

WHITE PAPER

# Transform Healthcare: A Data-Driven Strategy for Digital Transformation

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May 2019

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# Transform Healthcare: A Data-Driven Strategy for Digital Transformation

## Executive Summary

The global healthcare industry is transforming at a pace never seen before due to factors such as legislation, declining reimbursements and technological innovations. We are seeing a burst of innovation across multiple disciplines, including genomics, biotechnology, robotics, remote and connected care, internet of things or IoT, clinical data integration and more. The impact of these breakthroughs will be profound.

At the same time, global healthcare is facing a cost problem. The clinical promise of science and technology-driven breakthroughs is often tempered by the sticker shock of the cost of these new treatments. There is broad recognition that cost increases are unsustainable, yet quality and outcomes remain subpar.

Buyers of care, including governments, employers and consumers, are demanding better value across affordability, quality and outcomes dimensions. Value transformation is being fueled by:

- The shift toward value. Escalating costs in treating chronic diseases are fueling a shift from the volume-based, fee-for-service funding model that has dominated the healthcare industry architecture for decades to a more performance-based, outcomes-driven approach.
- A focus on quality. There are growing expectations of better provider and care quality and outcomes as healthcare consumers become more aware and discerning with increased access to health information.
- A focus on informatics. New modalities, diagnostics and innovative medical devices, as well as the use of remote monitoring, are adding to the improvement in care management and care coordination. The collection, classification, storage, retrieval, interoperability and integration of data are critical for medical economics-driven care workflows.

The industry is at a pivotal point to reengineer, reinvent and realign to a new model that is called connected care, digital health or patient-centered care. This new care model requires new reimbursement models, shared risk and greater accountability to the outcomes. The cost, quality and innovation challenges posed cannot be met by incremental attempts to extract greater productivity from the industry's existing structure.

The future requires a new definition of value for all stakeholders within the ecosystem, especially from the perspective of patients. Patient engagement and giving them the tools to be healthier will drive new care and revenue cycle models that promote coordination and sharing of knowledge among all caregivers to the benefit of the patient. This approach requires technology and tools to collect and analyze data to support decisions with evidence.

The long-term goal of digitization is to achieve better outcomes for members, improved population health for communities and decreased cost burdens for public and private sector payers.

<sup>1</sup> In the US alone, the total spend on healthcare was estimated to be around US\$3 trillion in 2015. It is estimated to be 18% of the GDP in 2016. Furthermore, the US has the largest industry workforce, with 1 out of every 11 US residents employed in the healthcare business.

# Digital Transformation of the Healthcare Industry

The healthcare industry is one of the world's largest and fastest-growing industries. Consuming over 10% of the gross domestic product (GDP) of most developed nations, the healthcare industry can form an enormous part of a country's economy.<sup>1</sup> The healthcare industry is an aggregation and integration of multiple sectors, including health-care providers, physicians, payers, long-term care, pharmacies, diagnostic labs, life sciences and government care, which treat patients with chronic, preventive and rehabilitative care.

The aging population and growing retiree population have been putting enormous pressure on the system, making the digital transformation of the healthcare industry a major priority for providers, policymakers, payers and patients alike as costs rise faster than inflation every year.

Patients, just like consumers in other industries, are getting more accustomed to having access to data. They are seeking personalized approaches, transparency and more control of their overall healthcare experience. These high expectations have made it imperative for organizations to invest in technologies that will help drive loyalty through patient satisfaction.

The digitization of electronic health records and clinical data, wearable technologies, mobile and the IoT are contributing to the data deluge. Innovations in technology are making it possible to transform these data into meaningful and actionable insights to enhance patient care and consumer experience, reduce overall costs and transform business.

