes. <i>Am J Med Qual.</i> 2003;18:51-8.	Non-experimental study conducted in an academic internal medicine practice that included 138 patients with diabetes	Faculty as service provider; Faculty as investigator	Clinical
2003	Sellors J, Kaczorowski J, Sellors C, Dolovich L, Woodward C, Willan A, Goeree R, Cosby R, Trim K, Sebaldt R, Howard M, Hardcastle L, Poston J. A randomized controlled trial of a pharmacist consultation program for family physicians and their elderly patients. <i>CMAJ.</i> 2003;169:17-22.	Randomized trial that involved 24 community pharmacists providing consultations on 889 elderly patients at 48 family physician offices	Faculty as investigator	Clinical; economic; humanistic
2003	Taylor CT, Byrd DC, Krueger K. Improving primary care in rural Alabama with a pharmacy initiative. <i>Am J Health Syst Pharm.</i> 2003;60:1123-1129.	Quasi-experimental study conducted in a community based clinic that included 69 patients receiving pharmacist-provided chronic care management services	Faculty as investigator	Clinical; economic
2002	Boudreau DM, Capoccia KL, Sullivan SD, Blough DK, Ellsworth AJ, Clark DL, Katon WJ, Walker EA, Stevens NG. Collaborative care model to improve outcomes in major depression. <i>Ann Pharmacother.</i> 2002;36:585-91.	*Description of the practice model used in a randomized trial (see Capoccia 2004) in a university-based family practice that included patients with depression and collaboration of a large multidisciplinary mental health care team	Faculty as investigator; faculty as service provider; residency training site; experiential education site	Clinical; humanistic
2000	Bozovich M, Rubino CM, Edmunds J. Effect of a clinical pharmacist-managed lipid clinic on achieving National Cholesterol Education Program low-density lipoprotein goals. <i>Pharmacotherapy.</i> 2000;20:1375-1383	Analysis of a pharmacist-managed lipid clinic that included 104 patients and collaboration with a cardiologist	Faculty as investigator	Clinical, humanistic
2000	Davidson MB, Karlan VJ, Hair TL. Effect of a pharmacist-managed diabetes care program in a free medical clinic. <i>Am J Med Qual.</i> 2000;15:137-42.	*Quasi-experimental study conducted in a free medical clinic that included 181 patients with diabetes and collaboration with a diabetologist	Cannot determine or not reported	Clinical
2000	Faulkner MA, Wadibia EC, Lucas BD, Hilleman DE. Impact of pharmacy counseling on compliance and effectiveness of combination lipid-lowering therapy in patients undergoing coronary artery revascularization: a randomized, controlled trial. <i>Pharmacotherapy.</i> 2000;20:410-416.	Analysis of 30 patients recruited for lipid management care following hospitalization in a university-affiliated tertiary care hospital and university cardiac center	Faculty as investigator	Clinical; humanistic
2000	Gammaitoni AR, Gallagher RM, Welz M, et al. Palliative pharmaceutical care: A randomized, prospective study of telephone-based prescription and medication and counseling services for treating chronic pain. <i>Pain Med.</i> 2000;1:317-331.	Outcomes study conducted in a university pain clinic that included 74 patients with pain	Cannot determine or not reported	Humanistic
1999	Gattis WA, Hasselblad V, Whellan DJ, O'Connor CM. Reduction in heart failure events by the addition of a clinical pharmacist to the heart failure management team: results of the Pharmacist in Heart Failure Assessment Recommendation and Monitoring (PHARM) Study. <i>Arch Intern Med.</i> 1999;159:1939-1945.	Randomized study conducted at a university medical center that included 181 patients with heart failure and physician collaboration	Cannot determine or not reported	Clinical

1996	Lamsam GD, Stone BA, Rumsey T, Shevlin JM, Scott BE, Reif CJ. Pharmaceutical services for a homeless population. <i>Am J Health Syst Pharm.</i> 1996;53:1426-30.	Description of a medication program for homeless persons conducted in 12 shelters and 2 drop-in centers and included collaboration of a physician, pharmaceutical representative, nurses, and pharmacists	Cannot determine or not reported	Clinical; economic
