

School of Public Health, notes that “the role of CIO is evolving. The new technology leader needs to be able to move away from managing technology under his or her complete [authority] to partnering with other leaders throughout the enterprise” (Ellis 2018). This complexity necessitates a leadership and governance model that promotes coordination, standards, and efficiency. HIT governance will be explored in more detail in chapter 4.

Staffing of the Health Information Technology Department

Given the organizational structure and responsibilities of the HIT department, each section must be staffed appropriately. Selecting the individuals with the necessary skills and expertise is the next task of the CIO. Even the best structure cannot be successful without optimal staffing. Naturally, from the CIO’s perspective, matching the skills and expertise of direct reports to their areas of responsibility is most important, but staff selection and assignment as well as other staffing decisions should be based on the design of the HIT unit. Generally, the directors or managers reporting to the CIO should have more technical and operational knowledge, experience, and expertise in their assigned areas than the CIO. Leadership must be able to count on these individuals to plan, design, and implement the best technology solutions or operational processes for their area. For example, the health information security division should be headed by an experienced and certified information security professional.

The approach to organizing and staffing the HIT department depends on the complexity of the organization. For example, an integrated delivery system composed of multiple facilities is much more complex than a single facility, requiring a larger and more intricate HIT function. Further, as a matter of culture, some systems are highly centralized, with all HIT planning and development carried out by a corporate IT staff. In other, less complex systems, more responsibility may be delegated to operational units. Whatever the approach, the organizational structure must facilitate reliable, safe, and secure electronic information collection, storage, and use, to the benefit of almost every business and clinical workflow throughout the enterprise.

Staffing for HIT has grown rapidly in recent years, both at HIT vendors and provider organizations. HIMSS (2019) reports workforce increases from the previous year were at 62 percent for HIT vendors and 42 percent for provider organizations. While only 16 percent of HIT vendors reported no changes in workforce size, 31 percent of provider organizations reported no growth. Furthermore, the HIMSS study suggests that staffing challenges (filling vacant positions with qualified candidates) continue to have a negative impact on HIT projects in 48 percent of healthcare provider organizations. As such, the importance of effective HIT staffing cannot be overemphasized for contemporary healthcare CIOs.

Budgeting the Health Information Technology Department

Budgets for HIT have increased over the past two decades. They were considered low compared to other fields at the turn of the century but now are considered to be slightly above the median—though still well below other information-intensive industries such as banking and financial services (CEB 2015). Between 2012 and 2016, Hall and colleagues (2016) found that healthcare provider IT spending as a percentage of overall revenue grew from 3.9 percent to 4.3 percent. Viewed through another lens, IT spending as a percentage of operating expenses also grew modestly from 4.1 percent to 4.6 percent over that same period. “While revenue may be subject to external-market-based volatilities, business operational expense typically remains much more consistent and predictable year over year. Therefore, it better reflects the overall business investment strategy. Typically, organizations with a greater level of IT investment relative to operating expense view IT as a strategic enabler, and this can improve business performance and productivity levels” (Hall et al. 2016).

The budget increases for HIT are likely to continue as workforce shortages drive labor costs up and as technology advancements lead to more opportunities for expanded and enhanced services. Despite the emphasis on hardware and software, however, labor costs continue to be the key driver of HIT costs. Hall and colleagues (2016) report that HIT personnel costs, along with outsourced services (which often have the effect of offsetting personnel costs), make up 58 percent of contemporary HIT budgets. As with overall increases in salaries that affect HIT budgets, CIO salaries have increased. Exhibit 3.7 presents the average and median salaries for CIOs overall, for CIOs in various work settings, for CIOs with different educational training, and for CIOs working in different regions of the country. As shown in the exhibit, the “average” CIO in all settings made about \$235,806 in 2018—up from \$151,000 in 2006 (CHIME 2020). The size and complexity of the organization tends to have an influence on CIO salaries in 2018 and is reflected in exhibit 3.7.

