The Flexential 2nd national IT trends in healthcare study

Insights from US healthcare IT decision makers

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FLEXENTIAL

Executive summary

"It's a 'never sleep always worry' [environment]."

CTO at GA hospital

Introduction

A 'never sleep, always worry' environment is an accurate descriptor for the position of the healthcare CIO, as well as healthcare organizations at large, given the ever-shifting state of information technology today. Taking into account the rapid trend of cloud adoption, critical considerations for security and compliance and the fact that IT now plays an integral role in driving revenue, there are a multitude of pressing challenges weighing on healthcare organizations and their IT teams—all of which are reflected in the feedback of respondents who participated in the Flexential 2nd national IT trends in healthcare study.

The two-phase study included a survey of 157 IT decision makers at healthcare organizations, as well as in-depth first-person interviews with seven C-level executives and healthcare information technology professionals on their technology usage, planning trends and security and compliance concerns.

Among the developments identified through the survey results were several overarching industry trends and drivers, presented below to precipitate the overall key findings:

The cloud adoption trend	IT as a revenue driver	Security and compliance: mitigating attacks, aligning with regulations
Healthcare organizations are more open to outsourcing cloud and colocation, with the intention of taking advantage of improved operational efficiency, cost reduction and increased security.	A number of IT trends predicted to come to fruition over several years are significantly accelerated, such as the adoption of patient portals and electronic records; healthcare organizations hope to use these tools as competitive differentiators and drivers of business. The healthcare CIO now has significant influence to drive business decisions at the board level.	Cybersecurity and compliance go hand-in-hand. Attack methods and breaches continue to threaten healthcare organizations, while compliance requirements remain a moving target. IT decision makers say that their budgets are increasing, but resources are still strained due to pressure to remain in compliance and breach-free.

"Cybersecurity risk is tremendous; we're being targeted significantly. Ransomware hits even in the last week"

CIO at Nebraska hospital

A message from Flexential

Mike Fuhrman, chief product officer and David Kidd, vice president of governance, risk and compliance

There is infinite potential behind the power of information technology that will continue to impact healthcare organizations in ways that will change the industry forever. The world of healthcare ushered in the age of the patient, both operationally and technologically, and medical facilities who are quick to adapt will see significant growth, while those that hesitate to acquiesce to change will fall behind. Today, a patient walking into a hospital has very specific expectations: hospital staff should instantaneously know who they are and every last detail of their medical history. Medical technology should effectively enable this expectation, offering the correct information and results in real-time, every time, driving an effortless and frictionless patient experience.

The technology and infrastructure behind a hospital's IT department determines an organization's level of success with meeting patient demands and keeping pace with change. Robust cloud and data center services are key in facilitating the ongoing evolution of the healthcare industry while supporting innovation to enhance patient care, quality and safety. While technology services take place behind-the-scenes, IT professionals are responsible for powering applications efficiently, storing data securely and aiding healthcare organizations in meeting the demands of industry and government compliance requirements.

At Flexential, we've worked alongside healthcare organizations since our beginning in 2000. We take pride in offering first-rate compliant colocation services and one of the largest HIPAA-compliant clouds in the world.

Flexential also works closely with customers on an ongoing basis to maximize IT investments and plan for the future. A significant component of our efforts is research and development to continuously enhance our deep understanding of the healthcare industry.

The survey results presented in this report provide insight into the specific challenges healthcare organizations face as they adopt the evolving practices of information technology. While the changes will continue and regulatory pressures remain, there are many tools and strategies to support healthcare IT professionals in their success.

We hope you find the data and insights in this paper useful to your organization and better equip you to make constructive decisions for the future, both for the health of your business and patients.

Mike Fuhrman
Chief Product Officer
Flexential

David Kidd
VP, Governance, Risk & Compliance
Flexential

Study findings: A bird's eye view

The Flexential 2nd national IT trends in healthcare study results reflect current market conditions and healthcare IT market trends. As referenced in the introduction, the top trends include the increasing rate of cloud adoption among healthcare organizations, IT beginning to play a more integral role in driving revenue and juggling security and compliance to balance mitigating attacks with adhering to industry and government regulations.

Below is a general summary of the study findings, followed by detailed results:

Key trends	Pain points	Technology planning
• Population health is top of mind for many healthcare organizations, along with changing business models, both of which are major big data considerations • Big data is taking hold as an initiative, but talent is an issue • EHR migrations remain a top priority for most organizations, transpiring more swiftly than expected • Consolidations and mergers drive IT priorities	• IT departments are stretched thin, straining for time, budget and personnel resources; and "doing more with less" is an ongoing challenge • Changing regulations, security and resource constraints remain constant obstacles • User adoption remains a large barrier to IT efficacy • Consolidation brings integration challenges	• Mobility and patient portals were reported as the top technology solutions or changes believed to have the greatest future impact on patient or customer experience in the next two to

Security	Regulations	Industry-wide changes: 2014-2016
• The majority of IT leaders rated their security programs a B- • Ransomware is a major concern, creating the need to balance proactivity versus reactivity, as well as balancing available organizational resources versus actual needs • Connected devices and IoT initiatives simultaneously create massive streams of data and openings for security threats	• IT leaders continue to struggle to keep up with regulations; staffing is a major concern • Fulfilling Meaningful Use 3 requirements is top of mind and CIOs are pushed to deliver faster and more transparent data to regulators, as well as patients	• Moderate infrastructure changes were reported, with a decrease in in-house environments and an increase in colocated and cloud IaaS environments. • Software as a Service adoption across workloads increased by about one-third • 67 percent of IT leaders indicated they expect their IT budgets to increase in the next two years, an accelerated trend since 2014

Part 1: The technology delivery model

The adoption of the cloud and general IT outsourcing is a major game changer for healthcare. Healthcare decision makers are slowly but surely more open to the cloud and partnering with third-party providers in hopes of increasing organizational productivity, improving overall patient experience and converting capital expenses to operational expenses.

