

The CHIME logo features the word "CHIME" in a blue, sans-serif font. A yellow and blue swirl graphic is positioned above the letter "I".

CHIME[®]

The main title "Digital Health most wired. Survey 2022" is centered on the page. "Digital Health" is in yellow, "most wired." is in white, "Survey" is in yellow, and "2022" is in white. The text is overlaid on a background of a hand writing on a laptop with a stethoscope nearby, and a network of yellow nodes and lines at the bottom.

+ Digital Health 
most wired.
Survey 2022

NATIONAL TRENDS REPORT

Sponsored by:

The logo for Oracle Cerner, with "ORACLE" in red and "Cerner" in black.

ORACLE Cerner

The logo for HCigroup, featuring a blue grid icon followed by "HCigroup" in blue. Below it, "A Tech Mahindra Company" is written in a smaller font.

HCigroup
A Tech Mahindra Company

The logo for imprivata, with a red and white icon followed by "imprivata" in black. Below it, "the digital identity company" is written in a smaller font.

imprivata[®]
the digital identity company

The logo for cerecore, featuring a yellow and blue cross icon followed by "cerecore" in blue.

cerecore

The logo for Clearsense, featuring a blue circular icon followed by "Clearsense" in blue.

Clearsense

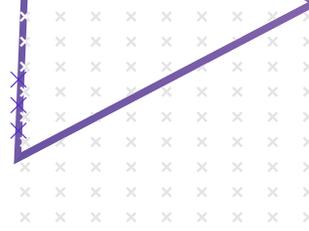
The logo for First Health Advisory, featuring a colorful icon followed by "FIRST HEALTH ADVISORY" in black. Below it, "ADVANCING SECURE AND EFFICIENT HEALTHCARE" is written in a smaller font.

FIRST HEALTH
ADVISORY
ADVANCING SECURE AND EFFICIENT HEALTHCARE

The logo for GOZIO Health, featuring a red and blue circular icon followed by "GOZIO Health" in blue.

GOZIO
Health

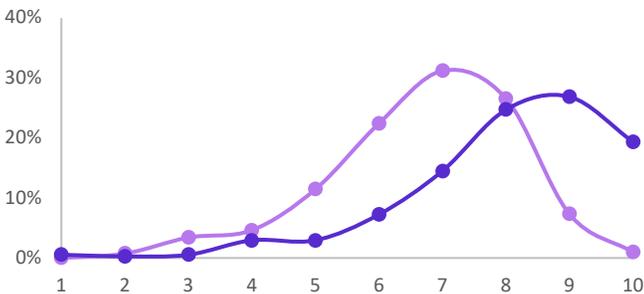
Introduction



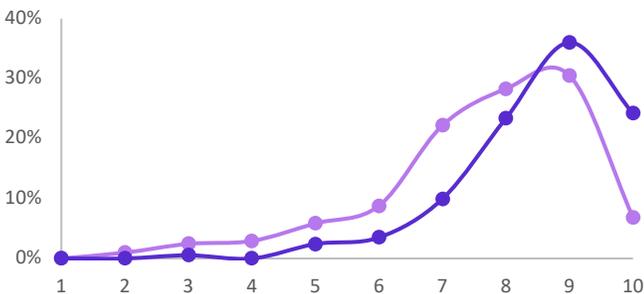
The Digital Health Most Wired survey and recognition program serves as a comprehensive “**Digital Health Check-up**” for Healthcare organizations across the world. As success in digital health increasingly determines the efficacy and quality of patient care, the scope of CHIME’s Digital Health Most Wired (DHMW) survey reflects the progress of leading healthcare providers as they continue to reimagine healthcare.

The last 3 years have been a period of remarkable disruption and challenge for healthcare organizations. As healthcare organizations, large and small, work to reinforce and reinvent solutions to fissures exposed by the COVID-19 pandemic, it is important to recognize the incredible role digital health is playing in the healthcare ecosystem’s regeneration. This is evidenced perhaps no more clearly than in the increased percentage of organizations in the 2022 DHMW survey achieving Level 10 designations in two areas highly stressed during the pandemic, **Administrative & Supply Chain** and **Clinical Quality & Safety**.

Administrative & Supply Chain



Clinical Quality and Safety



■ 2021
■ 2022

Table of Contents

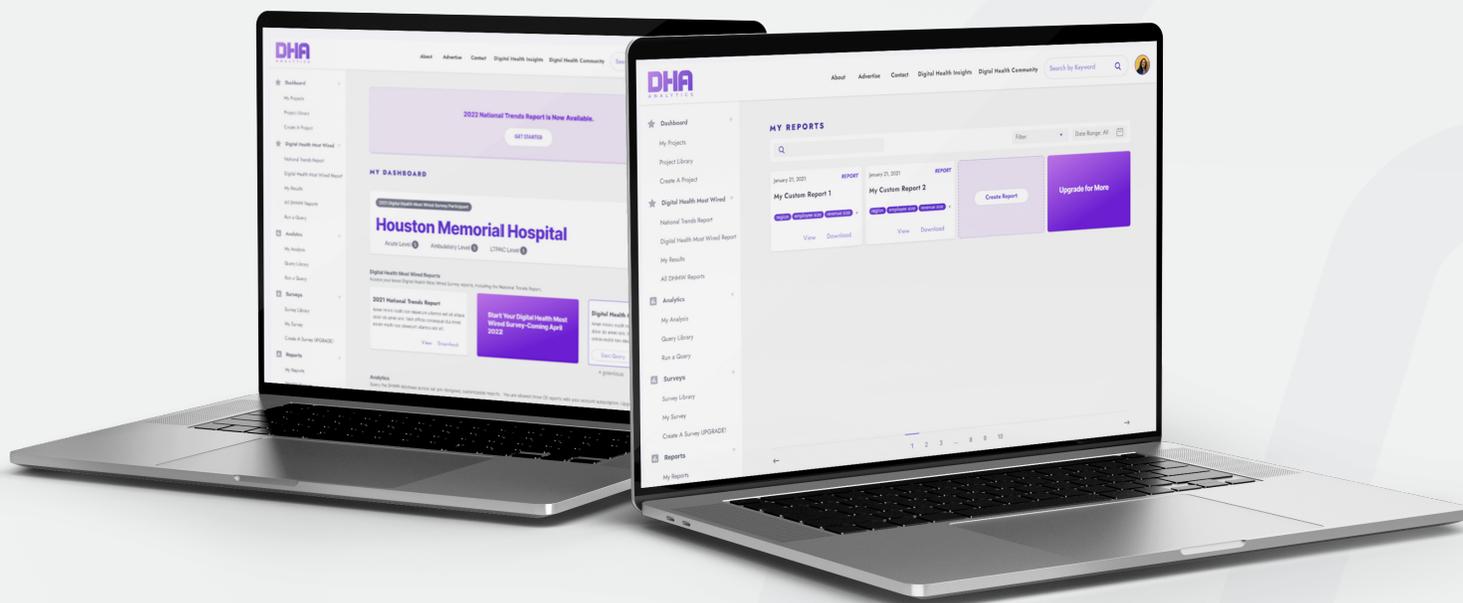
- 3 DHMW Level Designations by Section
- 4 Infrastructure
- 5 Security
- 6 Administrative & Supply Chain
- 7 Analytics & Data Management
- 8 Interoperability & Population Health
- 9 Patient Engagement
- 10 Clinical Quality & Safety
- 11 Innovation
- 12 Digital Transformation

Given CHIME’s mandate to leverage the DHMW survey to accelerate the adoption of digital technologies, CHIME continued to “raise the bar” on digital health expectations in the 2022 survey. By incorporating new, more demanding criteria into select sections of the survey, we appropriately witnessed a deflation in the percentage of organizations achieving Level 10 designations in **Analytics & Data Management**, **Interoperability & Population Health** and **Security** when compared to the 2021 distributions.

