TRENDS

Challenges To The Pharmacist Profession From Escalating Pharmaceutical Demand

For forty years the pharmacy profession has been moving from dispensing medications to providing certain clinical services.

by Judith A. Cooksey, Katherine K. Knapp, Surrey M. Walton, and James M. Cultice

ABSTRACT: Unexpected growth in medication use has escalated demand for pharmacists that has outpaced supply. Responses to the pharmacist shortage include larger workloads and greater use of pharmacist extenders and technology. As the profession has moved from a product orientation (dispensing medications) to a patient focus, clinical training requirements have expanded. However, structural and process barriers, particularly in community and retail pharmacies, must be addressed to improve the medication-use process. These issues merit greater attention from health care leaders and policymakers.

Striking growth in prescription drug use and spending, debate around a Medicare drug benefit, direct-to-consumer drug marketing, benefits of new pharmacotherapeutics, and quality and safety concerns have focused greater attention on pharmaceutical care. These factors also have contributed to an increased demand for pharmacists, the third-largest health professional group and the sole profession specifically trained to deliver pharmaceutical services.1 A study mandated by Congress in 2000 and conducted by the Health Resources and Services Administration (HRSA) noted that since 1998 the demand for pharmacists had outpaced supply, leading to a significant national shortage.2

This paper presents data describing the shortage, shifts in employment sectors and workforce characteristics, market responses to the shortage, and expanding roles for pharmacists. The current shortage and other structural and process barriers merit increased attention to the design and implementation of more integrated medication-use processes.

The Pharmacist Shortage

The 2000 national pharmacist workforce study described “a dynamic shortage of pharmacists” characterized by a rapid and persistent rise in demand for services that outpaced the level supplied by pharmacists.3 The study reported that the shortage affected all employment sectors and that vacancy rates were ris-
ing; 7 percent in community pharmacies, 9 percent in hospitals, 11 percent in public hospitals, and up to 18 percent in federal facilities. Increases of 20 percent in pharmacists’ income were reported between 1998 and 2000.4

The shortage, reported to be evident by mid-1998, is related to a complex set of factors. These include (1) a marked increase in prescription drug use; (2) expansion of pharmacists’ practice roles and nontraditional job markets; (3) limited uses of automation and pharmacist extenders such as pharmacy technicians; (4) inefficiencies in the workplace; and (5) greater numbers of female pharmacists, who work fewer hours than men do.6

This shortage developed despite steady growth in pharmacist supply. The HRSA pharmacist-supply model estimated that the active pharmacist workforce grew by 24,400 between 1991 and 2000, with 196,000 pharmacists practicing in 2000 (Exhibit 1).7 The pharmacist-to-population ratio increased from sixty-eight per 100,000 population to seventy-one during this period, and the HRSA model projects a 1.4 percent annual increase through 2010, slightly ahead of the projected population growth.

■ Escalating prescription drug use and spending. Prescription drug use increased dramatically over the past decade, reaching 2.8 billion retail prescriptions in 2000, a 46 percent increase from 1992 (Exhibit 2).8 Retail drug sales ($121.8 billion) accounted for 11 percent of national personal health spending in 2000.9 Comparable prescription volume data for the institutional sector (for example, hospitals) are not available. However, drug manufacturers’ wholesale drug sales data do include the hospital sector, where data show modest increases in hospital drug sales over the late 1990s (Exhibit 2).10 Studies suggest a continued high annual growth rate in drug spending with the impact of new drugs considered, rate increases are projected to average 13–16 percent annually between 2000 and 2004.11

■ Pharmacist workload increases. The striking prescription growth, coupled with a modest supply increase, led to a dramatic increase in pharmacists’ workloads. The average number of prescriptions dispensed by retail pharmacists annually increased by 35 percent, from 16,500 in 1992 to 22,200 in 2000 (Exhibit 2).12 The demand to manage more prescription-related administrative and billing tasks also increased, taking 10–20 percent of retail pharmacists’ time.13 The HRSA study reported that workload pressures reduced pharmacists’ time available to counsel patients and that job-related stress and longer work hours led to on-the-job fatigue, potentially increasing the risk of dispensing errors.