When it comes to a model for the delivery of technology, Flexential study findings revealed the following trends among major healthcare organizations:

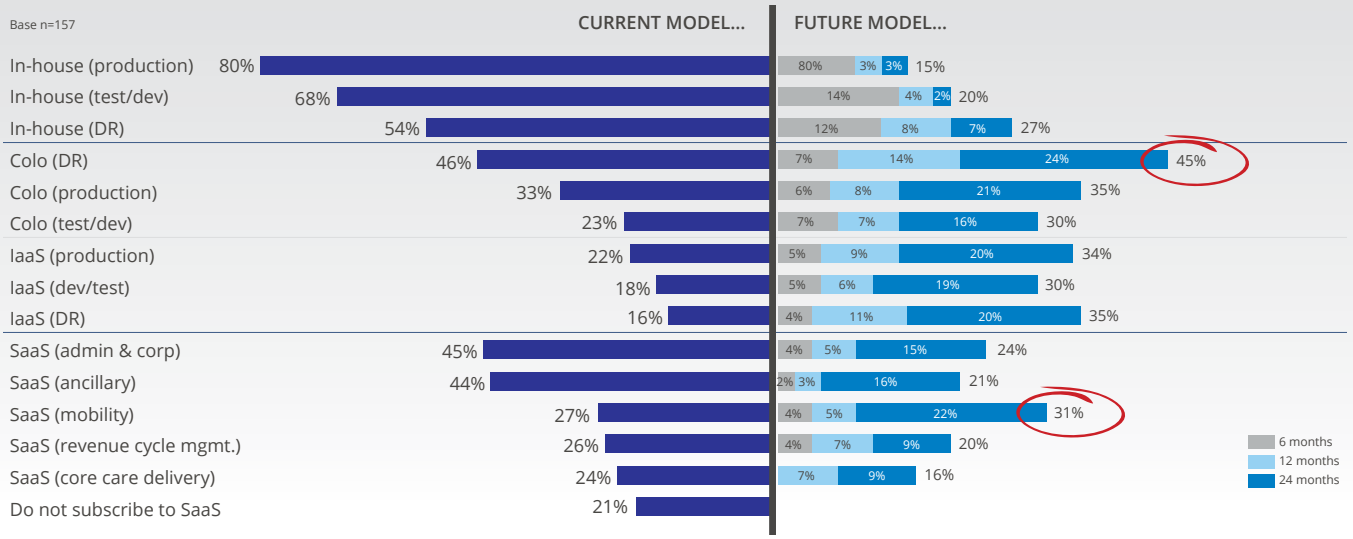
- A high propensity to outsource (SaaS, IaaS, colocation, DR) than is evident, with 11-20 percent of organizations outsourcing nearly 30 percent of IT needs
- Security and data privacy are top priorities and healthcare organizations are exercising extreme caution in response to repeated major data breaches
- Integrating multiple IT resources and systems is also a top priority
- EMR/EHR, HR/payroll and email are some of the top applications transitioning to the cloud
- Disaster recovery is a principal initiative
- Most healthcare organizations have DR plans in place, but only test their plan once yearly or less; few tests are successful
- Consolidations of hospitals, as well as vendors and applications, are key drivers for technology delivery models

Infrastructure delivery model

In recent years, cloud computing seemingly became the panacea for IT solutions across all industries, but healthcare was slow to adopt. Historically, healthcare organizations were measurably more likely to keep IT in-house due to the ubiquitous perception that outsourcing will compromise security. However, trends are shifting in favor of increased efficiencies and considerable cost reduction.

Figure 1 demonstrates that many healthcare organizations still prefer to keep IT in-house to an extent, but within the next six to 24 months, a majority will assess outsourcing their colocation, DR or SaaS workloads.

Figure 1: A Shift in Outsourcing to the Cloud: 2014 vs. 2016



Which of the following describe(s) your current and future technology infrastructure delivery model?

"Our HR system is cloud-based. Anytime we look into a new system, we consider cloud."

CIO at Nebraska hospital

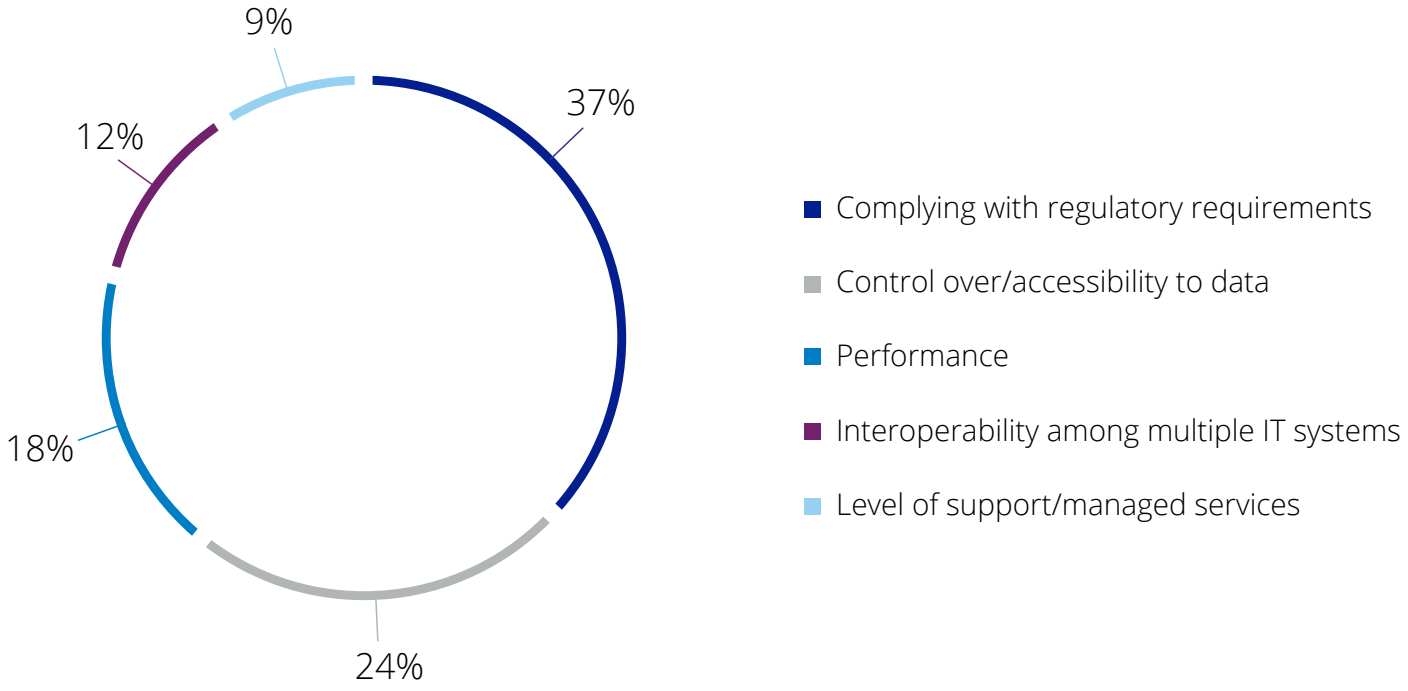
The great shift to the cloud and adoption barriers

Healthcare organizations are now more open to outsourcing cloud and colocation with the intention of taking advantage of improved operational efficiency and cost reduction. However, hesitation continues to persist in some areas, namely the fear of decreased security; particularly where breaches are concerned. 38 percent of respondents cited complying with regulatory requirements was a top concern in moving to the cloud (Figure 2), with control and accessibility to data following at 24 percent.