Community Pharmacy Models				
2009	Fera T, Bluml BM, Ellis WM. Diabetes Ten City Challenge: final economic and clinical results. <i>J Am Pharm Assoc.</i> 2009;49:383-91.	*Quasi-experimental study conducted at 10 community pharmacy sites that included 573 patients for diabetes, lipids, BP, immunizations, and screenings in collaboration with physicians	Faculty as service provider	Clinical; economic
2009	Hirsch JD, Rosenquist A, Best BM, Miller TA, Gilmer TP. Evaluation of the first year of a pilot program in community pharmacy: HIV/AIDS medication therapy management for Medi-Cal beneficiaries. <i>J Manag Care Pharm.</i> 2009;15:32-41.	*Non-experimental observational study conducted in 10 community pharmacies that included 1353 patients with HIV and physician collaboration	Faculty as investigator	Clinical; economic
2009	Western University. <i>Call for Successful Practices.</i> Available at: http://www.aacp.org/resources/education/Pages/SuccessfulPracticesinPharmaceuticalEducation.aspx . Accessed May 1, 2010.	Description of a practice model in a community pharmacy that serves patients' travel health needs	Faculty as service provider	Clinical; humanistic
2008	APhA, NACDS Foundation, et al. Medication therapy management in pharmacy practice: core elements of an MTM service model (version 2.0). <i>J Am Pharm Assoc.</i> 2008;48:341-53.	APhA/NACDS Foundation description of core elements in a MTM service model	Faculty on advisory board	N/A
2008	Bunting BA, Smith BH, Sutherland SE. The Asheville Project: clinical and economic outcomes of a community-based long-term medication therapy management program for hypertension and dyslipidemia. <i>J Am Pharm Assoc.</i> 2008;48:23-31.	Quasi-experimental study conducted in 12 community pharmacies and ambulatory care clinics that included 620 patients receiving MTM services for hypertension and dyslipidemia and PCP collaboration	Cannot determine or not reported	Clinical; economic
2008	Fera T, Bluml BM, Ellis WM, Schaller CW, Garrett DG. The Diabetes Ten City Challenge: interim clinical and humanistic outcomes of a multisite community pharmacy diabetes care program. <i>J Am Pharm Assoc.</i> 2008;48:181-90.	Outcome evaluation conducted in community pharmacy that included 914 patients with diabetes at 10 sites and physician collaboration	Cannot determine or not reported	Clinical
2008	Hare SK, Kraenow K. Depression screenings: developing a model for use in a community pharmacy. <i>J Am Pharm Assoc.</i> 2008;48:46-51.	Description of the development and testing of a depression screening tool that was conducted at 4 community pharmacy sites and included 18 patients	Residency training site; faculty as investigator	Clinical
2008	Johnson JF, Koenigsfeld C, Hughell L, Parsa RA, Bravard S. Bone health screening, education, and referral project in northwest Iowa: creating a model for community pharmacies. <i>J Am Pharm Assoc.</i> 2008;48:379-87.	Outcome evaluation conducted in community pharmacy that included 159 patients at 5 sites	Faculty as investigator; faculty as service provider; fellowship training site; experiential education site	Clinical
2007	Goode JV, Mott DA, Stanley DD. Assessment of an immunization program in a supermarket chain pharmacy. <i>J Am Pharm Assoc.</i> 2007;47:495-8.	*Description of a community pharmacy-based immunization service over 8 years at 11 sites where pharmacists provided over 150,000 immunizations	Faculty as service provider; faculty who directs services	Clinical; economic; humanistic
2007	Nau DP, Pacholski AM. Impact of pharmacy care services on patients' perceptions of health care quality for diabetes. <i>J Am Pharm Assoc.</i> 2007;47:358-365.	Description of a pharmacist implemented self-care program for diabetes based out of multiple community pharmacies in 4 states that included 218 patients covered by a self-insured employer based health plan, in collaboration with physicians	Faculty as service provider; faculty as investigator	Humanistic