Another notable change to this year’s survey was the introduction of two new sections: **Innovation**

and **Digital Transformation**. While the **Digital Transformation** questions do not impact an organization's overall DHMW score, the questions are designed to help stimulate internal conversations as to how best action the strategic insights gleaned from this year's report.

Finally, this year's survey marks a fundamental shift in the way CHIME desires healthcare organizations employ the DHMW survey program. CHIME has supercharged DHMW's digital health transformation capabilities by moving the survey from a snapshot in time, profile of an organization's digital health capabilities, to a 365/24/7 data and analytics resource via the **Digital Health Analytics portal**. Digital Health Analytics will be the gateway for provider organizations and companies to better understand how digital technology supports leaders in transforming health and care and delivering data insights that help them make the greatest business impact possible. To this end, starting this year, rather than reporting on high-level key themes and trends, CHIME has produced insights for each section of the survey and will publish a "deep-dive" into those sections over the course of the next year.

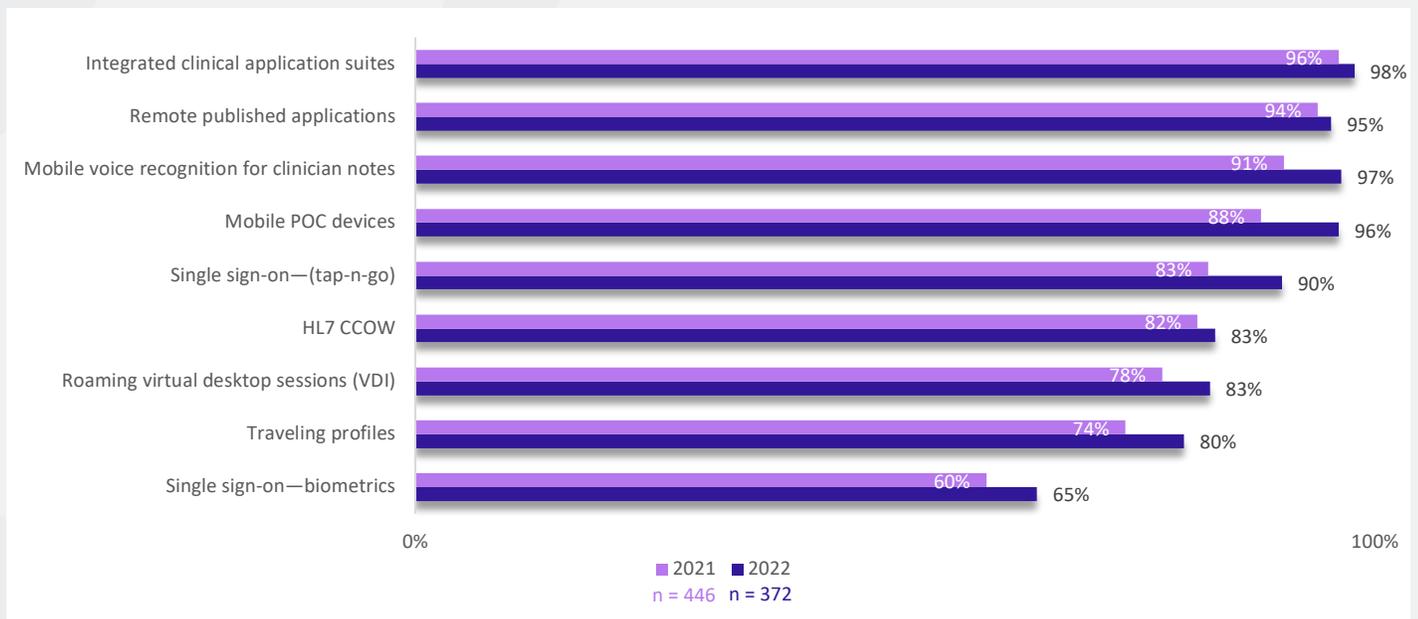


Infrastructure

Solid Infrastructure allows healthcare organizations to increasingly implement and support new technological capabilities

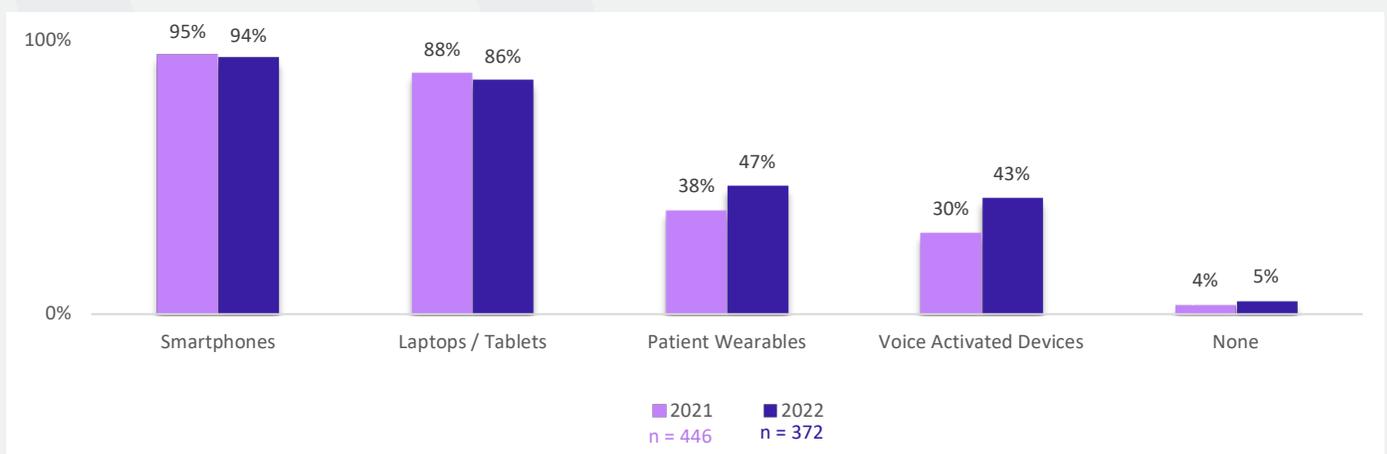
- Historically, healthcare organizations preferred to leverage existing, mature technologies rather than implement new technological capabilities. **This mindset required a shift in response to the pandemic** when organizations accelerated their use of new technologies in order to meet both patient and clinician need.
- This year organizations reported an increase in the utilization of technologies to improve caregiver workflow with the use of **Mobile Point-of-Care (POC) devices** and **Single Sign-On (tap-n-go)** increasing by approximately **8%** from 2021 to 2022.