"You can have a fair amount of technical controls, but no amount of technical procedure can prevent the end user from giving away their password to a phisher."

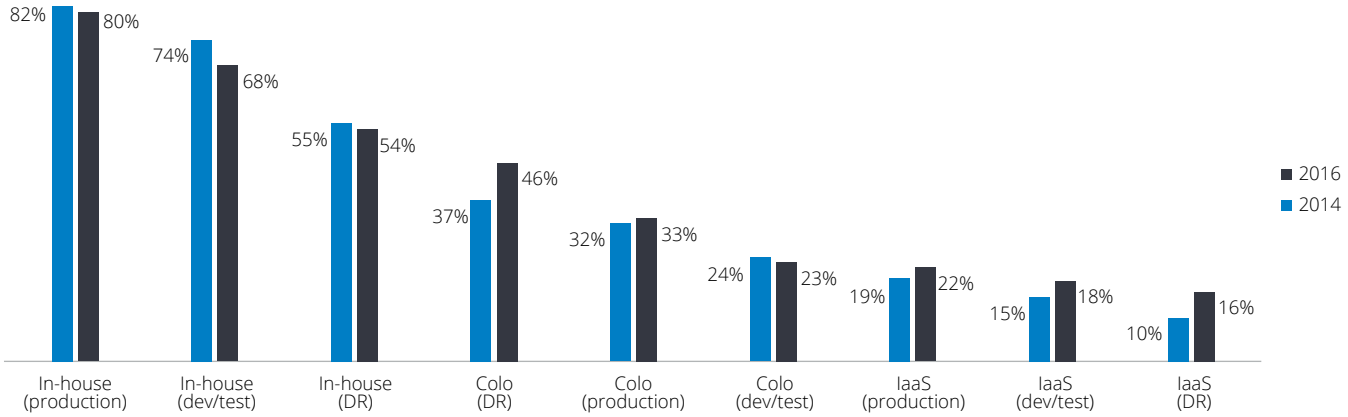
CIO at NC hospital

Figure 2: Top concerns for moving to cloud



What are your top concerns or obstacles about moving your IT infrastructure to the cloud?

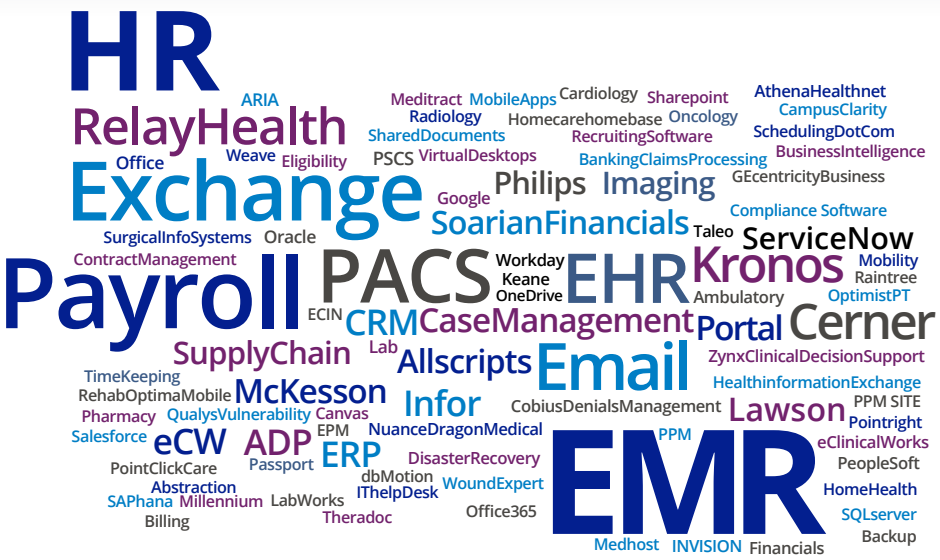
Figure 3: 2014 vs. 2016 Technology Infrastructure



Please select which of the following describe(s) your CURRENT technology infrastructure delivery model. Select all that apply.

2016 Base n = 157
2014 Base n = 149

As far as actual cloud usage, healthcare IT organizations are seeing the benefits of application hosting using third-party cloud partners. SaaS models are a common initial segue into cloud outsourcing, with a 33 percent increase in adoption since 2014 (Figure 3). Around one-quarter of respondents reported that 17 percent of their organization's data workload will be managed in a SaaS environment within the next one to three years. As healthcare organizations continue to reap operational and financial benefits through shared computing resources, putting more applications and even full infrastructures into the cloud are viable options. Most organizations currently host some applications in the cloud, but 80 percent still have in-house production workloads, though this trend is shifting..



What are the top specific applications that you have in the cloud today? Please enter at least one application.

What's in a cloud partner? Top attributes ranked by significance:

- Reliability and uptime
- 24/7 support
- Flexible contract terms/usage-based pricing
- Well-known company and positive reputation
- Self-service capabilities
- Tailored solutions
- Personalized and high-touch service delivery and support

Why outsource IT solutions? Top benefits ranked by significance:

- Improve patient outcomes and satisfaction
- Optimize data security
- Reduce costs
- Meet regulatory requirements
- Disaster recovery
- Streamline IT system integration and/or consolidation

Disaster recovery planning: A critical measure that enables compliance

A DR plan is critical to protecting the entirety of a healthcare organization in the event of an unplanned catastrophe, whether a natural disaster takes place, an outage occurs or a cord gets unplugged during routine maintenance in the data center (never discount human error). Without a robust DR plan in place, consequences range from considerable financial costs, irreparable damage to organizational reputation and the potential to expose sensitive patient data.

Further, HIPAA mandates that all healthcare organizations have a DR plan and complete a risk assessment to identify which events are most likely to disrupt confidentiality or availability. It's important to note that while compliance is not negotiable, it is also not equal to a healthy DR practice.

