

## Pharmacists' Role in Improving Diabetes Medication Management

Marie Smith, Pharm.D.

### Abstract

Today there are significant gaps between reaching the goal of "optimal medication therapy" and the current state of medication use in the United States. Pharmacists are highly accessible and well-trained—yet often underutilized—key health care professionals who can move us closer toward achieving better medication therapy outcomes for patients. Diabetes medication management programs led by pharmacists are described. This is consistent with the "medical home" concept of care that promotes primary care providers working collaboratively to coordinate patient-centered care. Pharmacists utilize their clinical expertise in monitoring and managing diabetes medication plans to positively impact health outcomes and empower patients to actively manage their health. In addition, pharmacists can serve as a resource to other health care providers and payers to assure safe, appropriate, cost-effective diabetes medication use.

*J Diabetes Sci Technol* 2009;3(1):175-179

### Commentary

In 2005, the Joint Commission of Pharmacy Practitioners (a council of 11 pharmacy practitioner organizations) described the following role for pharmacists in its *Vision of Pharmacy Practice*: "Pharmacists will be the health care professionals responsible for providing patient care that ensures optimal medication therapy outcomes."

There are significant gaps between reaching the goal of "optimal medication therapy" and the state of medication use in the United States. We have all seen news items on medication errors, adverse drug events, and rising costs of co-pays interfering with good patient medication adherence.

Pharmacists are the highly accessible and well-trained, yet often underutilized, key health care professionals to move us closer toward achieving better medication therapy outcomes for patients. In addition, pharmacists can serve as a resource to other health care providers and payers to assure safe, appropriate, cost-effective medication use.

There are several examples of pharmacists working in various settings—ambulatory care clinics, community health centers, and some community/food store pharmacies—to improve medication therapy outcomes of patients with diabetes. To understand the important

**Author Affiliation:** University of Connecticut School of Pharmacy, Storrs, Connecticut

**Abbreviations:** (APhA) American Pharmaceutical Association, (CDE) certified diabetes educator, (CDTM) collaborative drug-therapy management, (Pharm.D.) Doctor of Pharmacy

**Keywords:** collaborative drug-therapy management, diabetes management, medication therapy management, pharmacists, role of pharmacists

**Corresponding Author:** Marie Smith, Pharm.D., Department Head and Clinical Professor, University of Connecticut School of Pharmacy, 69 N. Eagleville Rd., Unit 3092, Storrs, CT 06269-3092; email address [marie.smith@uconn.edu](mailto:marie.smith@uconn.edu)

role of pharmacists in chronic disease medication management, I will review today's pharmacist education and training as well as review some of the successful models for diabetes medication management.

## Pharmacist Education and Training

### *Pharmacist Entry-Level Education*

Since the 1960s, the pharmacy profession educational requirements have undergone considerable changes that have shifted the pharmacy curriculum emphasis toward more patient-centered care and medication therapy management. In the late 1990s, there was a professional mandate that required the Doctor of Pharmacy (Pharm.D.) degree to replace the Bachelor of Science degree for all graduating pharmacy students seeking state licensure and all pharmacy schools seeking accreditation. In the United States, 102 pharmacy schools offer the Pharm.D. degree as the entry-level professional degree and approximately 10,000 students graduate with a Pharm.D. degree each year.<sup>1</sup>

The Pharm.D. curriculum—a six-year college course of study that includes biomedical, pharmaceutical, clinical, and sociobehavioral/administrative sciences—has undergone significant revisions to provide a competency-based learning environment where the pharmacy graduate (sometimes having a previous four-year degree) is prepared to contribute to the care of patients and to the profession by practicing in collaboration with other health care professionals. The foundational courses in the biomedical and pharmaceutical sciences include anatomy and physiology, pathophysiology, molecular biology, pharmacology, immunology, pharmaceutics, medicinal chemistry, toxicology, pharmacogenomics, and extemporaneous compounding. Clinical courses focus on patient-care competencies in pharmacotherapeutics, applied pharmacokinetics, drug literature evaluation, patient assessment and monitoring, and medication patient safety. The sociobehavioral/administrative courses build pharmacy practice competencies in communication skills, pharmacoeconomics, ethics, law, public health, health informatics, health care systems, drug information, health literacy, cultural competence, pharmacoadherence, and practice management/administration.