Infrastructure Leveraged in Support of Improved Caregiver Workflow



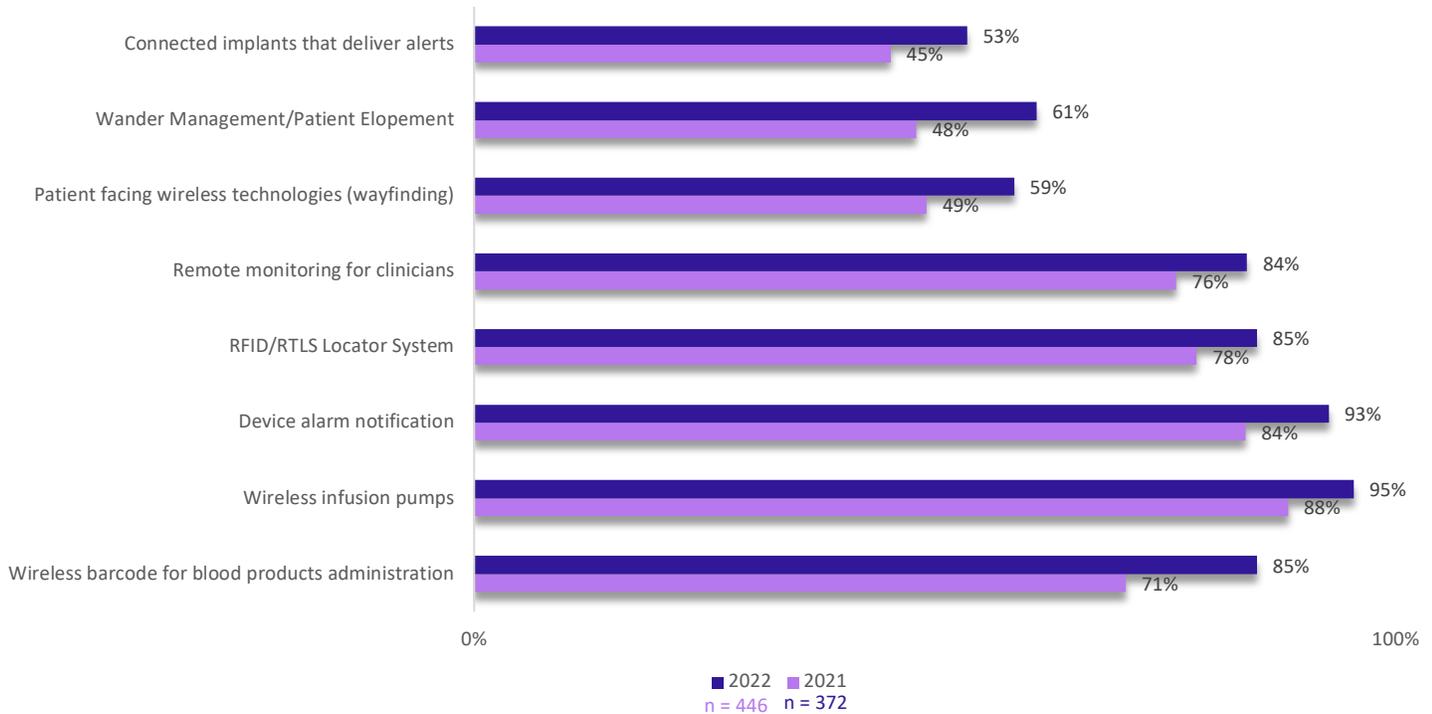
- In addition, nearly **97%** of organizations now report having deployed **mobile voice recognition** for clinician notes (**6%** increase) and **43%** support the use of **employee-owned voice activated devices** in the use of patient care (**13%** increase).

Adoption of Employee-Owned Devices in the Use of Patient Care



- Over 61% of organizations have established multiple discrete wireless networks to support enterprise functions such as clinical, biomedical, physicians and visitors. The bifurcation of networks aids in network visibility and control (i.e., which devices are connecting to which network), and supports the increased adoption of critical patient facing, technology such as Wander Management / Patient Elopement and Patient Wayfinding which grew by 13% and 10% respectively, in 2022.

Adoption of Various Wireless Applications and/or Technologies

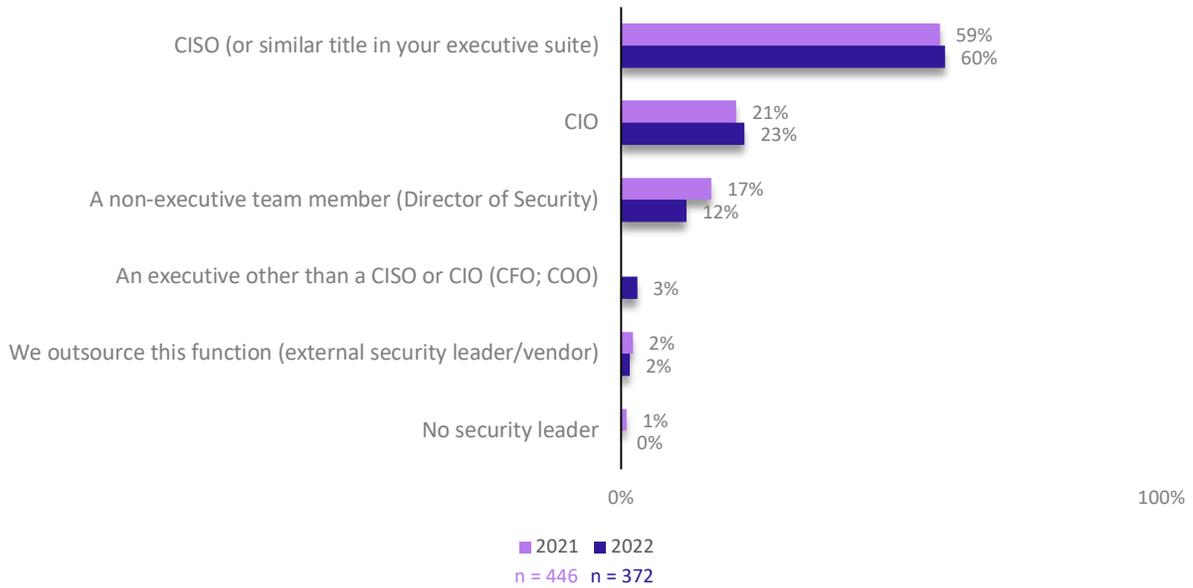


Security

With cyberattacks on the rise, healthcare organizations are rising to the challenge by adopting additional frameworks, sharing information and implementing new security measures

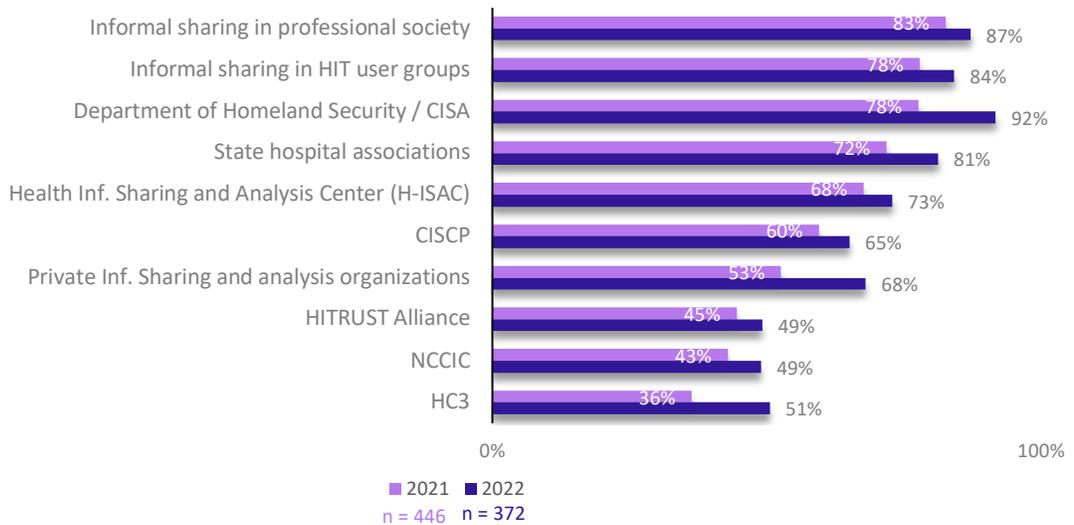
- High-profile cyberattacks have become all too common for healthcare organizations, and with the continued implementation of network connected devices the risk from cyberattacks increases. To address this risk, 60% of healthcare organizations now have a Chief Information Security Officer (CISO) in place and responsible for information security, with 12% of organizations (5% decrease) having a non-executive team member in charge of information security.