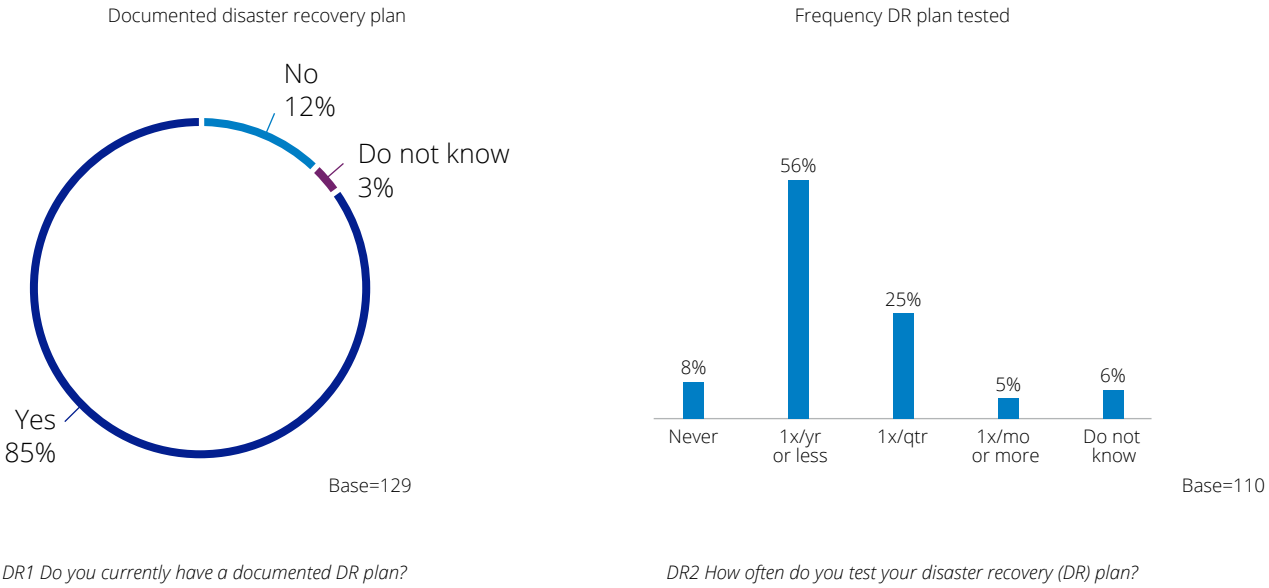
Taking full measures to develop a DR plan that will effectively address risks and ensure recovery in the event of a disaster will require measures beyond solely meeting HIPAA mandates.

Equally important to the DR plan is testing—your plan is only as strong as its weakest link, thus regular testing is critical in order to identify vulnerabilities and ensure ongoing efficacy. However, the Flexential healthcare study determined that most participants execute DR testing less than once annually (Figure 4).

"If infrastructure goes down, you paralyze an institution. So you need it to be redundant from a power and data standpoint. I always worry about that."

VP of IT at NJ hospital system

Figure 4: DR plans



DR1 Do you currently have a documented DR plan?

DR2 How often do you test your disaster recovery (DR) plan?

Part 2: Electronic medical records/electronic health records and the interoperability challenge

There are a multitude of systems medical facilities utilize on a daily basis, from patient health records to prescription management systems. Concurrently, a great deal of activity takes place between hospitals. While a multitude of disparate systems are utilized among healthcare facilities and medical professionals need to communicate in real-time, CIOs are left with a plethora of EHRs and revenue cycle model systems that need to be integrated. The question remains: how can the interoperability challenge be addressed quickly and efficiently?

Flexential study findings identified the following overarching findings covering issues related to EHRs:

- User adoption and alignment with business objectives are key challenges for healthcare IT leaders
- Medical records aggregation and interoperability of systems for improved communication between healthcare systems, as well as between doctors and patients, are major projects
- EMR/EHR system implementations and integrations overall are top priorities which encompass a considerable project scope

Health and medical records made electronic, systems integrations critical

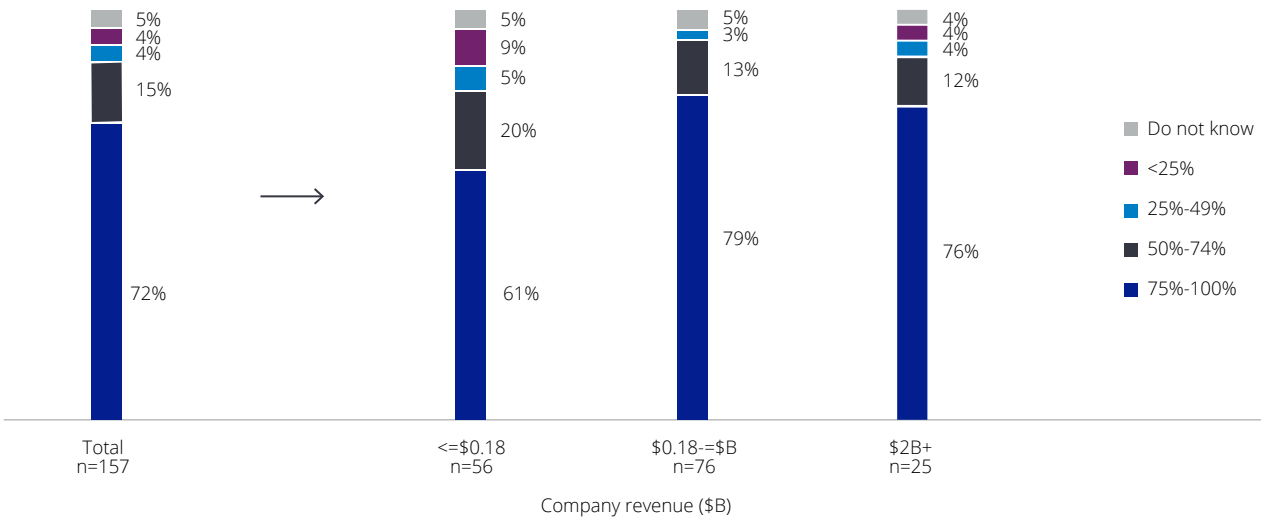
Today's healthcare organizations are highly pressured to juggle making information available across various technology systems with constant availability of real-time patient data. Long gone are the days of physical files and manual note-taking, as the age of electronic records takes its place. Hospitals are now measured on patient experience scores that the effectiveness of technology determines, coupled with the age-old dilemma of doing more with less.

Overall, Flexential survey participants made 72 percent of all medical records electronic (Figure 5), and 27 percent consider integrating multiple IT resources and systems a priority. Transitioning from physical to medical records allows healthcare organizations to keep up with the demanding pace of IT by making patient data readily available and enabling system integrations.

"The EHR integration wasn't about reducing software cost, it was about integrating operations."

CIO at a Pennsylvania hospital system VP of IT at NJ hospital system

Figure 5: Medical records made electronic



What percent of medical records has your organization made electronic?

While the majority of healthcare organizations are in the process of adopting electronic systems, inter-facility communication and around-the-clock availability remains a challenge. IT decision makers continue to figure out how to make data seamlessly available internally and across different providers, as well as to patients.

Larger organizations adopt a greater percentage of electronic health records, suggesting that smaller businesses are slower to catch up given greater budget constraints.