### *Postgraduate Residency Training*

Approximately 15–20% of today's Pharm.D. graduates pursue postgraduate pharmacy residency training programs. Pharmacy residency programs supplement one's pharmacy education and provide the opportunity to develop advanced knowledge and expertise in the

provision of patient-centered pharmacy care. Pharmacy residency programs typically involve one or two years of post-Pharm.D. training and include several programs nationwide in ambulatory care, primary care, and community pharmacy that focus on working with patients for medication management of chronic diseases. In 2008, there were approximately 2100 pharmacy residency positions<sup>2</sup> in the United States. While many residency programs focus on inpatient care, a growing number are in ambulatory, primary, and community pharmacy care. In addition, there are pharmacy fellowship programs that focus on research in clinical settings.

### *Pharmacy Specialties and Certifications*

The profession of pharmacy has six board-certified specialties: nuclear pharmacy (1978), nutrition support (1988), pharmacotherapy (1988), psychiatric pharmacy (1992), oncology pharmacy (1996), and geriatrics (1997). Pharmacists with board-certified specialties in pharmacotherapy and geriatrics frequently work with patients, caregivers, and health care professionals to manage complex drug therapies and polypharmacy in diabetes patients.

There are several certification programs available to professionals from many health disciplines, including pharmacists. Areas in which such certification is available include diabetes education, anticoagulation therapy, pain management, and asthma education. According to the National Certification Board for Diabetes Educators, there are 719 pharmacists who are certified diabetes educators (CDEs), representing 4.5% of all CDEs.<sup>3</sup>

## Pharmaceutical Care

In 1990, Hepler and Strand introduced a new term, "pharmaceutical care,"<sup>4</sup> to describe the change in the focus of pharmacy practice from products and dispensing to ensuring the best drug therapy and patient medication safety. Since this landmark article, there has been a plethora of new practice standards, cooperative agreements with other health professionals, and clinical practice literature that describes a patient-centered care model for pharmacists to ensure the safe and effective drug therapy of the individual patient.

## Collaborative Drug-Therapy Management

With the complexity of today's drug therapies and greater emphasis on patient medication safety, the need for an interdisciplinary, shared responsibility between pharmacists and physicians to improve patient

medication outcomes and manage cost effectiveness of drug-therapy regimens has become more apparent. More than 75% of states have enacted legislation or modified state pharmacy practice acts that provide for a pharmacist role in a patient's drug-therapy management. Collaborative drug-therapy management (CDTM) involves qualified pharmacists (with requisite clinical training and practice experience) working within the context of a defined protocol with one or more physicians to perform patient assessments; order medication-related laboratory tests; administer medications; and select, initiate, monitor, and adjust medication therapy regimens.<sup>5</sup> There is significant variability in CDTM agreements by state regulations, practice settings, and pharmacist education/training requirements. Ultimately, the specific pharmacist qualifications and scope of CDTM responsibilities need to be determined by the collaborating health care practitioners, taking into consideration patient needs, involved drug therapies, and care setting factors.

Collaborative drug-therapy management involves the development of a protocol that delegates authority to pharmacists under designated circumstances and delineates the functions, procedures, and decision-making criteria to be followed in managing medication therapy. This protocol is mutually agreed upon by the involved pharmacists and physicians and must be reviewed by the appropriate body responsible for quality assurance or quality improvement. Most often, the involved pharmacists and physicians have a preexisting working relationship and are familiar with pharmacists' knowledge, clinical skills, and patient-care medication-management role. Collaborative drug-therapy management typically focuses on managing complex medication regimens or chronic disease medication therapies for diabetes, hypertension, hyperlipidemia, anticoagulation, or asthma.