Outsourcing and Multisourcing Health Information Technology Functions

With the ascendance of cloud computing (i.e., the practice of using a network of remote servers hosted on the internet to store, manage, and process data, rather than a local server or a personal computer [Lexico 2019]) and the continued focus on operational cost control, many healthcare organizations are considering outsourcing portions of their HIT functions as an alternative to in-house staffing (Monegain 2013). The decision to outsource entails

EXHIBIT 3.7
Salary for CIO
by Type of
Organization,
Education, and
Region, 2018

Category	Average Salary, 2018
Overall	\$235,806
<i>Type of organization</i>	
CIO—Hospital/acute care facility	\$243,035
CIO—Stand-alone hospital < 25 beds	\$136,183
CIO—Academic health center	\$287,385
CIO—Children’s hospital	\$309,028
<i>Education/Degree</i>	
MD	\$381,688
PhD	\$220,076
Master’s degree	\$236,724
Bachelor’s degree	\$206,535
Technical certificate	\$207,000
Associate’s degree	\$172,360
High school diploma	\$121,500
<i>Region</i>	
Pacific	\$262,272
Northeast	\$231,122
Southeast	\$228,125
Midwest	\$238,710
Mountain	\$186,125
South Central	\$238,275

Source: Data from CHIME (2020).

purchasing the services from an external vendor or a contractor rather than hiring the staff and producing the service in-house. This decision between “making” and “buying” your services must be seriously considered as the complexity of HIT increases. Traditionally, the term *outsourcing* has been associated with a contract for facilities management. More recently, however, the term is used in a broader context to denote contracting with the best-qualified company to meet a specific information systems objective. This may involve *multisourcing* to a number of different vendors as well as outsourcing to a single vendor.

Some of the major potential benefits of outsourcing include the following five:

1. Reduction of in-house staffing requirements
2. Smaller investment in capital equipment

3. More flexibility in meeting changing requirements and adopting new technology
4. Reduction in the time required to implement new applications
5. More predictable cost structure, particularly if fixed-price contracting is employed

Outsourcing is not without potential dangers and risks to the organization and to the CIO leading the outsourcing initiatives; they include the following four:

1. Heavy dependence on vendors, with the possibility that a critical contractor might exit the market or change business direction
2. High costs associated with vendor fees
3. Employment of contractors who do not understand the operation and culture of healthcare organizations
4. Misaligned incentives between the vendors' own profit motive and the health system's goal of reducing costs

Hensley (1997) describes some of the time-tested principles that careful leaders should adhere to as they outsource. He emphasizes the importance of weighing the cultural fit with the vendor; suggests that outsourcing be part of a long-term strategy (not just a quick fix); recommends good reference checking; and recommends looking for staying power among vendors being considered. Further, Hensley states that healthcare organizations should not outsource the things they do best, should not become obsessed with short-term savings, and should not negotiate such favorable terms in a contract that a business partner is put out of business. To address the dynamic between a need for stable information processing environments and innovation, Su, Levina, and Ross (2016, 82) suggest an innovative IT outsourcing model that combines a select few—but key—outsourcing partners to create stability while leveraging “a dynamically changing and unrestricted number of smaller contracts with other suppliers to deliver specific value propositions beyond the capabilities of the key partners.”

A survey by Waller, Rubenstrunk, and Hallenbeck (2010) reveals the top three reasons for outsourcing HIT services, according to survey respondents:

1. Expertise of vendor: 90 percent
2. Cost savings: 63 percent
3. New service: 9 percent

In addition, between 27 percent and 34 percent of respondents indicated that they outsource EHR management, patient surveys, and help desk functions. *Modern Healthcare* magazine conducts an outsourcing survey as well. The top outsourcing firms, based on size of the client base, reported a 13 percent gain in the number of clients in 2011 (Kutscher 2012). However, IT ranked seventh in terms of money spent by organizations on outsourcing.

Davis (2015), citing a Black Book Market Research study of 1,030 hospital CIOs, 243 CFOs and other financial executives from 266 hospitals, and business managers from 1,400 non-acute facilities, found that 74 percent of health systems with more than 300 beds are leveraging HIT outsourcing to some degree. The figure is even greater (81 percent) for provider organizations under 300 beds. While HIT outsourcing has had some historical perceptions of underperformance relative to expectations, the Black Book Market Research study found that 84 percent of respondents who were using some form of outsourced HIT services were satisfied and reported that their expectations were being met. For those who encountered issues, respondents suggested the problems could have been mitigated by choosing a more suitable vendor, preparing more accurate budgets, establishing more realistic expectations, and monitoring performance more effectively.