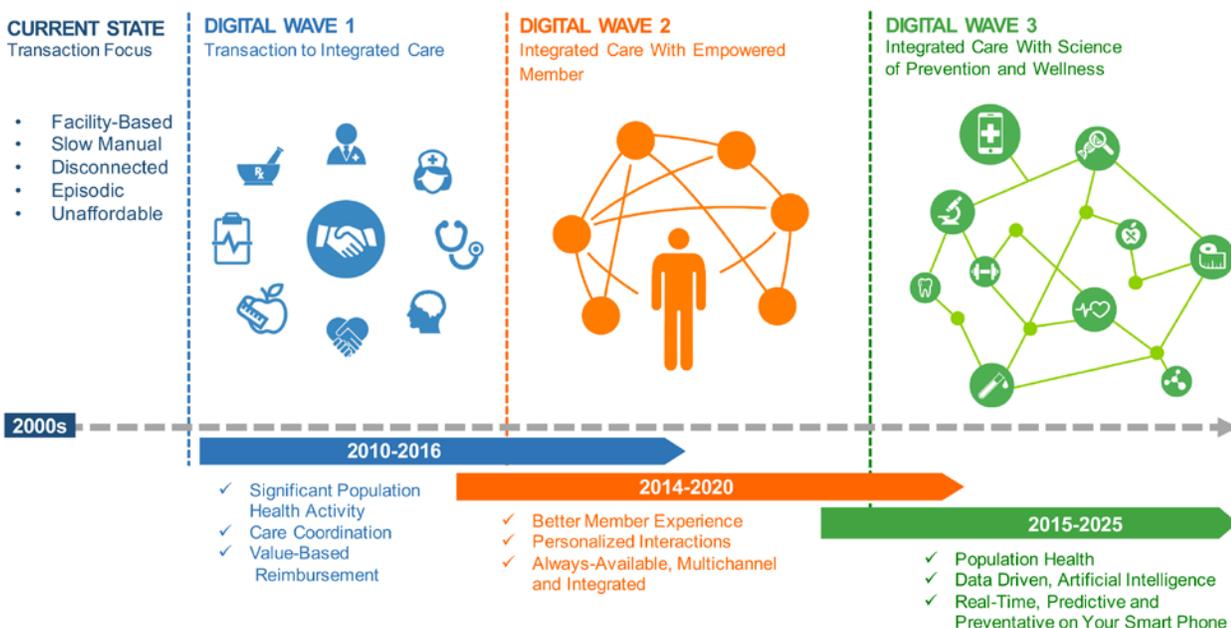
It is critical for healthcare organizations to strategically align technology initiatives with patient consumerization and the aging population to meet the demands of the "new" connected healthcare era.

Meeting the rising expectations of patients and members requires organizations to manage their data. While this may seem like a simple task, it's quite daunting to execute. Healthcare organizations are inundated with claims and clinical data; unfortunately, much of the data are not useful unless they can be transformed into timely and actionable insights at the point of care.

Transforming clinical data into knowledge requires integrating disparate data sources. These sources include electronic medical records, clinical summaries, patient history and drug adherence, as well as the creation of true interoperability and a strong analytics strategy. With these pieces in place, healthcare providers can make decisions on hard data rather than intuition, and have real-time insights at their fingertips to deliver high-quality and affordable patient care.

The waves of digital transformation taking place in the healthcare industry are shown in Figure 1.

Figure 1. Waves of Transformation



## Digital and Data Trends Transforming the Healthcare Industry

In this section, we take a look at the top connected health trends that healthcare payers and providers are focused on.

### Consumerization of Healthcare

This consumerization of healthcare is emerging as a major force in how healthcare is consumed. To support the trend of consumers taking greater control of their health and healthcare, providers need to provide a different level of connectivity between the physician and the patient. Member portals, bi-directional provider portals, mobile health apps, telehealth, population health and information security are critical components in achieving this new level of connected care.

Consumer engagement (education, alerts and notifications, dialog with physicians, cost calculators and so forth) continues to be a high priority for healthcare organizations. Connected health tools (mobile health apps, telehealth, healthcare scorecards) are thus the key to empowering healthcare consumers. Connected health engages patients, members, providers and the health community using technology to deliver quality care outside of the traditional medical setting.

As the healthcare industry continues to evolve, consumers remain at the center of the transformation. Healthcare is entering an era of the consumer; with that comes new challenges and opportunities.<sup>2</sup>

### Wellness, Prevention and Internet of Things (IoT)

The prevention of disease and illness is a major focus in healthcare. Increasing this focus on wellness and prevention will help to improve health, quality of life and prosperity.

Behavior is considered the root cause of many health problems. More than 52% of adults do not meet recommendations for daily physical activity. Health risk behaviors like obesity are known to cause chronic diseases downstream. For example, seven out of ten deaths among Americans each year are from chronic diseases (such as heart disease and cancer), and almost one out of every two adults has at least one chronic illness, many of which are preventable.

