Abstract

Objective: To review relevant trends threatening primary care and the evidence supporting use of nonphysicians in primary and chronic care of patients with diabetes.

Data sources: Current medical and pharmacy literature as selected by authors.

Summary: The care needed by patients with diabetes does not fit well into our current medical model for primary care, and an adequate supply of physicians is not likely to be available for primary care roles in coming years. Patients with diabetes who are placed on evidence-based regimens, are educated about their disease, are coached in ways that motivate them to lose weight and adopt other therapeutic lifestyle changes, and are adhering to and persisting with therapy will soon have improved clinical parameters. These quickly translate into fewer hospitalizations and emergency department visits. A growing body of literature supports the use of pharmacists and other nonphysicians in meeting the needs of patients with diabetes. Pharmacists should join nurse practitioners, specially trained nurses, and physician assistants as integral members of the health care team in providing care to patients with diabetes and, by logical extension, other chronic conditions.

Conclusion: Demand for primary care is likely to outstrip the available supply of generalist physicians in the coming years. In addition to nurse practitioners and physician assistants, pharmacists should be considered for key roles in future interdisciplinary teams that triage and provide direct care to patients, including those with diabetes and other chronic conditions.

Keywords: Pharmacy services, medication therapy management, diabetes, health care systems, primary care, health professionals.


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A number of trends have converged to create a potential crisis in the delivery of primary care, and patients with diabetes and other chronic diseases will be among the first to suffer the consequences of this situation, if it is not resolved. Physicians continue to prefer specialty over generalist practice, and one can imagine the day when nonphysicians are pressed into service as the sole or chief gatekeepers to the health care system, providing triage and routine interventions in primary care settings. In fact, this is already occurring in the U.K. National Health Service (NHS), in which pharmacists have joined other allied health professionals in handling initial triage of patients and routine primary care visits.¹

The aging and increased longevity of the baby boomers is expected to drive the number of elderly patients in the United States to 70 million by 2030.² The total number of people with diabetes worldwide is projected to increase from 171 million in 2000 to 366 million by 2030, with the greatest increase predicted to occur in people aged 65 years or older.³

Physician assistants and nurse practitioners are the two types of nonphysicians who can easily fill the primary care gap, given their educational backgrounds and the laws and regulations in most states in this country. But their numbers are small. On its website, the American College of Nurse Practitioners reported that an estimated 158,348 nurse practitioners were credentialed in 2008. Similarly, according to the American Academy of Physician Assistants, 88,771 physician assistants were eligible to practice at the beginning of May 2010.

Registered nurses are available in greater numbers—more than 3 million, the American Nurses Association reports on its website. With adequate training and supplemental education, they represent another potential supply of primary care providers.

At a Glance

**Synopsis:** In a resource-scarce economic environment and in a country where approximately 78 million baby boomers are entering financially fragile Social Security and Medicare systems, demand for primary care is likely to outstrip the available supply of generalist physicians in the coming years. The authors of the current work therefore believe that use of nonphysicians to provide primary and chronic care will become increasingly attractive and, given the lack of interest in primary care on the part of physicians, Americans in fact may have no other choice. Pharmacists can play a role in improving the knowledge and skills that patients and their caregivers need for self-management by assessing needs and abilities, providing extensive diabetes education, coaching patients and caregivers to increase their motivation for self-care, providing support tools or resources to improve self-care, and engaging in collaborative decision making.

**Analysis:** Although the number of prescriptions dispensed has increased during the previous decade, the emergence of an identifiable group of paraprofessionals (>300,000 Certified Pharmacy Technicians) and the increasing effect of automation on pharmacy practice should enable sizable numbers of pharmacists to transition from distributive to clinical roles. Diabetes care delivered by specially trained nurses and pharmacists has consistently been better than that rendered by physicians. Evidence for physician assistant and to some degree pharmacists needs to be supplemented with more rigorous studies. For pharmacists and other nonphysician health professionals, modifications to educational programs for both students and practitioners will likely be needed if primary care roles continue to develop as expected.

**Objective**

As is now occurring in the NHS, we argue that the pharmacist is the logical health professional to incorporate into a multidisciplinary team for providing collaborative care to patients with diabetes and other chronic diseases. In this article, we review the relevant trends threatening primary care and the evidence supporting use of nonphysicians in primary and chronic care of patients with diabetes.

