Healthcare Solutions Guide

IBM

Table of contents

Forward

As technology becomes increasingly ubiquitous in our lives, healthcare organizations, governments, clinicians, individuals and entrepreneurs are leveraging it to help us live healthier, more productively and perhaps longer. At the same time, healthcare costs continue to increase around the world, largely due to aging populations, longer life expectancies and the increasing prevalence of multi-chronic disease. In response, we see stakeholders using technology solutions to focus on population health strategies, the individual and caregiver experience, and to drive cost efficiency and data consolidation to continuously improve quality and safety. To learn more on the disruptive forces confronting the healthcare industry, please see the IBM Global industry agenda for healthcare and life sciences.[1]

Industry imperatives

Improve care for patients and populations
Provide insights to clinicians, collaborative caregivers and community-based support agencies to identify gaps in the care of all population segments.

Empower individuals to become advocates in their health
Design interactions for empowered consumers and clinicians as a way of creating sustainable differentiation.

Deliver value and reduce costs
Use evidence-based practices to keep individuals safe through prevention, early detection and appropriate therapeutic strategies to help ensure high-quality health care for all patients.

Enable new operating models and gain efficiency
Consolidate data to generate insights and improve processes to provide better health, better care and reduced costs.

A portfolio designed to meet the most challenging needs of the industry

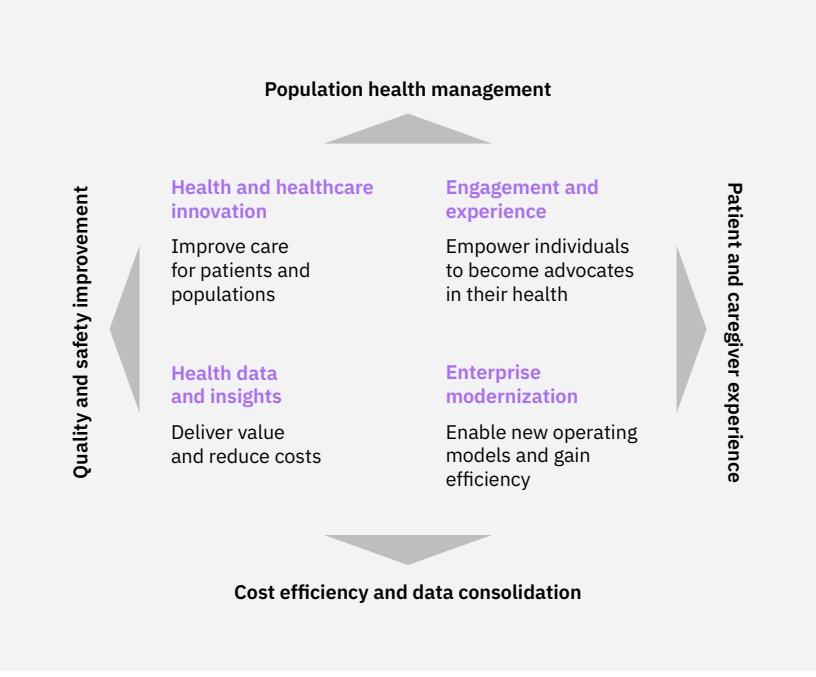
Given the level of disruption and uncertainty in an industry that continues to transform, the IBM portfolio of industry solutions, technologies and capabilities are designed to help organizations meet today's challenges and better position themselves for tomorrow's opportunities.

Health and healthcare innovation:
– Integrate new technologies into the workflow of clinicians to improve the quality of care and satisfaction of the clinician.

Engagement and experience:
– Design experiences that meet the needs of the patient, provider, caregiver and the person; deliver when and where they want to engage and provide them the right information at the right time.

Health data and insights:
– Collect, organize, analyze and infuse data with insights to drive greater transparency in cost, quality, outcomes and support innovation.

Enterprise modernization:
– Design your organization's infrastructure for scalability, flexibility and security to enable reinvention as the industry continues to adapt.



Featured solutions for healthcare

Enterprise modernization

Foundations
- Cloud platforms and migration
- IBM Security
- Blockchain enterprise applications
- Consulting services for Workday
- Electronic medical record (EMR) implementation
- Services for SAP solutions
- Consulting services and solutions for Oracle

Process Automation and services
- IT Automation
- Human resources (HR) transformation

Health data and insights

Services and platforms
- Data strategy and consulting
- IBM Cloud™ Pak for Data
- IBM Digital Insights

Collect
- IBM Spectrum® Computing and IBM Spectrum Storage
- IBM MarketScan® Research Databases
- Cloud and cognitive data tools
- Watson Health Imaging

Organize
- IBM Unified Data Model for Healthcare
- Cloud and cognitive data tools

Analyze
- IBM Action OI™
- IBM CareDiscovery®
- IBM Healthcare Cost and Care Insights
- IBM Market Expert® tool
- Watson Health 100 Top Hospitals™
- IBM PowerAI Vision
- IBM Flexible Analytics
- Cloud and cognitive data tools

Health and healthcare innovation

Innovation strategy
- Digital strategy
- Simpler advisory services
- Care management
- IBM Watson™ Care Manager

Care management
- Watson Care Manager
- Clinical decision support
- IBM Micromedex® with Watson solution
- IBM Watson for Oncology
- IBM Watson for Genomics
- IBM Watson Health™ Imaging

Public health
- Panorama

Engagement and experience

Digital experience
- IBM® Marketing Catalyst
- Salesforce Consulting Services
- IBM Watson® Marketing
- IBM Phytel®
- IBM Design Thinking services

Call center transformation
- IBM Watson Assistant for Health Benefits
- Kyruus patient scheduling
- Cognitive call center

Enterprise modernization

Healthcare organizations need to operate on a more flexible, scalable and secure infrastructure to meet the needs of their enterprises.