■ Employment shifts for pharmacists. The number of pharmacist positions measured by the Bureau of Labor Statistics (BLS) increased in the late 1990s, with some volatility, as is characteristic of employment data (Ex-

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**EXHIBIT 1**
Active Pharmacists, Pharmacy Schools, And Pharmacy Graduates, Selected Years 1980–2005

|----------|-------|-------|-------|-------|-------|-------|-------|-------
| Active pharmacists | 142,400 | 153,500 | 171,600 | 181,000 | 184,100 | 189,700 | 196,000 | 210,300 |
| Pharmacists per 100,000 population | 62 | 64 | 68 | 69 | 69 | 70 | 71 | 73 |
| Female pharmacists | 18% | 24% | 32% | 39% | 41% | 44% | 46% | 53% |
| Pharmacy schools | 72 | 72 | 74 | 75 | 75 | 80 | 81 | 81 |
| Total graduates | 7,131 | 5,640 | 7,122 | 7,765 | 7,943 | 7,333 | 7,195 | 8,050 |
| PharmD degree | 4% | 10% | 17% | 21% | 23% | 36% | 60% | 100% |
| Women | 40% | 54% | 62% | 63% | 63% | 64% | 65% | 65% |

**SOURCE:** Health Resources and Services Administration, Bureau of Health Professions, supply model; and American Association of Colleges of Pharmacy.

*Projected.
Two-thirds of pharmacists worked in retail or community pharmacies (independent drug stores, chain drug stores, food stores, and mass merchants) and 25 percent in non-retail health services (predominantly hospitals but also skilled nursing facilities and home health) in 2000. Jobs in nontraditional areas (business, government, wholesale trade) increased steadily to 10 percent by 2000.

Pharmacist positions in retail pharmacy declined 3). Two-thirds of pharmacists worked in retail or community pharmacies (independent drug stores, chain drug stores, food stores, and mass merchants) and 25 percent in non-retail health services (predominantly hospitals but also skilled nursing facilities and home health) in 2000. Jobs in nontraditional areas (business, government, wholesale trade) increased steadily to 10 percent by 2000.

Pharmacist positions in retail pharmacy decreased}

### Exhibit 2
Retail Prescription Volume, Prescriptions Per Pharmacist, and Retail And Pharmaceutical Manufacturers’ Prescription Drug Sales, 1992–2000

<table>
<thead>
<tr>
<th>Year</th>
<th>Retail prescriptions dispensed (millions)</th>
<th>Prescriptions dispensed per retail pharmacist per year</th>
<th>Retail prescription sales (billions)</th>
<th>Pharmaceutical manufacturers’ sales (billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>1,947</td>
<td>16,500</td>
<td>$46.6</td>
<td>$78.0</td>
</tr>
<tr>
<td>1993</td>
<td>1,964</td>
<td>16,600</td>
<td>$51.3</td>
<td>$88.0</td>
</tr>
<tr>
<td>1994</td>
<td>2,016</td>
<td>17,600</td>
<td>$54.6</td>
<td>$37.8</td>
</tr>
<tr>
<td>1995</td>
<td>2,212</td>
<td>18,200</td>
<td>$60.8</td>
<td>$42.4</td>
</tr>
<tr>
<td>1996</td>
<td>2,316</td>
<td>19,000</td>
<td>$67.2</td>
<td>$49.6</td>
</tr>
<tr>
<td>1997</td>
<td>2,481</td>
<td>21,400</td>
<td>$75.7</td>
<td>$59.6</td>
</tr>
<tr>
<td>1998</td>
<td>2,707</td>
<td>22,200</td>
<td>$87.2</td>
<td>$67.1</td>
</tr>
<tr>
<td>1999</td>
<td>2,843</td>
<td>21,400</td>
<td>$103.9</td>
<td>$140.0</td>
</tr>
<tr>
<td>2000</td>
<td>2,707</td>
<td>21,400</td>
<td>$121.8</td>
<td></td>
</tr>
</tbody>
</table>

**Sources:** National Association of Chain Drug Stores; Health Resources and Services Administration, The Pharmacist Workforce reports and authors' calculations of prescriptions per pharmacist; and Centers for Medicare and Medicaid Services.

