Overview of the History of Hospital Pharmacy in the United States

William A. Zellmer

Introduction

Hospitals 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. The historical facets discussed here are highly selective, reflecting the author’s judgment about the most important points to cover within the limits of one chapter.

Hospital Pharmacy’s Nascence

Hospital pharmacy practice in the United States did not begin to develop 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]—see Figure 2-1—and Martin Wilbert [1865–1916]), many factors kept hospital pharmacy at the fringes of the broader development of pharmacy practice and pharmacy education. When the Pennsylvania Hospital (the first hospital in Colonial America) was established in 1752 and Jonathan Roberts was appointed as its apothecary, medicine and pharmacy were commonly practiced together, with drug preparation often the responsibility of a medical apprentice. 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. Hospitals, which were “places of dreaded impurity and exiled human wreckage,” and doctors had little to do with each other. Hospitals played a small role in health care, and pharmacists played a very small role in hospitals.

In the early 1800s, drug therapy consisted of strong cathartics, emetics, and diaphoretics. From the 1830s to the 1870s, clean air and good food rather than medicines were the treatments emphasized in hospitals.

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.
the mid-1800s, 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.

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. This era of hospital expansion 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.

By the early twentieth 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.

By the 1930s, pharmacy-related issues in hospitals had coalesced to the point that the American Hospital Association (AHA) created a Committee of Pharmacy to analyze the problems and make recommendations. The 1937 report of that committee was considered so seminal by hospital pharmacy leaders that even a decade later they saw value in republishing it. The aim of the committee was to develop minimum standards for hospital pharmacy departments and to prepare a manual of pharmacy operations. The committee characterized pharmacy practices in hospitals 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.” The proliferation of unapproved and proprietary drug products in hospitals was the target of extensive criticism by the committee.

A Fifty-Year Perspective

There is much that can be learned by comparing contemporary hospital pharmacy with practice of 50 years ago. Fifty years is a comprehensible period of time for most people and, in hospital pharmacy’s case, the past half century was a period of astonishing advancement.

The data sources for making such a comparison are remarkably good. A major study of hospital pharmacy was conducted between 1957 and 1960—the Audit of Pharmaceutical Services in Hospitals—under the direction of Donald E. Francke and supported by a federal grant (see Figure 2-2). The results were published in a book, Mirror to Hospital Pharmacy, which remains a reference of monumental importance. In more recent times, ASHP has conducted an annual survey of hospital pharmacy, yielding contemporary data for comparison with the figures of an earlier era.

Four 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. Hospital pharmacy departments have come to see their mission as fostering optimal patient outcomes from medication use.

It is important to keep in mind what was happening over this period in the United States as a whole. Since 1950, the U.S. population has grown 86%. Expenditures for health care services have grown from about 5% of gross domestic product to 14%. This growth has fostered an endless stream of public and private initia-
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tives to curtail health care spending. Average daily hospital census, on a per-population basis, has declined by 24% during this period as a result of public and private initiatives to reduce hospital use. Nonfederal, short-term general hospitals in 1950 numbered 5,031 and rose to a zenith of 5,979 in 1975; in 2003 the number stood at 4,918, nearly 18% fewer than the peak of three decades before. On a per-capita basis, the number of inpatient hospital beds has declined 65% since 1950. Since 1965 (the first year AHA reported these data), hospital outpatient visits have increased more than fourfold.

Drug Product Acquisition, Distribution, and Control

Fifty to sixty years ago, pharmaceutical services were of marginal importance to hospitals. The 1949 hospital standards of the American College of Surgeons had only three questions related to pharmacy in its point-rating system, 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.12 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.10 Fewer than four 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 full-time pharmacist. This performance declined sharply with decreasing hospital size:

- 200–299 beds 96%
- 100–199 beds 72%
- 50–99 beds 18%
- under 50 beds 3.5%

Today, the vast majority of hospitals in the United States have the services of one or more pharmacists. Important exceptions are small rural hospitals that still rely on the services of local community pharmacists. About 7% 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.10 Today, there are about 50,000 full-time equivalent pharmacists providing inpatient services in nonfederal short-term hospitals.13 (Hospitals employ an equal number of pharmacy technicians.) About one-fourth of all actively practicing pharmacists in the U.S. today are in hospitals.