## Pharmacist Programs in Diabetes Management

### *Asheville Project*

In the late 1990s, two employers in Asheville, North Carolina—the municipal government and Mission St. Joseph's Health System—began a progressive pilot project where specially trained pharmacists held face-to-face meetings with employees with diabetes to educate, motivate, and empower the employees to better manage their condition with resultant improved health status and reduced diabetes-associated cost. The essential elements of the Asheville model included:

- a network of specially trained community pharmacists to whom employees with diabetes made regular visits for care monitoring and counseling,
- employer payment to pharmacists for pharmaceutical care services, and
- waived co-pays on diabetes medications and supplies for employee participants.

Pharmacists performed a variety of patient-specific tailored services, including setting and monitoring diabetes treatment goals; home glucose meter training; adherence strategies; performed physical assessment of patients' feet, skin, blood pressure, and weight; and diabetes and lipid management education. Patients were referred to their physician or diabetes education center as needed.

The Asheville Project diabetes program realized the following clinical and financial outcomes:<sup>6</sup>

- mean HbA1c values and lipid levels of program participants decreased, with more than 50% of participants demonstrating improvements at every measurement,
- at the first six-month follow-up, 24.3% more patients had optimal A1c values (<7.0%) compared to baseline values (increases of 27.2 and 18.2% more patients were noted at the second and third six-month follow-ups, respectively),
- emergency department visits occurred at a rate that is one-third the national average,
- employer program sponsors realized decreases in total direct medical costs that ranged from \$1622–3356 per program participant,
- one employer had an average reduction of 41% in program participant sick days and estimated a value of \$18,000 annually for increased productivity of program participants, and
- employer return on investment was 4:1 for diabetes patients

### *Diabetes 10-City Challenge*

Building on the success of the Asheville Project, the American Pharmaceutical Association (APhA) Foundation established the Diabetes 10-City Challenge in 2005 as an innovative program for employers and

communities to fight diabetes and reduce health care costs by implementing the APhA Foundation's Patient Self-Management Program.<sup>7</sup> Employer groups in 10 communities were invited to establish a voluntary health benefit for employees and dependents. Using incentives, employers encourage people to manage their diabetes with the help of pharmacists, physicians, and community health resources. Pharmacists worked with 30 employers in 10 cities/regions, including Charleston/Spartanburg, SC; Chicago, IL; Colorado Springs, CO; Cumberland, MD; Dalton, GA; Honolulu, HI; Los Angeles, CA; Milwaukee, WI; Pittsburgh, PA; and Tampa Bay, FL. Employer industries included county and municipal governments, utility companies, supermarkets, and corporate entities. Pharmacists' services were similar to those in the Asheville Project described earlier, and this collaborative approach has resulted in

- a savings of approximately \$918 per employee in total health care costs for the initial year, with an even greater savings in subsequent years,
- return on investment of at least 4:1 beginning in the second year,
- a 50% reduction in absenteeism and fewer workers' compensation claims,
- high employee satisfaction—95% approval for pharmacist care—and improved quality of life, and
- employees saving an average of \$400–600 per year with incentives such as waived co-pays.

### ***Diabetes Medication-Therapy Management Programs***

Some community or hospital-based pharmacists have incorporated remote disease management technology, where they have patients uploading blood glucose meter readings via the internet on a weekly basis or have patients download blood glucose meter readings at pharmacist visits. This allows the pharmacist to evaluate blood glucose levels between physician visits, provide self-management training for patients, and create a personalized diabetes management plan to optimize medication-therapy regimens for each patient. As an example, a patient may not see a physician for 3–6 months, yet the pharmacist can monitor blood glucose levels during that time to check if any new medications, over-the-counter or herbal products, lifestyle changes, or diabetes treatment changes are affecting glucose control.

