DHA ANALYTICS | CHIME Digital Health most wired Survey

ANALYTICS & DATA MANAGEMENT TREND REPORT

ACTIONABLE DATA AND INSIGHTS FROM IMPROVED WORKFORCE AND PATIENT CARE

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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 as 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.

The Digital Health Most Wired Survey and Analytics and Data Management

In the tumultuous landscape of today's healthcare, the annual Digital Health Most Wired (DHMW) survey is a significant digital health "north star" that healthcare organizations (HCOs) have relied upon for years. Widely known for the annual Most Wired recognition awards, the DHMW survey annually provides healthcare leaders a comprehensive profile of digital health usage among U.S. HCOs and a reliable resource by which to benchmark their own digital health progression.

Reflecting the digital profiles of approximately 40% of U.S. hospitals, the array of HCOs included in the 2023 DHMW survey can be characterized as representative of the entire U.S. healthcare system. As such, the survey serves as a critical resource in helping researchers identify major themes and shifts in the HCO marketplace.

This is the case with the most current survey's findings where an overarching theme of "**the acceleration of data usage**" emerged across survey categories.

In a digital health world shaped by Meaningful Use, HCOs have largely moved on from focusing on their data capture and storage capabilities to improving outcomes. In this environment, leveraging data emerges as a critical activity in the realization of improved operational and clinical outcomes.

This "acceleration of data usage" was evident in all eight sections of the survey, but it is at the heart of the Analytics and Data Management section. The use of predictive analytics based on artificial intelligence (AI) and machine learning (ML) is rising sharply thanks to the increased availability of data, more sophisticated analytics tools, and demand for value-based care. HCOs are turning to predictive analytics to improve patient care, reduce operating costs, and lower workforce burdens.

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Philips, an Analytics and Data Management Leader

To help make sense of the Analytics & Data Management findings in the 2023 DHMW survey and the digital patient empowerment market in general, CHIME sat down with leaders from Philips, a leader in health technology that brings together data and analytics to improve healthcare delivery.

Using the 2023 DHMW survey as a starting point, we profiled the use of digital patient engagement tools in the U.S. HCOs before leaning on the profound insights of Shez Partovi, Chief Innovation & Strategy Officer of Philips, to provide context and clarity around how HCOs can manage the complex healthcare data landscape and take advantage of powerful new predictive technologies in a responsible and productive way.

Emerging from this effort, we find that to **accelerate data usage** for the purpose of deploying analytics and AI/ML, HCOs are increasingly relying on specialized leaders, moving to cloud storage and as-a-service analytics applications.

Defining Analytics and Data Management

Analytics and data management are foundational to building a modern healthcare provider via improved patient care, operational efficiency, and strategic decision-making. By effectively leveraging data, HCOs can gain valuable insights, identify trends, and make informed decisions that enhance the overall quality of healthcare delivery.

Analytics refers to the process of collecting, analyzing, and interpreting data to extract meaningful insights and patterns. In healthcare, analytics involves utilizing a variety of data sources, including electronic health records (EHRs), patient data, claims data, and financial data, to gain a comprehensive understanding of patient health, healthcare utilization, and organizational performance.

Predictive analytics identifies risks and potential outcomes, tailoring interventions to patient needs, while clinical analytics can improve clinical decision-making, optimize treatment plans, and enhance patient care through data-driven insights.

Data management encompasses the processes, policies, and procedures for collecting, storing, organizing, protecting, and accessing data. Effective data management ensures that HCOs have high-quality, reliable, and accessible data to support analytics and decision-making.

In the context of CHIME's 2023 Digital Health Most Wired (DHMW) survey, an HCO's analytics and data management capabilities were assessed using following four factors:

1. Analytics leadership/structure
2. Data management practices
3. Analytical capabilities
4. Data governance practices

Representing approximately 14% of an HCO's total DHMW performance score, the Analytics and Data Management section of the survey in many ways reflects the "tip" of an HCO's digital transformation "spear."

"Healthcare organizations are moving faster than ever before, and the only fuel that can power this speed is data," noted Lorren Pettit, CHIME's Vice President of Digital Health Analytics (DHA), on the weighting assigned to DHMW's Analytics and Data Management section. "Being data driven is no longer an aspiration end state; it is an expectation in today's healthcare environment. Fortunately, the entire data industry has been innovating at a rapid pace. New architectures, new cloud platforms, and new technologies have given rise to the modern data stack. HCOs committed to excelling in data analytics open themselves to new opportunities to which the scoring system of the DHMW survey program acknowledges."

1 Analytics Leadership/Structure

Healthcare data is becoming increasingly complex, with data coming from a variety of sources, including EHRs, claims data, and patient-generated data. This makes it difficult for healthcare leaders to effectively manage and analyze this data.

Increased reliance on data-driven decision-making to improve patient care, reduce costs, and comply with regulations requires specialized leaders who have the skills and expertise to collect, analyze, and interpret healthcare data. Further, surging technologies such as AI and ML are being used to analyze healthcare data and generate insights that can improve patient care. These technologies require specialized leaders who have the skills and knowledge to use them effectively.

