CHAPTER 2

Overview of the History of Hospital Pharmacy in the United States

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LEARNING OBJECTIVES

After completing this chapter, readers should be able to:

1. Describe how hospital pharmacy developed in the United States.
2. Analyze the forces that shaped the hospital pharmacy movement.
3. Use history to discuss challenges to the future of institutional practice.
4. Discuss how professional organizations such as ASHP advanced the practice of institutional pharmacy practice.
5. Define key terms associated with the history of hospital pharmacy.

KEY TERMS AND DEFINITIONS

- **ASHP Hilton Head conference:** A conference of hospital pharmacy leaders and pharmacy educators conducted in 1985 in Hilton Head, South Carolina, which emerged with the idea that hospital pharmacies should function as clinical departments with the mission of fostering the appropriate use of medicines.
- **Formulary:** A list of drugs approved for use within the hospital or health system by the pharmacy and therapeutics (P&T) committee.
- **Formulary system:** A structure whereby the medical staff of a hospital or health system, working through the P&T committee, evaluates, appraises, and selects from among the drug products available those that are considered most useful in patient care. It is also the framework in which medication-use policies are established and implemented.
- **Full-time equivalent (FTE):** A method for standardizing the number of full- and part-time employees working in an institution. A full-time employee working a 40-hour week is equal to one full-time equivalent (FTE), and an employee who works for 20 hours per week is equal to 0.5 FTE.
- ***Mirror to Hospital Pharmacy*:** A publication documenting the state of pharmacy services in hospitals in the late 1950s.
- **Pharmacy and therapeutics (P&T) committee:** A committee of the medical staff of a hospital or health system with oversight for medication management. The committee establishes a formulary, assesses medication use, and makes recommendations on policies and procedures associated with medication management. It is made up of representatives of the medical staff, administration, pharmacy, nursing, and other parties interested in the medication-use process; a pharmacist often serves as secretary of the committee.
- **Practice standard:** An authoritative advisory document, issued by an expert body, which offers advice on the minimum requirements or optimal method for addressing an important issue or problem. It does not typically have the force of law.

INTRODUCTION

Hospitals and other institutional practice settings today offer immense opportunities for pharmacists who want to practice in an environment that draws on the full range of their professional education and training. It was not always so.

This chapter tells the story of how hospital pharmacy developed in this country, analyzes the forces that shaped the hospital pharmacy movement, and draws lessons from the changes in this area of pharmacy practice.

HOSPITAL PHARMACY'S NASCENCE[a,1–4]

Pharmacists have been associated with hospitals as long as there have been hospitals in America. When the Pennsylvania Hospital (the first hospital in Colonial America) was established in 1752, Jonathan Roberts was appointed as its apothecary. At that time, medicine and pharmacy were commonly practiced together in the community, with drug preparation often the responsibility of a medical apprentice.[5]

However, hospital pharmacy practice in the United States never developed into a significant movement until the 1920s. Although there were important milestones before that era (including the pioneering hospital pharmacy practices of Charles Rice [1841–1901][6] [see **Figure 2-1**] and Martin Wilbert [1865–1916][7]), many factors kept hospital pharmacy at the fringes of the broader development of pharmacy practice and pharmacy education.

For much of the nation's history, hospital pharmacists were rare because there were few hospitals. In 1800, with a population of 5 million, the nation had only two hospitals. Even by 1873, with a population of 43 million, the United States had only 178 hospitals with fewer than 50,000 beds.[2] This might have not been a bad thing, because hospitals were "places of dreaded impurity and exiled human wreckage," and physicians seldom had anything to do with them.[8] Hospitals played a small role in healthcare, and pharmacists played a very small role in hospitals.

1800s

In the early to mid-1800s, drug therapy consisted of strong cathartics, emetics, and diaphoretics. Clean air and good food rather than medicines were the treatments emphasized in hospitals. The medical elite avoided drug use or used newer alkaloidal drugs such as morphine, strychnine, and quinine. An organized pharmacy service was not seen as necessary in hospitals, except in the largest facilities. The situation changed somewhat during the Civil War when hospital directors sought out pharmacists for their experience in extemporaneous manufacturing and in purchasing medical goods.[2]

In the 1870s and 1880s, responding to the influx of immigrants, the number of hospitals in cities doubled. Most immigrants in this period were Roman Catholic, and they built Catholic hospitals. This was significant for two reasons—Catholic hospitals charged patients a small fee (which allowed services to be improved) and they were willing to train, or obtain training for, nuns in pharmacy (see **Figure 2-2**).[9] This era of hospital expansion

[a]American Society of Health-System Pharmacists (ASHP) in conjunction with anniversaries of its 1942 founding published well-documented accounts of the development of hospital pharmacy practice in the United States. Particularly noteworthy are the "decennial issue" of the *Bulletin of the American Society of Hospital Pharmacists* and articles that marked ASHP's 50th anniversary.[1-3] Readers who have an interest in more detail are encouraged to seek out those references and others.[4] This section of the chapter is based closely on reference 2.

FIGURE 2-1. Hospital Pharmacy Department, Bellevue Hospital, New York City, late 1800s.