Executive Primarily Responsible for Leading Information Security



- Almost all organizations leveraging the **NIST (CSF) framework**, with a notable segment of the market adding other security approaches, to include **SANS Top 20/CIS Critical Controls (8% increase)** and **ISO 27000 series (5% increase)**.

Information Sharing and Analysis Group Participation



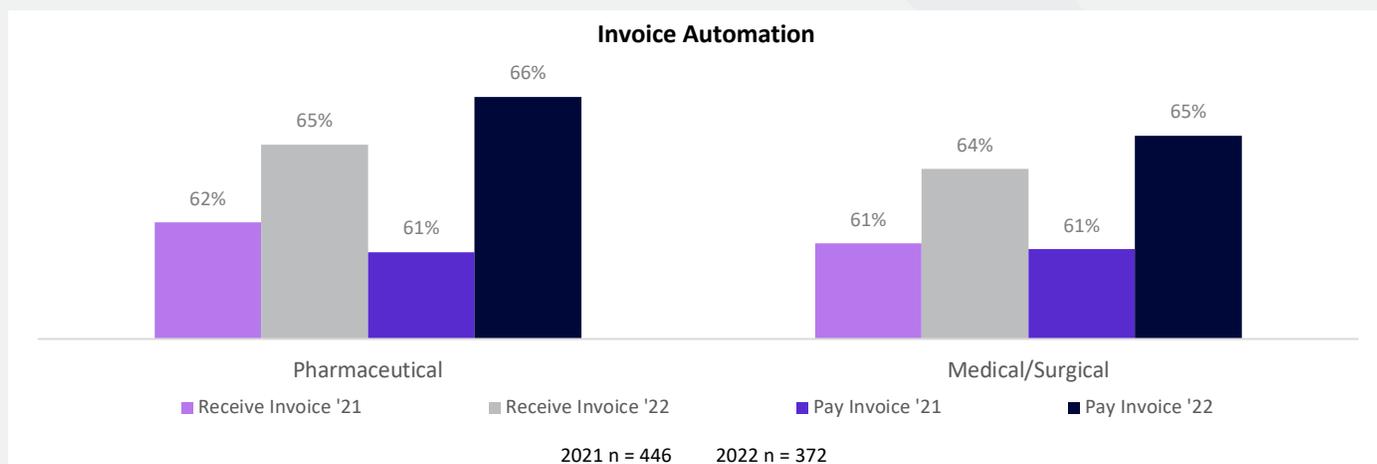
Participation in Information Sharing and Analysis Groups continues to increase year-over-year

- In addition, **52%** of organizations report their **formally chartered cybersecurity governance, risk and/or compliance committee meets monthly (or more often)** while only **3%** of organizations report not having a formally chartered cybersecurity governance, risk and/or compliance committee at all (**2% decrease**).

Administrative & Supply Chain

Building upon the transformation required to survive the pandemic, healthcare organizations continue to strengthen their administrative and supply chain capabilities

- Amongst many of the core operational efficiencies healthcare organizations implemented throughout the last several years, real-time insight into their supply chains and product inventory levels (medical/surgical and pharmaceutical) and automation of parts of their financial operations (i.e., ability to receive and pay invoices) was critically important in order to sustain operations. While an organization's ability to automatically check product levels remained relatively unchanged from last year; this year, **nearly two-thirds of organizations (3% increase)** reported the ability to automatically receive invoices for medical/surgical products, while **65% (4% increase)** reported they automatically pay invoices for medical/surgical products. Further, **65% of organizations (3% increase)** reported they automatically receive invoices for pharmaceutical products while **66% (6% increase) can automatically pay** those invoices. By automating these manual process, organizations are able focus their time and attention on more value-add administrative and operational activities and are building stronger relationships with suppliers and vendors through their ability to pay for goods and services in a timely manner.



- Computer-based online training is well established across the industry with nearly **100%** of organizations training physicians, nurses and other licensed providers on privacy training, information security training and EHR training online. Conversely, just **57%** of organizations leverage computer-based training on voice recognition software for nurses (versus **92%** for physicians and **82%** and other licensed providers) and just **43%** of organizations leverage computer-based training for Biomed Bar Code Readers training for physicians (versus **77%** for nurses and **66%** for other licenses providers, respectively).

- Organizations are reporting a significant increase in the use of bed/exam room tracking or patient-flow software systems across the enterprise, with 4 of the 7 categories tracked experiencing increases of at least 9% from last year. **Tracking systems for Emergency, Observation and In-patient beds** each increased by **almost 9%**, respectively, while **tracking systems for ICU beds** increased by **11%**.

Bed/Exam Room Tracking or Patient Flow Software



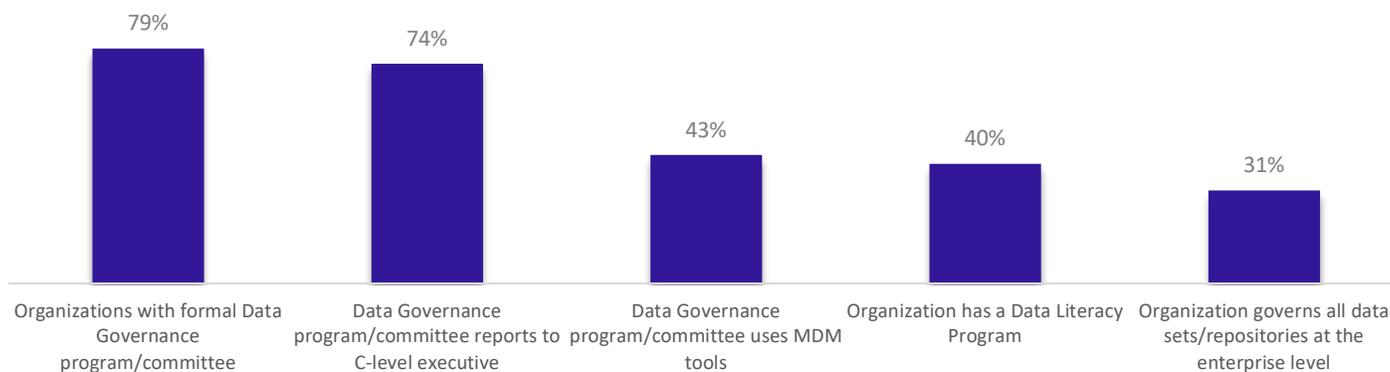
Analytics & Data Management

Healthcare organizations increasingly leverage analytics; however, data management tools and data literacy programs are not widely adopted, and organizations have an opportunity to better leverage Supply Chain/ERP and CRM data within their environments