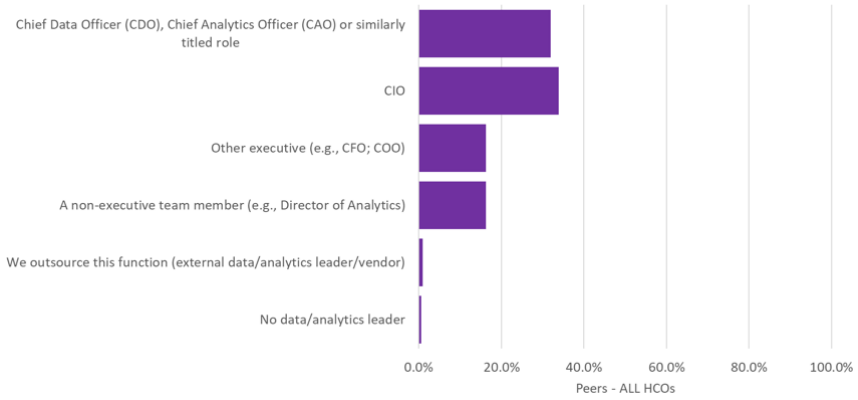
The first category considered in the Analytics and Data Management section of the DHMW survey addressed the leadership and the structure of the HCO's analytics effort. In this section, two questions were used to assess these factors:

1. Executive Leading Analytics

The results show most HCOs lean on the CIO (34%) or Chief Data/Analytics Officer (32%) to lead their analytics and data management efforts. However, in the absence of historical data (2023 was the first year this question was presented to DHMW survey participants), anecdotal evidence suggests the oversight of analytics has been gradually shifting away from the CIO to data specialists.

Question 32

Whom on your executive team is primarily responsible for leading your organization's analytics and data management efforts?



Question 32

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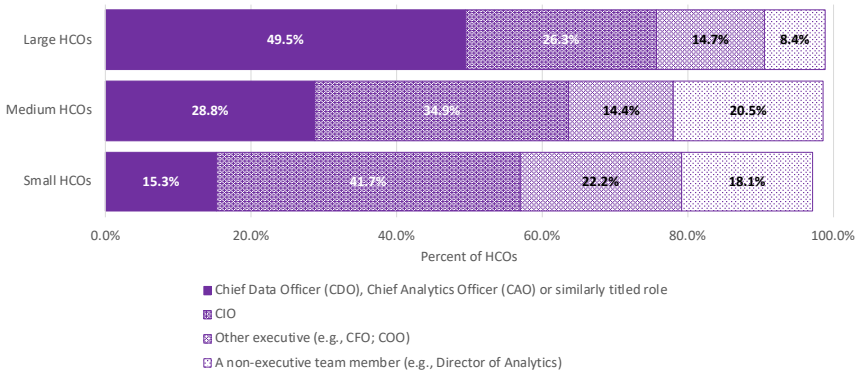


Specialized leaders such as a Chief Analytics Officer (CAO) and Chief Data Officer (CDO) have a strong understanding of data and analytics techniques and tools, as well as the business needs of HCOs, so they can manage how data analysis can be used to improve patient care, reduce costs, and comply with regulations.

Analyzing responses by HCO size (where small HCOs defined by less than 250 bed systems; large HCOs defined as systems with 1,000+ beds), large HCOs were three times more likely to have a Chief Data/Analytics Officer leading their analytics and data management efforts than small HCOs.

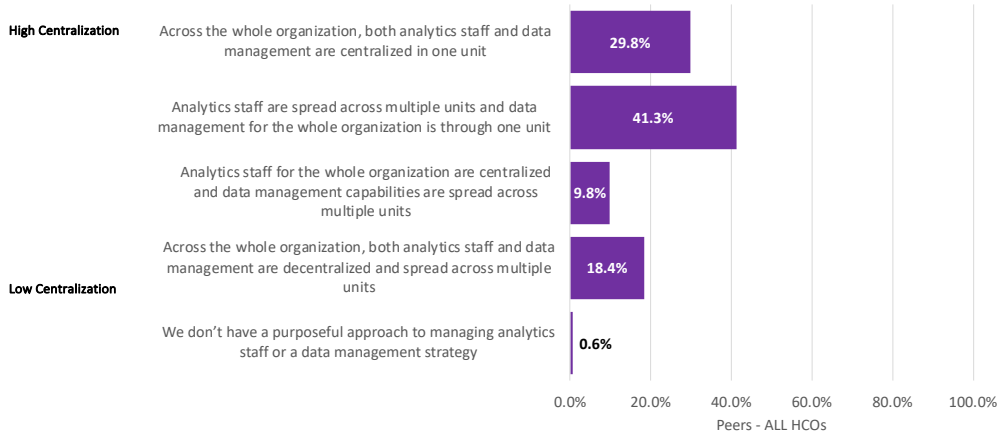
"Large HCOs lead the pack on specialized leaders because they deal with a larger volume of data," Partovi said, explaining larger organizations have a wider variety of data sources, including EHRs, claims data, patient-generated data, and social media data. "It can be more difficult for smaller HCOs or HCOs with fewer specialized leaders to analyze data."

Larger HCOs also tend to have more resources than smaller HCOs, and this may allow them to invest more in data and analytics, including bringing on specialized leaders like CDOs and CAOs to accelerate data usage to improve patient care, reduce costs, and comply with regulations. Smaller HCOs rely more heavily on the CIO to wear many hats, including data management and analytics.

2. Data Analytics Management and Staffing

Question 33

Whhich of the following best describe the management of data analytics and staffing in your organization?



The findings in this section also reveal most HCOs have a relatively high degree of centralization in managing their data analytics staff and effort. Approximately 70% of HCOs centralize their data management efforts, with 30% also centralizing their analytics staff. Pettit noted, "While the optimal way to manage data and analytics staff is influenced greatly by an organization's culture, a centralized data management approach can enhance efficiencies by ensuring data is organized, stored, and cataloged in a manner that facilitates easy and quick access for analysts."

Specialized leaders such as a CAO and CDO have a strong understanding of data and analytics techniques and tools, as well as the business needs of HCOs, so they can manage how data analysis can be used to improve patient care, reduce costs, and comply with regulations.

DHMW found an almost even split between HCOs using a CAO, CDO, or similarly specialized leader for analytics and data management efforts, and HCOs folding these responsibilities into the CIO role. Large HCOs (> 1,000 beds) lead the pack in use of specialized leaders for analytics and data management, with a nearly 50% adoption rate, while small HCOs (≤ 250 beds) had a far lower adoption rate of such leaders, about 16%.