The bulk medicine area, where medicines were packaged for use on the wards, at Bellevue Hospital, New York City, in the late 1800s. Standing on the right is Charles Rice, the eminent chief pharmacist at Bellevue, who headed three revisions of the *United States Pharmacopeia*.
Source: AJHP.

coincided with reforms in nursing, development of germ theories, and the rise of scientific medicine and surgery. The general adoption of aseptic surgery in the 1890s made the hospital the center of medical care. Advances in surgery led to growth of community hospitals, most of which were small and relied on community pharmacies to supply medicines.[2]

EARLY 1900s

By the early 20th century, hospitals had developed to the point of having more division of labor, more specialization in medical practice, a greater need for professional pharmaceutical services for handling complex therapies, and recognition that it was more economical to fill inpatient orders in-house. Hospital pharmacists retained the traditional role of compounding, which fostered a sense of camaraderie among them and an impetus to improve product quality and standardization. The advent of the hospital formulary concept persuaded many hospital leaders about the value of professional pharmaceutical services. An important reason for hiring a hospital pharmacist in the 1920s was Prohibition—alcohol was commonly prescribed, and a pharmacist was needed for both inventory control and to manufacture alcohol-containing preparations, which were expensive to obtain commercially.[2]

KEY POINT . . .

Catholic hospitals were important to the progress of hospital pharmacy because they charged patients a small fee (which allowed services to be improved), and they were willing to train, or obtain training for, nuns in pharmacy.

. . . SO WHAT?

It might surprise some students and young pharmacists of the critical importance of religious organizations in the progress of the pharmacy profession. Look at pictures of hospital pharmacy leaders in the 20th century, and it will be common to see nuns prominent among that group.

FIGURE 2-2. Sisters of Mercy in the pharmacy department of St. Francis Hospital in New York City during the mid-1950s.

Catholic nuns were instrumental in developing U.S. hospital pharmacy practice. In the late 1950s, more than half of the women who were chief pharmacists in hospitals were members of a religious order.

Source: From the Drug Topics Collection, Kremers Reference Files, American Institute of the History of Pharmacy.

By the 1930s, pharmacy-related issues in hospitals had coalesced to the point that the American Hospital Association (AHA) created a Committee on Pharmacy to analyze the problems and make recommendations. Hospital pharmacy leaders considered the 1937 report of that committee so seminal that even a decade later they saw value in republishing it.[10] The committee's aim was to develop minimum standards for hospital pharmacy departments and to prepare a manual on pharmacy operations. The committee characterized pharmacy practices in hospitals at the time as "chaotic" and commented, "Few departments in hospital performance have been given less attention by and large than the hospital pharmacy." In the committee's view, "…any hospital larger than one hundred beds warrants the employment of a registered pharmacist…. Unregistered or incompetent service should not be countenanced, not only because of legal complications but to insure absolute safety to the patient."[10] The proliferation of unapproved and proprietary drug products in hospitals was the target of the committee's extensive criticism.

KEY POINT . . .

It was not until the 1930s that hospital leaders explicitly recognized the need for pharmacy services.

. . . SO WHAT?

Pharmacy may have a long history, but it was only about 80 years ago that hospital leaders recognized a need for pharmacists.

A 60-YEAR PERSPECTIVE

There is much that can be learned by comparing contemporary hospital pharmacy with practice of 60 years ago. Sixty years is a comprehensible period of time for most people and, in hospital pharmacy's case, the past six decades were a period of astonishing advancement.

Good data sources for making such a comparison are available. A major study of hospital pharmacy was conducted between 1957 and 1960—the Audit of Pharmaceutical Services in Hospitals—and published in a book, *Mirror to Hospital Pharmacy*, which remains a reference of monumental importance.[11,12] Over the years, ASHP (American Society of Health-System Pharmacists and before 1995 known as the American Society of Hospital Pharmacists) has documented the progress of hospital pharmacy through its annual surveys of pharmacy practice in hospital settings, yielding contemporary data for comparison with figures from an earlier era. Five major themes emerge from an examination of changes over this period:

1. Hospitals have recognized universally that pharmacists must be in charge of drug product acquisition, distribution, and control.
2. Hospital pharmacy departments have assumed a major role in patient safety.
3. Hospital pharmacy departments have assumed a major role in promoting rational drug therapy.
4. Many hospital pharmacists have become patient care providers.
5. Hospital pharmacy departments have expanded their clinical activities to include patients in ambulatory care clinics.

To fully appreciate the changes in hospital pharmacy over the past 60 years or so, it is important to keep in mind what was happening in the United States as a whole. Since 1950, the U.S. population has more than doubled. Expenditures for healthcare services have grown from about 5% of gross domestic product to more than 17% (which has fostered an enduring stream of initiatives to curtail healthcare spending). Nonfederal, short-term general hospitals in 1950 numbered 5,031 and rose to a zenith of 5,979 in 1975; in 2012 the number stood at 5,010—16% fewer than the peak of 37 years earlier. On a per-capita basis, the number of inpatient hospital beds has declined 22% since 1950. Between 1965 and 2012, hospital outpatient visits increased nearly sevenfold.[13-15]

DRUG PRODUCT ACQUISITION, DISTRIBUTION, AND CONTROL

Sixty years ago, pharmaceutical services were still of marginal importance to hospitals. The 1949 hospital rating system of the American College of Surgeons had only three questions related to pharmacy, and responses to those questions contributed only 10% to the overall rating. Pharmacy was perceived as a complementary service department, not as an essential service.[16]

Fewer than half the hospital beds in the nation (47%) in the late 1950s were located in facilities that had the services of a full-time pharmacist.[11] Fewer than 4 out of 10 hospitals (39%) had the services of a pharmacist. Hospital size was an important determinant of the availability of a pharmacist. All larger short-term institutions—those with 300 beds or more—employed a

KEY POINT . . .

In the late 1950s, fewer than 4 out of 10 hospitals had the services of a full-time pharmacist.