Information technology (IT) has become an essential foundation for the provision of care. However, the increasing demands of today's IT systems are outgrowing their existing infrastructures. Healthcare enterprises need to modernize their infrastructures to scale secure access to their data, tools and technologies.

Reducing cost and supporting efficiency
Cloud technology platforms have become a prerequisite for flexibility and scale, but an interesting adoption issue persists; less than 20 percent of potential workloads have been moved to the cloud, largely due to regulatory and compliance concerns, unique workload needs, multiple clouds and vendors, and lack of skills.[2] For many healthcare organizations, migration to more scalable cloud platforms remains complicated by the lack of a digital scalable framework, poor adoption of technologies, or an overall fragmented approach.

Adopting enterprise applications
From EMR systems to HR and finance systems, such as Workday and Oracle, healthcare organizations are looking to enterprise resource planning (ERP) systems to run their businesses and keep up with the consumerization of health. They need assistance to optimize these investments and integrate these systems into their workflows.

Enabling security
In the evolving healthcare security landscape, healthcare organizations are being forced to reconsider cybersecurity as a strategic priority beyond compliance. With the influx of data from the Internet of Things (IoT) devices, genomic mapping, telemedicine and so on, the vulnerabilities of healthcare technology are becoming increasingly diverse and difficult to manage. Healthcare is leading other industries in metrics, such as cost per breach, cost per breached record and time to discovery.

What it takes to restructure your organization for the future

Cloud platforms and migration
There are clear benefits to a migration of a workload to the cloud. However, healthcare organizations need a clear plan to integrate their multiple and hybrid cloud environments and identify the right cloud platform for each workload.

Blockchain
Blockchain's distributed ledger has the promise to reduce administrative costs while improving security of select applications. Innovators in the industry are organizing and piloting different use cases and models that may ultimately disrupt and transform the industry for the better.

Security
Healthcare organizations need to build a risk-aware management system, establish intelligent security operations and rapid threat response systems to secure a culture of cybersecurity vigilance. Assessing and understanding their risks, developing mitigation strategies and obtaining clear visibility across their enterprises are essential to maintain the trust of their patients, citizens, stakeholders and communities.

Enterprise applications
To run the business of healthcare, provider organizations not only need an EMR to digitize patient records, but also broader solutions to help digitize the finance, administration and HR processes. These ERP systems are becoming cloud enabled, helping organizations achieve flexibility and scalability.

Process automation and services
To allow provider organizations to focus on the provision of care, backend processes should be evaluated for automation opportunities, such as recruitment, finance and HR.

Enterprise modernization

IBM Solutions

Foundation
- Cloud platforms and migration
- Security
- Blockchain

Enterprise applications
- Workday
- EMR implementation
- SAP
- Oracle

Process automation and services
- IT automation
- HR transformation

How IBM can help

IBM believes hybrid multicloud platforms are the future and set the foundation for business operations as shown in Figure 1. IBM provides industry expertise and time-tested technology to help advise clients on their journey to the cloud. From DevOps to storage to operations, IBM can advise, move, and manage the cloud infrastructure of clients across private, public and hybrid infrastructures.

IBM is a member of a new collaboration[3] to design and create a network using blockchain technology to improve transparency and interoperability in the healthcare industry. The aim is to create an inclusive blockchain network that can benefit multiple members of the healthcare ecosystem in a highly secure, shared environment. The collaboration members intend to use blockchain to address a range of industry challenges, including promoting efficient claims and payment processing, to enable secure and frictionless healthcare information exchanges, and to maintain current and accurate provider directories.

IBM has built its brand largely on trust and it shares that integrity with its clients through its comprehensive security approach, from providing point solutions for cyber detection to helping transform your security operations. Backed by analytics, real-time defenses, integration expertise and experts, IBM can help you gain the guidance needed to navigate your healthcare security journey with confidence, leverage integrated best-of-breed technologies to gain a single view into your medical devices, records and infrastructure, and engage with an open ecosystem to manage EHR and the Internet of Medical Things (IoMT) risks.

When evaluating ERP or EMR systems, IBM can help you select or implement your system. IBM leverages its cross-industry experience in large systems integration and combines it with specific industry processes and requirements to help ensure the minimum workflow impact on your business. Our services can include master system integrator, program management office, or change management roles for EMR implementation, using Workday, SAP or Oracle. IBM can also build an agile IT as a service (ITaaS) environment to meet ever-changing business needs and support an always-on, security-rich environment for continuous improvement.

Finally, to help clients gain the most from their transformation and to save costs, IBM offers HR transformation focused on talent and recruitment, outsourcing, and digital change management.