2 Data Management Practices

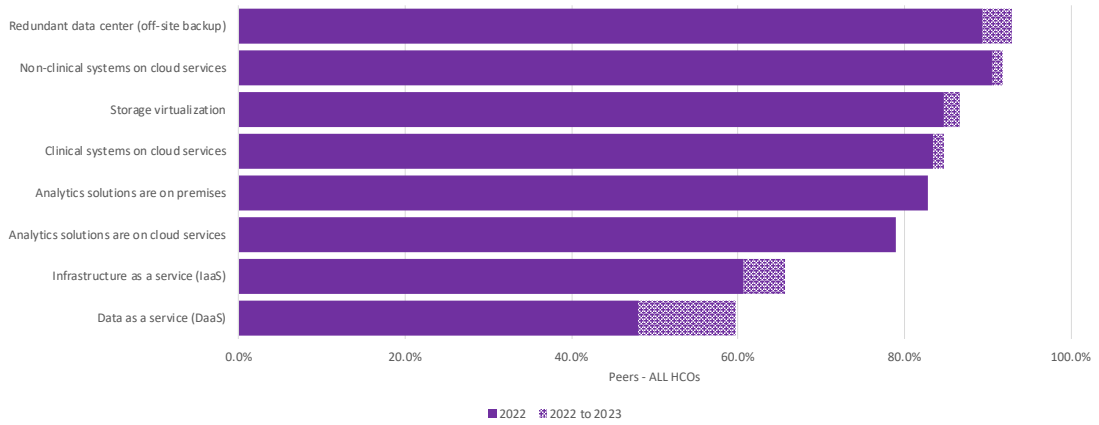
Healthcare data continues to grow more abundant and complex, presenting increased challenges to how HCOs store and use this information.

Based on the survey responses, DHMW HCOs are using a mix of on-premises and cloud infrastructure for data storage and analytics applications.

"In healthcare, we are coming from a legacy infrastructure moving toward a more modern version," Partovi said. "Historically, we've come from on-premises data storage. The survey results are showing lingering use of the on-premises data centers filled with servers, but the growth is moving toward a utility model where data is stored in the cloud."

Question 34

Which of the following data storage/analytics applications models does your organization use?



This trend of moving infrastructure and data into cloud and as-a-service models indicates that organizations are looking at their core strength and focus, and they are deciding where purchasing utility-based services can allow them to grow and scale as they want.

"The complexity of managing the infrastructure and data has gotten to a point where it's better and simpler to outsource those aspects and focus in-house on the parts that are more value added, things like improving quality, cost, and experience of care," Partovi suggested.

Moving data and analytics to cloud and as-a-service infrastructure requires data assessment, preparation, cloud infrastructure setup, data migration, testing, deployment, and ongoing monitoring.

Detailing all data sources and types, as well as the volume, sensitivity, and compliance requirements will help determine the appropriate cloud storage and security solutions. Then cleansing the data, standardizing formats and structures across data sources, and protecting sensitive info are also important steps to prepare data for migration.

An important step in data migration is data liquidation, including deleting outdated, irrelevant, or non-compliant data to reduce on premise storage volume.

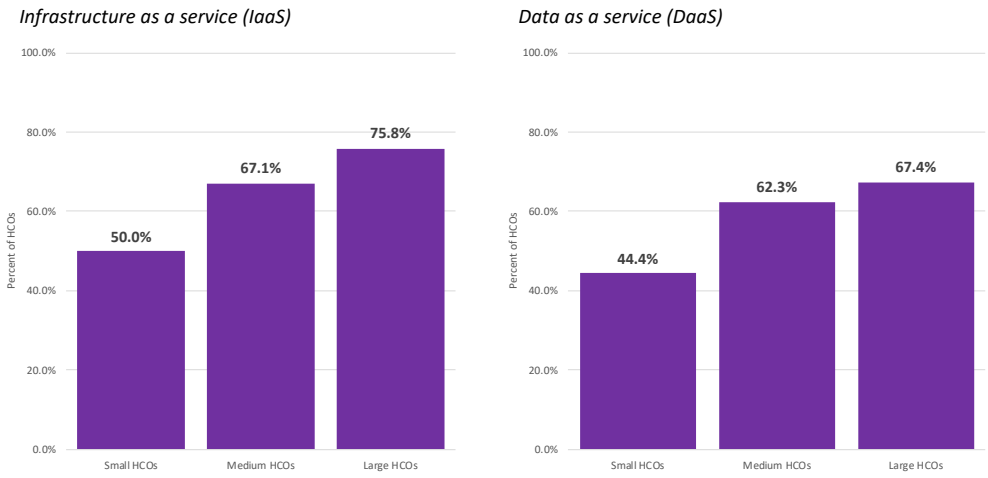
"Data migration to the cloud presumes HCOs can actually liquidate their data silos and give it to an organization that would then give it back to them as-a-service," Partovi said. "You have data coming from all over the hospital, from MRI scanners downstairs in the radiology department to equipment in the ICUs and ORs that are generating a lot of data. Health systems are looking to get this data liquidated."

Philips Capsule offers vendor-neutral medical device integration, streaming data and contextual insights to help HCOs liquidate data from more than a thousand different kinds of medical devices. "It moves the data to an environment where it can be converted into insights," Partovi explained.

"More and more the health systems don't want to manage this infrastructure on their own," he said. "They don't want to manage the data, normalization, harmonization, and cleansing; they just want to take the data they have on the floors, data they have in all these different devices and have a third party do this for them at scale. Then they can use that data as a service and build on top of that."

Question 34

Which of the following data storage/analytics applications models does your organization use?



"The survey results suggest smaller HCOs are slower to adopt as-a-service models and still use so-called legacy systems," Pettit noted.