. . . SO WHAT?

Many of today's pharmacists were born in hospitals without a pharmacist providing oversight for their care.

full-time pharmacist. Pharmacist employment declined sharply with decreasing hospital size—for hospitals of 200–299 beds, 96% employed pharmacists; 100–199 beds, 72%; 50–99 beds, 18%; and under 50 beds, 3.5%.

Today, the vast majority of U.S. hospitals have the services of one or more pharmacists. Important exceptions are small rural hospitals that sometimes still rely on the services of local community pharmacists. About 8% of the nation's hospitals have fewer than 25 beds; it is not known how many of them employ a pharmacist.

In 1957, the total number of hospital pharmacists was 4,850 full-time and about 1,000 part-time.[11] Today, there are about 60,000 **full-time equivalent (FTE)** pharmacists providing inpatient services in nonfederal short-term hospitals.[17] (Hospitals employ approximately an equal number of pharmacy technicians.) About one-fourth of all actively practicing pharmacists in the United States work in hospitals.

Today's hospitals employ approximately 17 FTE pharmacists per 100 occupied beds.[17] The comparable figure for 1957 was approximately 0.4 FTE pharmacists per 100 occupied beds. In other words, pharmacist staffing in hospitals is about 40 times more intensive today than it was 60 years ago. During the same interval, the intensity of hospital staffing as a whole increased approximately fivefold.[14,18] Reflective of more intensified pharmacist staffing, about 40% of hospitals offer 24-hour inpatient pharmacy services.[17]

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. . . SO WHAT?

The public image of the pharmacist is one working in an independent or chain pharmacy in the community. The public is generally unaware of the large number of pharmacists providing innovative services in hospitals and other institutional settings.

In the middle of the 20th century, nurses and community pharmacists—not hospital pharmacists—were responsible for hospital drug product acquisition, distribution, and control in many hospitals. The *Mirror to Hospital Pharmacy* estimated that 4,000 nurses were engaged in pharmacy work.

Two types of services—bulk compounding and sterile solution manufacturing—were a major element of the hospital pharmacists' professional identity in the 1950s (**Figure 2-3**). Hospital pharmacy leaders of the time cited the following factors in explaining the heavy involvement in manufacturing:

- The unsuitability of many commercially available dosage forms for hospital use
- The close relationship between physicians and pharmacists in hospitals
- The opportunity to serve a need of physicians and patients
- The opportunity to offer a professional service and build interprofessional relations[10]

In sharp contrast to 60 years ago, hospital pharmacists now prefer to purchase commercial products whenever they are available, in the interests of appropriate deployment of the workforce and of using products of standard commercial quality. Changes in the laws and regulations that govern drug product manufacturing and distribution, the development of a well-regulated generic pharmaceutical industry, and a shift in the perceived mission of pharmacy practice were among the factors that led to the relegation of manufacturing to hospital pharmacy's past.

In summary, from mid-20th century to today, hospital pharmacy in the United States moved from an optional service to an essential service. It used to be that the administrator, the physicians, and the nurses in many institutions, especially smaller facilities, believed

that they could function adequately with a drug room controlled by nurses. Today it is beyond question by anyone in the hospital field that medications need to be controlled by a pharmacy department managed and staffed by qualified pharmacists supported by qualified pharmacy technicians. Moreover, as pharmacists have become firmly established in hospitals, they have been recognized for their expertise beyond drug acquisition, distribution, and control functions, which has led to greatly intensified pharmacy staffing. The growing opportunities in hospitals have attracted more practitioners to the field, which has made hospital practice a major sector of the profession.

KEY POINT . . .

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. . . SO WHAT?

Over the years, pharmacists have identified opportunities in healthcare institutions and carved out roles in managing the medication-use process. This has taken leadership, hard work, building strong professional relationships, and caring for the patient.

PATIENT SAFETY

A clarion call to professionalism in hospital pharmacy arose in the 1960s following studies on the incidence of medication errors in hospitals.[19] Hospital pharmacists have made immense progress in this arena. Initially, that progress was gauged in terms of minimizing errors in dispensing and administration of medications, and it has evolved to also focus on improving prescribing and ensuring that the intended results from medication use are achieved.

FIGURE 2-3. Sterile Solution Laboratory, Cardinal Glennon Memorial Hospital for Children, St. Louis, Missouri, circa 1950s. Production of distilled water and the manufacture of large-volume sterile solutions were major pharmacy activities in medium and large hospitals in the 1950s and 1960s.

Source: ASHP Archives.

In 1957, drug products were distributed to hospital inpatients using floor stock or individual-patient prescription systems.[11] Authors of the *Mirror to Hospital Pharmacy* highlighted a critical limitation of medication systems of that era:

> *From the viewpoint of patient safety, one of the major advances in dispensing procedures would be the interpretation by the pharmacist of the physician's original … order for the patient. In many hospitals, the pharmacist never sees the physician's original order. In cases where the physician does write an original prescription, he does so only for a limited number of drugs, the other drugs being stock items on the nursing units. In many cases the pharmacist receives only an order transcribed by a nurse or even more commonly by a lay person such as a ward clerk. As a result, errors made by the prescribing physician and errors made in transcribing his orders often go undetected, while the patient receives the wrong drug, the wrong dosage form, or wrong amount of the drug, or is given the drug by injection when oral administration was intended, and vice versa.*[11(p115)]