How you can benefit

IBM capabilities for enterprise modernization help you create a scalable, flexible and security-rich architecture to support the clinicians, care and business professionals of your organization to focus on the highest value processes, while automating lower-value processes. These solutions support your initiatives to:

- Streamline operations and reduce cost
- Increase flexibility and agility
- Reduce incidence and impact of security breaches
- Improve patient trust
- Transition from capital expenditure (CAPEX) to operating expense (OPEX)

Enterprise platform architecture

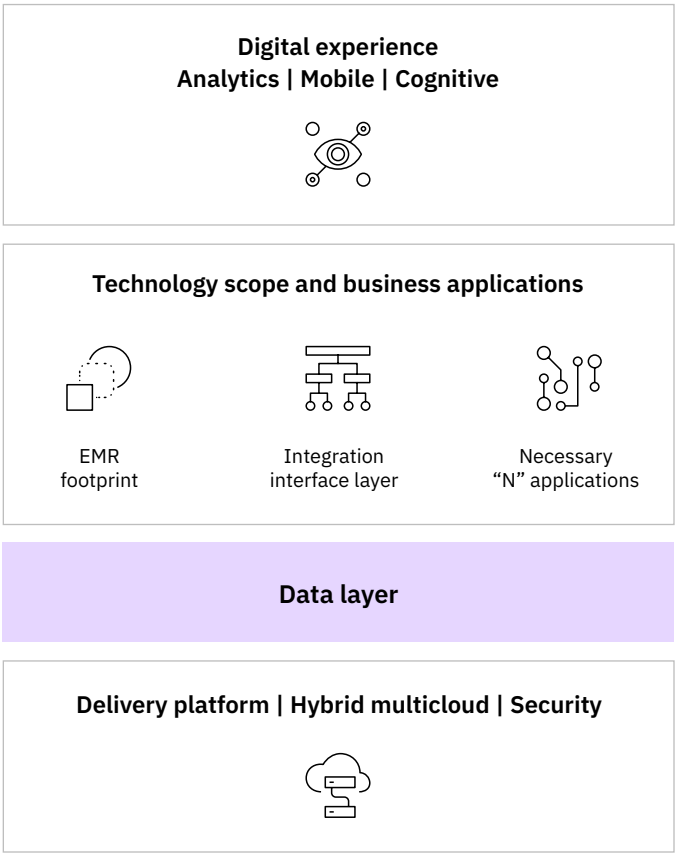
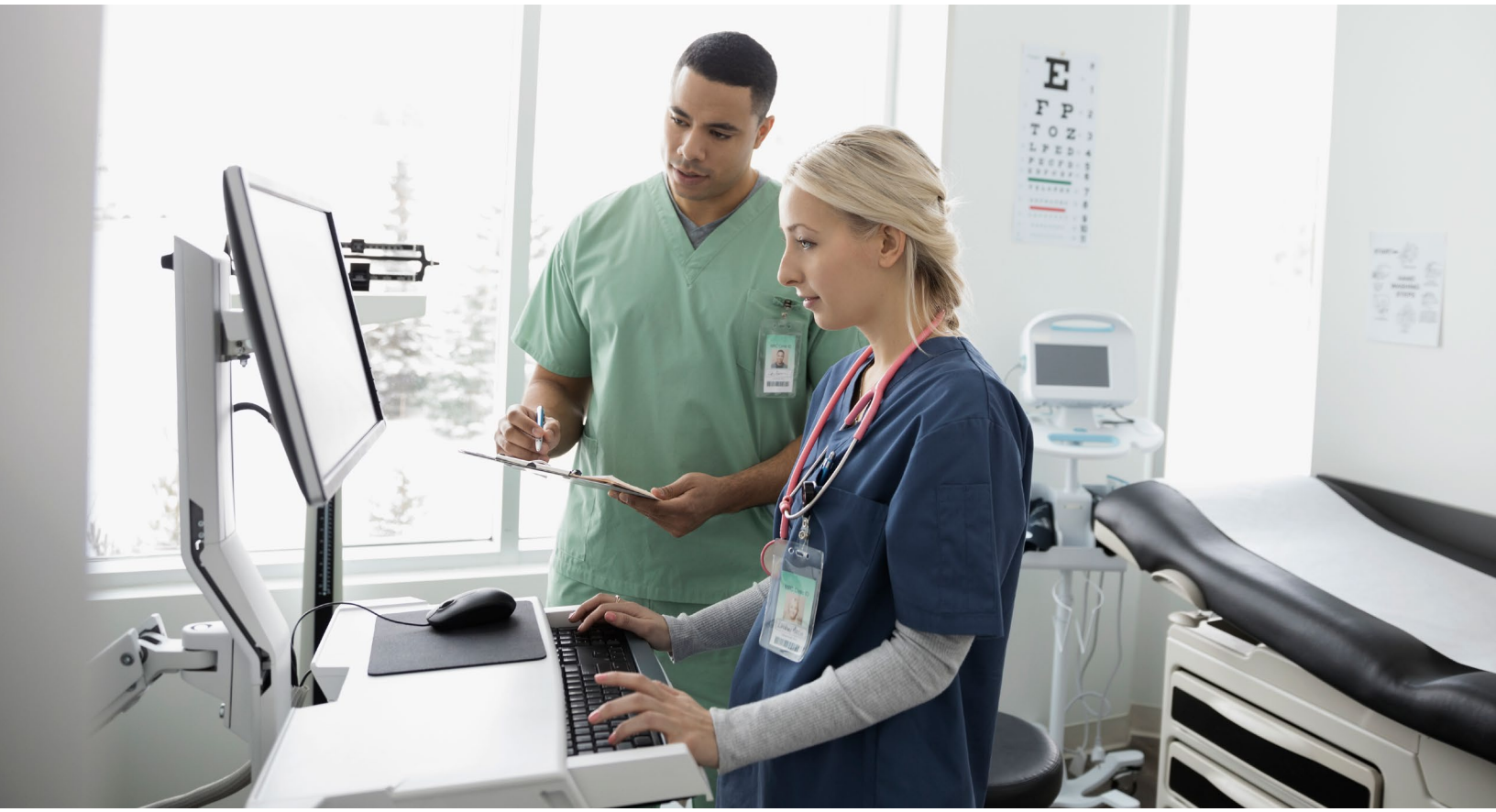