Today’s hospitals employ approximately twelve full-time equivalent pharmacists per 100 occupied beds.13 The comparable figure for 1957 was approximately 0.4 FTE pharmacists per 100 occupied beds. In other words, pharmacist staffing in hospitals is 30-fold more intensive today. During the same interval, the intensity of hospital staffing as a whole increased approximately sevenfold.14

Reflective of more intensified pharmacist staffing, 30% of hospitals today offer 24-hour inpatient pharmacy services. In the largest hospitals (400 beds), 95% of pharmacy departments are open around the clock.13

In the middle of the 20th century, nurses and community pharmacists had significant responsibility for

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*The authors of the Mirror to Hospital Pharmacy examining a slide containing data from the results of the Federal Audit of Pharmaceutical Services in Hospitals that was conducted in 1957. From left, Clifton J. Latiolais, Donald E. Francke, Gloria Niemeyer Francke, and Norman F. H. Ho. The results were published by ASHP in the book, Mirror to Hospital Pharmacy, in 1964.

Source: ASHP Archives.

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b Throughout this chapter, pharmacy data from recent ASHP surveys refer to U.S. nonfederal short-term hospitals.

c Calculated based on data in Reference 11.
hospital drug product acquisition, distribution, and control. The Mirror to Hospital Pharmacy estimated that 4,000 nurses were engaged in pharmacy work. Here are specific data collected in 1957 showing who handled drugs for the 2,200 hospitals that did not have a full-time pharmacist:

- Nonpharmacist personnel (generally nurses) 45%
- Nonpharmacist personnel plus community pharmacist 45%
- Supervision by local community pharmacist 9%

Table 2-1 shows the services hospital pharmacists were providing in 1957–1960. 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 day 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

Today, bulk compounding or manufacturing is no longer a significant activity in U.S. hospital pharmacies. In sharp contrast to 50 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-twentieth 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 that is run by qualified pharmacists. 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.

### Patient Safety

The clarion call to professionalism in hospital pharmacy in recent times has been the patient safety imperative. Hospital pharmacists have made immense progress in this arena. Initially, that progress was tied to greater accuracy in dispensing and administration of medications, but it has evolved to also focus on improving prescribing and monitoring the results of therapy. But it all started with a desire to improve drug product distribution for inpatients.

In 1957, there were two ways in which drug products were distributed to hospital inpatients: as ward

| Table 2-1 | Percentage of U.S. Hospitals Providing (or Desiring to Provide) Specific Pharmacist Services, 1957–1960
<table>
<thead>
<tr>
<th>Service</th>
<th>Provide</th>
<th>Would Like to Provide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply drugs to nursing units</td>
<td>97</td>
<td>1</td>
</tr>
<tr>
<td>Inpatient prescriptions</td>
<td>95</td>
<td>1</td>
</tr>
<tr>
<td>Prescription compounding</td>
<td>94</td>
<td>1</td>
</tr>
<tr>
<td>Interdepartmental drug needs</td>
<td>91</td>
<td>1</td>
</tr>
<tr>
<td>Drug information</td>
<td>84</td>
<td>9</td>
</tr>
<tr>
<td>Outpatient prescriptions</td>
<td>64</td>
<td>6</td>
</tr>
<tr>
<td>Formulary system</td>
<td>53</td>
<td>25</td>
</tr>
<tr>
<td>Bulk compounding program</td>
<td>41</td>
<td>12</td>
</tr>
<tr>
<td>Teaching program</td>
<td>28</td>
<td>23</td>
</tr>
<tr>
<td>Product development/research</td>
<td>13</td>
<td>23</td>
</tr>
<tr>
<td>Sterile solution manufacturing</td>
<td>11</td>
<td>15</td>
</tr>
</tbody>
</table>

*Hospitals with a chief pharmacist.
stock or as individual prescriptions. If the patient was charged for the medication, individual prescriptions were generally used. Otherwise, it was most common for stock containers of medications to be available to the nurse for administration to the patient as needed.10

The 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.”14

Concerns about medication errors and about overall efficiencies and best use of hospital personnel led to the development of improved drug distribution systems.15 Two major studies were done in the early 1960s on unit dose drug distribution. At the University of Arkansas Medical Center, a centralized system was developed, and at the University of Iowa, a decentralized system was studied (see Figure 2-4).16,17 Both projects 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.