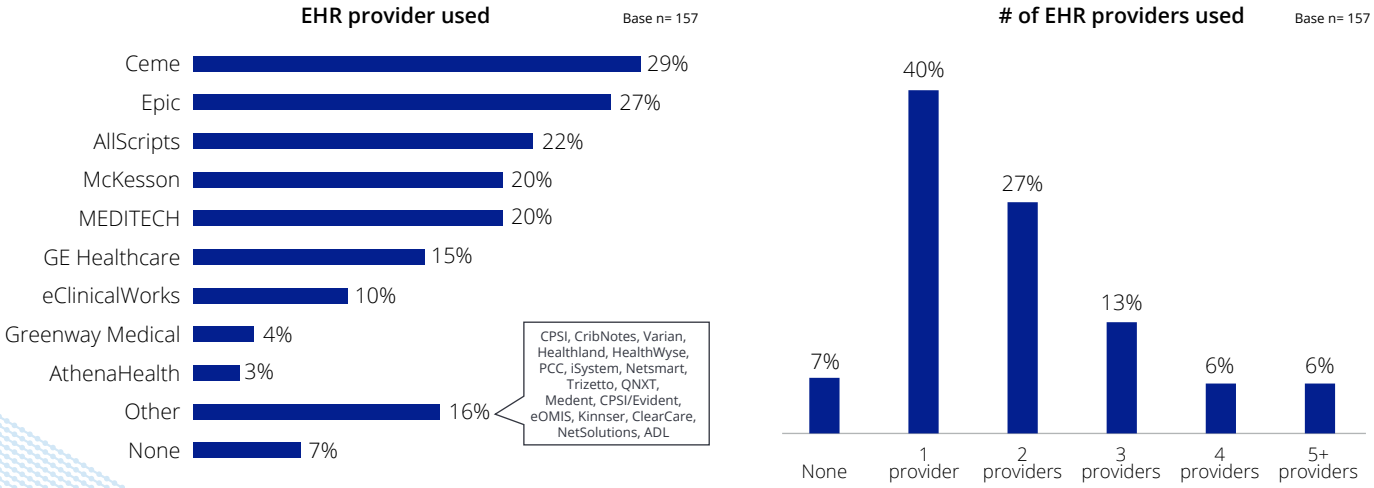
EHR workloads and hosting providers

In spite of the increasing importance of EMR/EHR system implementations, only 12 percent of respondents currently host EMR/EHR workloads in the cloud. EMR/EHR occurs more swiftly than cloud adoption, primarily due to hesitation stemming from trusting the security of workloads and applications in a third-party cloud. Also noteworthy is the common practice of using a multitude of EHR providers for various purposes, further influencing the persistent challenge of interoperability. So far, there is not a single solution available for all administrative functions, making multiple EHR providers necessary, but tedious.

"We're fully electronic with records hosted in the cloud, lab systems, pharmacy systems, supply chain and payroll are hosted with a third party."

VP of IT at NJ hospital system

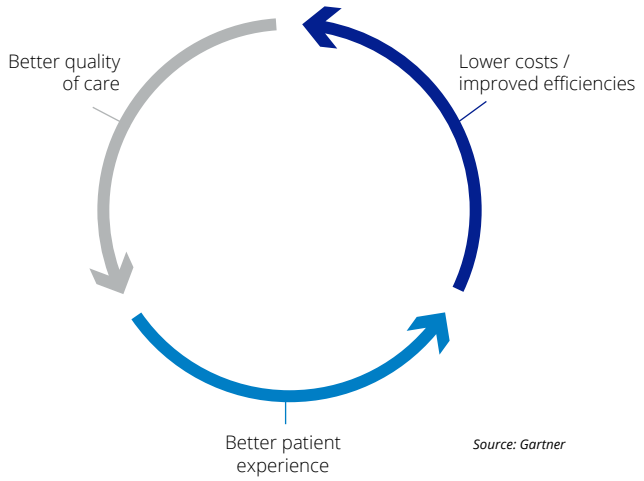
Figure 6: EHR statistics



Part 3: CIO agenda: A day in the life and planning for the future

The responsibilities of healthcare CIOs shift rapidly. What was once an operations-based, day-to-day focused role is now a strategic position centered on forecasting future needs based on today's trends. Challenges include reacting to ever-changing regulations, implementing technology solutions to solve complex problems, improving patient care and outcomes and meeting regulation and security requirements.

Triple aim



Source: Gartner

Simply put, healthcare CIOs do not have enough hours in the day to keep up with the demands of their own organizations. Inputs include executive pressure based on patient outcomes, strategic direction and patient experience, the changing business model of hospitals, and a chronic problem with under-staffed/under-funded IT organizations. On top of their internal and operational job functions, CIOs must maintain a 360-degree view of technology innovation, remaining compliant with changing regulations and staying alert on the latest security threats. In essence, a day in the life of a healthcare CIO is a round-the-clock job.

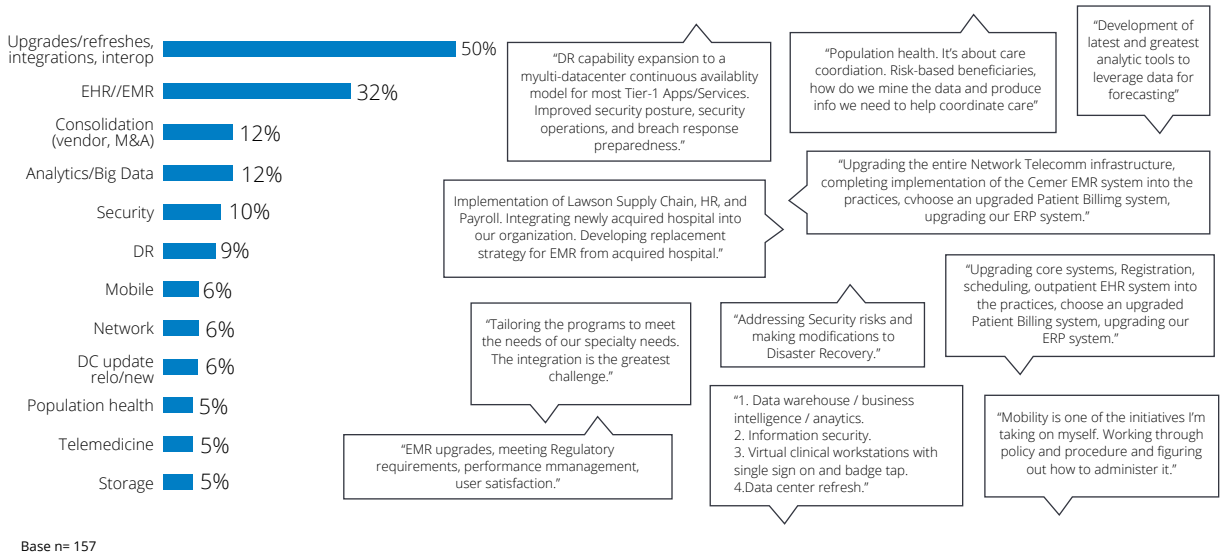
Flexential study findings identified the following conclusions spanning internal and external pressures that affect IT initiatives for healthcare CIOs:

- Healthcare CIOs are juggling many initiatives and pressures which include EMR/EHR migrations and integrations, as well as application(s), hardware and software implementations and upgrades
- New roles created to deal with the many changes:
  - Analytics and data managers
  - Cloud and security czars
  - Engineering and development resources
- Budgets increased steadily since 2014 and are expected to increase exponentially in the coming years
- Key IT trends expected to affect the patient experience in the next two to five years include mobility, patient portals, telemedicine, EHRs, interoperability, cloud, analytics and big data

Future IT initiatives

When CIOs and IT directors were asked about key initiatives for the present and future, participants listed goals ranging from simple storage to big data (Figure 7). Upgrades, refreshes, integrations and interoperability drive CIO and IT leader decisions, so it's no surprise that the list of current and upcoming initiatives is long and winding. While EHRs and EMRs play a considerable role, so too do consolidation, population health and balancing policies and procedures. Healthcare organizations are under pressure to achieve a plethora of lofty goals with a considerably limited amount of resources.

Figure 7: Initiatives, present and future



QITGoals1 What are your biggest IT initiatives for the next 12 months?

New IT roles and budget expectations

Given the increasing complexity of IT in healthcare, CIOs oversee growing IT departments and create new roles to accommodate their evolving needs, particularly in the case of mid-sized IT businesses. Respondents specified that pressing initiatives to integrate patient records and use data to make useful recommendations are creating the requisite for more specialized roles.

Beneficially, healthcare IT budgets continue to rise. 67 percent of participants predicted an increase in the next two years, as compared to 2014's projection of 51 percent.

IT's ultimate impact on healthcare

Most CIOs spend a considerable amount of time looking into the future in order to stay on top of the challenges of today, which include anticipating how IT will influence healthcare in the coming years. As the Flexential survey results exhibit, patient portals, mobility and mobile applications were at the top of the list, while interoperability and security issues closely follow.

Part 4: Internet of Things: Connected devices, telemedicine, patient portals and big data

Internet of Things (IoT) is considerably changing the patient experience. For instance, in the situation of a patient fitted with an implanted pacemaker, regular doctor's visits were once required for check-ups and interpreting data. Today, the same patient can go about their life with significantly increased convenience because their pacemaker is connected and transmits health data to their healthcare provider on a regular and automatic basis, making trips to the doctor few and far between.

A medical record number and reactive processes represented the patient of the past, but today IT enables a significantly improved patient experience. For example, in Gartner's white paper, "Healthcare Provider CIOs Must Boost CNO Collaboration to Materialize the Real-Time Health System," it was noted that "...sleep deprivation has recently been featured in a study by Peter Pronovost as the No. 1 source of patient dissatisfaction with hospital stays."1 As healthcare IoT continues to advance, devices such as smart thermometers can easily address these types of issues. Consider a "smart thermometer device" installing such a tool in a patient room can simultaneously improve patient experience and provide real-time data to doctors on an automatic basis without disrupting the patient.

Then there's telemedicine. Many healthcare organizations offer patients the option of checking in with medical professionals remotely. If a patient needs an assessment for a low-risk illness, a nurse practitioner or doctor is only a mouse click away. Additionally, patient portals allow patients to view medical data ranging from personal health history to test results via a convenient online gateway. Hospitals and doctor's offices are increasingly adopting portals.

Further, big data has a massive impact on the healthcare industry. While full-scale implementation and usage are still in process, big data is a major initiative, particularly where population health and connected devices are concerned. Healthcare organizations now have a significant opportunity to make meaningful inferences about the state of doctors and patients both today and in the future, creating the ability to predict operational changes before they occur and accommodate for the evolving needs of healthcare consumers.

Flexential study findings defined the following fundamental conclusions related to the ongoing growth of IoT, telemedicine and big data:

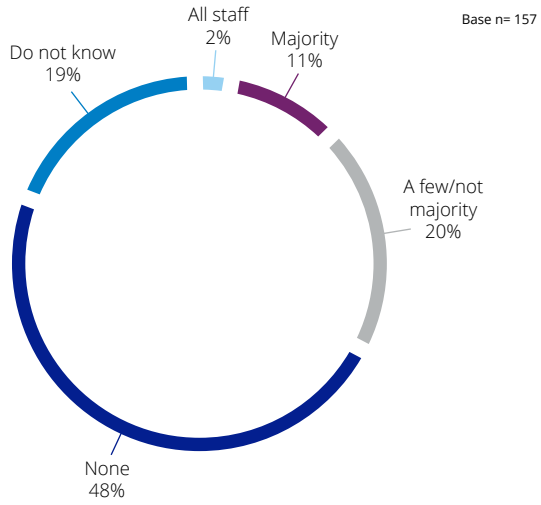
- CIOs choose to integrate new technologies with caution due to security worries, but often have little control
- Devices and applications produce increasing amounts of data and the majority of organizations are still figuring out what to do with it and how to best leverage findings
- Big data is a major initiative with "population health" and connected devices, but implementation and usage is not yet strong
- Nearly half of healthcare organizations adopted telemedicine and an additional third plan to implement telemedicine with the expectation to see improved patient experience and increased competitive advantage
- Based on Flexential study findings, we predict close to 100 percent adoption of telemedicine in the next two to three years

Location-aware connected device usage and challenges

There are a wide range of security concerns around applications. CIOs feel like they have less control given the volume of data produced by applications and mobile devices on a continuous basis. They see the benefits and work on identifying a solution for using data, but are very cautious.

The question of "How do we store all this data?" is common in the pursuit of cost-effectively collecting and storing the infinite data produced by connected devices.

Figure 8: Medical staff using connected devices



QMobility1 What portion of your medical staff uses location-aware connected devices for their day to day jobs?

About one-third of healthcare organizations reported that doctors and nurses use location-aware connected devices, with smartphones having the highest rate of usage.

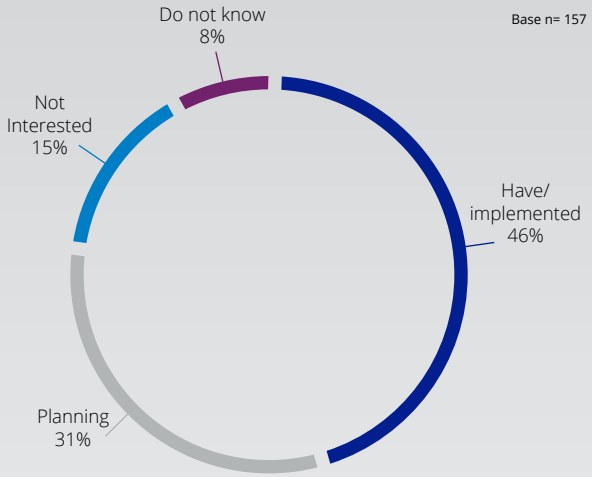
"One of our strategic initiatives for the next 24 months is telemedicine; how can we use IT to help coordinate care, monitor vitals and make sure people are taking their meds?"