- 94%** of organizations leverage an **Enterprise Data Warehouse (EDW)** or **Operational Data Store (ODS)** for their clinical and business and intelligence efforts and **69%** send **Supply Chain/ERP data to the EDW or ODS** while only **39%** send **CRM data**.
- The use of **near real-time analytics** in the **delivery of data to clinical and operational leaders** increased significantly from 2021 with **81%** of organizations (**11% increase**) deploying real time analytics for delivery of Clinical Quality metrics, 72% (8% increase) for Clinician Productivity, 87% (10% increase) for Patient Volume, 77% (11% increase) for EHR Utilization / Performance Data and 45% (14% increase) for Social Determinates of Health.
- As healthcare organizations continue to build analytical capabilities, the use of **Predictive Analytics is more widely adopted than Machine Learning and Artificial intelligence**, with Predictive Analytics being deployed at 80% of organizations for Clinical Workflow, 49% for Revenue Cycle Management, 32% for Supply Chain Management/ERP and 30% for CRM/Patient Engagement.

- To support the growing reliance on analytics, most organizations (**79%**) have **established a formal Data Governance Program/Committee** and **74%** of organizations have that program/committee **reporting a C-level executive**. Conversely, just 43% of organizational Data Governance Programs/Committees leverage Master Data Management Tools, 40% have established a Data Literacy Program (an effort to assist data analysts/scientists leverage Master Data Management (MDM) Tools in reading, writing and communicating data in context) and 31% govern all data sets/repositories at an enterprise level.

Adoption and Execution of a Data Governance Program



2022 n = 372

- A growing number of healthcare organizations are subscribing to data storage models with 84% of organizations subscribing to cloud services for clinical systems (**4% increase**) and **91%** subscribing for non-clinical systems (**5% increase**). Further, nearly 50% of organizations now leverage Data as a Service (DaaS) which represents a 7% increase from 2021.

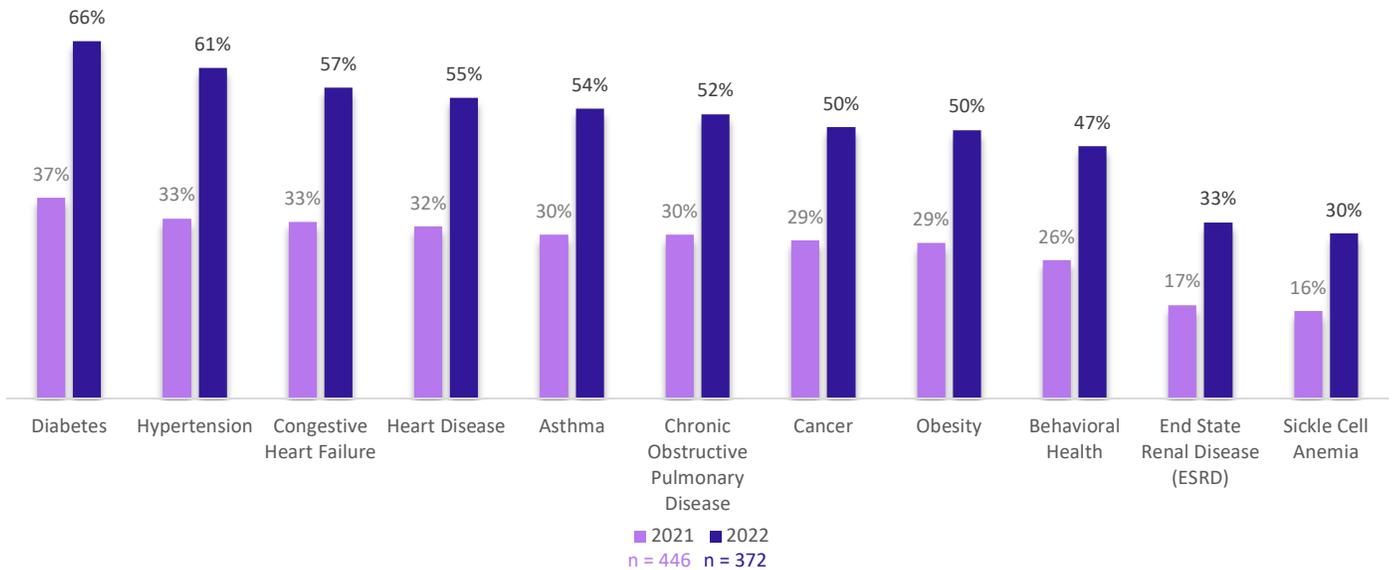
Interoperability & Population Health

Interoperability & Population Health Management remain a key part each organization's strategy, particularly in the areas of Patient Engagement and Clinical Quality and Safety, as information sharing and capture is critically important

- Despite a generally high level of consistency in the sharing of data with external entities such as other hospitals/health systems, physician practices, retail pharmacies, etc., interoperability with emergency entities remains remarkably low despite significant increases in the past year. Just **64%** of organizations (21% increase) report that Urgent Care/Freestanding Emergency centers can receive and integrate discrete patient data, while just **53%** of Emergency Ambulance agencies (16% increase) can receive and integrate the data. Similarly, just **57%** of organizations report having the ability to receive and integrate data from Emergency Ambulance agencies into their systems (17% increase).

- This year, organizations are reporting a significant increase in their ability to integrate data for **chronic and care/disease management services provided outside of the healthcare facility into their EHR**. In 2022, integration capabilities increased by more than 20% for many key services and now close to half of all organizations report EHR integration for services such as **Asthma (54%), Behavioral Health (47%), Cancer (50%), Chronic Obstructive Pulmonary Disease (52%), Congestive Heart Failure (57%), Diabetes (66%), Heart Disease (55%), Hypertension (61%)** and **Obesity (50%)**. The significant increase likely reflects the importance healthcare organizations are placing on having as complete of a picture as possible into a patient’s longitudinal health record.

Chronic & Care/Disease Management with EHR Integration



- Healthcare organizations have built a solid foundation to support care coordination with clinical partners with **more than 90%** of organizations reporting the use of information technology to support the following activities: Manage care transitions (**98%**), Electronic medication and diagnostic ordering/management (**96%**), Secure messaging with patient and health professionals (**95%**), Coordinate and monitor exchanges of information with specialists (**92%**), and Consult/referral management (**91%**).