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2006	Bunting BA, Cranor CW. The Asheville Project: long-term clinical, humanistic, and economic outcomes of a community-based medication therapy management program for asthma. <i>J Am Pharm Assoc.</i> 2006;46:133-147.	Outcome evaluation conducted in community pharmacies and hospital that included 13 sites and 207 patients with asthma	Faculty as service provider; faculty who directs services; faculty as investigator	Clinical; economic; humanistic
2006	Hansen RA, Roth MT, Brouwer ES, Herndon S, Christensen DB. Medication therapy management services in North Carolina community pharmacies: current practice patterns and projected demand. <i>J Am Pharm Assoc.</i> 2006;46:700-6.	Cross-sectional study of 1,593 community pharmacy managers detailing provision of MTM services in North Carolina community pharmacies	Faculty as investigator	Clinical; economic
2005	Garrett DG, Bluml BM. Patient self-management program for diabetes: first-year clinical, humanistic, and economic outcomes. <i>J Am Pharm Assoc.</i> 2005;45:130-137.	Quasi-experimental study conducted at 80 community pharmacy locations that included 256 patients with diabetes	Cannot determine or not reported	Clinical; economic
2005	Law AV, Shapiro K. Impact of a community pharmacist-directed clinic in improving screening and awareness of osteoporosis. <i>J Eval Clin Pract.</i> 2005;11:247-255.	Outcomes study conducted in an independent community pharmacy that included 111 patients that assessed patient awareness of osteoporosis and intention to follow up with a PCP	Faculty as investigator	Humanistic
2005	Yamada C, Johnson JA, Robertson P, Pearson G, Tsuyuki RT. Long-term impact of a community pharmacist intervention on cholesterol levels in patients at high risk for cardiovascular events: extended follow-up of the second study of cardiovascular risk intervention by pharmacists (SCRIP-plus). <i>Pharmacotherapy.</i> 2005;25:110-5.	Outcome evaluation in an ambulatory care clinic that included 162 patients with lipid disorders at 26 sites and physician collaboration	Academic connection to medical school	Clinical
2004	Tsuyuki RT, Olson KL, Dubyk AM, Schindel TJ, Johnson JA. Effect of community pharmacist intervention on cholesterol levels in patients at high risk of cardiovascular events: the Second Study of Cardiovascular Risk Intervention by Pharmacists (SCRIP-plus). <i>Am J Med.</i> 2004;116:130-3.	Non-experimental study conducted in 42 community pharmacies that included 419 patients at very high risk of cardiovascular events	Faculty as investigator	Clinical
2004	Zeolla MM, Cerulli J. Assessment of the effects of a community pharmacy women's health education program on management of menopause survey scores. <i>J Manag Care Pharm.</i> 2004;10:442-448.	Quasi-experimental study conducted in community pharmacy that included 31 menopausal women	Faculty as service provider; faculty as investigator	Clinical; humanistic
2003	Ahrens RA, Hower M, Best AM. Effects of weight reduction interventions by community pharmacists. <i>J Am Pharm Assoc.</i> 2003;43:583-589.	Outcomes study of weight management program conducted in community pharmacy that included 95 obese patients	Faculty as investigator	Clinical; humanistic
2003	Chrischilles EA, Carter BL, Lund BC, et al. Evaluation of the Iowa Medicaid pharmaceutical case management program. <i>J Am Pharm Assoc.</i> 2004;44:337-349.	Prospective cohort study conducted at 114 community pharmacies that provided a pharmaceutical case management service to 2,211 Medicaid eligible patients	Faculty as investigator	Clinical; economic
2003	Cranor CW, Bunting BA, Christensen DB. The Asheville Project: long-term clinical and economic outcomes of a community pharmacy diabetes care program. <i>J Am Pharm Assoc.</i> 2003;43:173-84.	Quasi-experimental study conducted in 12 community pharmacies that included 194 patients with diabetes	Faculty as investigator	Clinical; economic; humanistic