Studies documented important benefits to unit dose drug distribution, including greater nursing efficiency, better use of the pharmacist's talents, cost savings, and improved patient safety.[20,21] The key elements of unit dose drug distribution, as the system has evolved from the original studies, are as follows:

1. The pharmacist receives the physician's original order or a direct copy of the order.
2. A pharmacist reviews the medication order before the first dose is dispensed.
3. Medications are contained in single-unit packaging that is labeled appropriately.
4. Medications are dispensed in as ready-to-administer form as possible.
5. Not more than a 24-hour supply of doses is delivered or available at the patient care area at any time.
6. A patient medication profile is concurrently maintained for each patient.[22]

These fundamental precepts for safe drug distribution are met widely in U.S. hospitals today.[17]

Early unit dose drug distribution systems were very labor intensive, which stimulated an expansion in the use of pharmacy technicians (see **Figure 2-4**).[23] Working from pharmacist-reviewed handwritten physician orders, pharmacy staff added patients' medications (in unit dose packages) to mobile cabinets, which were then transported to patient care areas. Guided by a record of physicians' orders, nurses administered the medications and manually created a medication-administration record. Modern unit dose systems are highly automated, including the use of computerized physician order entry (with clinical decision support in most hospitals), application of machine-readable labeling of unit dose packages in dispensing and administration, robotic picking of doses for unit dose carts, or automated dispensing cabinets that are accessed by nurses. U.S. hospitals have exerted immense effort in applying computer technology to improve the safety of the medication-use process, stimulated in part by federal incentives.[24]

The development of pharmacy-based intravenous (IV) admixture services, beginning in the 1960s, made a tremendous contribution to patient safety. Previously, nurses largely carried out this task in patient care areas.[25]

Because of the advocacy of groups such as the National Academy of Medicine and various federal health agencies, improving patient safety is a major national priority.[26] Because that general interest in patient safety embraces medication-use safety, hospital pharmacists have cheered and felt "it's about time!" Breakthrough advances in medication-use safety will depend on further reengineering of the entire medication-use process, a shift toward a true team culture in providing care, and continued implementation of information technology.[27]

PROMOTING RATIONAL DRUG USE

Edward Spease (dean of the School of Pharmacy at Western Reserve University) and Robert Porter (chief pharmacist at the University's hospitals) first promulgated the concept of a **pharmacy and therapeutics (P&T) committee** in U.S. hospitals as a formal mechanism for the pharmacy department and the medical staff to communicate on drug-use issues in 1936.[11(p139)] Subsequently, the AHA and ASHP jointly developed guidance on the P&T committee and on the operation of a hospital formulary system. The **formulary system** is a method whereby the medical staff of a hospital, working through the P&T committee, evaluates and selects from among the drug products available those that are considered most useful in patient care. The formulary system is also the framework in which a hospital's medication-use policies are established and implemented.

A major imperative for the advocates of the formulary system in the mid-1900s was to manage the proliferation of drug products. In just one year, 1951, the number of market entries consisted of 330 new drug products, including 35 new drug entities, 74 duplications of drug entities, and 221 combination products.[28] In 1957, slightly more than half of all hospitals operated under the formulary system.[11] Today, essentially all hospitals do so.[17] In 1957, 58% of hospitals had an active P&T committee, and a similar percentage of hospitals had a **formulary** or approved drug list. However, about one-fourth of the P&T committees were inactive.[11] Today, nearly all hospitals in the United States have an active P&T committee that meets an average of seven times a year.[29]

In the late 1950s, the functions of P&T committees focused on very basic activities such as delegating to the chief pharmacist responsibility for preparing product specifications and selecting sources of supply (66% of committees) and approving drugs by nonproprietary name (50%).[11] In most hospitals today, under the guidance of the P&T committee, pharmacists are involved in selecting a patient's medication and its dosing following a physician's diagnosis, developing drug therapy guidelines, engaging in therapeutic interchange, and conducting medication-use evaluations.[29]

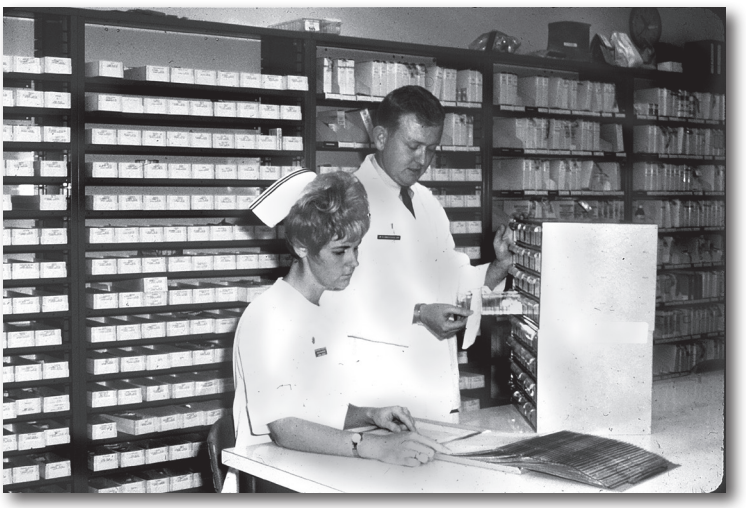

FIGURE 2-4. A sense of the labor- and paper-intensiveness of early unit dose drug distribution systems is conveyed in this image from the pharmacy department at Providence Hospital, Seattle, Washington, circa mid-1960s.
Source: ASHP Archives, Herbert Flack Photograph Collection.