VP of IT at NJ hospital system

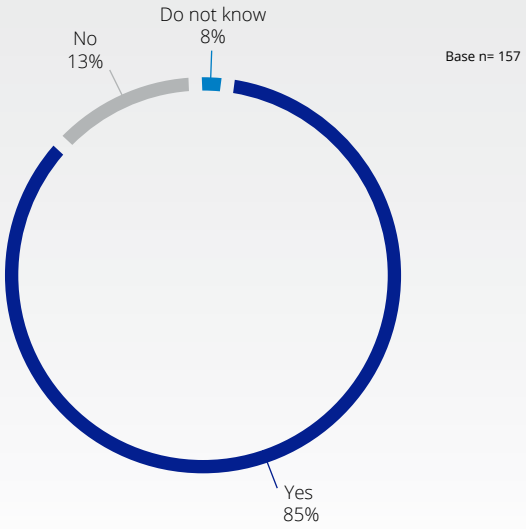
Telemedicine and patient portals

Telemedicine empowers healthcare organizations to provide significantly better patient experience and competitive advantage with an implementation rate of nearly 50 percent, while 31 percent plan to implement (Figure 9).

Figure 9: Telemedicine stats



QTelemed1 Please indicate your organization's current status regarding telemedicine



Qpp2 Does your organization have a patient portal?

In addition to fewer trips to the doctor and overall increased convenience, telemedicine drives numerous critical technology initiatives that change the landscape of healthcare, including Natural-language processing. According to "Hype Cycle for Healthcare Provider Technologies and Standards, 2015" by Gartner, "(NLP) technology is used to extract, categorize and summarize data from speech-to-text documents and unstructured clinical documentation." With proper implementation, NLP can identify clinical conditions, patient safety issues, quality measures, meaningful use reporting data, procedures for reimbursement and patient populations or point-of-care information delivery for clinical decision support.[2]

"We have an initiative to implement a patient portal and push that out to patient population. The technology stands up easily. The hard part is engaging with patients when they come in to facilitate the use of the portal."

CIO at PA health system

Patient portals are also a leading initiative. 85 percent of healthcare IT decision makers currently offer a patient portal, with content including electronic medical records and access to prescription details.

Part 5: Security, risk and compliance

Given the danger and frequency of ransomware attacks and evolving methods for hacking, cybersecurity is vital to healthcare organizations. Further, the challenges of compliance include keeping up with change and new regulations, plus a pervasive strain for resources despite increasing budgets.

At the same time, no healthcare organization is willing to become the next major name in the news as a result of a security breach. Organizations are hyper-focused on remaining compliant and avoiding becoming the target of an attack.

Flexential study findings resulted in the below security, risk and compliance-based inferences:

- Cybersecurity is increasingly important, however, many organizations find it difficult to adequately address given the current talent and team bandwidth
- Ransomware is a pressing concern and healthcare organizations scramble to protect their data before it's too late
- Internal staff practices expose organizations to risk, which are difficult to control, especially with the evolution of IoT, connected devices and patient self-service
- Constant change within regulation impacts resource-strained IT departments and reporting related to government mandates also causes a great deal of pressure
- Meaningful Use Stage 3 has a significant impact on IT departments and healthcare organizations overall

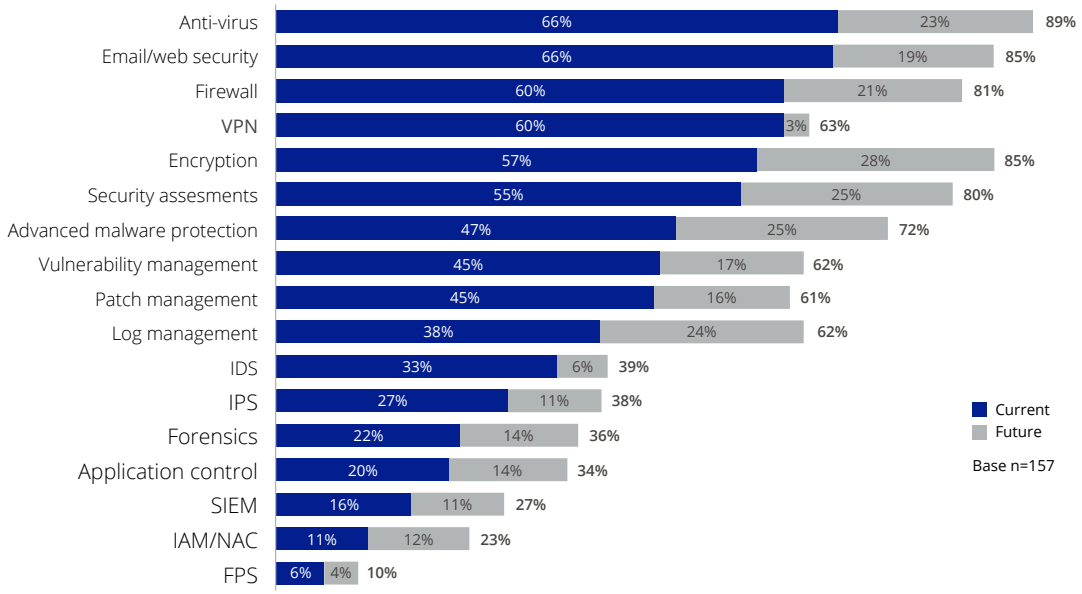
Security services and program grading

Security and risk are major concerns in the healthcare world. So much is at stake if a potential vulnerability becomes a breach. While an initial hesitation to work with third-parties is common in healthcare, a solid amount of IT decision makers purchase security services from third parties in an effort to shore up overall security posture (Figure 10). Notably, the top three most purchased third-party services are anti-virus (89 percent), email and web security (85 percent) and firewalls (81 percent), with encryption and security assessments closely following.

"An obvious thing out there is security. Hackers, ransomware – and you want to be secure enough, but not so secure that you affect the business."

VP of IT at NJ hospital system

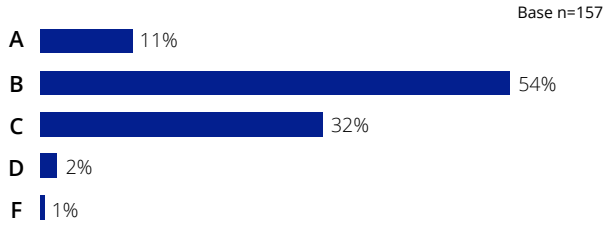
Figure 10: Services from third party



Which of the following other security services do currently invest/do you plan to invest in in the next 12 to 24 months?