Patient Engagement

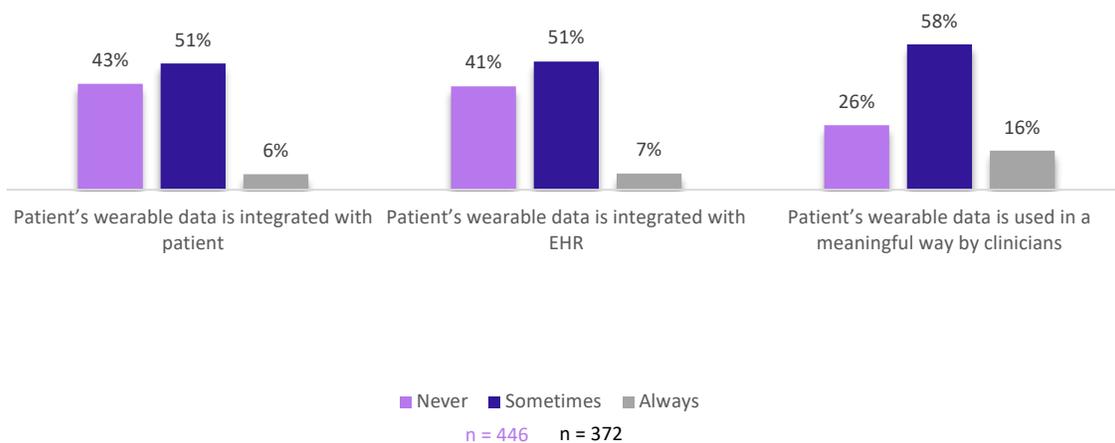
Healthcare organizations are increasingly able to meet patient needs related to engagement, access, education and transparency

- As healthcare organizations increasingly focus on Patient Engagement strategies to connect with patients and improve health outcomes, there has been a remarkable increase in the use of

patient/family facing videos to educate patients and their families about **procedures (16% increase)**, **labs and test results (16% increase)** and **medications (11% increase)**.

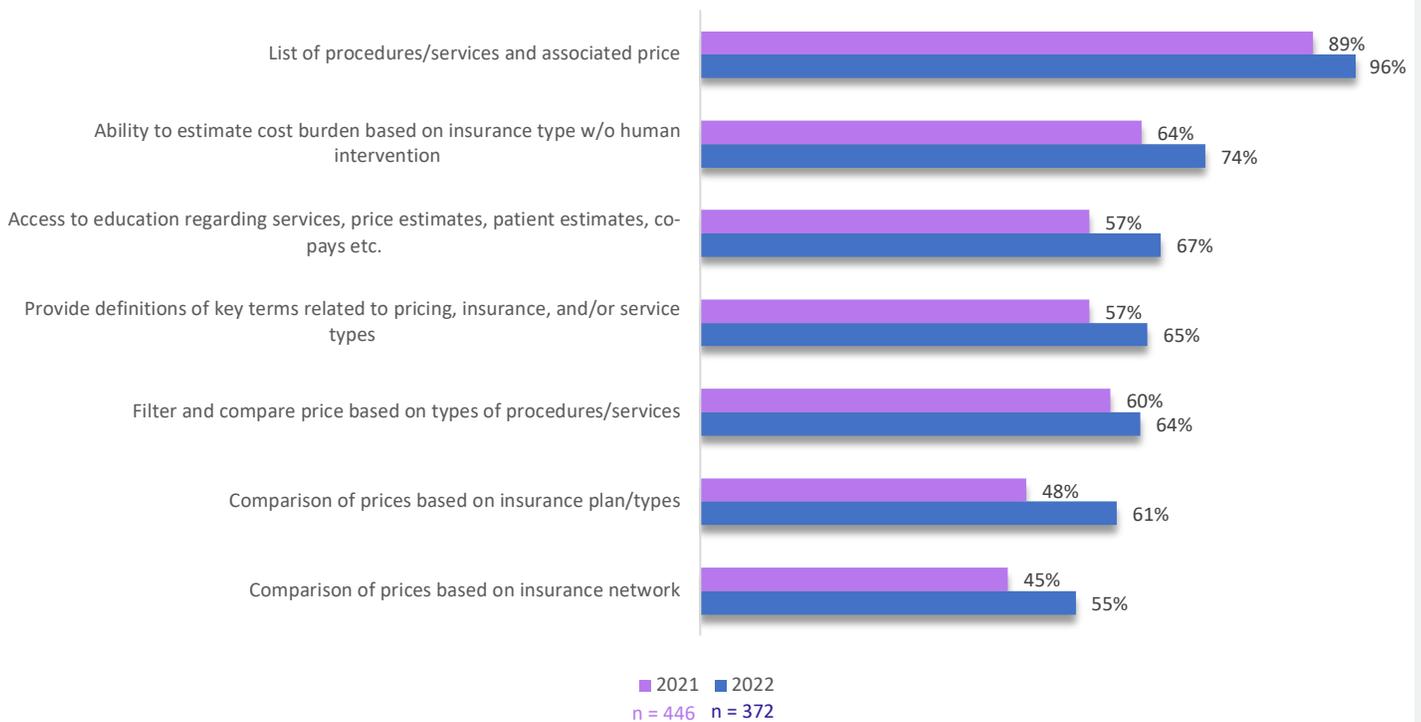
- Mobile applications are increasingly used to engage patients. This year, organizations reported a significant increase in the array of functionalities available within their mobile applications to include offering; **a price list for different services (14% increase)** **health maintenance campaigns (14% increase)**, **mobile check-in (10% increase)** and **event alerts (13% increase)**.
- While telehealth played a significant role in the continuity of care throughout the pandemic, the patient demand for telehealth visits appears to have decreased. This year, **total patient visits using telehealth** decreased nearly 6% to just **13% of total visits**, suggesting the demand for telehealth visits is decreasing as patients are increasingly choosing to have in-person appointments with their provider(s).
- Though the percentage of organizations that provide staff members with interactive capabilities to promote patient and family engagement is somewhat low, the last year saw a notable increase in **training the family/resident on patient interactive devices (19%)** and the ability to **initiate a patient pathway leveraging HIT to follow a care plan (11%)**.
- Despite the increased adoption of **patient generated health data (PGHD) wearables**, the widespread clinical use of PGHD is still fairly limited. Just **51%** of organizations report they **sometimes integrate the data with the EHR**, while **58%** report the data is **sometimes used by clinicians in a meaningful way**.

Personal Health Tracking from Patient Wearables



- The lack of pricing transparency which negatively impacted the patient experience for decades, is in retreat due to recent legislation. In 2022, **67%** of organizations provide **education on price estimates, co-pay etc. (10% increase)**, **61% provide resources to compare prices based on**

Price Transparency Capabilities (>50% Adoption)



Clinical Quality and Safety

Delivering high quality and safe clinical care is a never-ending process and leveraging technology to make the right information available to the right people at the right time is critical for continuous improvement of Clinical Quality and Safety measures