### Exhibit 3
Pharmacists’ Employment By Industry, Retail Pharmacy Stores, And Pharmacists’ Income, Selected Years 1990–2000

<table>
<thead>
<tr>
<th>Year</th>
<th>Pharmacists’ employment</th>
<th>Self-employed pharmacists</th>
<th>Retail and community pharmacies</th>
<th>Health services</th>
<th>Othera</th>
<th>Retail pharmacies/drug stores</th>
<th>Chain drug stores</th>
<th>Independent drug stores</th>
<th>Food stores</th>
<th>Mass merchants</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>167,450</td>
<td>9.0%</td>
<td>60.2</td>
<td>26.5</td>
<td>4.2</td>
<td>58,642</td>
<td>18,638</td>
<td>31,879</td>
<td>4,641</td>
<td>3,484</td>
</tr>
<tr>
<td>1992</td>
<td>162,673</td>
<td>6.2%</td>
<td>57.8</td>
<td>30.8</td>
<td>5.2</td>
<td>54,043</td>
<td>17,806</td>
<td>27,305</td>
<td>4,948</td>
<td>3,994</td>
</tr>
<tr>
<td>1994</td>
<td>167,458</td>
<td>4.2%</td>
<td>58.8</td>
<td>30.3</td>
<td>6.7</td>
<td>53,243</td>
<td>18,103</td>
<td>24,862</td>
<td>5,719</td>
<td>4,559</td>
</tr>
<tr>
<td>1996</td>
<td>171,689</td>
<td>4.7%</td>
<td>58.5</td>
<td>30.9</td>
<td>6.9</td>
<td>51,377</td>
<td>18,523</td>
<td>22,006</td>
<td>6,155</td>
<td>4,693</td>
</tr>
<tr>
<td>1998</td>
<td>184,388</td>
<td>3.4%</td>
<td>57.9</td>
<td>29.9</td>
<td>9.6</td>
<td>51,966</td>
<td>19,108</td>
<td>20,641</td>
<td>6,963</td>
<td>5,254</td>
</tr>
<tr>
<td>2000</td>
<td>216,864</td>
<td>2.8%</td>
<td>62.7</td>
<td>29.1</td>
<td>10.0</td>
<td>216,865</td>
<td>20,298</td>
<td>20,896</td>
<td>8,268</td>
<td>5,549</td>
</tr>
</tbody>
</table>

**Sources:** Bureau of Labor Statistics (BLS); National Association of Chain Drug Stores; and C. Ukens, “Up, Up, and Away,” Drug Topics (19 March 2001); 25–35.

b Includes hospitals, long-term care facilities, and home health.
c Includes business, insurance, wholesale trade, government, education, and other.
d Includes salaries, bonuses, and overtime.
clined over the early 1990s, with a rebound in 1994 and substantial growth through 2000. (The number of self-employed pharmacists, largely owners of small independent drug stores, dropped throughout the decade.) These employment data are consistent with changes in the number of retail pharmacy stores. As a result of substantial losses in the early 1990s, there were 3,600 fewer stores at the end of the decade, despite expansions in chain drug stores and particularly food and mass merchandise-based pharmacies (Exhibit 3). 15

Responses To The Shortage

A classic market response to the pharmacist shortage would be a rise in pharmacists’ wages (as seen in Exhibit 3) that induced more work hours from pharmacists (including working more than one job), stimulated re-entry into the workforce, and attracted new workers. The data confirm wage increases and striking growth in pharmacist positions (although salary competition has worked against employers with fewer financial resources such as public and rural hospitals and government and educational institutions). However, the production of more U.S. pharmacists is constrained by the long professional education period. Further, because of high U.S. educational requirements, very few pharmacists trained outside of the United States enter and become licensed (about 300 per year), and this is not likely to change in the near future. 16