Figure 1: Creating a platform to support your business and digital experience



Case studies

NHS Digital
With the mission is to harness the power of information and technology to improve health and care, NHS Digital is working with IBM to provide a range of new and improved services to enhance data security and cyber security response and provide additional defense against increasingly complex, evolving threats.

"This partnership will strengthen how we help to keep patient information and services safe and secure, enabling NHS staff and patients to have confidence in the security of our system."

Dan Taylor, Program Director, Data Security Centre at NHS Digital.[4]

Large provider in the Middle East
This provider represents a major shift in the provision of healthcare in the United Arab Emirates (UAE) and the Middle East. To open a new "digital hospital," IBM helped integrate all the hospital's systems, covering 160+ integration points—including 30 specialized applications, and successfully designed and delivered 16+ weeks of training for the hospital staff to support a seamless transition.

Medical Confidence
Founded to help patients access specialist treatment more quickly and effectively, Medical Confidence needed a secure hosting platform for its sensitive data and applications. Using an IBM Cloud solution, the company addresses industry security requirements and creates a streamlined and supportive framework to help users get the care they need.[5]

Health data and insights

Healthcare providers need to move from being "data rich and insight poor" to having access to the right insights at the right time. Providers are under incredible pressure to provide evidence-based proof that they are managing the health of the populations they serve.

"On the clinical side, providers are dealing with a really troubling data paradox. They are under enormous pressure to meet new performance guidelines, all of which are based on quantitative evidence. But they are drowning in the very data they need to reach these performance benchmarks."

Dr. Kyu Rhee, Vice President and Chief Health Officer, Watson Health

Health data and insights

IBM Solutions

Services & platforms
- Data Strategy & Consulting
- IBM Cloud Pak for Data
- Digital Insights

Collect & store
- Spectrum Computing and Storage
- MarketScan Databases
- Cloud and Cognitive Data Tools
- Watson Health Imaging

Organize
- Unified Data Model for Healthcare
- Cloud and Cognitive Data Tools

Analyze
- IBM ActionOI, Care Discovery and Healthcare Cost and Care Insights
- IBM Market Expert
- IBM 100 Top
- PowerAI Vision
- IBM Flexible Analytics
- Cloud and Cognitive Data Tools

Infuse AI
- Cloud and Cognitive Data Tools

Healthcare data is unstructured, complex and large

Providers view analytics and artificial intelligence (AI) as key opportunities to improve the value of the care they provide and to personalize medicine, but many data scientists and knowledge workers spend more than half their time looking for data rather than interpreting the data for insights. Providers are recognizing that it's no longer sufficient to simply pour all their data into a data lake and expect everyone to go fishing. Instead, organizations must curate and enrich data so that it meets specific business needs, functions and workflows and provides trust so that value-based risk-sharing models are possible to implement.

To add to this burden, provider organizations are increasingly being asked to analyze unstructured data and enormous data sets, such as imaging and genomics data or clinical notes. The opportunity is immense, but so is the challenge to organize and understand the data.

What it takes to collect, organize and analyze data to create insights

The path to insights is not a clear-cut direct path, but instead a winding road map that must take into consideration all that a provider organization has already implemented.

The first step is to collect and store data, making it simple and accessible across the organization. Data can be sourced from internal systems, EMR records or external sources that supplement clinical data with financial or social determinants of health data. External data can also provide benchmarks against what the organization has internally.

Healthcare organizations and their enterprises must then organize the data. This step is critical for setting up trust in the data and creating a single source of truth. The data must be profiled, cleansed, integrated and cataloged in a healthcare-specific data model that complies with industry regulations such as General Data Protection Regulation (GDPR) and the Health Insurance Portability and Accountability Act (HIPAA).

Next, they need to analyze the data to scale insights on demand and provide analytics and reporting. This should integrate and unify the full range of skills across the enterprise and provide descriptive and predictive modeling, data mining and statistical analytics that can inform value-based and risk-based compensation models.