2003	Cranor CW, Christensen DB. The Asheville Project: short-term outcomes of a community pharmacy diabetes care program. <i>J Am Pharm Assoc.</i> 2003;43:149-59.	Quasi-experimental study conducted in 12 community pharmacies that included 85 patients with diabetes	Faculty as investigator	Clinical; economic; humanistic

2003	Garrett DG, Martin LA. The Asheville Project: participants' perceptions of factors contributing to the success of a patient self-management diabetes program. <i>J Am Pharm Assoc.</i> 2003;43:185-90.	Focus groups conducted of participants in the Asheville Project, a quasi-experimental study conducted in 12 community pharmacies that included patients with diabetes	Cannot determine or not reported	Humanistic
2003	Malone M, Alger-Mayer SA. Pharmacist intervention enhances adherence to orlistat therapy. <i>Ann Pharmacother.</i> 2003;37:1598-1602.	Analysis of patient persistence to orlistat therapy conducted in community pharmacies that included 30 patients	Faculty as investigator; faculty who directs services; faculty as service provider	Clinical
2003	McLean W, Gillis J, Waller R. The BC Community Pharmacy Asthma Study: A study of clinical, economic and holistic outcomes influenced by an asthma care protocol provided by specially trained community pharmacists in British Columbia. <i>Can Respir J.</i> 2003;10:195-202.	Study conducted in 18 community pharmacies that included 242 patients with asthma	Cannot determine or not reported	Clinical; economic; humanistic
2003	West D, Blevins MA, Brech D, Stotts F, Gardner S. A multidisciplinary approach in a community pharmacy can improve outcomes for diabetes patients. <i>Diabetes Educ.</i> 2003;29:962-968.	Outcome evaluation of a pharmacist-coordinated diabetes management program that included 30 patients and collaboration of a full multidisciplinary team	Faculty as investigator	Clinical
2002	Osterhaus JT, Dedhiya SD, Ernst ME, Osterhaus M, Mehta SS, Townsend RJ. Health outcomes assessment in community pharmacy practices: a feasibility project. <i>Arthritis Rheum.</i> 2002;47:124-31.	Non-experimental study conducted in 12 community pharmacies that included 461 patients with musculoskeletal disorders	Faculty as investigator	Clinical; humanistic
2002	Weinberger M, Murray MD, Marrero DG, Brewer N, Lykens M, Harris LE, Seshadri R, Caffrey H, Roesner JF, Smith F, Newell AJ, Collins JC, McDonald CJ, Tierney WM. Effectiveness of pharmacist care for patients with reactive airways disease: a randomized controlled trial. <i>JAMA.</i> 2002;288:1594-602.	Randomized trial conducted in 36 community pharmacies that included 1,113 patients with asthma or COPD	Faculty as investigator	Clinical; humanistic
2002	Zillich AJ, Ryan M, Adam A, et al. Effectiveness of a pharmacist-based smoking-cessation program and its impact on quality of life. <i>Pharmacotherapy.</i> 2002;22:759-765.	Descriptive study of a smoking cessation program provided in a university hospital outpatient pharmacy that included 31 patients	Faculty as service provider; faculty as investigator; residency training site	Clinical; humanistic
2001	Giles JT, Kennedy DT, Dunn EC, et al. Results of a community pharmacy-based breast cancer risk-assessment and education program. <i>Pharmacotherapy.</i> 2001;21:243-253.	Analysis conducted in 6 community pharmacies that included 137 patients who were educated on breast self-examination and other breast health care indicators	Faculty as investigator	Humanistic

Integrated Models

2010	Roberts S, Gainsbrugh R. Medication therapy management and collaborative drug therapy management. <i>J Manag Care Pharm.</i> 2010;16:67-69.	*Description of a MTM practice model at Kaiser Permanente that included 330 patients and physician collaboration	Cannot determine or not reported	Clinical; humanistic