When asked to rate their internal security program, the majority of participants rated themselves between the C and B level, most likely due to being overwhelmed with limited IT staff available for security operations. IT departments strive to cover as much ground as possible, but keeping up with security as a whole often results in the need to drop all IT pursuits and respond to an alarm.

Figure 11: Security grade



QSecurity4 If you were evaluating your security program, what grade would you give your organization's security program with "A" being excellent andn "F" being failing?

Closing reflections

The Flexential study shows that the key drivers of healthcare organizations will determine the progress of healthcare organizations throughout the country, depending on how technology leaders respond to today's pressing issues. According to the results of the Flexential study, fast-paced innovations in technology in conjunction with the complexity of compliance requirements aggressively drive the healthcare industry.

It is absolutely critical to remain cognizant of the potential for technology to transform your healthcare business. IT is no longer a day-to-day activity; it's a driver of business and influencer of revenue. Patient experience is a success and compensation metric for hospitals and there is no room for error.

The evolving role of the healthcare CIO means that these individuals have a seat at the executive table, with the power to make a lasting financial impact on business. Technology can now help transform the healthcare organization at large and IT leaders need to stay abreast of changing tides.

Working with a reputable technology services partner can significantly reduce risk, downtime and capital expenditures. On top of allowing overloaded IT staff to focus on critical technology initiatives, consulting with an expert IT partner will allow your organization to stay on top of today's needs while adequately planning for the future.

The results of this study yielded a considerable breadth of information spanning almost every area of IT in the realm of healthcare; more than could be efficiently included in this white paper. After fully mining and analyzing the study results, the Flexential research and analytics team made a strong effort to make every applicable finding available to the healthcare IT community by creating a wide range of content on each topic in hopes that your team will be able to absorb information relevant to your organization and better equipped to make constructive decisions for the future, both for the health of your business and patients.

1. Gartner "Healthcare Providers CIOs Must Boost CNO Collaboration to Materialize the Real-Time Health System" March 7, 2016 by Barry Runyon
2. Gartner "Hype Cycle for Healthcare Provider Technologies and Standards" July 2, 2015 by Barry Runyon

Appendices

Methodology

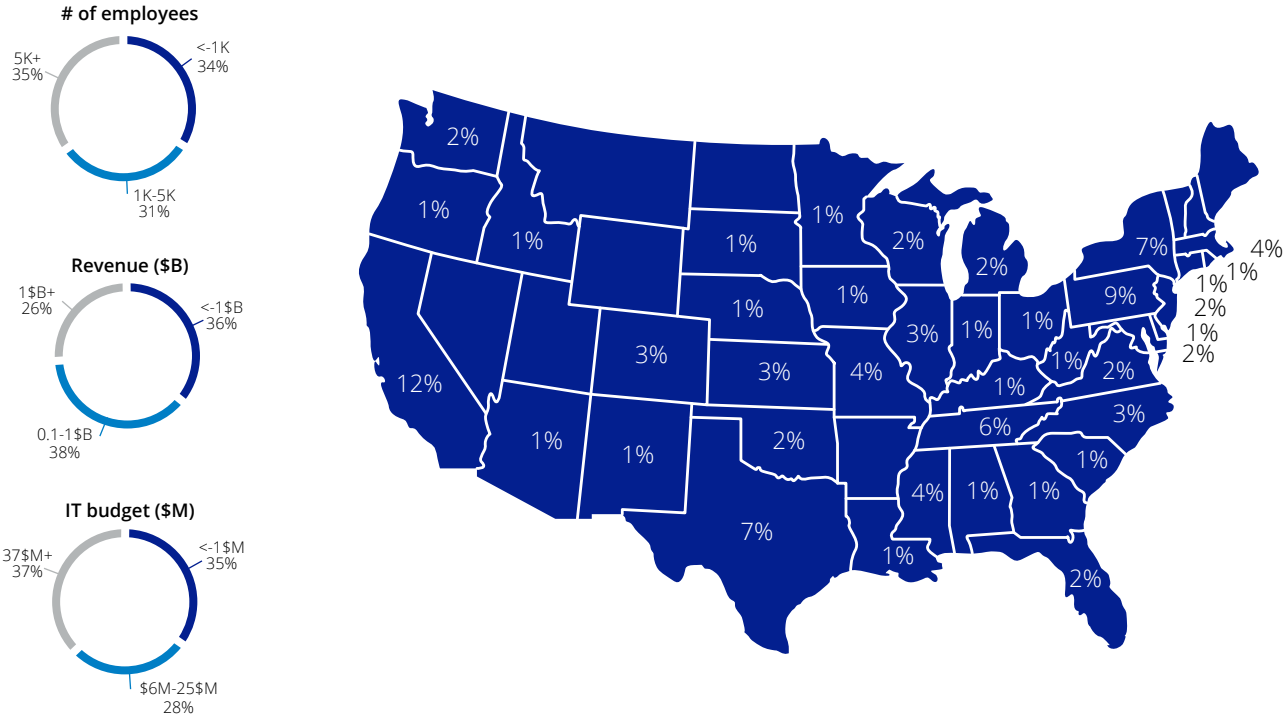
In March 2016, Flexential conducted a two-phase research project to assess decision making for IT infrastructure purchases in the healthcare sector. The first phase consisted of an online survey of 157 IT decision makers. Although all survey participants were identified as having a role in IT decision making, their titles ranged widely and included chief information officers, IT directors, chief clinical officers, chief information security officers, chief medical information officers, technical architects and systems administrators, among others.

The participants represented a geographically diverse mix of hospitals and health systems throughout the United States, many of which met the definition of a "covered entity" under HIPAA.

For the second phase of the project, Flexential conducted one-on-one phone interviews with seven IT decision makers that participated in the initial survey. The results of both phases were then tabulated and analyzed, with further assessment provided by Flexential in-house research and healthcare industry experts. It should be noted that in the analyses where percentages are cited, not all may add up to 100% as many of the questions in both studies involved multiple choice questions. The report provides an insightful look at some of the significant issues and challenges for IT professionals in healthcare organizations.

In January 2018, a revised study was issued in an effort to keep the data current, and the results within this white paper were updated accordingly.

Survey Demographics



Flexential helps organizations optimize IT transformation while simultaneously balancing cost, scalability, compliance and security. With a focus on building trusted relationships, providing valuable support and delivering tailored solutions and reliable performance, Flexential delivers colocation, connectivity, cloud, managed solutions and professional services to 4,200 customers across the U.S. and Canada.

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