Partovi listed several probable factors at play, including the greater volumes of data large HCOs face. "Large organizations generate a lot more data, and the challenge of managing data on-prem and then conditioning it, cleaning it, etc., exponentially increases as the number of data sources increases," he explained. "Large health systems that have more than a thousand beds look at the amount of labor and infrastructure required to manage this, and they see the voluminous data and the rate of growth is more than they can handle."

Recognizing the need for an as-a-service solution is only one step, one factor. A related factor is having specialized leaders to move to this new level of sophisticated use of as-a-service models. "Larger HCOs likely have the right talent and leaders to undertake these migrations," Partovi reasoned. "Whether it's the CDO, CIO, Chief Transformation Officer or other leader, it requires a certain kind of cloud-savvy talent."

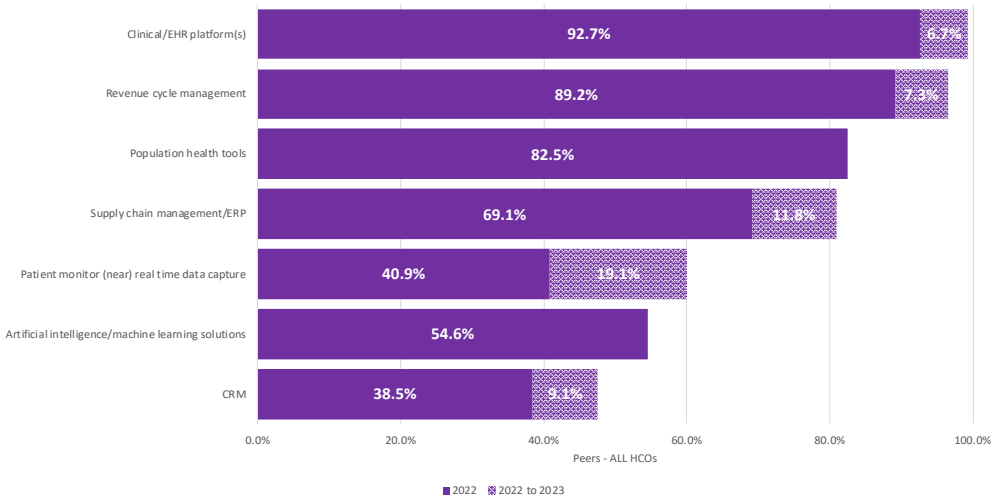
On the other side, Partovi said the curve of adoption and the curve of talent availability in smaller HCOs may still lend itself to more classic or legacy models rooted in on-prem data management.

Additional questions in this section showed HCOs increasingly are drawing data from many sources and delivering actionable data across their enterprises.

Data Sources Supported by Enterprise Data Warehouse/Operational Data Store

Question 35

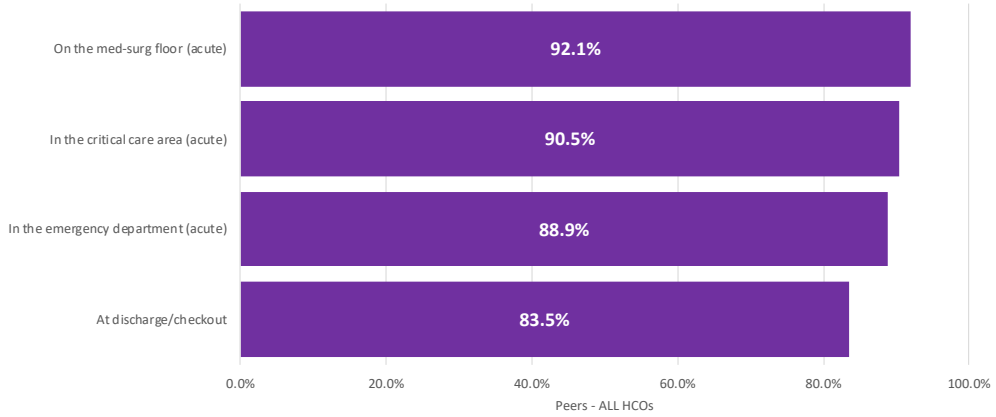
Which of the following data sources send data to your organization's enterprise data warehouse and/or operational data store?



Compliance Alerts

Question 36

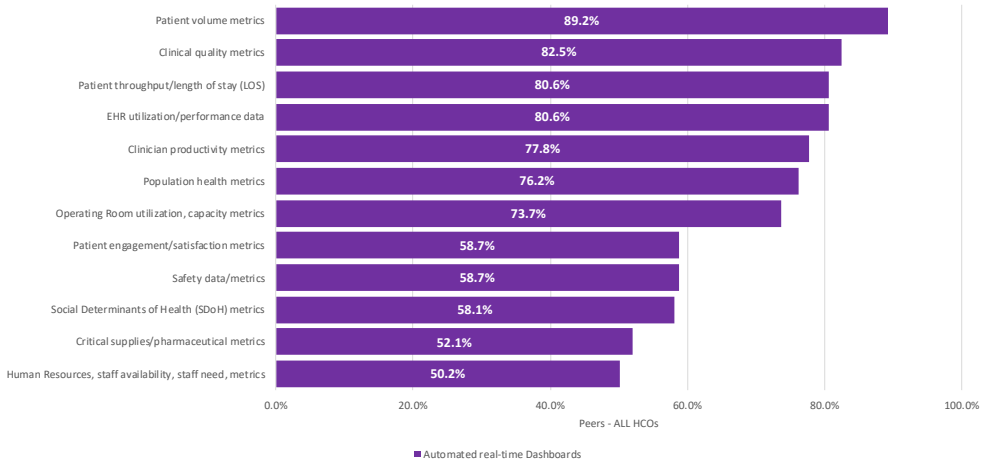
Which of the following areas in your organization leverage technology to automatically review patient data in your EHR and alert caregivers when their patients are out of compliance with key quality indicators?



Data Delivery Tools – *Automated Real-Time Dashboards*

Question 37

How does your organization deliver the following data to your organization's clinical and operational personnel (leaders and individual clinicians)?