In an updated survey of 807 hospital CIOs, IT leaders, and CFOs, representing 244 inpatient facilities and 789 physician practices, Black Book Market Research (2017) found the following:

- Of respondents, 82 percent had either signed HIT department outsourcing contracts since the third quarter of 2016 or are in the process of vendor selection.
- The key area fueling the growth of outsourcing is infrastructure, where respondents noted a need for “better and secured IT facilities.”
- The biggest demand for outsourced services was in the area of cybersecurity, with nearly 44 percent of hospitals and 35 percent of physician groups outsourcing all security application needs as of the third quarter of 2017.
- The primary motives for seeking outsourced services were to achieve a positive return on investment (81 percent), immediate access to key skill sets (73 percent), and access to needed technology (71 percent).
- As of the second quarter of 2017, 91 percent of hospital organizations noted that they were at or near achieving their expected return on investment.
- Of vendor firms providing the outsourced services, 41 percent “met expectations.”
- Of respondents, 39 percent noted that vendor firms providing outsourced services had “fallen below expectations.”

- Only 10 percent were thought to exceed expectations.
- Of the 69 outsourcing vendors represented in the survey, 17 that had been rated “superior” in 2015 were “slipping” in 2017.
- Seventy-seven percent of the dissatisfaction stemmed from outsourcing vendors with limited experience in the healthcare provider setting.

Doug Brown, a managing partner at Black Book, suggests that “doing business with firms with insufficient health care experience that are not knowledgeable of current industry issues, such as compliance, cybersecurity, value-based revenue changes and interoperability, is extremely risky. The successful client/vendor relationship depends (on) health care provider experience to ensure efficient connectivity between IT, clinical care and business workflows” (Black Book Market Research 2017).

In short, HIT outsourcing and multisourcing are expected to continue to be an important option for contemporary CIOs and leadership teams, despite mixed reviews with regard to achieving expected benefits. The collective HIT outsourcing experience of healthcare organizations suggests that by selecting vendor partners with healthcare experience, articulating expectations more comprehensively, establishing more realistic budgets that can be tuned to changes in the healthcare organization’s needs, and actively and continuously managing the performance of the outsourcing vendor firm, healthcare organizations can reduce some of the risk that has historically been attributed to HIT outsourcing arrangements.

Evolving Role of the Chief Information Officer

At the risk of stating the obvious, the *I* in CIO stands for “information.” Yet for decades it has been suggested that CIOs gravitated more toward the technical and tactical aspects of the senior HIT executive’s role. Phoenix Children’s Hospital CIO David Higginson suggests that “in the ’80s and ’90s, it was kind of a plumber-type person who got the network working, got the servers running, got the emails going, and that was their job. . . . Next, in the 2000s, [CIOs] got into having great big budgets and being tasked by the organization to ‘go make this thing happen.’ I think a lot of CIOs today did really well in that project management, system implementation-type field” (Sullivan and Miliard 2018).

As of 2020, the *I* in CIO is finally becoming more operative. Today and in the near future, innovation and leveraging data are becoming ever more important (see chapter 11). “We’re moving toward more of an information science. . . . All that effort and all that money we’ve spent getting data into the system—now what are we going to do with it? The potential role for

the CIO is to be the digital transformation person who's going to understand what's going on with business and then apply technology to get something out of it" (Sullivan and Miliard 2018). Sam Hanna of George Washington School of Public Health further suggests that "gone are the days of tactical and project management expertise. . . . To be effective, the role requires transformational thinking, real-world innovation experience, and the ability to connect multiple pieces of strategy, technology, and people together for better sustainable outcomes" (Sullivan and Miliard 2018).

Increasingly, new roles outside of the CIO's department are being established to focus on innovation and information science. Titles such as chief innovation officer, chief data and analytics officer, or chief digital officer are being created to focus fully on these needs. Doug Brown of Black Book suggests that "the successful CIO is adapting to be the orchestrator of multiple IT support functions, not the IT purchase decision-maker. . . . The new CIO must make sure he or she is recognized as the go-to person for help on integrating technologies, ensuring they meet corporate policies and getting the right price, rather than [as] the leader of complex vendor selections for specific business units. However, the broad distribution of decision-making power around the acquisition, deployment and management of digital technology is a huge challenge for CIOs because business units want independence" (Raths 2019). This statement suggests even more diligence and use of effective enterprise architecture approaches to integrating technologies and service providers will be needed in the future, as well as the use of effective governance in making these types of decisions.