2009	Indian Health Service. <i>Call for Successful Practices.</i> Available at: http://www.aacp.org/resources/education/Pages/SuccessfulPracticesinPharmaceuticalEducation.aspx . Accessed May 1, 2010.	*Description of a practice model that serves patients with diabetes and hypertension at 8 sites in collaboration with a full interdisciplinary, interprofessional health care team	Residency training site; experiential education site	Clinical; humanistic
2008	Green BB, Cook AJ, Ralston JD, et al. Effectiveness of home blood pressure monitoring, web communication, and pharmacist care on hypertension control: a randomized controlled trial. <i>JAMA.</i> 2008;299:2857-2867.	Randomized controlled study conducted in a large managed care organization that included 10 clinics and 778 patients with hypertension and compared pharmacist intervention with web assistance and home BP monitoring with 2 other groups (web assistance only and usual care)	Faculty as investigator	Clinical

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2008	Nadrash TA, Plushner SL, Delate T. Clinical pharmacists' role in improving osteoporosis treatment rates among elderly patients with untreated atraumatic fractures. <i>Ann Pharmacother.</i> 2008;42:334-40.	Outcome evaluation in a managed care organization that included 137 patients with fractures and physician collaboration	Faculty as investigator	Clinical
2007	Dole EJ, Murawski MM, Adolphe AB, Aragon FD, Hochstadt B. Provision of pain management by a pharmacist with prescribing authority. <i>Am J Health Syst Pharm.</i> 2007;64:85-9.	*Description of a chronic pain service conducted in an integrated health-system that included 564 patients and collaboration with PCPs	Faculty as service provider; faculty as investigator	Clinical; economic
2007	Smith JP, Dong MH and Kaunitz JD. Evaluation of a pharmacist-managed hepatitis C care clinic. <i>Am J Health Syst Pharm.</i> 2007;64:632-6.	*Description of a practice model in a VAMC (gastroenterology) that included 27 patients with hepatitis C and collaboration with a gastroenterology physician	Cannot determine or not reported	Clinical
2006	Collins C, Kramer A, O'Day ME and Low MB. Evaluation of patient and provider satisfaction with a pharmacist-managed lipid clinic in a Veterans Affairs medical center. <i>Am J Health Syst Pharm.</i> 2006;63:1723-7.	Outcomes study conducted in a VA ambulatory care clinic that included 105 patients with lipid disorders and collaboration with 49 referring healthcare providers	Residency training site	Clinical; humanistic
2006	Kicklighter CE, Nelson KM, Humphries TL and Delate T. An evaluation of a clinical pharmacy-directed intervention on blood pressure control. <i>Pharmacy Pract.</i> 2006;4:110-116.	Analysis conducted in a managed care clinic that compared pharmacist collaboration with physicians versus usual care and included 224 patients with hypertension	Residency training site	Clinical
2006	Lee JK, Grace KA, Taylor AJ. Effect of a pharmacy care program on medication adherence and persistence, blood pressure, and low-density lipoprotein cholesterol: a randomized controlled trial. <i>JAMA,</i> 2006;296:2563-2571.	Outcomes study conducted in a VAMC-based MTM clinic that included 200 elderly patients with coronary risk factors	Faculty as investigator; faculty as service provider	Clinical; economic
2006	McCord AD. Clinical impact of a pharmacist-managed diabetes mellitus drug therapy management service. <i>Pharmacotherapy.</i> 2006;26:248-53.	Quasi-experimental study conducted in a managed care physician group that evaluated pharmacy impact on 316 patients with diabetes	Faculty as investigator; faculty as service provider	Clinical
2006	Shah S, Dowell J, Greene S. Evaluation of clinical pharmacy services in a hematology/oncology outpatient setting. <i>Ann Pharmacother.</i> 2006;40:1527-33.	Description of clinical pharmacy services in a VA ambulatory care hematology/oncology clinic that included 423 patients and collaboration with oncologists and hematologists	Faculty as investigator; faculty as service provider; residency training site; experiential education site	Clinical