The ladder to insights

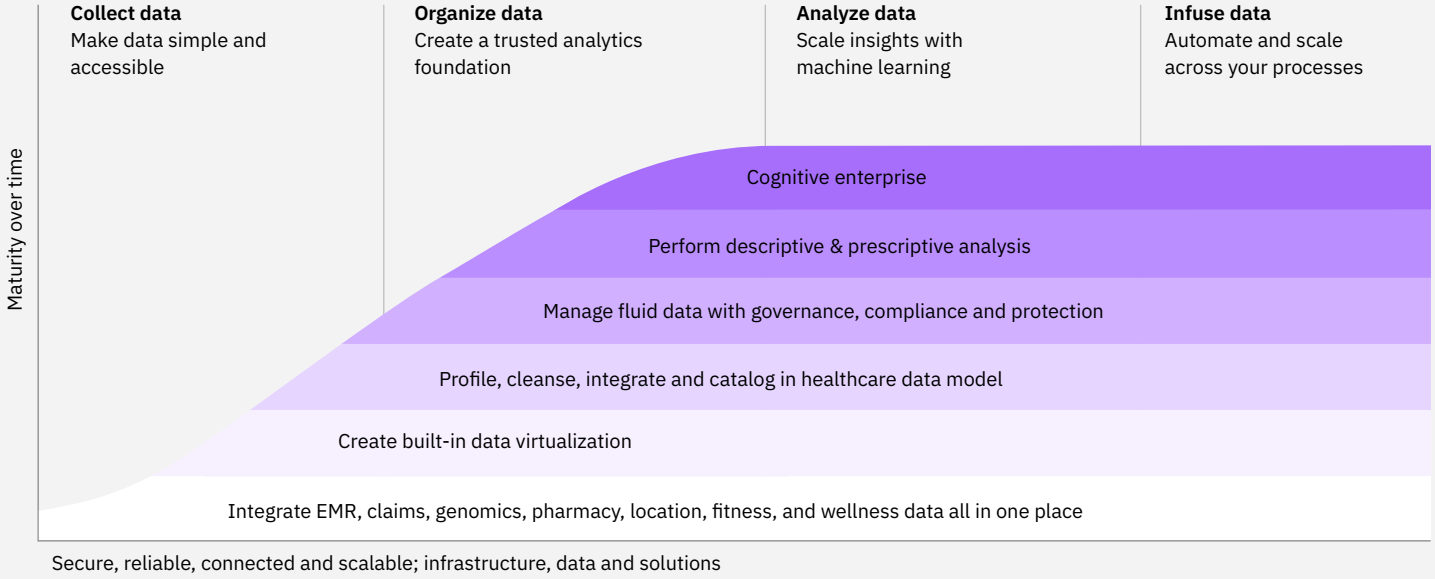


Figure 2: Advancing your data and analytics capabilities in a structured way to form trusted insight

This approach provides tremendous value however, provider organizations can further enrich their insights by infusing AI. AI models can be incorporated into the clinical and operational processes in hybrid multicloud platforms to provide the insights required across the continuum of care and for population health management.

How IBM can help

To be successful in the future of insight-driven care, clinicians, data scientists and IT staff must come together to define the vision and requirements. IBM helps its clients design and road map capabilities through its data, strategy and management consulting to accelerate providers' progress along their journey. See Figure 2.

IBM can also implement a full end-to-end platform that allows clients to collect, organize, analyze and infuse data in a single system with IBM Cloud Pak for Data or IBM Digital Insights, both of which complement providers' current systems to help run analytics on their platforms.

To help organizations interested in data collection, IBM offers data collection solutions, such as IBM DB2® and IBM Cloudant® database solutions, the IBM Integrated Analytics System, IBM Cloud Object Storage, Watson Health Imaging and IBM Spectrum Scale for genomic data, and can also supplement internal data sources with the MarketScan data set.

For those looking for assistance organizing their data, IBM offers an industry-recognized data model called the IBM Unified Data Model for Healthcare. IBM also offers data organization tools, such as IBM InfoSphere® Optim™ software, the IBM Watson Knowledge Catalog, IBM Master Data Management, the IBM StoredIQ® platform and IBM Spectrum Discover.

For assistance with analytics, IBM offers a range of preconfigured solutions along with capabilities to assist organizations in setting up their own models. IBM Action OI, IBM CareDiscovery and IBM Healthcare Cost and Care Insights solutions allow provider organizations to benchmark their operational and clinical quality metrics against similar organizations and identify areas of potential improvement.

IBM Market Expert helps clients make informed strategic decisions by providing comprehensive local market analysis of key market characteristics, utilization forecasts and competitive positioning. IBM Watson Health 100 Top Hospitals studies offer peer benchmarks based on a balanced scorecard using publicly available data for clinical, operational, and patient satisfaction metrics. IBM Flexible Analytics allows population management and organizational risk evaluation. PowerAI Vision allows organizations to train machine learning (ML) modules to recognize imaging patterns and assist in radiology. Other IBM modeling tools include IBM Watson Studio, IBM Cognos® Analytics, IBM Planning Analytics, IBM SPSS® software, Watson application programming interfaces (APIs) and IBM DataProbe® software.

To infuse AI into your organizations, Watson on the IBM Cloud allows you to integrate AI into your application and store, train and manage your data in the most secure cloud. With IBM Watson OpenScale™ you can track and measure outcomes from AI across its lifecycle and adapt and govern AI to your changing business situations, for models built and running anywhere. Plus, we offer an array of solutions and services described in the following pages.