Regardless of whether or not innovation and/or analytics remains under the CIO's direction, contemporary and future CIOs must ensure that the healthcare organization is able to nimbly innovate and appropriately leverage data and information to the benefit of the healthcare organizations that they serve.

Summary

This chapter discussed the leadership, human resources, and management expertise required to make effective use of HIT infrastructure in healthcare organizations. The organizational position of the CIO has evolved over the years and is now a separate, executive-level role. This elevation is a result of the growing importance of clinical systems, regulatory reporting requirements, and the use of information in strategic planning and decision support.

Today, regardless of reporting relationship, the CIO is generally a formal member of the senior leadership team (e.g., the executive committee of the organization) and primarily assists the team in using information

effectively, providing management of information processing and telecommunications in the organization. The required skills of the CIO include enterprise-wide planning, leadership, management oversight, human resource management, and financial management.

The HIT department's organization has also evolved over the years. However, this department's specific functions and associated organizational structures vary widely according to the size and complexity of the organization. In large, complex organizations, CTO and CMIO roles may exist. Most HIT departments have one or more steering committees to assist in providing strategic direction. One added complexity of the CIO role is that many organizations have information systems staff members who report to operational units outside of the HIT department.

To manage the HIT business unit, the evolving role of HIT will force the CIO to work upward with the CEO and board, horizontally with other hospital leaders, and internally with staff members. The functions and roles outlined for HIT leadership exist even in small organizations that do not have individuals with those assigned tasks. The functions must be managed in small institutions, as in large organizations, but individuals with other non-HIT roles often assume the responsibilities for these functions.

Key priorities for the coming decade include innovation around digital health, analytics, cybersecurity, enterprise architecture, and HIT governance.

Web Resources

A number of organizations (through their websites) provide more information on the topics discussed in this chapter:

- *American College of Healthcare Information Administrators (ACHIA, www.achca.org)*. A subunit of the American Academy of Medical Administrators, ACHIA is a personal membership organization for information managers with special focus on continuing education and research in healthcare information administration.
- *American Health Information Management Association (AHIMA, www.ahima.org)*. AHIMA is a personal membership organization of information professionals who specialize in the use and management of clinical information.
- *American Medical Informatics Association (AMIA, www.amia.org)*. The term *medical informatics* is used to describe the science of storage, retrieval, and optimal use of biomedical information for problem-solving and medical decision-making. AMIA is a personal membership

organization of professionals interested in computer applications in biomedicine.

- *Applied Health Informatics Learning and Assessment* (www.nihi.ca/bi). This comprehensive website details the competencies necessary for CIOs and other HIT leadership. Here, you can view the challenge faced by the CIO or other leader, a detail of the smaller roles necessary to meet that challenge, an assessment of the importance of this role, and even suggestions for how to gain the experience necessary for the job. See www.nihi.ca/hi/ahimacroroles.php?id=1&Menu%20ItemID=5.
- *College of Healthcare Information Management Executives (CHIME)*, <https://chimecentral.org>. CHIME is a personal membership organization of CIOs in the healthcare field. CHIME provides professional development and networking opportunities for its members.
- *Healthcare Information and Management Systems Society (HIMSS)*, www.himss.org. HIMSS is a personal membership organization representing professionals in clinical systems, information systems, management engineering, and telecommunications. HIMSS provides professional development opportunities to its members through publications and educational programs.
- *HIT and quality improvement training, Health Resources and Services Administration, US Department of Health and Human Services* (www.hrsa.gov/library/health-information-technology). This website is rich with information, fundamental data, research studies, and manpower assessments related to HIT.

Discussion Questions

1. Why are clinical, business, and operational acumen more important for healthcare CIOs today than in past years?
2. What factors can increase the size and complexity of the HIT organizational structure?
3. What factors are contributing to the need for even more effective HIT governance?
4. Why is the relatively new HIT function of enterprise architecture important?
5. In organizations where not all HIT functions report to the CIO, what are some approaches to ensure alignment of HIT purchase decisions with the healthcare organizations' strategy?

6. With the increase in the use of external service providers (e.g., cloud-based data centers, externally provided applications), what are some of the challenges that CIOs and HIT departments must address in order to successfully leverage these options? What are some of the risks associated with these options?

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