2006	Taveira TH, Wu WC, Martin OJ, Schleinitz MD, Friedmann P, Sharma SC. Pharmacist-led cardiac risk reduction model. <i>Prev Cardiol.</i> 2006;9:202-8.	Description of a practice model in a VAMC cardiology clinic that included 375 patients and collaboration of a large multidisciplinary team	Faculty as service provider; faculty as investigator	Clinical
2006	Winterbottom LM, Fong AM, Benkstein KL, et al. Impact of a clinical pharmacy consult service on guideline adherence and management of gabapentin for neuropathic pain. <i>J Manag Care Pharm.</i> 2005;12:61-69.	Quasi-experimental study conducted in the VA that included 124 patients and documented clinical pharmacy service impact on gabapentin guideline adherence for neuropathic pain	Cannot determine or not reported	Clinical
2005	Mazzolini TA, Irons BK, Schell EC, Seifert CF. Lipid levels and use of lipid-lowering drugs for patients in pharmacist-managed lipid clinics versus usual care in 2 VA Medical Centers. <i>J Manag Care Pharm.</i> 2005;11:763-71.	Quasi-experimental study conducted at 2 VAMC lipid clinics that included 115 patients with lipid abnormalities and collaboration of a multidisciplinary team	Faculty as service provider; faculty as investigator	Clinical

2005	Olson KL, Rasmussen J, Sandhoff BG, Merenich JA; Clinical Pharmacy Cardiac Risk Service Study Group. Lipid management in patients with coronary artery disease by a clinical pharmacy service in a group model health maintenance organization. <i>Arch Intern Med.</i> 2005;165:49-54.	Non-experimental observational study conducted in a Kaiser Permanente group that included 8014 patients with lipid abnormalities and collaboration of a multidisciplinary team	Faculty as service provider; faculty as investigator	Clinical
2005	Straka RJ, Taheri R, Cooper SL, Smith JC. Achieving cholesterol target in a managed care organization (ACTION) trial. <i>Pharmacotherapy.</i> 2005;25:360-371.	*Controlled trial conducted in 4 managed care clinics that compared pharmacist collaboration with physicians versus usual care to control dyslipidemia and included 481 patients with CHD	Faculty as service provider; faculty as investigator	Clinical
2005	Zarowitz BJ, Stebelsky LA, Muma BK, et al. Reduction of high-risk polypharmacy drug combinations in patients in a managed care setting. <i>Pharmacotherapy.</i> 2005;25:1636-1645.	Time-series cohort outcome evaluation of polypharmacy awareness and detection in over 100,000 patients enrolled in a managed care plan in collaboration with physician specialty clinic	Cannot determine or not reported	Clinical; economic
2004	Cioffi ST, Caron MF, Kalus JS, et al. Glycosylated hemoglobin, cardiovascular, and renal outcomes in a pharmacist-managed clinic. <i>Ann Pharmacother.</i> 2004;38:771-775.	Outcome evaluation conducted in a VA that included 70 patients with diabetes and collaboration of a multidisciplinary, multiprofessional care team	Faculty as investigator	Clinical
2004	Pineros SL, Sales AE, Li YF, Sharp ND. Improving care to patients with ischemic heart disease: experiences in a single network of the Veterans Health Administration. <i>Worldviews Evid Based Nurs.</i> 2004;1:33-40.	Description of 3 different interventions to improve LDL in 2,467 ischemic heart disease patients conducted within a VA regional network that included collaboration of a multidisciplinary care team	Cannot determine or not reported	Clinical
2003	Finley PR, Rens HR, Pont JT, Gess SL, Louie C, Bull SA, Lee JY, Bero LA. Impact of a collaborative care model on depression in a primary care setting: a randomized controlled trial. <i>Pharmacotherapy.</i> 2003;23:1175-85.	*Randomized study conducted in a Kaiser Permanente Medical Center that included 125 patients with depression	Faculty as investigator	Clinical; economic; humanistic
2003	Till LT, Voris JC, Horst JB. Assessment of clinical pharmacist management of lipid-lowering therapy in a primary care setting. <i>J Manag Care Pharm.</i> 2003;9:269-73.	*Quasi-experimental study conducted in a VAMC that included 88 patients on lipid medications	Faculty as investigator	Clinical