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.

Figure 2-4
Pioneers in Unit Dose Drug Distribution—William Heller (circa 1965) and William Tester (circa 1965)*

*The pharmacy departments led by these two prominent hospital pharmacists—William M. Heller (left), University of Arkansas Medical Center, and William W. Tester (right), University of Iowa Hospital—conducted important studies on unit dose drug distribution in the 1960s. This method of drug distribution was devised in response to the results of medication error studies.

Source: ASHP Archives.
2. A pharmacist reviews the medication order before the first dose is dispensed.
3. Medications are contained in single-unit packaging.
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.

These precepts for state-of-the-art drug distribution are met widely in U.S. hospitals today. For example, in a 2002 survey, in 79% of hospitals, pharmacists reviewed and approved all medication orders before the drug was administered to patients. The figure for the largest hospitals (≥400 beds) was 92%.19

There has been much debate in hospital pharmacy over the years about the virtues of centralized versus decentralized drug distribution. With a decentralized system, pharmacists come in contact more regularly with physicians, nurses, and patients, which is consistent with contemporary views about how the profession should be practiced. Among all hospitals, 20% use a decentralized system; the figure is 41% for the largest hospitals.19 Many hospitals indicate that they would like to move toward decentralized pharmacy services in the future (see Table 2-2).

U.S. hospitals have shown a remarkable rate of adoption of point-of-use automated storage and distribution devices, which are now used to some extent in 58% of facilities. Point-of-use dispensing is now the primary method of dose delivery in about one-fourth of U.S. hospitals.19

Pharmacy-based IV admixture services have been widely adopted by U.S. hospitals. Development of such services, as a professional imperative, was a topic of intense interest in the 1960s.20 For short-term hospitals as a whole, ASHP estimates that about 80% of IV admixtures are now prepared by the pharmacy department.19

ASHP's 2002 survey showed that most hospitals regularly engage in a number of programs designed to increase the safety of injectable medications, including educational programs on IV administration equipment (82%), administration and precautions associated with high-risk therapies (71%), and administration of IV push medications (62%); promulgating lists of approved IV push medications (57%); and affixing supplemental labels for IV push medications (53%).19

There is immense interest in U.S. hospitals in applying computer technology to improve the safety of medication prescribing, dispensing, and administration. Computer-generated medication administration records are used in 64% of all hospitals and in 75% of the largest hospitals.19 The foregoing data notwithstanding, the cost of such technology is having a decided moderating effect on the rate of adoption. For example, in 2002, only about 2% of hospitals used computer-readable coding technology to improve accuracy of medication administration, and, in 2004, only about 3% of hospitals used a computerized prescriber order entry system that was linked to a decision support system.13,15

Because of the concerns of groups such as the Institute of Medicine and various federal agencies, improving patient safety is now a major national priority.21 When that general interest in patient safety embraces medication-use safety, hospital pharmacists have cheered and felt “it’s about time!” Further breakthrough advances in medication-use safety will depend on a fundamental reengineering of the entire medication-use process, a shift toward a true team culture in providing care, and wider application of computer technology.22 As new technologies or new patterns of health professional behavior evolve, history suggests that hospital pharmacists will be at the leading edge of those advances.