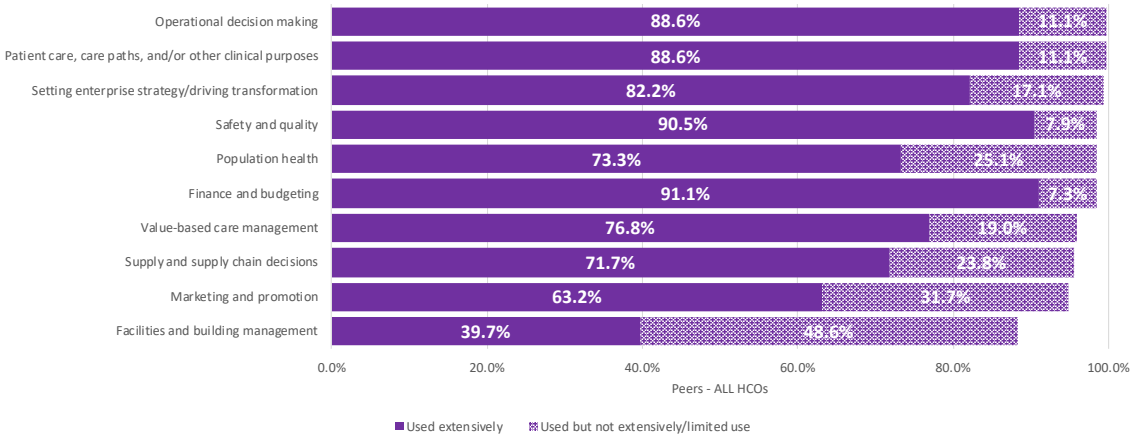
Pettit noted that the data management practices captured in the DHMW survey aligned with expectations. "The main takeaway is that organizations largely appear to be well-positioned to support the management of basic clinical and operational data demands," he concluded, adding DHMW will be monitoring emerging data management issues like the percentage of organizations feeding AI data into their EDW for future surveys.

3 Analytical Capabilities

DHMW looked at how HCOs are using advanced analytics across business functions, finding more than 80% are leveraging some form of analytics in their business. There was near total utilization, extensive and limited use, for functions including operational decision-making, patient care and clinical purposes, safety and quality, enterprise strategy/transformation, population health, and finance and budgeting.

Question 38

How would you characterize the utilization of data analytics to support the following business functions in your organization?



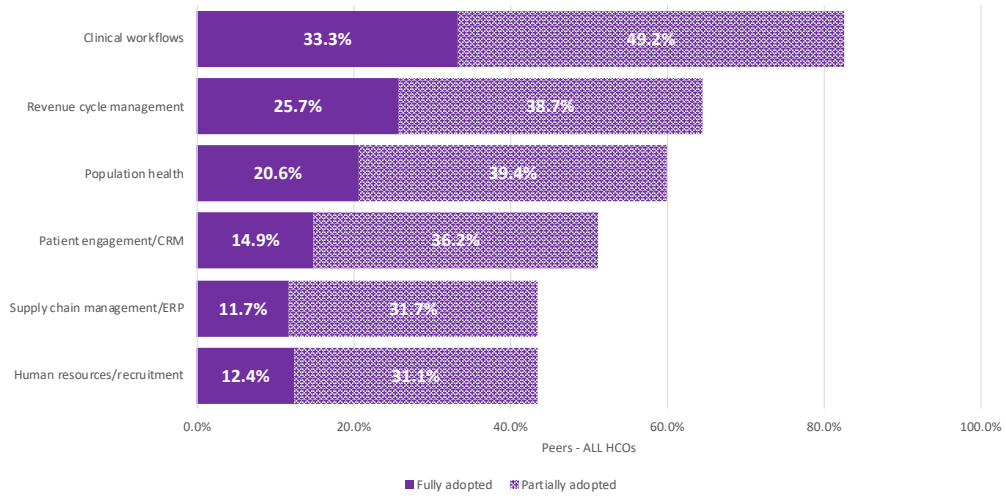
"The capability to use analytics does not always translate to fully adopting analytics," Pettit said, noting HCOs' use of multiple vendors' solutions across different locations and departments can inhibit seamless integration of analytics. "HCOs need to align technology, data, and strategy to fully realize the potential of analytics, especially AI."

This year's survey separately assessed HCOs' adoption of ML, predictive analytics, and AI. The results showed the highest use of these technologies for clinical workflow, with more than 80% combined full and partial adoption of ML and predictive analysis for this purpose, and 73% combined utilization for AI.

Use of ML to Support Varied Business Functions

Question 39

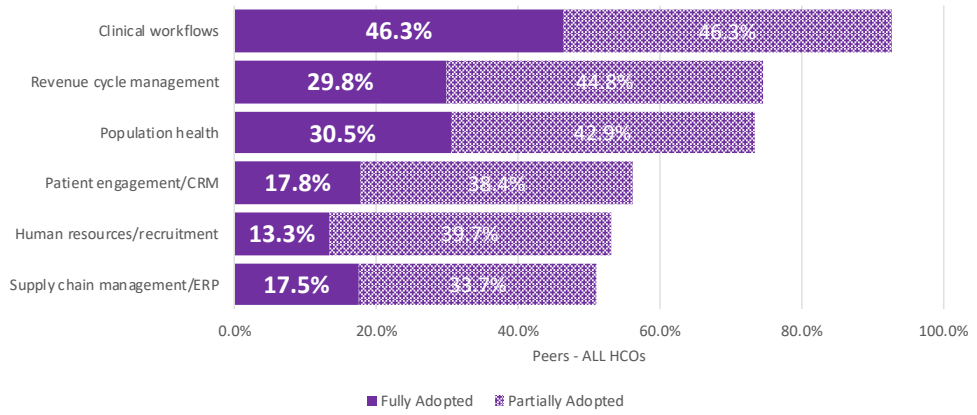
How would you characterize the adoption of MACHINE LEARNING in each of the following business functions in your organization?