**Dearth of primary care physicians**

Despite the increasing numbers of patients with diabetes, a declining number of generalist and family medicine physicians are available to care for them. A 2007 survey of more than 1,100 fourth-year medical students at 11 U.S. medical schools showed that only 2% planned to become primary care internists.¹ Burdensome paperwork, hectic clinics, the need to bring work home, and the attractiveness of other specialties were prominent among the reasons these medical students cited in preferring specialty practice. In addition, some were discouraged by the challenges of caring for elderly and chronically ill patients.

Exacerbating this problem is the salary gap between generalist and specialist physicians.⁵,⁶ From 2000 to 2004, median annual income for family practice physicians increased 7.5% to $156,000, whereas median income for diagnostic radiologists increased 36.2% to $407,000. This disparity in income, coupled with mounting educational debt, leads many medical students to choose specialty practice.⁷ Ebell⁸ reported a strong correlation between higher overall future salary and higher residency fill rates with U.S. graduates. His data, reflecting a later time point and different data set, showed that family medicine had the lowest mean salary ($185,750) and was associated with the lowest residency fill rate in 2007.

In addition, physicians report that the average 18-minute office visit is simply not enough time to address all of the complexities of care.⁹ Nearly one in four primary care physicians believe that the scope of care they are expected to provide is greater than it should be.⁹ As Campion⁷ points out, there is sim-
ply so much more—in fact, too much—to do these days: more complicated options for diagnostic testing, more medications, more expectations for prevention, and more steps in managing chronic conditions.

A recent theme issue of *Health Affairs*, published in May 2010, explored the need for “reinventing primary care.” Articles pertinent to use of nonphysicians included those on Rhode Island’s effort to rebuild primary care from the insurance side,9 the multistakeholder movement in primary care,10 and the pharmacist’s role in medical homes.11

**Nonphysician delivery of primary care**

Among nonphysician health professionals, the education, knowledge, and skills of three groups indicate that they are possibilities for filling the gap created by the lack of primary care physicians; physician assistants, nurse practitioners and specially trained nurses, and pharmacists. Considering patients with diabetes, evidence supports the effectiveness of nurse practitioners, specially trained nurses, and pharmacists in delivering care, usually through collaborative agreements with physicians and as part of multidisciplinary teams.

Davidson12 reviewed 15 randomized controlled trials of nurses and 5 such studies of pharmacists in caring for patients with diabetes. Studies used detailed algorithms to guide treatment decisions, and the nurses and pharmacists practiced collaboratively, working under supervision of physicians. Most studies used specially trained nurses (not nurse practitioners) and pharmacists. Compared with usual care, the decrease in mean glycosylated hemoglobin (A1C) levels was three times greater with nurse or pharmacist care in these studies.

Independent clinical decisions were important elements of these studies, according to Davidson.12 Studies in which nurses and pharmacists were not given prescriptive authority did not lead to improvements. Although decisions were guided by and within the scope of algorithms developed jointly with physicians, outcomes and clinical indicators improved when nurses and pharmacists were able to titrate doses and make clinical decisions without contacting physicians.

Davidson et al.13 published 1-year data in which a specially trained registered nurse treated 331 minority patients by following detailed algorithms for treatment of diabetes. An endocrinologist was available by telephone for consultation and met with the nurse weekly. During the study, A1C levels decreased from 8.8% to 7.0%. American Diabetes Association A1C goals were achieved by 60% of study participants, and 82% of patients met their low-density lipoprotein (LDL) cholesterol goals.

Taylor et al.14 conducted a randomized controlled trial of 169 patients with long-standing diabetes to evaluate the impact of a nurse care management system on outcomes. Patients had an initial 90-minute consultation with a nurse, attended 1- to 2-hour group classes once weekly for a month, and subsequently received follow-up calls to review medication use and self-care. After 1 year, mean reductions in A1C levels, total cholesterol, and LDL cholesterol were significantly greater for patients managed by the nurses compared with usual care.

Aubert et al.15 reported similar results with a nurse case management intervention. Among 71 patients with long-standing diabetes who were randomized to nursing or usual care, those seeing the nurse had mean decreases in A1C levels of 1.7 percentage points and fasting plasma glucose decrements of 43 mg/dL after 1 year—both significantly better than with usual care.