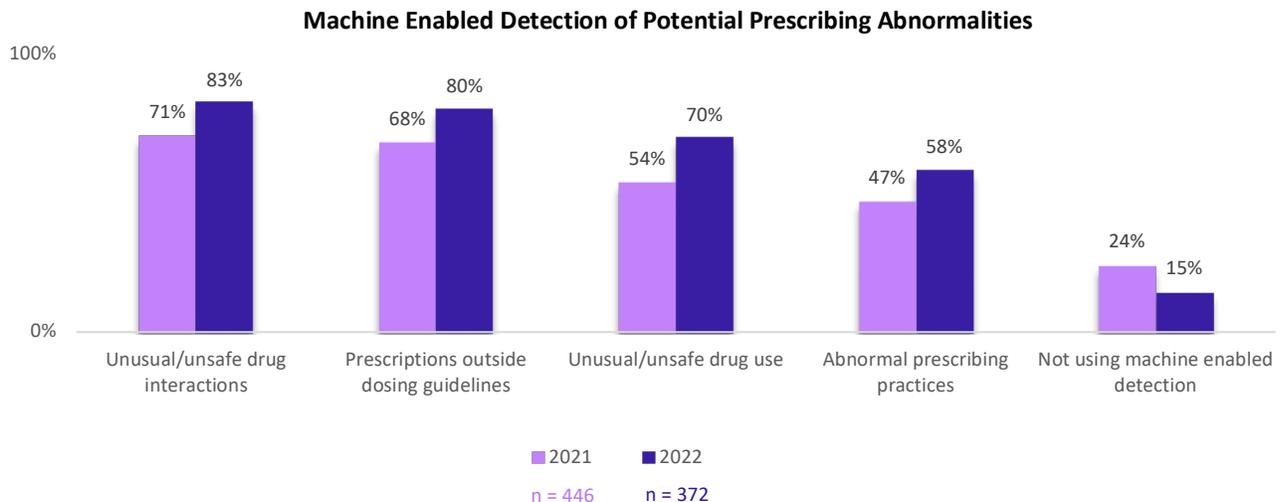
- The use of Computerized Physician Order Entry (CPOE) and closed loop bar-coded (RFID) medication administration to match patients to drug (formulation, dose, route, date/time) are universally implemented with nearly 100% of organizations reporting their use **99%** of the time. In addition, the use of closed loop bar-coded matching of patients to blood product administrations grew significantly last year (6% increase) and is now leveraged **83%** of the time.
- Clinical nursing activities / workflows continue to be supported electronically with the following 7 activities tracked by the DHMW survey used by over 90% of organizations: Medication Administration Documentation (**98%**), Capture patient education assignments and status (**98%**), Taking/Recording vital signs (**98%**), Post-discharge/checkout follow-up (**94%**), Standardized care transition process (**94%**), Provider hand-off tools (**91%**) and Embedded links to relevant research and quality measures (**91%**).

- During the last year, organizations have increasingly integrated/fully deployed readings from patient monitoring equipment directly to the EHR, with almost **90%** of organizations (7% increase) directly sending **EKG information**, **80%** (5% increase) sending **blood pressure information**, and **76%** (9% increase) sending **medication dispensing information**.
- This year saw a remarkable increase in the deployment of **integrated surveillance systems with the EHR** as well as **machine enabled detection of prescribing anomalies**, which is a significant tool in the continued effort to combat the U.S. opioid crisis.
- For integrated surveillance systems: **monitoring of change in condition** increased **19%**, **medication administration** and **monitoring falls** both increased **17%**, **test lab results** increased **15%** and **patient vital signs** increased **14%**.

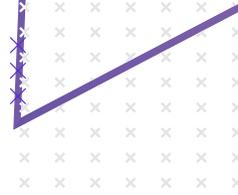
Surveillance System integrated with EHR



- For machine enabled detection of possible prescribing anomalies: **unusual/unsafe drug use** increased **16%**, **unusual /unsafe drug interactions** increased **12%** and **abnormal prescribing practices** increased **11%**.



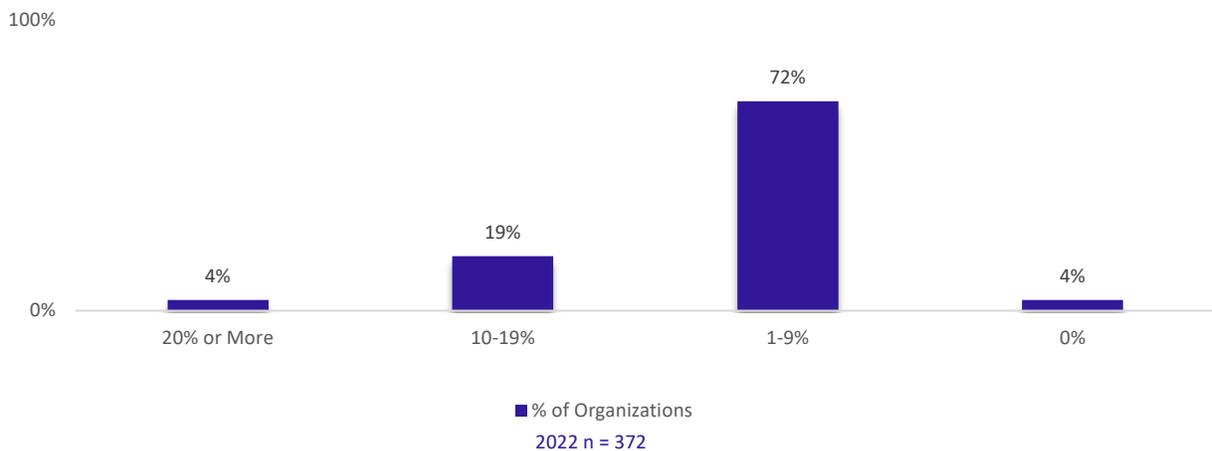
Innovation



Innovation in the healthcare industry is accelerating at a never-before-seen pace, kicked into an overdrive by the pandemic, forcing organizations to either adapt or be left behind

- In order to survive, most organizations are looking to increase investment in technology and digital solutions. Currently, **72%** of organizations report spending between **1-9% of their IT spend on experimentation/trials of technological innovation, new ideas, ventures, etc.**, **19%** report spending between **10-19%** and **4%** report spending **20% or more**, highlighting how important investing in innovation and competitive differentiation is becoming amongst healthcare organizations.

% of IT Spend on Experimentation/Trials of Technological Innovation



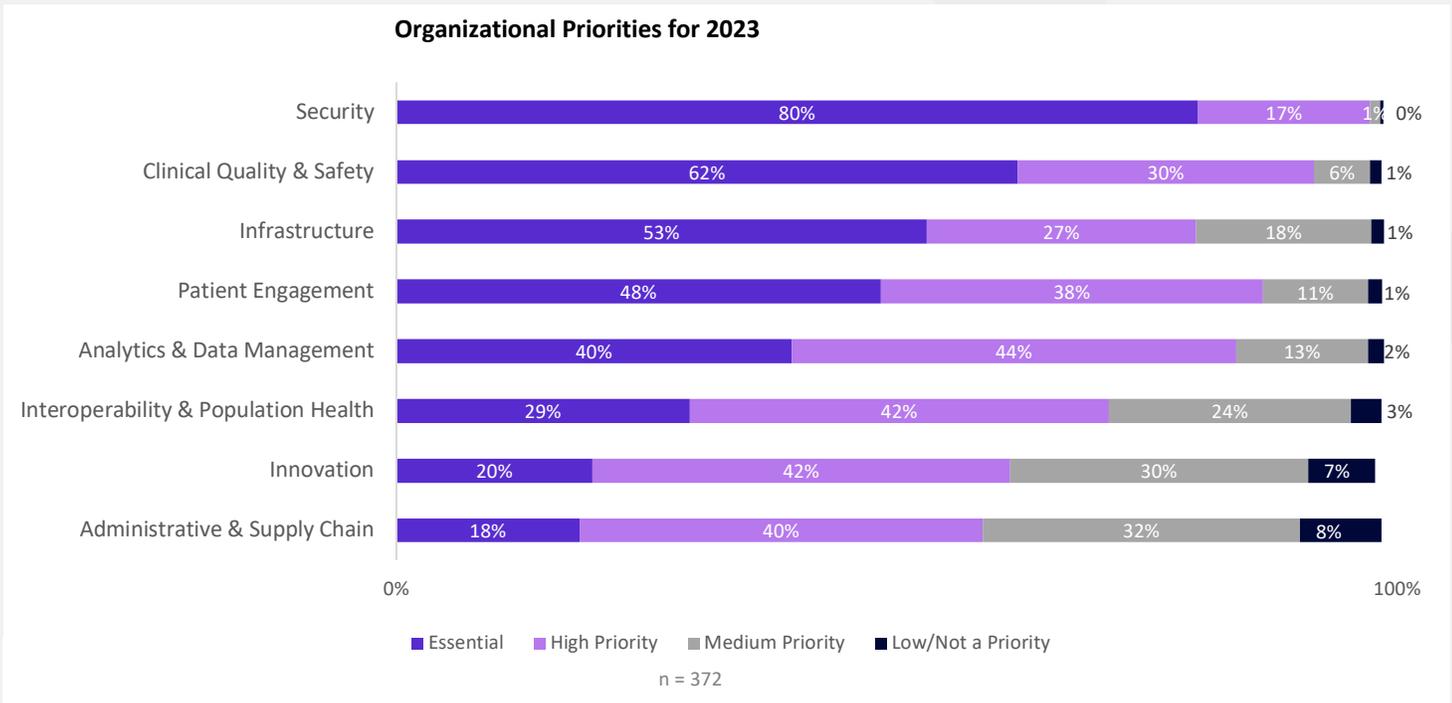
- CIOs are primarily responsible for leading tactical technological innovation (**66%** of organizations), though **60%** of organizations claim their strategic leadership encourages innovation at all levels.
- **44%** of organizations claim strategic indicators are measured within their organization, and overall performance is managed at board level with KPIs designed for innovation activities.
- Healthcare organizations currently have a distributed view on the organizational structures and business models required to support innovation; **33%** of organizations redesign their organizational structures and business models to foster innovation and empower strategies, **28%** of organizations have a functional organizational model and business model defined with **26%** of organizations integrating their organizational structure and business model into their strategies.
- Technology innovations specifically focused on patient empowerment continue to remain the focus for almost all organizations. Over the past 3 years, in order to drive innovation and competitive differentiation, **95%** of the organizations have addressed tele-visits/virtual visits, **91%** have addressed consumer access to clinical data, and **78%** have addressed both clinical decision support and patient engagement initiatives.