How you can benefit

The IBM portfolio of solutions for health data and insights helps you apply a comprehensive infrastructure, application and use-case-driven approach in support of your initiatives such as:

- Reduce data and analytics cost
- Enhance employee satisfaction
- Increase compliance
- Improve benchmarking capabilities on operational and clinical data
- Improve insights on the population served and ability to adopt value-based care
- Expand evidence-based practices, as well as promoting practice-based evidence

Case studies

North York General Hospital
A healthcare provider in Canada gains instant insights into operations, analyzes years of data in minutes, accelerates trend analysis and streamlines development when it uses IBM PureData® System for Analytics, IBM InfoSphere® DataStage and IBM Cognos® Analytics solutions to redesign its analytics architecture and provide sophisticated interactive dashboards.[6]

Dekalb Medical
The hospital was able to reduce complications by 58 percent, saving 55 lives annually and saving USD 12 million a year by benchmarking resource utilization and quality measures to improve length of stay and readmission and mortality rates with the IBM CareDiscovery solution. It's now easier to identify areas of opportunity through reports and dashboards.[7]

iKure
Leaders at Kolkata-based iKure realized they could fill a critical heart disease gap using wearable technology and ML. The start-up used the tools and know-how of the IBM Data Science Elite team to create a model to identify patients who have the highest risk of suffering from a heart attack, allowing doctors to see the most urgent cases first.[8]

Health and healthcare innovation

Clinicians are overwhelmed by the deluge of data and increasingly complex digital workflows.

Healthcare providers want to provide the best care possible, however, they can be overwhelmed by daily workloads, keeping up with industry insights, and managing newly digitalized workflows.

Consolidating all the information on an individual into a single view would create 300 million books worth of health data for each person's lifetime.[9] With general practitioners (GP) seeing more than 40 patients a day in the UK,[10] the amount of information needed for a full view of their daily patients would fill 12,000 books.

On top of needing to know all this information about their patients, clinicians would need to read 29 hours a day to keep up with professional insights[11] and primary care physicians spend about six hours a day working with their EMRs during and after clinic hours.[12] This data deluge and system inefficiency is leading to the health crisis of clinician burnout.

Social determinants of health are as important as clinical insights

Medical care is estimated to account for only 10–20 percent of the modifiable contributors to healthy outcomes for a population, while the other 80 to 90 percent is determined by the health-related behaviors, socioeconomic factors, and environmental factors.[13] Understanding and intervention onto the social determinants can have dramatic impact on the individual. For example, an individual's zip code has been shown to be a better predictor of health than genetic code[14] and helping people move to affordable housing can reduce emergency room (ER) visits by 18 percent and Medicaid costs by 12 percent.[15]

Organizing care around the individual

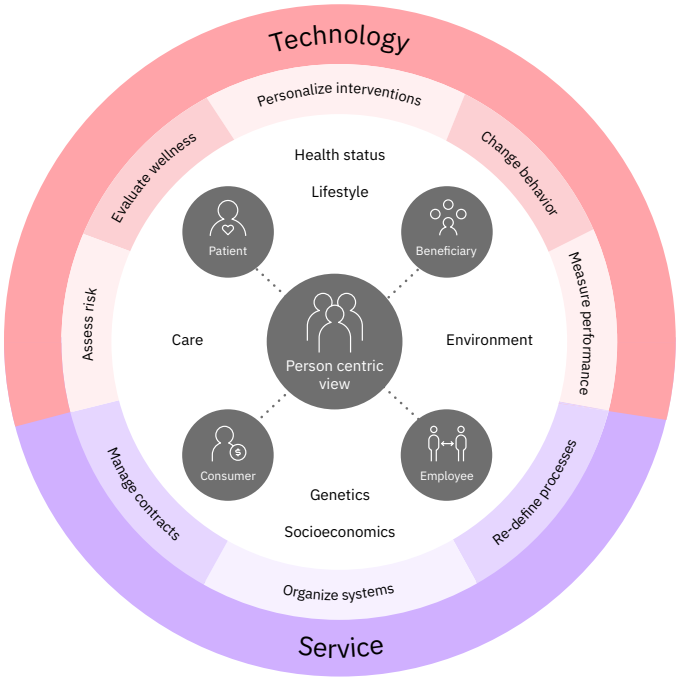


Figure 3: Technology and services must be oriented towards your clinical staff and patients

What it takes to innovate and provide personalized care

Strategy

To ensure digital adoption has a purpose and will fit the clinical workflow, an overall strategy and approach must be developed.

Care management

By identifying the highest risk individuals and providing hands-on care and coordination, care providers are able to take a full view of the individual. This full view includes the patient's social determinants of health to provide the right care, whether it's a clinic appointment or assistance in finding the right affordable housing in the area.

Health and healthcare innovation

IBM Solutions

Strategy
- Digital strategy
- Simpler advisory services

Care management
- Watson Care Manager

Clinical decision support
- Micromedex with Watson
- Watson for Oncology
- Watson for Genomics
- Watson Health Imaging

Public health
- Panorama

Clinical decision support and public health
To provide clinicians the right information at the right time, many organizations are turning to machine learning (ML) and artificial intelligence (AI) with the goal to derive actionable insights that can be delivered at the point of care.

Many use cases for AI have been identified, including:

- Radiology imaging analytics
- Identifying and managing pandemics and health crises
- Identifying and matching eligible patients to clinical trials
- Effectively targeting immunotherapy treatments based on an individual's unique genes
- Making medical devices and machines more intelligent
- Extracting relevant information from the EMR and providing insights at the point of care
- Providing physicians with evidence-informed treatment options for consideration

How IBM can help

IBM has the breadth and depth of industry expertise to help organizations design their digital futures. IBM Simpler Consulting experts can help you define improvements to workflows through lean consulting and establish a digital strategy and road map project using IBM Design Thinking.