2003	Yuan Y, Hay JW, McCombs JS. Effects of ambulatory-care pharmacist consultation on mortality and hospitalization. <i>Am J Manag Care.</i> 2003;9:45-56.	Study conducted at a Kaiser Permanente clinic that included 5,499 patients in a multidisciplinary clinic	Faculty as investigator	Clinical; economic
2002	Cording MA, Engelbrecht-Zadvorny EB, Pettit BJ, Eastham JH, Sandoval R. Development of a pharmacist-managed lipid clinic. <i>Ann Pharmacother.</i> 2002;36:892-904.	*Description of a pharmacist-managed lipid clinic conducted in a military-based teaching hospital that also reports outcomes for 115 patients	Faculty as service provider; faculty as investigator	Clinical
2002	Finley PR, Rens HR, Pont JT, Gess SL, Louie C, Bull SA, Bero LA. Impact of a collaborative pharmacy practice model on the treatment of depression in primary care. <i>Am J Health Syst Pharm.</i> 2002;59:1518-26.	*Quasi-experimental study conducted in Kaiser Permanente that included 220 patients with depression	Faculty as investigator	Clinical; humanistic
2002	Irons BK, Lenz RJ, Anderson SL, Wharton BL, Habeger B, Anderson HG Jr. A retrospective cohort analysis of the clinical effectiveness of a physician-pharmacist collaborative drug therapy management diabetes clinic. <i>Pharmacotherapy.</i> 2002;22:1294-300.	*Quasi-experimental study conducted in a primary care clinic in a prison facility that included 172 patients with diabetes and physician-pharmacist collaboration	Faculty as service provider; faculty as investigator	Clinical

2001	Malone DC, Carter BL, Billups SJ, Valuck RJ, Barnette DJ, Sintek CD, Okano GJ, Ellis S, Covey D, Mason B, Jue S, Carmichael J, Guthrie K, Sloboda L, Dombrowski R, Geraets DR, Amato MG. Can clinical pharmacists affect SF-36 scores in veterans at high risk for medication-related problems? <i>Med Care</i> . 2001;39:113-22.	*Experimental study conducted in VAMC that included 1,054 patients in 9 sites	Faculty as investigator	Humanistic
2001	Okamoto MP, Nakahiro RK. Pharmacoeconomic evaluation of a pharmacist-managed hypertension clinic. <i>Pharmacotherapy</i> . 2001;21:1337-44.	Experimental study conducted in Kaiser Permanente that included 330 patients with hypertension	Faculty as investigator	Clinical; economic; humanistic
2001	Roth MT, Westman EC. Use of bupropion SR in a pharmacist-managed outpatient smoking-cessation program. <i>Pharmacotherapy</i> . 2001;21:636-41.	*Non-experimental study conducted in a VAMC that included 71 patients who were tobacco users	Faculty as service provider; faculty as investigator	Clinical
2001	To LL, Stoner CP, Stolley SN, et al. Effectiveness of a pharmacist-implemented anemia management protocol in an outpatient hemodialysis unit. <i>Am J Health Syst Pharm</i> . 2001;58:2061-2065.	Retrospective study of anemia protocol in 49 VA dialysis patients	Residency training site	Clinical
2000	Dunham DM, Stewart RD, Laucka PV. Low-density-lipoprotein cholesterol in patients treated by a lipid clinic versus a primary care clinic. <i>Am J Health Syst Pharm</i> . 2000;57:2285-6.	*Quasi-experimental study conducted in a VAMC that included 120 patients who received care in either a pharmacist-managed or PCP-managed lipid clinic	Residency training site	Clinical; economic
2000	Yanchick JK. Implementation of a drug therapy monitoring clinic in a primary-care setting. <i>Am J Health Syst Pharm</i> . 2000;57:S30-4.	Non-experimental study conducted in a primary care clinic in a military hospital that included an average of 104 patients/month with a variety of chronic medical conditions	Residency training site; Experiential education site	Clinical; economic
1999	Coast-Senior EA, Kroner BA, Kelley CL, Trilli LE. Management of patients with type 2 diabetes by pharmacists in primary care clinics. <i>Ann Pharmacother</i> . 1998;32:636-41.	*Non-experimental study conducted in a VAMC that included 23 patients with diabetes	Faculty as service provider; faculty as investigator	Clinical