In summary, concepts first advanced in the 1930s regarding a formal linkage between the hospital pharmacy department and the medical staff with respect to drug-use policy have taken hold firmly. Hospital pharmacists are heavily engaged in helping the medical staff establish drug-use policies, in implementing those policies, in monitoring compliance with those policies, and in taking corrective action as needed. Additionally, there is a trend toward authorizing hospital pharmacists to select the medication regimen for a patient after a physician has made the diagnosis. The invention of the P&T committee and the formulary system has facilitated continuous advancement in the involvement of pharmacists in promoting rational drug use in hospitals.

KEY POINT . . .

The invention of the P&T committee and the hospital formulary system has facilitated the deep involvement of pharmacists in promoting rational drug use in hospitals.

. . . SO WHAT?

The pharmacist's role on the P&T committee has allowed pharmacists to build their professional standing in institutions. If they had never accepted leadership in establishing and maintaining these committees, their influence might have been diminished.

HOSPITAL PHARMACISTS AS PATIENT CARE PROVIDERS

U.S. hospital pharmacists have evolved markedly in their self-concept over the past 60 years. Thirty years ago, the traditional pharmacist mission still predominated, a mission that was captured in the words, *right drug, right patient, right time,* connoting a drug-product-handling function. *Right drug* in this context meant whatever the physician ordered. Today's philosophy about the mission of pharmacists focuses on whether patients are achieving the optimal outcomes from the use of medicines. An expression sometimes used to summarize this philosophy is, "The pharmacist is responsible for helping a patient make the best use of medicines."[30] The Joint Commission of Pharmacy Practitioners (JCPP), an alliance of all national pharmacist organizations, has expressed its consensus vision as follows: "Patients achieve optimal health and medication outcomes with pharmacists as essential and accountable providers within patient-centered, team-based healthcare."[31] However expressed, the words reflect a profound paradigm shift with respect to the primary purpose of pharmacy practice.

The active consensus-building efforts by hospital pharmacy leaders stimulated the transformation of the hospital pharmacy department from a product orientation to a clinical orientation. One important example of such efforts was the **ASHP Hilton Head conference**.[32,33]

The Hilton Head meeting was a consensus-seeking invitational conference conducted in 1985 in Hilton Head, South Carolina, officially designated as an invitational conference on Directions for Clinical Practice in Pharmacy. The purpose of the meeting was to assess the progress of hospital pharmacy departments in implementing clinical pharmacy. What emerged from the event was the idea that clinical pharmacy should not be thought of as something separate from pharmacy practice as a whole. Rather, hospital pharmacies should function as clinical departments with a mission of fostering the appropriate use of medicines. This was a very important idea because most hospital pharmacists thought in terms of adding discrete clinical services (e.g., pharmacokinetic monitoring) rather than conceptualizing the totality of the department's work as a clinical enterprise.

Working through its affiliated state societies, ASHP supported repetitions of the Hilton Head conference on a regional basis. ASHP leaders spoke at meetings around the country about the ideas of Hilton Head, and the *American Journal of Hospital Pharmacy* published numerous papers on the subject.

As a result, many individual pharmacy departments began to hold retreats of their staffs to reassess the fundamental mission of their work. It was common for departments to adopt mission statements that, for the first time, framed their work not in terms of drug distribution but in terms of achieving optimal patient outcomes from the use of medicines. They were supported by a growing body of scientific evidence, published in both the medical and pharmacy literature, about the positive outcomes achieved through pharmacist involvement in direct patient care.[34-37]

In more recent times, ASHP conducted important consensus-seeking events related to the pharmacy practice model in hospitals and in ambulatory care clinics.[38,39] Both conferences issued bold recommendations on how to better align the capacity of pharmacists with the challenge of improving the responsible use of medicines. This challenge faces all sectors of pharmacy practice, and important work is being done on that broader front, as evidenced by JCPP's promulgation of a standard patient care process for pharmacists, which can be applied in all practice settings.[40] Expanded pharmacist engagement in patient care is a natural side benefit of healthcare leaders' efforts to improve team-based patient care.[41]

KEY POINT . . .

After the Hilton Head conference, hospital pharmacy departments began to frame their work not in terms of drug distribution but in terms of achieving optimal patient outcomes from the use of medicines.

. . . SO WHAT?

The Hilton Head conference changed the practice model in institutions away from the process of drug distribution to a system of care that attempts to achieve optimal health outcomes. Many of the profession's initiatives in hospital practice have their origin in this conference.

Some examples of hospital pharmacists' growing role as patient care providers include pharmacists routinely monitoring medication serum levels (95% of hospitals),[42] pharmacists managing anticoagulation therapy (84% of hospitals),[43] pharmacists performing patient care functions in the emergency department (22% of hospitals),[43] and pharmacists routinely assigned to monitor a majority of patients at least 8 hours per day, 5 days per week (53% of hospitals).[17]

In summary, U.S. hospital pharmacists today are engaged in extensive clinical activity (often as full-fledged members of patient care teams), which is a major change from practice of 60 years ago. In many hospitals today, patients can be confident that their medication therapy is receiving close oversight by pharmacists.

HOSPITAL PHARMACISTS AND AMBULATORY CARE

Stimulated by various healthcare marketplace changes (including payment reform), most hospitals have become components of health systems that encompass primary care and specialty physician services as well as other facets of healthcare such as home care, long-term care, outpatient surgery, chemotherapy infusion, and urgent care. The trend in health

insurance coverage is to reward good patient outcomes and penalize poor outcomes, focusing on an entire episode of care, before, during, and after hospitalization. This gives hospitals a strong incentive to ensure that patients experience successful recovery after discharge from inpatient care. Because post-discharge healing and recovery often depend on how well medication therapy is handled, many hospitals are engaging pharmacists in medication adherence and monitoring programs for discharged patients.