IBM also offers true cognitive offerings, incorporating a combination of human, published and real-world data, along with the latest in AI in care management, clinical decision support and public health.

Watson Care Manager is focused on personalized care by creating a specific engagement plan for every individual and providing reference and linkage to the right social services to support the individual through Watson Care Manager Community Service Referral. The IBM Watson for Oncology and IBM Watson for Genomics solutions were developed in conjunction with leading cancer centers and industry collaborators to allow clinicians to efficiently navigate through massive amounts of information, optimize their workflows, and help deliver personalized care.

The IBM Micromedex with Watson solution puts natural language processing technology into the workflow of hospital clinical staff around the world to help them quickly answer drug information questions from the evidence within the IBM Micromedex clinical knowledge suite.

A shortage of radiologists and the increased use of medical imaging is causing a bottleneck. IBM Watson Health Imaging products help organize available, contextually relevant information and present it in an objective manner to assist healthcare professionals, whether at a reading workstation or at the point of care.

To help our customers manage public health more broadly, IBM has developed an integrated disease surveillance and outbreak management solution, which we call Panorama. Panorama helps organizations to track outbreak and disease case management, immunization, and vaccine inventory.

How you can benefit

The IBM Health and Healthcare Innovation portfolio of solutions helps you rethink and redesign the current clinical experience and support patient-centered care goals, such as:

- Reduce cost of care through increased efficiency in workflows
- Improve quality of care
- Enhance the employee experience
- Improve individual care experience
- Reduce the cost of chronic conditions and improve adherence through active management
- Optimize patient-treatment matching

Case studies

Health Quest
As a result of engaging care teams and optimizing technology with insights from Watson Health solutions, Health Quest closed gaps in care, generating USD 3.7 million in total billing revenue and received a final Merit-based Incentive Payment System (MIPS) score of 93.32 out of 100.[16]

United States Department of Veteran Affairs (VA)
The VA is using AI to help interpret genomic data, identifying relevant mutations and potential therapeutic options that target those mutations in this project. The collaboration between clinician and technology aims to support and scale precision oncology care for Veterans.[17]

Connecticut Children's Medical Center
Simpler® Consulting, part of IBM Watson Health, worked with the staff to diagnose inefficiencies and reallocate resources to improve patients' hospital stays, saving upwards of USD 5 million in the first year in enhanced revenue capture and expense reduction. The hospital also saved nearly USD 1 million on magnetic resonance imaging (MRI) scheduling and over USD 900,000 in reduced medicine waste due to fine-tuning its administrative processes.[18]

Engagement and experience

Seventy-three percent of healthcare C-suite executives (CxOs) expect more emphasis on customer experiences over the next few years.[19]

The growing needs for consumers to supplement their own care, and the increased focus on health and wellness, creates an interesting social dichotomy. Combine these dynamics with the demands of the now empowered consumer, and we see provider organizations scrambling to meet consumer expectations.

Consumer industries are setting the bar for experience
Consumer technology companies and start-ups have identified health as an opportunity area, breaking into the market with offerings such as Apple's mobile health record, 98point6's subscription-based primary care, and Haven threatening to disrupt the entire care delivery system.[20] The current fragmentation of industry solutions will consolidate over time as a more coherent model evolves, but until then, senior leaders must make technology bets to cater to their organizations.

Consumers now directly control USD 330 billion of out-of-pocket expenses related to their health[21]
In a Porter Research and Navicure study of clinicians, 63 percent of respondents indicate that healthcare consumerism is a factor with their patients, with 69 percent saying their patients are price shopping and 63 percent noting that individuals are becoming more involved in their medical decisions.[22]

The global wellness industry is estimated to be about USD 4.2 trillion and growing at about 12.8 percent year-over-year[23]
This involvement is caused in part by increasingly informed consumers, but also the influx of health, wellness and disease management tools that help individuals manage their own health.

For more on consumerism of health see IBM Institute for Business Value report "Consumers at the Heart of Healthcare."[24]

Engagement and experience

IBM Solutions

Digital experience
- IBM® Marketing Catalyst
- Salesforce Consulting Services
- IBM Watson® Marketing
- IBM Phytel®
- IBM Design Thinking Services

Call center transformation
- IBM Watson Assistant for Health Benefits
- Kyruus patient scheduling
- Cognitive call center

What it takes to deliver a meaningful consumer experience

To meet these expectations, healthcare organizations need to start engaging individuals in their care and providing them with the information and insights necessary to manage their care beyond the facility, while at the same time, making the clinical experience more seamless. This effortless experience requires modernization of infrastructures, agility and scale, and the ability to organize data into insights that can empower caregivers.

Digital experience
Moving from episodic care to an engagement model requires rethinking the way organizations and individuals interact and communicate. As in other consumer industries, patients want their providers to know them and remember their interactions across channels and touchpoints. The design of new digital systems of engagement need to take all stakeholders' needs into account and optimize the integration of technology into the workflow instead of adding technological steps. To learn more, see the IBM study "A Healthy Outlook."[25]

Call center transformation
To enhance the patient experience, organizations are thinking of how to put information into the hands of their patients. While this process often starts with enabling the call center through agent assist or chat bot functions, it should expand to create a cross-channel strategy to meet an individual's needs around self-service capabilities.