Use of Predictive Analytics to Support Varied Business Functions

Question 40

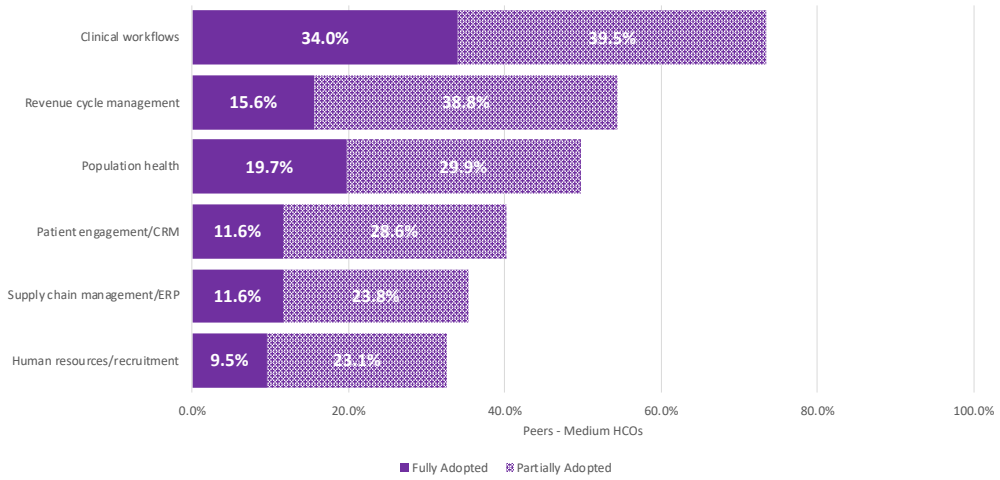
How would you characterize the adoption of PREDICTIVE ANALYTICS in each of the following business functions in your organization?



Use of AI to Support Varied Business Functions

Question 41

How would you characterize the adoption of ARTIFICIAL INTELLIGENCE in each of the following business functions in your organizations?



Partovi said he would expect revenue cycle to have higher adoption rates than clinical workflows, as finance usually is the first target, but he suggested the recent pandemic highlighted the need for workforce solutions.

"Health systems today are facing an incredible workforce shortage, marked by high rates of burnout," he said. "I believe we've entered a phase or cycle where HCOs are looking to solve the problem of cognitive overload and burden for physicians and clinicians using machine learning, predictive analytics and artificial intelligence."

He said efforts to improve workflow also have an impact on patient care. "It is partly taking the friction out of the workforce by reducing unnecessary tasks via machine learning and automation, but it's also partly care delivery," he explained. "It is encouraging to see these DHMW results showing clinical workflow as a high-use function for these technologies. Time will tell whether these aggregate into solid use cases that have meaningful impact."

There are valid tools today that use ML and AI that improve clinician workflow and provide better care at scale, according to Partovi. "For 20 years or so, AI algorithms have been used for surveillance and monitoring patent physiology in eICUs, quickly predicting whether a patient will have an untoward event in the next few hours," he said. "It will alert a clinician to take appropriate action before the event occurs, ultimately conveying not only a patient benefit but also a cognitive load reduction for the clinician." Thus, he sees the DHMW results as an expansion of exploration of such opportunities to apply these technologies. "There are clearly well-established cases where this technology helps, which is why it's being expanded."

Among the use functions in the survey, patient engagement fell in the middle of the pack for adoption of these emerging technologies, and Partovi called it a relatively untapped opportunity. "This is an area that health systems should target as they look to improve the experience of patients and remove friction from their engagement with the HCO."

Pettit noted the survey questions were crafted specifically to gauge the extent to which analytical capabilities were being employed throughout an organization, because "claiming to have a capability does not necessarily mean it is being used extensively." He said the results indicate many HCOs are testing the waters without fully jumping in. "Organizations are looking at return on investment and scalability when it comes to use of these technologies".

Despite this excited but measured inclusion of AI, Partovi believes it is not just the latest trendy tech but will be influential in digital health for years and decades to come. “AI is here to stay,” he assured. “There’s enough evidence of real, meaningful benefits from artificial intelligence, and particularly generative AI.”

4 Data Governance

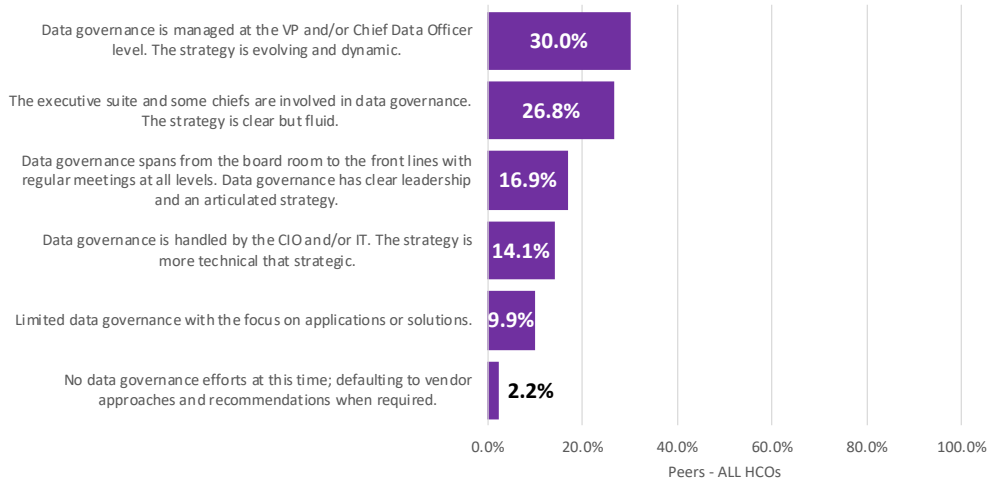
As HCOs increasingly rely on data to drive decision-making, improve patient care, and comply with regulations, data governance becomes even more essential. Data governance plays a vital role in today’s healthcare by ensuring the quality, security, and accessibility of patient data according to the organization’s digital health and overall business strategies.