A strong movement has emerged to place all facets of the pharmacy enterprise in a health system under consolidated leadership.[44,45] In particular, pharmacy practice leaders who have such system-wide responsibility have moved assertively to establish pharmacists on the patient care teams of primary care and specialty clinics.[45] ASHP data indicate that about one-third of hospitals have pharmacists practicing in ambulatory care or primary care clinics.[17]

There is substantial evidence of patient benefit when pharmacists collaborate closely with primary care and chronic care providers, for example in optimizing the care of patients with diabetes, asthma, or cardiovascular disease.[46] Contemporary observers predict that hospital pharmacists will become increasingly active in rigorously coordinating post-acute care services[47] and that individual hospital pharmacists will have patient care responsibilities for both inpatients and outpatients.[48] Specialized pharmacy residency training[49] and specialty certification[50] are expanding the number of pharmacists who are qualified to contribute to the care of ambulatory patients.

In summary, after a half century of concentrating on the medication-related needs of inpatients, hospital pharmacists are increasingly expanding their focus to the care of ambulatory patients; it is likely that the historic lines separating acute care pharmacy practice from ambulatory care pharmacy practice will become blurred.

RECAP OF MAJOR THEMES

Thus, we have a picture of the thrust of major changes in hospital pharmacy over the past 60 years. The five major themes have been, *first*, the universal recognition by hospitals that pharmacists must be in charge of drug product acquisition, distribution, and control; *second*, hospital pharmacy departments have assumed a major role in patient safety; *third*, pharmacy departments have assumed a major role in promoting rational drug therapy; *fourth*, hospital pharmacists have become patient care providers; and, *finally*, pharmacy departments have expanded their focus to include patients in ambulatory care clinics. Taken together, these changes signify that pharmacy practice in U.S. hospitals over the past 60 years has become more intensive in its professional staffing, more directly focused on patient care, and more directly influential on the quality and outcome of patient care. Hospital pharmacy has been transformed from a marginal, optional activity into a vital profession contributing immensely to the health and well-being of patients and to the stability of the institutions that employ them.

EXPLAINING THE TRANSFORMATION

A combination of indirect and direct factors helps explain this transformation in hospital pharmacy. Indirect factors are those forces external to hospital pharmacy that fostered development of the field. These external factors include the following:

- Shift of national resources into healthcare, especially hospital care (stimulated immensely by implementation of Medicare in 1965 and expansion of other health insurance coverage)

- Expanded research on human health, which led to greater understanding of disease and development of targeted drug therapies
- Greater complexity and cost of drug therapy accompanied by sophisticated pharmaceutical product marketing
- Expanded information technology and automation
- A national commitment to improving healthcare quality and moderation of healthcare expenditures

More important for this chapter's discussion are the internal factors within hospital pharmacy that precipitated the field's advancement. In this category, five points merit discussion:

1. Visionary leadership
2. Professional associations
3. Pharmacy education
4. Postgraduate residency education and training
5. Practice standards

VISIONARY LEADERSHIP

One cannot read the early literature of hospital pharmacy in the United States without being impressed by the clear articulation of an exciting, uplifting vision by that era's practice leaders. These views were being expressed at a time when pharmacy was a marginal profession in the United States; when most pharmacists were engaged primarily in retail, mercantile activities; when hospital pharmacy had little visibility and respect; and when hospital pharmacy was a refuge for pharmacists who preferred minimal interactions with the public. Out of this environment emerged a number of hospital pharmacists, many of them at university teaching hospitals, who expressed an inspiring vision about the development of hospital pharmacy and the role of hospital pharmacy in elevating the status of pharmacy as a whole.

These were leaders such as Arthur Purdum, Edward Spease, Harvey A. K. Whitney, and Donald E. Francke (to mention only a few) who were familiar with the history of pharmacy and had a sense of pharmacy's unfulfilled potential. Many of them had seen Western European pharmacy firsthand and decried the significant gap in professional status and scope of practice between that area of the world and the United States.

KEY POINT . . .

One cannot read the early literature of hospital pharmacy in the United States without being impressed by the clear articulation of an exciting, uplifting vision by that era's practice leaders.

. . . SO WHAT?

Hospital pharmacy has not always been the way it is now. It was built by pharmacists who led change in practice. In order for institutional pharmacy practice to thrive in the future, pharmacy students and newly graduated pharmacists will need to accept leadership positions vacated by pharmacy leaders who retire or leave the profession for other opportunities. They will need to provide a new vision for the profession for the 21st century.

A sense of these leaders' deep feelings is found in the following comment by Edward Spease, a retired pharmacy dean speaking in 1952 about his initial exploration of hospital pharmacy 40 years earlier:

> *I expected to see true professional pharmacy in hospitals and was much disappointed that it did not exist there. The more I observed and heard about the growing tendency towards commercialism in drugstores, the more I felt that if professional pharmacy was to exist, let alone grow to an ideal state, it would have to be in the hospital where the health professions were trained.... Good pharmacy is as important in hospitals away from teaching centers as it is in the teaching and research hospital. It can be developed to a high degree of perfection there, too,* if the pharmacist can get the picture in his mind.[51]

The words, *if the pharmacist can get the picture in his mind*, reflect the goal of creating a new model for pharmacy practice in hospitals that transcended the marginal professionalism that prevailed in most community pharmacies. Spease and other hospital pharmacy leaders of the day were change agents who had a missionary zeal and were blessed with the ability to infect others with their passion.