U.S. pharmacy school graduates. The production of new pharmacists is dependent upon U.S. pharmacy schools. There were 73,500 new U.S. pharmacist graduates during the 1990s; various factors (curriculum changes, new schools opening, changing applicant pools) affected annual graduate counts (see Exhibit 1). 17 The annual count is expected to rise to about 8,000 by 2005 and to remain there throughout the decade. 18 Whether the shortage will stimulate further increases in graduates or new schools opening is dependent on issues that are difficult to predict, such as educational funding support, applicant pools, and faculty recruitment and retention (made more difficult by the shortage). Notably, there has been a marked increase in the number of women entering the profession, from 14 percent of graduates in the 1960s, to 30 percent in the 1970s, to 65 percent in the 1990s. 19 Women made up 12 percent of practicing pharmacists in 1970 and 46 percent in 2000 (see Exhibit 1). 20 Female pharmacists report working fewer hours per week (thirty-seven) than their male peers (forty-four) and are more likely to work part time (28 percent versus 11 percent). 21 If these work patterns continue, the large number of women will tend to reduce aggregate hours produced by the pharmacist workforce.

Pharmacy technicians. Other market responses to the shortage include the use of substitute labor and technology applications to increase productivity. Labor substitution is evident in the dramatic job growth in pharmacist extenders (pharmacy technicians and assistants), from 123,000 in 1996 to 247,000 in 2000. 22 However, highly variable and often limited training (for example, six hours of on-the-job training) for technicians is a problem. Pharmacists have been reluctant to delegate many dispensing tasks to technicians, and the profession has expressed concern that lack of sufficient training threatens the safety of medication dispensing. 23 While pharmacy technicians work under the supervision of a pharmacist and many states regulate the supervisory ratios, these requirements have not been viewed as a sufficient solution. A national technician-credentialing effort represents a recent step to address this issue, but it is voluntary in almost all states. 24

A successful demonstration project addressed the training issue by combining strong and graded pharmacy technician training with a career track, which allowed for safe task delegation and a higher technician-to-pharmacist ratio (6:1) than is found in traditional private settings (for example, 1:1 to 2:1). 25 Variations of this model, which is located within a closed health care system (the U.S. military), could be implemented in other settings.

Technology applications. Technology that can improve pharmacists’ productivity is available (such as dispensing robotics, bar
Coding, and information systems). Substantial productivity gains have been achieved in a refill prescription program (the Consolidated Mail Outpatient Pharmacy) of the U.S. Department of Veterans Affairs (VA), which combines automation and staffing efficiencies to produce 65,000 refill prescriptions annually per full-time-equivalent (FTE) worker. Mail-order and Internet pharmacy services use similar technology and have captured a greater market share in recent years (see Exhibit 2).

Pharmacists’ Expanding Roles

Over the past forty years the pharmacy profession has expanded its role beyond dispensing medications to include more clinical functions. This shift has been supported by the enhanced clinical education required for the doctor of pharmacy, or PharmD, degree, which will replace the baccalaureate degree as the required entry-level degree in 2004. The PharmD degree requires four years of pharmacy education and is more clinically focused. Additionally, one- and two-year postgraduate education or residencies provide advanced general pharmacy practice and specialty training. This training prepares pharmacists for clinical pharmacy responsibilities in complex care settings (for example, transplantation services, cancer centers, and intensive and critical care hospital units).

Enhanced practice in community pharmacies. Shifting from a dispensing focus to a patient focus has been particularly challenging in community and retail pharmacies. Progress in the past five years has included offering expanded patient counseling, immunizations, and medication-dependent disease management for persons with certain chronic conditions (such as asthma, diabetes, hypertension, and high cholesterol). Surveys tracking pharmacists’ activities in hospitals and integrated health system clinics have reported a wide range of clinical and management functions: tracking adverse drug effects, participating in programs to reduce medication errors, monitoring patients’ compliance with medication use, and conducting medication management programs.