Table 2-2
Hospitals with Decentralized Drug Product Distribution

<table>
<thead>
<tr>
<th></th>
<th>Year 2002</th>
<th>Future Desire</th>
</tr>
</thead>
<tbody>
<tr>
<td>All hospitals</td>
<td>20%</td>
<td>44%</td>
</tr>
<tr>
<td>Largest hospitals (≥400 beds)</td>
<td>41%</td>
<td>56%</td>
</tr>
</tbody>
</table>

Promoting Rational Drug Use
In U.S. hospitals, the concept of a pharmacy and therapeutics (P&T) committee, as a formal mechanism for the pharmacy department and the medical staff to communicate on drug-use issues, was first promulgated in 1936 by Edward Spease (dean of the School of Pharmacy at Western Reserve University) (Figure 2-5) and Robert Porter (chief pharmacist at the University's...
hospitals). Subsequently, the American Hospital Association and the American Society of Hospital Pharmacists 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, appraises, 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. The number of new market entries for just one year, 1951, were as follows:

- New drug products, 332
- New drug entities, 35
- Duplications of drug entities, 74
- Combination products, 221

In 1957, slightly more than half of all hospitals operated under the formulary system. Today, essentially all hospitals do so.

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. Today, nearly all hospitals in the U.S. have an active P&T committee that meets an average of seven times a year.

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%). In most hospitals today, the P&T committee has authorized pharmacists to track and assess adverse drug events (ADEs), conduct retrospective drug-use evaluations, and identify and monitor patients on high-risk therapies.

In summary, concepts first advanced in the 1930s regarding a formal communications 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. The invention of the pharmacy and therapeutics committee and the hospital formulary system has facilitated the deep involvement of pharmacists in promoting rational drug use in hospitals.

**Fostering Optimal Patient Outcomes**

U.S. hospital pharmacists have evolved markedly in their self-concept over the past 50 years. As recently as 20 years ago, the traditional pharmacist mission prevailed, 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 achieving optimal outcomes from medication use. The overarching question for the hospital pharmacist is whether the right drug is being used in the first place. A popular phrase used to summarize this philosophy is, “The mission of pharmacists is to help people make the best use of medicines.” These words reflect a profound paradigm shift with respect to the primary purpose of pharmacy practice.

In the 1950s, hospital pharmacy’s Spartan staffing levels did not leave much time for work beyond the
basics of acquiring, storing, compounding, and distributing medications. Nevertheless, chief pharmacists of the time were called upon frequently by physicians and nurses to answer drug information questions related to dosage, dosage forms, and pharmacology. Somewhat less frequently, pharmacists were asked for advice on adverse drug reactions and clinical comparisons of products. In analyzing pharmacist consultations, the authors of the Mirror to Hospital Pharmacy suggested that both weakness in the pharmacist’s scientific knowledge and lack of time contributed to limited progress in this realm.

The transformation of the hospital pharmacy department from a product orientation to a clinical orientation was stimulated by active consensus-building efforts by hospital pharmacy leaders. One important example of such efforts was the ASHP Head conference. Hilton Head refers to 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 (see Figure 2-6). 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 (such as 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 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.

The most important indirect indicators of hospital pharmacist clinical activity in the current era are shown in Table 2-3. There is 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. In summary, U.S. hospital pharmacists today are engaged in extensive clinical activity, which is a major change from practice of 50 years ago. We are not yet at the point where a majority of hospital patients who are on medication therapy receive the benefit of clinical oversight by the pharmacist, but progress in this direction continues to be made.

### Recap of Major Themes

Thus we have a picture of the major thrust of changes in hospital pharmacy over the past 50 years. The four 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; and, finally, pharmacy departments...
have defined their mission in terms of optimal patient outcomes from medication use. Taken together, these changes signify that pharmacy practice in U.S. hospitals over the past 50 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. In short, 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 factors include the following:

- Shift of national resources into health care, especially hospital care (stimulated immensely by implementation of Medicare in 1965 and expansion of other health insurance coverage).
- Expanded clinical research and drug product development.

More important for this chapter’s discussion are the internal factors within hospital pharmacy that precipitated the changes discussed above. 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 U.S. 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 U.S.; 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 about 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 European pharmacy firsthand and decried the immense gap in professional status and scope of practice between the two continents.