It is noteworthy that the *Mirror to Hospital Pharmac*y framed the entire audit of the field in the context of professional advancement. Remarkably, more than 50 years after its publication, the *Mirror's* discussion of the essential characteristics of a profession[11(pp35-40)] still has the capacity to inspire pharmacy students and practitioners.

PROFESSIONAL ASSOCIATIONS

ASHP, the national organization of hospital pharmacists, has had a profound effect on the advancement of the field. The visionary hospital pharmacists of the early 1900s focused much of their energies on the creation of an organizational structure for hospital pharmacy. One landmark event was the creation of the Hospital Pharmacy Association of Southern California in 1925. On a national level, organizational efforts were funneled through the American Pharmaceutical Association (APhA), the oldest national pharmacist organization in the country. For years, hospital pharmacists participated in various committee activities of APhA focused on their particular interest. Then, in 1936, a formal APhA subsection on hospital pharmacy was created. This modest achievement evolved to the creation of ASHP in 1942 as an independent organization affiliated with APhA.[52]

There are two essential things that ASHP has done for the advancement of hospital pharmacy. One is to serve as a vehicle for the nurturing, expression, and actualization of the professional ideals and aspirations of hospital pharmacists. This was done through the pages of the *Bulletin of the American Society of Hospital Pharmacists* (which later became the *American Journal of Hospital Pharmacy*). In its early years, ASHP conducted a series of educational institutes that were very influential in enhancing knowledge and skills and in building esprit de corps among hospital pharmacists.[53] Also noteworthy, especially as the organization has grown in size and diversity, is ASHP's efforts to develop consensus about the direction of pharmacy practice.[32,33,38,39,54]

The second essential act of ASHP has been its creations of resources to assist practitioners in fostering the development of hospital pharmacy practice. One example is the *AHFS Drug Information* reference book and database that are widely used independent sources of drug information in U.S. hospitals. ASHP publications and other activities such as the Midyear Clinical Meeting have produced a source of funds beyond membership dues that are used to develop a broad array of services to help members advance pharmacy practice.

The original objectives of ASHP were as follows:

- Establish minimum standards of pharmaceutical service in hospitals
- Ensure an adequate supply of qualified hospital pharmacists by providing standardized hospital pharmacy training for 4-year pharmacy graduates
- Arrange for interchange of information among hospital pharmacists
- Aid the medical profession in the economic and rational use of medicines

The core strengths of ASHP today are as follows:

- Practice standards and professional policy
- Advocacy (government affairs and public communications)
- Network of autonomous affiliated state societies
- Practitioner education
- Residency and technician training accreditation
- Drug information resources
- Publications and web-based resources
- Practitioner networking

One of the reasons for ASHP's success has been its clarity about objectives and its concentrated focus on a limited number of goals. It is a testament to the wisdom of ASHP's early leaders that the goals expressed in 1942 still serve to guide the organization, although different words are used today to express the same ideas, and some other points have been added. The organization continues as a powerful force in the ongoing efforts to align pharmacists with the needs that patients, health professionals, and administrators in hospitals have related to the appropriate use of medicines.

PHARMACY EDUCATION

There are three important points about the role of pharmacy education in transforming hospital pharmacy. *First*, as pharmacy education as a whole has been upgraded over the years, hospital pharmacy has benefited by gaining practitioners who are better educated and better prepared to meet the demands in hospital practice. *Second*, hospital pharmacy leaders have put considerable pressure on pharmacy educators to upgrade the pharmacy curriculum, to make it more consistent with the needs in hospital practice. This is significant because practice pressure to meet the demands in hospitals served to elevate education for all pharmacists. Also, beginning in the 1970s, corresponding with increased emphasis on clinical pharmacy in the curriculum, hospital pharmacies played a much larger role in pharmacy education as clerkship (experiential) rotation sites for pharmacy students. *Third*, in the early days of clinical education, faculty members from schools of pharmacy began establishing practice sites in hospitals, which often had a large impact on the nature of the hospital's pharmacy service.

Table 2-1 shows how the minimum requirements for pharmacy education have evolved over the years. It took a long time for pharmacy in the United States to settle on the PharmD as the sole degree for pharmacy practice. Many bitter fights—between educators, between practitioners, among educators and practitioners, and among educators and the retail employers of pharmacists—occurred over this issue. After the matter was settled, everyone has moved on with the intention of making the best application of the pharmacist's excellent education.[55]

Over the past 30 years, pharmacy education in the United States has been transformed completely from teaching primarily about the science of drug products to teaching primarily about the science of drug therapy. Transformation of hospital pharmacy practice from a product orientation to a patient orientation was greatly stimulated by this change in education.

TABLE 2-1.

Evolution of Minimum Requirements for Pharmacist Education in the United States

Year	Minimum Requirement (Length of Curriculum and Degree Awarded)
1907	2 years (Graduate in Pharmacy)
1925	3 years (Graduate in Pharmacy or Pharmaceutical Chemist)
1932	4 years (BS or BS in Pharmacy)
1960	5 years (BS or BS in Pharmacy)[a]
2004	6 years (PharmD)

[a]Transition period; some schools offered only the BS or the PharmD degree; many schools offered both degrees, with the PharmD considered an advanced degree.