Pharmaceutical care services for older adults. Older adults—particularly persons with multiple medical conditions—use more prescription drugs than younger persons do. In 2000 older adults with drug coverage had an average of twenty-six prescriptions that year, compared with seven prescriptions for those under age sixty-five. The risk of inappropriate and potentially harmful medication use is high for persons over age sixty-five, estimated as one in five prescription medication users. Further research is essential if we are to better understand the costs and benefits of greater clinical pharmacist involvement in managing older adults’ pharmaceutical care. The lack of third-party reimbursement for pharmacists’ advanced clinical services is a barrier that must be addressed (most insurers cover only a dispensing fee). A physician group’s recent position paper supported limited professional reimbursement for pharmacists and called for further research on physician-pharmacist collaboration in community-based pharmaceutical services. Proposals before Congress would expand pharmacists’ Medicare professional provider status (currently pharmacists are approved only as immunization providers) under a Medicare prescription drug benefit.

Redesigning the medication-use system. Two recent Institute of Medicine (IOM) reports that describe deficits in quality and safety within the U.S. health care system contain relevant criticisms of the current medication-use process. The pharmacy profession has discussed the need to “re-engineer the medication use system” to reduce preventable drug therapy–related adverse outcomes; to identify well-functioning models and to develop strategies to evaluate and implement additional models; and to encourage interprofessional collaboration. The importance of having an effective process cannot be overstated. Medications are an increasingly central component of overall medical care; and the future holds even greater promise for more-effective therapies.

However, system redesign will be challenging, because physical, organizational, and in-
formational separation of many pharmacists and pharmacies from other health care providers creates major structural and process barriers (for example, lack of patient medical information, patient confidentiality concerns, limited professional communication, multiple approved formularies). The market direction seems to have pharmacists delivering services in settings designed more for consumers’ convenience than for integrated health care delivery. Pharmacists working in integrated systems such as the Indian Health Service, VA clinics, and Kaiser Permanente have developed more functional (for patients and staff) models.

**Concluding Observations**

The unprecedented demand for prescription drugs has challenged the pharmacist profession, and although automation and pharmacist extenders may increase dispensing efficiency, the overall demand for pharmaceutical care will remain high. The pharmacist shortage and other stresses come at a time when developing and testing modern pharmacy practice models are critical steps toward improving the medication-use process.

As medications have become increasingly more effective, widely used, and costly, pharmacists’ role in assuring their proper use has become even more important. Recognition that safety and quality in medication use are essential has led to positive steps to integrate pharmaceutical care in hospital practice. However, the majority of medication use occurs in community pharmacies, where barriers will make change slow, difficult, and expensive.

To date, the medication-use process has not been a priority in health care policy, and there is limited research to inform redesign efforts. It is time that this component of health care receives adequate attention, to more systematically address current shortcomings. An important part of this process will be efforts to develop and assess new models of pharmaceutical care that embrace the IOM principles and optimally engage pharmacists.

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**NOTES**


3. Ibid.

4. Ibid.


6. HRSA, *The Pharmacist Workforce*.


10. Pharmaceutical manufacturer sales data provided by Laura Miller, NACDS, personal communication, 11 February 2002.


12. HRSA, The Pharmacist Workforce.

13. Ibid.


15. NACDS, The Chain Pharmacy.


19. AACP, Profile of Pharmacy Students.


22. BLS estimates of pharmacy technicians and pharmacy aides, which were not reported separately in recent years. Cosca, BLS, personal communication, 31 January 2002.


33. For example, the Medicare Pharmacist Services Coverage Act of 2001 (S. 974 and H.R. 2799) would amend title XVIII of the Social Security Act to provide for coverage of pharmacist services under Part B of the Medicare program, thomas.loc.gov (11 July 2002).