The primary four questions in this section were new to historical DHMW survey participants.

1. Data Governance Scope

Question 42

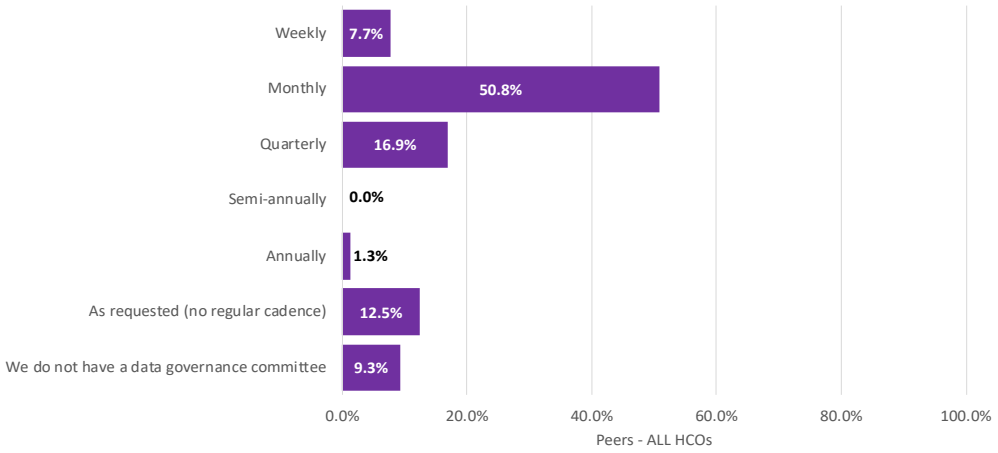
Which of the following best describe the scope of your organization’s data governance program?



2. Cadence of Data Governance Meetings

Question 43

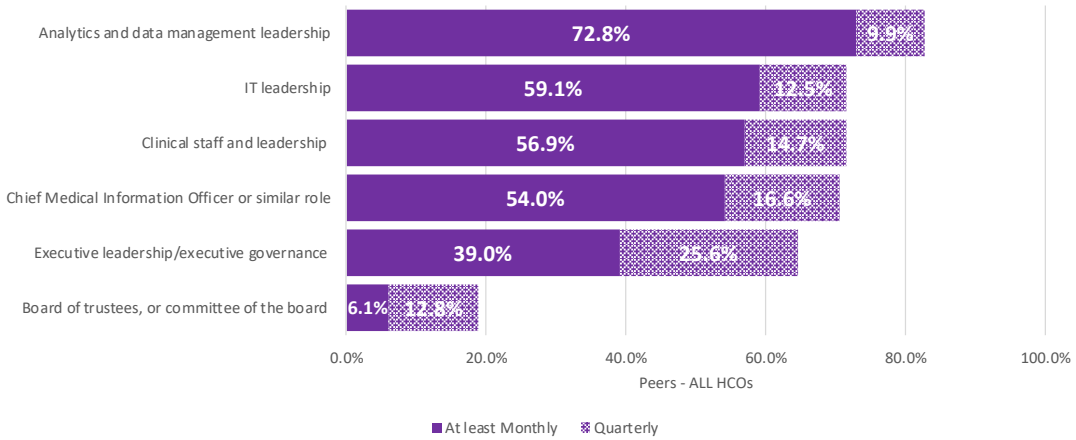
How often does your organization’s data governance committee meet?



3. Involvement of Varied Groups in Data Governance

Question 44

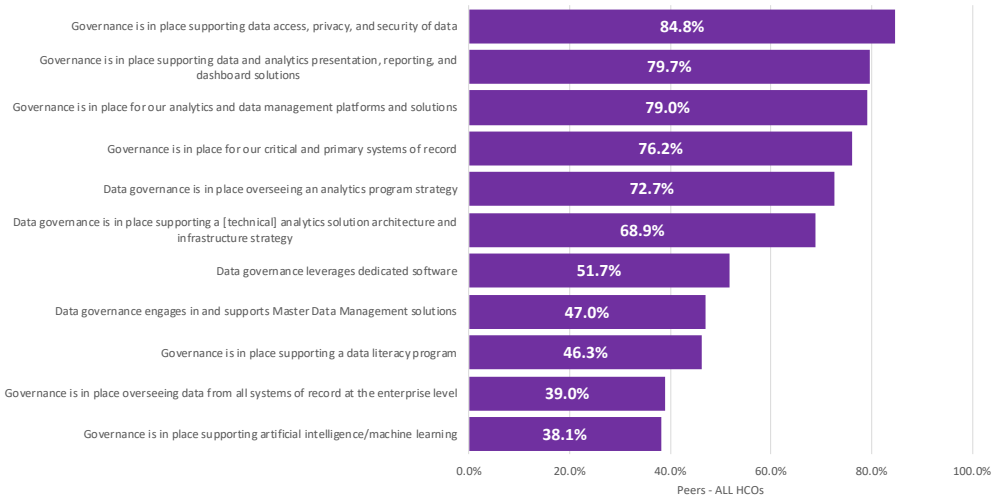
How often do the following groups engage in your organization's data governance efforts?



4. Components of Data Governance Effort

Question 45

Which of the following are reflective of your organization's data governance effort?