The best-known studies of pharmacists were nonrandomized demonstration projects conducted in real-world settings.9,16,17 In the Diabetes Ten City Challenge, community-based pharmacists provided diabetes care services to 914 patients in 10 distinct geographic sites using scheduled consultations.16 Pharmacists focused on clinical goals, established patient-specific self-management goals, and worked with other health professionals to recommend adjustments in patient treatment plans. Among patients who were in the program for 1 year and saw the pharmacist an average of 4.6 times, A1C levels decreased from 7.6% to 7.2%, influenza vaccination rates rose from 43% to 61%, eye examinations increased by 17%, and foot examination rates rose from 38% to 68%.

The Asheville Project evaluated the impact of expanded pharmaceutical care services on clinical and economic outcomes in patients with diabetes.17 Scheduled visits with pharmacists certified in diabetes education resulted in mean reductions in A1C at follow-up visits and improved lipid levels. Economic benefits included a reduction in total mean direct medical costs by $1,200 and an estimated annual increase in productivity of $18,000 secondary to a reduction in total days of sick time. Because this study had a rolling enrollment, some have thought the varying numbers of patients at different time points indicated that many patients died or dropped out of the study;16 however, as reported in the original article, only two patients died and nine left the program because of a change in employment.17

**Diabetes care: Model for the future of primary and chronic care?**

In a resource-scarce economic environment and in a country where some 78 million baby boomers are entering financially fragile Social Security and Medicare systems and the health care reform law is expected to provide health coverage to millions more, we believe use of nonphysicians to provide primary and chronic care will increasingly be an attractive option. In addition, given the lack of interest in primary care on the part of physicians, Americans may in fact have no other choice.

The primary care model focuses on the essential elements needed to provide high-quality evidence-based care of chronic conditions. The chronic care model is a multidimensional framework that advocates productive interactions between informed patients and prepared, proactive health care teams. Nonphysician providers, as integral parts of a multidisciplinary team caring for patients, are in a key position to implement essential elements of this model and thereby improve diabetes care. Nurse practitioners and pharmacists, and pre-
sumably physician assistants, can play a role in improving the knowledge and skills that patients and their caregivers need for self-management by assessing needs and abilities, providing extensive diabetes education, coaching patients and caregivers to increase their motivation for self-care, providing support tools or resources to improve self-care, and engaging in collaborative decision making. In addition, these providers are well suited to implement evidence-based guidelines to achieve glycemic goals and prevent long-term complications.

Is the supply of pharmacists sufficient to permit these new roles? Estimates are that about 300,000 pharmacists will be practicing by 2020. Although the number of prescriptions dispensed—the classic metric for productivity of this group—has increased during the previous decade, the emergence of an identifiable group of paraprofessionals, in the form of more than 300,000 Certified Pharmacy Technicians, and the increasing impact of automation on pharmacy practice should enable sizable numbers of pharmacists to transition from distributive to clinical roles. In addition, adopting the doctor of pharmacy as the entry-level degree ensures availability of a continuing supply of adequately trained pharmacists, and the increasing popularity of postgraduate practice residencies and specialty fellowships for pharmacists enhances their knowledge and skills.

For patients with diabetes, care delivered by specially trained nurses, nurse practitioners, and pharmacists has been shown in randomized controlled trials and systematic reviews to be superior to usual care. Physician assistants have been practicing within medical offices for many years, and their roles in settings where physicians are not always present require assessment and study. For all three types of professionals, modifications to educational programs for both students and practitioners will likely be needed if primary care roles continue to develop as we believe they will.

Conclusion
Demand for primary care is likely to outstrip the available supply of generalist physicians in the coming years. In addition to nurse practitioners, specially trained nurses, and physician assistants, pharmacists should be considered for key roles in future interdisciplinary teams that triage and provide direct care to patients, including those with diabetes and other chronic conditions. Research is needed to support the effectiveness of physician assistants and to some degree pharmacists in these expanded roles. Patients with diabetes are ideal for studying the impact of alternative systems of care, as divergences in clinical parameters as well as hard clinical outcomes become evident quickly.

References