How IBM can help

Delivering an effective experience and engaging individuals and your staff will look slightly different for each enterprise and must match your current environment and culture.

A Design Thinking Digital Reinvention® project is the right place to start to understand the current experience of your patients and employees. Using ideation principles of design thinking combined with business strategy consulting will help identify the key workflows and experiences for innovation and change. The project will help you outline the need for additional clinical or patient-facing applications or enhancements to current processes.

Once you have defined the target patient and caregiver experience, the cross-channel experience can be brought to life with a marketing platform, such as the IBM Marketing Catalyst for Healthcare using the Adobe platform, Salesforce, or Watson Marketing. These platforms can integrate with the IBM Phytel solution to help ensure your patients are getting the right information and outreach at the single view of the individual, so any messages and communications are targeted and relevant.

Population health and engagement based on an integrated patient view

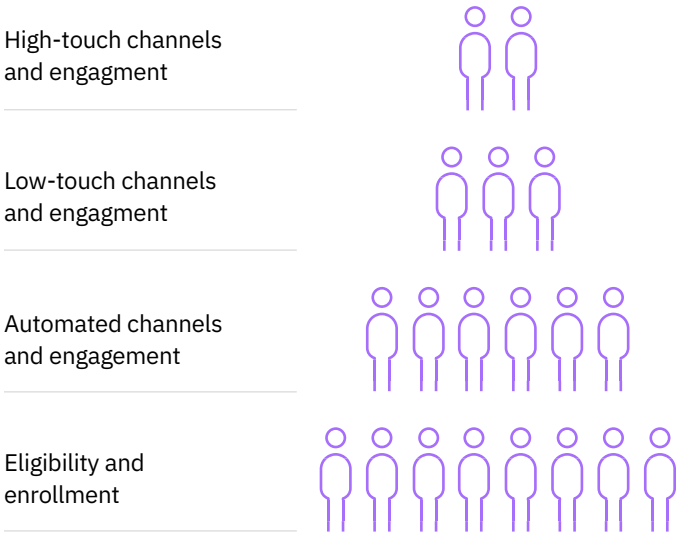


Figure 4: Segmenting your population based on their needs helps you interact with the right person in the most effective channel

There's an enormous call center opportunity for provider organizations to streamline cost and also provide a digital and contextual experience. With the move to telehealth and on-the-go care, providing care and advice outside the examination room will be critical. Patients should be able to schedule appointments digitally or through a chat at their convenience, for example, with the Kyruus Patient Scheduling tool. Chat can also help answer questions many patients have around their health benefits and coverage and the IBM Watson Assistant for Health Benefits was developed to help triage some of this workload from highly trained healthcare provider professionals. In addition, cognitive chat capabilities applied to instant message applications show promise in helping individuals manage low levels of anxiety through smartphones.

Online or automated, chat won't solve all call center challenges. A cognitive call center strategy needs to be put in place, including capabilities such as agent assist, to help maximize the employee and individual experience.

How you can benefit

As individuals take on more responsibility to manage and pay for their care, and clinicians take on more data to provide individualized care, provider organizations need to make sure they're demonstrating the value of their care and engagement. The IBM portfolio of engagement and experience capabilities is designed to support your initiatives to:

- Decrease cost through optimized channel management
- Enhance employee experience
- Enhance individual experience
- Improve adherence
- Improve patient retention
- Increase revenue through increased patient visits

Case studies

#Here4U
Researchers at Queen's University have teamed up with IBM Canada Ltd. to develop an instant messaging smartphone application that will connect members of the military, veterans and their family members to counseling options and resources to combat mental health disorders.[26]

A large healthcare provider in the Middle East
This provider wanted to design the patient engagement application of the future. Working with the IBM iX® agency, an app was developed to cover patient scheduling, navigation at the hospital, and health and wellness tracking to improve customer experience and differentiate this provider in the market.

SimplyWell, Inc.
This wellness solutions provider predicts a significant boost in engagement by deploying innovative apps to wellness program participants. Using IBM Watson Automation software, it will offer personalized communications to encourage users to complete activities and track their health.[27]

Taking action to reinvent healthcare

Until recently, healthcare systems and providers primarily focused on episodic remediation of specific ailments and systemic challenges. However, recent innovations in healthcare have begun to move the industry toward medical prevention, ongoing management and cure. Current advances in technology help define a more ubiquitous orchestration of health, wellness, disease management and prevention and hope to do so more affordably, individually and at scale.

Transformation of the industry continues to accelerate, spurred by government regulations, unsustainable costs, vertical and horizontal integrations and disruption by new market entrants. A world where care providers have a full view of an individuals' health is closer than you imagine. Access to the right information, at the right time, will help augment decision-making and the ability to provide the best care possible. However, much work remains to be done to prepare our health systems for these capabilities.

For organizations that want to hit the ground running, their healthcare strategy should consider how to best leverage the incumbent advantage which resides in their data—and unlock its full value. This process will require platform modernization discussions, information architecture, governance and integration work, with a deep analysis and understanding of current workflows.

There's a lot of work to be done, and a lot of momentum. The future is within reach.

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Produced in the United States of America
September 2019

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1 ibm.com/services/us/gbs/thoughtleadership/giahealthcarels

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