In food stores with pharmacies, clinical dietitians and pharmacists are holding two-hour educational programs

that teach diabetes patients and customers how to make wise food and pharmacy choices. These programs include a store tour that focuses on reading food labels and making healthier food choices combined with classes on understanding diabetes medications, avoiding drug interactions and medications that affect blood glucose levels, symptoms of hyper- and hypoglycemia, and monitoring blood glucose levels.

Several pharmacists practicing in hospital ambulatory care clinics and physician offices have developed interdisciplinary diabetes-management programs on a referral/consultation basis. Many of these models are affiliated with pharmacy schools as clinical training sites and operate with CDTM agreements between the pharmacists and physicians involved. Pharmacists work with patients to evaluate and modify medication regimens, perform adherence counseling, discuss lifestyle modifications, review device and disease state education, and enroll patients in medication assistance programs if needed. Patients receive a diabetes action plan based on diabetes self-management principles; this plan is reviewed at subsequent meetings or follow-up phone calls with the pharmacist to assess the patient's progress until goals are met. A systematic review of 21 outpatient studies with a pharmacist intervention group for diabetes management found an overall improvement in HbA1c across diverse settings and study designs.<sup>8</sup> The differences in change for A1c ranged from an increase of 0.2% to a decrease of 2.1%. A few studies suggested that pharmacist interventions can reduce long-term costs by improving glycemic control and reducing future diabetes complications.

There is a growing body of literature supporting the role of the pharmacist in diabetes care, as pharmacists can provide "continuity of care" by following patient care progress between physician visits, utilizing their clinical expertise to monitor and manage diabetes medication plans, and educating patients on disease, lifestyle, and adherence issues. As of January 2008, new pharmacist current procedural terminology codes have been established to allow pharmacists to bill for medication-therapy management services.

Pharmacists in community and primary care settings can be a key resource working in an interdisciplinary model for improved medication management of patients with diabetes. This is consistent with the "medical home" concept of care that promotes health care providers working collaboratively to coordinate patient-centered care. In such a model, pharmacists can focus on

managing medications to positively impact health outcomes, reduce overall healthcare system costs, and empower patients and consumers to actively manage their health.

---

**References:**

1. American Association of Colleges of Pharmacy. Academic pharmacy's vital statistics. [http://www.aacp.org/Docs/MainNavigation/InstitutionalData/8855\\_2008.pdf](http://www.aacp.org/Docs/MainNavigation/InstitutionalData/8855_2008.pdf). Accessed September 1, 2008.
2. Medical News Today. Record number of pharmacy graduates to enter pharmacy residencies. <http://www.medicalnewstoday.com/articles/102558.php>. Accessed September 1, 2008.
3. Personal communication with National Certification Board for Diabetes Educators, Arlington Heights, IL. July 23, 2008.
4. Hepler CD, Strand LM. Opportunities and responsibilities in pharmaceutical care. *Am J Hosp Pharm.* 1990;47(3):533-43.
5. Hammond RW, Schwartz AH, Campbell MJ, Remington TL, Chuck S, Blair MM, Vassey AM, Rospond RM, Herner SJ, Webb CE, American College of Clinical Pharmacy. Collaborative drug therapy management by pharmacists—2003. *Pharmacotherapy.* 2003;23(9):1210-25.
6. Cranor CW, Bunting BA, Christensen DB. The Asheville Project: long-term clinical and economic outcomes of a community pharmacy diabetes care program. *J Am Pharm Assoc (Wash).* 2003;43:173-84.
7. 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. *J Am Pharm Assoc (2003).* 2008;48(2):181-90.
8. Wubben DP, Vivian EM. Effects of pharmacist outpatient interventions on adults with diabetes mellitus: a systematic overview. *Pharmacotherapy.* 2008;28(4):421-36.