1999	Foss MT, Schoch PH, Sintek CD. Efficient operation of a high-volume anticoagulation clinic. <i>Am J Health Syst Pharm</i> . 1999;56:443-9.	*Description of an anticoagulation clinic conducted in a VAMC that included 600 patients	Residency training site; experiential education site	Clinical

Other Models

2009	Carter BL, Rogers M, Daly J, Zheng S, James PA. The potency of team-based care interventions for hypertension: a meta-analysis. <i>Arch Intern Med</i> . 2009;169:1748-55.	Systematic review of studies evaluating nurse or pharmacist intervention to improve BP control	Faculty as investigator	Clinical
2008	American College of Clinical Pharmacy, Harris IM, Baker E, Berry TM, Halloran MA, Lindauer K, Ragucci KR, McGivney MS, Taylor AT, Haines ST. Developing a business-practice model for pharmacy services in ambulatory settings. <i>Pharmacotherapy</i> . 2008;28:285.	ACCP White Paper on developing a pharmacy business-practice model in ambulatory care	Faculty as investigator	Clinical; economic; humanistic
2008	Kliethermes MA, Schullo-Feulner AM, Tilton J, Kim S, Pellegrino AN. Model for medication therapy management in a university clinic. <i>Am J Health Syst Pharm</i> . 2008;65:844-56.	Description of an MTM clinic that operates as a subunit of a university medical center-based community pharmacy	Faculty as investigator; faculty as service provider; experiential education site	Clinical

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2007	Christensen DB, Roth M, Trygstad T, Byrd J. Evaluation of a pilot medication therapy management project within the North Carolina State Health Plan. <i>J Am Pharm Assoc.</i> 2007;47:471-483.	Description of a community-based MTM self-insured model that included 67 patients	Faculty as investigator; faculty as service provider	Clinical; economic; humanistic
2006	Lapane KL, Hughes CM. Pharmacotherapy interventions undertaken by pharmacists in the Fleetwood phase III study: the role of process control. <i>Ann Pharmacother.</i> 2006;40:1522-6.	Process assessment of the intervention arm of The Fleetwood Phase III study that included 4,272 patients in 12 nursing homes and provision of recommendations by dispensing and consultant pharmacists to physicians	Faculty as investigator	Clinical
2002	Schommer JC, Byers SR, Pape LL, Cable GL, Worley MM, Sherrin T. Interdisciplinary medication education in a church environment. <i>Am J Health Syst Pharm.</i> 2002;59:423-8.	Non-experimental study conducted in 20 churches that included 187 patients and pharmacist-nurse collaboration to provide medication education	Faculty as investigator; experiential education site	Clinical
1999	Baran RW, Crumlish K, Patterson H, Shaw J, Erwin WG, Wylie JD, Duong P. Improving outcomes of community-dwelling older patients with diabetes through pharmacist counseling. <i>Am J Health Syst Pharm.</i> 1999;56:1535-9.	Non-experimental study conducted in 10 different settings that included 88 patients with diabetes	Faculty as investigator	Clinical; humanistic
1996	Slack MK, McEwen MM, Carter JT, Brueckner RL. Case management delivery model for pharmacy. <i>Am J Health Syst Pharm.</i> 1996;53:2860-7.	Description of the case management delivery model and the implications for pharmacists	Faculty as investigator	N/A

KEY: ACCP = American College of Clinical Pharmacy, AHEC = Area Health Education Center, APhA = American Pharmacists Association, BP = blood pressure, CHD = coronary heart disease, COPD = chronic obstructive pulmonary disease, CVD = cardiovascular disease, HIV = human immunodeficiency virus, LDL = low density lipoprotein, LPN = licensed practical nurse, MTM = medication therapy management, N/A = not applicable, NACDS = National Association of Chain Drug Stores, NP = nurse practitioner, Ob/GYN = obstetrics/gynecology; PA = physician assistant, PCP = primary care provider, RN = registered nurse, VA = Veterans Affairs, VAMC = Veterans Affairs Medical Center

* = the model involves the pharmacist(s) working under a protocol, collaborative practice agreement or similar