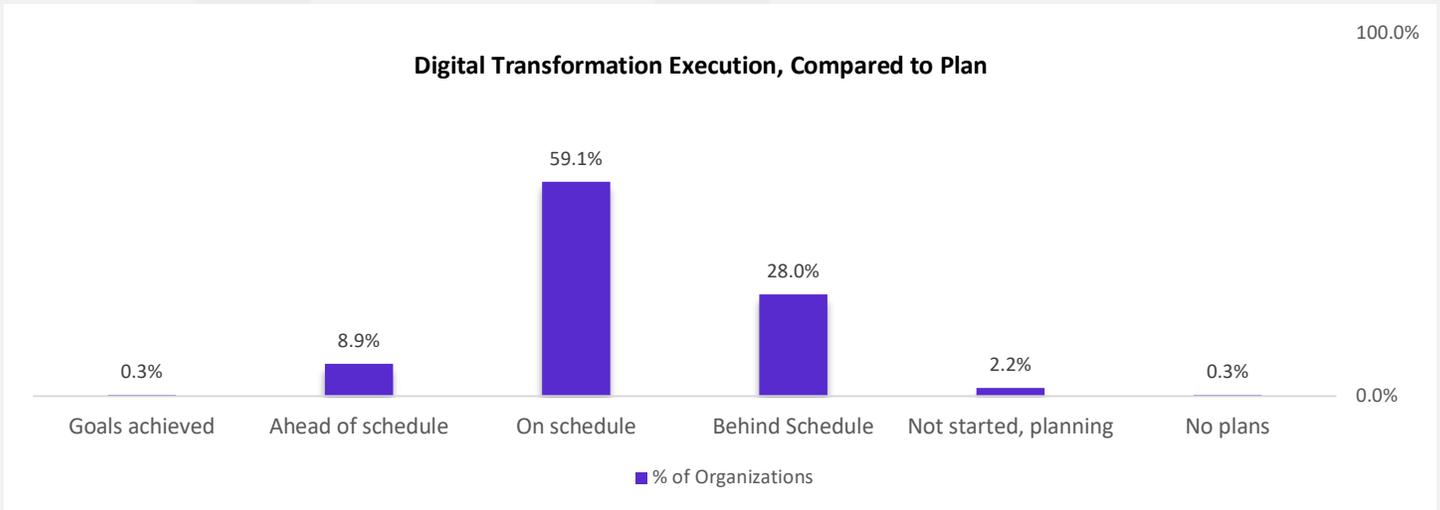
Digital Transformation Priorities

Despite the pandemic, and maybe even because of it, most healthcare organizations are over halfway towards achieving their digital transformation goals

- With 2022 rapidly drawing to a close, almost every organization is planning for 2023, and most have been for the past several months. As part of the process, leaders are reflecting on the incredible accomplishments of the past several years and identifying and prioritizing the opportunities for improvement and investment in 2023. By an overwhelming margin, 80% of healthcare organizations rank **Security** as an **Essential priority** next year as they continue to invest in their security capabilities and technology. In addition to Security, leaders will be focusing on **Clinical Quality and Safety** and **Infrastructure** which leaders ranked as **Essential** by 62% and 53% of organizations, respectively. Not surprisingly, after years of heavy investment and implementation, to survive the pandemic, just 18% of organizations are prioritizing **Administrative and Supply Chain** as Essential in 2023.



- Despite the challenges presented by the pandemic, 60% report being **right on schedule** with their **digital transformation efforts**, while 28% claim they are behind schedule.



- While more than **90%** of organizations are in some stage of executing their digital strategies, many have shared experiences related to their critical enablers, and biggest challenges to realizing digital transformation strategies:
 - **Critical steps to enable a successful transformation:** Involve all departments in developing a strategy (23%), assign a board or c-level sponsor to the project (19%), invest in the right technology and tools (16%), and ensure executive commitment and alignment (15%).
 - **Biggest challenges to realizing a successful transformation:** Lack of dedicate budget (20%), cultural resistance (15%), tendency for short-term over long-term planning (12%) and an over reliance on legacy technology (11%).



DIGITAL HEALTH LEADERS

The College of Healthcare Information Management Executives (CHIME) is an executive organization dedicated to serving chief information officers (CIOs), chief medical information officers (CMIOs), chief nursing information officers (CNIOs), chief innovation officers (CIOs), chief digital officers (CDOs) and other senior healthcare IT leaders. With more than 5,000 members in 58 countries plus two U.S. territories and over 190 healthcare IT business partners and professional services firms, CHIME and its three associations provide a highly interactive, trusted environment enabling senior professional and industry leaders to collaborate, exchange best practices, address professional development needs and advocate the effective use of information management to improve the health and care in the communities they serve. For more information, please visit chimecentral.org.



Digital Health Analytics (DHA), is a global market intelligence and survey research hub for digital health technology. Provided by the College of Healthcare Information Management Executives (CHIME), DHA was created in 2022 to supercharge your digital health transformation capabilities by moving from a one snapshot in time static Most Wired survey to a 365/24/7 data and analytics resource. Digital Health Analytics is the gateway for provider organizations and companies to better understand how digital technology supports leaders in transforming health and care and delivering data insights that help them make the greatest business impact possible. For more information, please visit dhanalytics.org.