POSTGRADUATE RESIDENCY EDUCATION AND TRAINING

Stemming from their concerns about the inadequacy of pharmacy education for hospital practice, early ASHP leaders advocated internships in hospitals and worked for years to establish standards for such training. This led to the concept of residency training in hospital pharmacy and a related ASHP accreditation program.[53,56,57]

Early hospital pharmacy leaders noted the following imperatives for hospital pharmacy residency training[11(pp157-167)]:

- Hospitals were expanding, thereby creating a growing unmet need for pharmacists who had been educated and trained in hospital pharmacy
- Pharmaceutical education was out of touch with the needs in hospital pharmacy
- The internship training required by state boards for licensure was not adequate preparation for a career in hospital pharmacy practice
- Hospital pharmacists required specialized training in manufacturing, sterile solutions, and pharmacy department administration
- Organized effort was needed to achieve improvements in hospital pharmacy internships or residencies

Tens of thousands of pharmacists in hospital pharmacy practice today have completed accredited residency training. These individuals have been trained as practice leaders and change agents. Early in their careers, they came to understand the complexity of hospital pharmacy, including inpatient operations, outpatient services, drug product technology and quality, and medication-use policy. Residency training is the height of mentorship in professionalism in American pharmacy. Residency training guides young pharmacists in developing a personal vision (along with the requisite knowledge, abilities, and attitudes) for dedicating their careers to helping the profession achieve its full potential.

PRACTICE STANDARDS

Numerous legal and quasi-legal requirements affect hospital pharmacy practice. On the legal end of the spectrum are various federal laws governing drug products and state practice acts governing how the pharmacist behaves and how pharmacies are operated. At the opposite end of the spectrum are voluntary practice standards promulgated by organizations such as ASHP.

A **practice standard** is an authoritative advisory document, issued by an expert body, offering advice on the minimum requirements or optimal method for addressing an important issue or problem. A practice standard does not generally have the force of law. Methods used to foster compliance with practice standards include education and peer pressure. ASHP's practice standards have been very important in elevating the scope and quality of hospital pharmacy practice in the United States.

The origins of hospital pharmacy practice standards go back to 1936 when the American College of Surgeons adopted the *Minimum Standard for Pharmacies in Hospitals*. This document was semi-dormant for a number of years, but it served as a rallying point for hospital pharmacists[3] and revision and promulgation of the Standard became a priority for ASHP.[58] The revision pursued by ASHP in the 1940s specified the following minimum requirements:

- An organized pharmacy department under the direction of a professionally competent, legally qualified pharmacist
- Pharmacist authority to develop administrative policies for the department
- Development of professional policies for the department with the approval of the P&T committee
- Ample number of qualified personnel in the department
- Adequate facilities
- Expanded scope of pharmacist's responsibilities:
  - Maintain a drug information service
  - Nurse and physician teaching
  - File periodic progress reports with administrator
- P&T committee must establish a formulary

From this modest beginning, ASHP in 2016 had more than 100 practice standards (including some endorsed documents developed by others) that covered a wide range of philosophical and practical aspects of hospital pharmacy practice and several important areas of therapeutics.[59] ASHP actively updates existing standards and develops new documents to guide emerging issues in practice.

ASHP practice standards have been used effectively over the years as a lever for advancing the scope and quality of hospital pharmacy services. The standards have been used in the following ways:

- Requirements for pharmacy practice sites that conduct accredited residency programs
- Guidance to practice leaders who aspire to provide state-of-the-art pharmacy services
- Guidance to hospital accreditation organizations such as The Joint Commission in establishing requirements for the medication-use process
- Tools for pharmacy directors who are seeking administrative approval for practice changes
- Guidance to regulatory bodies and courts of law
- Guidance to curriculum committees of schools of pharmacy

SUMMARY OF INTERNAL FACTORS

In summary, five internal factors have played a major role in transforming U.S. hospital pharmacy over the past 60 years: (1) visionary leadership, (2) a strong professional society, (3) reforms in pharmacy education, (4) residency training, and (5) practice standards. The common element among these forces has been dissatisfaction with the status quo and a burning desire to bring hospital pharmacy in better alignment with the needs of patients and the needs of physicians, nurses, other health professionals, and administrators in hospitals related to the responsible use of medicines. These success factors are far more than historical curiosities; contemporary leaders of the field continue to be faithful to them, as reflected in the organizational activities and current literature of hospital and health-system pharmacy.

SUMMARY

From the author's perspective, colored to be sure by participation in the hospital pharmacy movement for many years, four tentative lessons may be drawn from the history of U.S. hospital pharmacy:

1. Fundamental change of complex endeavors requires leadership and time. Hospital pharmacists are sometimes frustrated by the slow pace of change. Wider study of history might help practitioners dispel that discouragement while learning to formulate more effective strategies for advancement.
2. It is important to engage as many practitioners as possible in assessing hospital pharmacy's problems and identifying solutions, so that a large number of individuals identify with the final plan and are committed to pursuing it.
3. It is critical to recognize and capitalize on changes in the environment that may make conditions more favorable to the advancement of hospital pharmacy. This requires curiosity about the world at large and the ability to spot and analyze relevant trends.
4. It is important to regularly and honestly assess progress and embark on a new approach if the existing plan for constructive change is not working or has run its course. This requires open-mindedness and a good sense of timing.

Today's challenges in hospital pharmacy are no more daunting than those that faced hospital pharmacy's leaders and innovators in the past. Fortunately, hospital pharmacy is imbued with a culture of taking stock, assessing the environment, setting goals, making and executing plans, measuring results, and refining plans. If hospital pharmacy sticks to this time-tested formula, it will continue to be a beacon for the profession as a whole.

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