A sense of the deep feelings of these leaders may be gained from 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 commercial-

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Table 2-3

<table>
<thead>
<tr>
<th>Indicators of Contemporary Hospital Pharmacist Clinical Activity</th>
<th>All Hospitals</th>
<th>Largest Hospitals (≥400 beds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitals with decentralized pharmacists (1999 data)</td>
<td>29%</td>
<td>82%</td>
</tr>
<tr>
<td>Percentage of decentralized pharmacists time spent on clinical activities (1999)</td>
<td>59%</td>
<td>-</td>
</tr>
<tr>
<td>Pharmacists have authority to initiate medication orders (2001)</td>
<td>52%</td>
<td>62%</td>
</tr>
<tr>
<td>Pharmacists attend rounds (2004)</td>
<td>35%</td>
<td>79%</td>
</tr>
<tr>
<td>Pharmacists provide drug information consultations (2004)</td>
<td>90%</td>
<td>-</td>
</tr>
<tr>
<td>Pharmacists monitor prescriber compliance with medication-use policies (2004)</td>
<td>81%</td>
<td>92%</td>
</tr>
</tbody>
</table>

All data are from ASHP national surveys of the year shown.
ism 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. (Emphasis added.)

"...if the pharmacist can get the picture in his mind." Those are key words that reflect that early hospital pharmacy leaders were trying to create a new model for pharmacy practice in hospitals and not allow this practice setting to become an extension of the type of practice that prevailed in community pharmacies. These leaders were change agents with a missionary zeal, and they were blessed with the ability to infect others with their passion.

It is noteworthy that the Mirror to Hospital Pharmacy framed the entire Audit project in the context of professional advancement. The report laid out the essential characteristics of a profession and articulated goals for hospital pharmacy that would bring pharmacy as a whole into better alignment with those characteristics.

Professional Associations

The national organization of hospital pharmacists—the American Society of Health-System Pharmacists (ASHP)—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 (see Figure 2-7).

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. 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. Also noteworthy, especially as the organization has grown in size and diversity, is ASHP's efforts to develop consensus about the direction of practice.

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, in recent times, electronic versions for central information systems, desktop computers, and handheld devices), which is the most widely used independent source of drug information in U.S. hospitals. Another example is the American Journal of Health-
System Pharmacy. These two publications, and other ASHP activities such as the Midyear Clinical Meeting, have produced a source of funds beyond membership dues that ASHP has used to develop a broad array of services that help members advance 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 four-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 relations)
- Residency and technician training accreditation
- Drug information
- Practitioner education
- Publications and communications

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 demands have always been far more intense in hospitals than in community pharmacy, so 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 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 2-4 shows how the minimum requirements for pharmacy education have evolved over the years. It took a very long time for pharmacy in the U.S. to settle on the Pharm.D. 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. Now that the matter is settled, everyone seems to be moving on with the intention of making the best application of the pharmacist's excellent education.

Over the past 20 years, pharmacy education in the U.S. has been transformed completely from teaching primarily about the science of drug products to teaching primarily about the science of drug therapy. Trans-
formation of hospital pharmacy practice from a product orientation to a patient orientation could not have occurred without this change in education.

**Postgraduate Residency Education and Training**

Stemming from its early concerns about the inadequacy of pharmacy education for hospital practice, 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.33–35

Early hospital pharmacy leaders noted the following imperatives for hospital pharmacy residency training36:

- 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.

There are well over 10,000 pharmacists in practice who have completed accredited residency training. These individuals have been trained as change agents and practice leaders. 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. Dreams are fostered in residency training—dreams of the profession becoming an ever more vital force in health care; dreams of patients improving their health status more readily because pharmacists are there to help them.

**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, that offers 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 hospital pharmacy 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 semidormant for a number of years, but it served as a rallying point for hospital pharmacists and revision and promulgation of the Standard became a priority for ASHP.37

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 pharmacy and therapeutics 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 has developed more than 60 practice standards that deal with most aspects of hospital pharmacy operations and several major controversies in therapeutics.38

ASHP practice standards have been used effectively over the years as a lever for raising the 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 practitioners who desire to voluntarily comply with national standards
- Guidance to the Joint Commission on Accreditation of Healthcare Organizations in developing standards for pharmacy and 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 large role in transforming U.S. hospital pharmacy over the past 50 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 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.

Summary
From the author's perspective, clouded 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 dissolve that discouragement.
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.
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, 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.

References