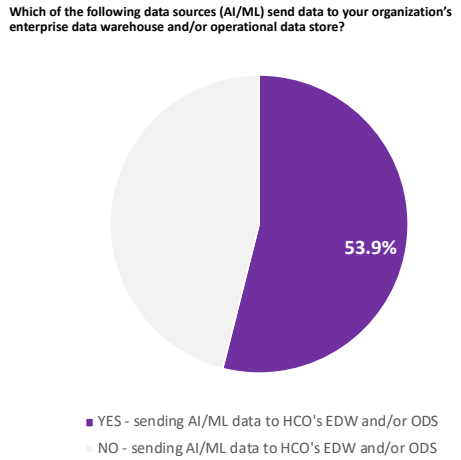


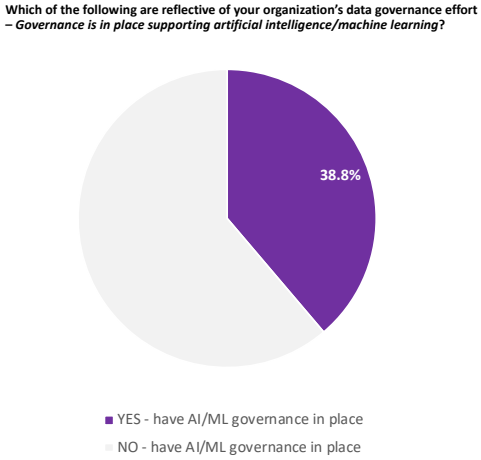
Similar to the Data Management findings, the results here align with expectations. Data governance is managed at the highest levels in the organization, varied groups are regularly involved in data governance efforts, and a core set of activities appears to define an HCO's data governance efforts.

That said, Pettit highlighted AI governance as an area to watch moving forward, noting as the use of AI expands, the percentages for this data governance activity should increase.

AI/ML governance has become increasingly important for HCOs due to the growing adoption of AI/ML technologies in various aspects of healthcare, including clinical decision support and patient monitoring. As AI/ML models become more complex and integrated into critical healthcare decisions, it is imperative to establish robust governance frameworks to ensure these technologies are developed, deployed, and used in a responsible, ethical, and compliant manner while safeguarding patient data, safety, and privacy.

While HCOs are using AI to support an array of business functions… Just over half (53.9%) report sending AI data to their organization's enterprise data warehouse and/or operational data store… AND only about 40% report having AI governance in place…





"The survey results show 54% of HCOs are sending AI/ML data to their enterprise data warehouse, but only about 40% of all HCOs have AI governance in place," Pettit reported, who advised governance should not be overshadowed by innovation. "Drilling down further, we found that of those who are sending data to their EDW, only about 60% have AI governance in place."

For HCOs looking to leverage data and AI/ML for operational and clinical benefits, Partovi advised working back from the problem that needs to be solved.

"The journey from data to insights begins with only the data you need," he said. "The insights are meant to solve a clinical or patient problem, so the most salient approach is not technology for the sake of technology, but rather identifying the problem or challenge, the insights needed then the data required to generate those insights."

He noted this approach lends itself well to governance, because it allows for minimum exposure of data to get the insights needed. "The answer isn't to always get all data," he said. "What is the data you need to get the insight that you're looking for? Asking this question will simplify governance. Often, challenges in governance are due to an overreach to all possible data, then you start to investigate what the data is going to be used for and how to govern it."

5 Partnering for Success

HCOs are increasingly turning to outside partners for data storage and analytics applications as-a-service software as a service (SaaS) to leverage the expertise and capabilities of these providers and gain access to cutting-edge technologies such as predictive analytics, AI, and ML. However, before embarking on this journey, organizations should carefully consider key factors to ensure a successful and beneficial partnership.

- **Data Security and Privacy:** Healthcare data is highly sensitive and must be protected at all costs. Evaluate the provider's security infrastructure, data encryption practices, and compliance with healthcare data privacy regulations such as HIPAA.
- **Scalability and Performance:** HCOs generate massive amounts of data, and the analytics platform must be able to handle this volume and growth over time. Ensure the provider's infrastructure can scale to meet your organization's data needs and provide high performance for analytics tasks.
- **Integration Capabilities:** The analytics platform should seamlessly integrate with your existing healthcare IT systems, including EHRs, patient portals, and financial systems. This integration ensures data consistency and facilitates data-driven decision-making across the organization.
- **Data Ownership and Access:** Clearly define data ownership rights and ensure that your organization retains control over its data. Establish clear access protocols for authorized users and maintain transparency regarding data usage by the partner.

- **Predictive Analytics, AI, and ML Capabilities:** Assess the partner's expertise in predictive analytics, AI, and ML. Evaluate their ability to develop and implement customized solutions tailored to your organization's specific needs and objectives.
- **Domain Expertise:** Choose a partner with deep expertise in the healthcare domain and a proven track record of success in implementing data analytics solutions for HCOs. This expertise ensures that the solutions align with your specific needs and challenges.
- **Vendor Stability and Support:** Evaluate the partner's financial stability, reputation, and customer support capabilities. Ensure they have a strong track record of providing reliable support and timely responses to issues.
- **Cost-Effectiveness:** Evaluate the total cost of ownership, including subscription fees, implementation costs, and ongoing maintenance expenses. Ensure the benefits of the SaaS solution outweigh the costs.
- **Regulatory Compliance:** Verify that the partner's solutions comply with all applicable healthcare regulations, including data privacy, security, and clinical decision support standards.

By carefully considering these factors, HCOs can make informed decisions when selecting outside partners for data storage and analytics SaaS. A well-chosen partnership can significantly enhance data management capabilities, improve operational efficiency, optimize clinical workflows, and ultimately deliver better patient care.

About CHIME

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 2 US 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**.

About Digital Health Analytics

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 organizations' 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. DHA 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**.

About Philips

Royal Philips is a leading global health technology company focused on improving people's health and well-being through meaningful innovation, employing about 74,000 employees in over 100 countries. Our mission is to provide or partner with others for meaningful innovation across all care settings for precision diagnosis, treatment, and recovery, supported by seamless data flow and with one consistent belief: there's always a way to make life better. For more information, please visit https://www.philips.com/global.

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