Several consumer behavior trends are driving the growth of the connected health and fitness market:

- **Individuals and employers are increasingly focusing on health and fitness.** A variety of factors, such as changing consumer lifestyles and demographics, combined with rising healthcare costs and employers' increased emphasis on productivity, are leading individuals and employers to focus on prevention and fitness.<sup>3</sup>
- **Advances in technology have enabled the emergence of connected devices.** Recent technological advances in sensors, lower power components, and longer-life batteries, combined with the introduction of wireless standards such as low-energy Bluetooth, have enabled the emergence of connected devices. These devices are smaller and more power-efficient, track a broader range of biometric data, and fit a wide range of consumer preferences.
- **Mobile devices have become the preferred platform for accessing information.** Mobile devices have become the preferred platform for people to access information and manage their health, as well as the primary hub to connect a variety of consumer devices.<sup>4</sup>
- **More individuals are turning to technology solutions to improve health and fitness.** Individuals are increasingly using mobile apps and other software to improve wellness and health, allowing consumers to directly manage and track their biometric data in new ways.
- **There is growing focus on leveraging mobile and telehealth services for preventative care.** A key foundational element is wearable devices (for example, fitness trackers, biometric monitors). According to the International Data Corporation (IDC), consumer spend on the wearable devices market is growing faster than any other segment in the global consumer electronics market.<sup>5</sup>

<sup>2</sup> Among millennials, reliance on healthcare scorecards to compare the performance of doctors, hospitals or health plans has grown from 31% to 49%. Consumers' use of technology to measure fitness and health improvement goals has grown from 17% in 2013 to 28% in 2015. Among consumers who have major chronic conditions, tech-based monitoring has jumped from 22% to 39% (Deloitte Consulting Study, 2016).

<sup>3</sup> IBISWorld estimates that the corporate wellness industry will grow in the United States from US\$7.2 billion in 2015 to US\$9.9 billion in 2019.

<sup>4</sup> According to Gartner, by 2018 more than 50% of users will go to a tablet or smartphone first for all online activities.

<sup>5</sup> According to The NPD Group, over 25% of US consumers reported using a fitness app on their smartphone.

## Align Clinical, Quality Metrics and Financial Analytics To Enable Value-Based Care

Healthcare organizations today are being challenged to reduce costs, improve care coordination and outcomes, be patient-centric, and provide more with less. And they are doing all of this while trying to adhere to regulatory requirements and untangle the legacy web of inefficiencies that negatively impacts clinical outcomes.

Reform and regulation are driving value-based care. The Patient Protection and Affordable Care Act (ACA) changed provider reimbursements by focusing on the Triple Aim:

- Improving the health of the population beyond the walls of the facility.
- Enhancing the experience and outcomes of patients.
- Reducing the cost of care by engaging physicians and providers.

In the US, Medicare (and Medicaid) reimbursements<sup>6</sup> are increasingly based on value, not volume. This means that hospitals and physicians will see their payments modified so those who provide higher-quality care will receive higher payments than those who provide lower-quality care.

For more optimal revenue cycle management, it's critical for healthcare providers to integrate quality indicators and measures (for example, Healthcare Effectiveness Data and Information Set or HEDIS scores) with clinical analytics that drive operational performance. Care delivery teams within healthcare providers are dependent on high-quality data to make timely decisions that positively impact the outcomes of the individuals, organizations and communities they serve. By truly harmonizing data and quality indicators, healthcare providers can move from reactive reporting to proactive and actionable insights that uncover process improvement opportunities.

## Integrate Clinical and Claims Data To Enable Population Health Management Insight

Technology-enabled population health initiatives have traditionally relied solely on either clinical data or claims data. While this method has value, there is a tremendous opportunity for healthcare organizations to take population health efforts—consolidated information across systems—to the next level by integrating claims, revenue and electronic health record (EHR) data.

Integrating clinical data from EHRs with claims data can help to develop a more complete patient view and improve overall care. Merging clinical and claims data provides healthcare organizations with a more complete picture and delivers the insights needed to address their most complex challenges.

When combined, clinical, lab, EHR and claims data can be used to:

1. Compare recommended care against evidence-based practices.
2. Manage overall care transitions, such as discharge planning and post-acute outreach, to prevent costly hospital readmissions.
3. Reduce unnecessary clinical procedures.
4. Help patients avoid hospitalization by identifying early risk factors.

Population health<sup>7</sup> is a big focus for the healthcare industry, and there are many different programs, resources and technologies available to support this initiative. Robust healthcare data are becoming more readily available as healthcare provider organizations and health plans recognize the importance of sharing patient data to improve outcomes and reduce costs. Organizations that leverage the combination of clinical and claims data will have a strong foundation for population health management. However, those that maximize the value of these data by transforming them into meaningful and actionable insights to help meet quality, cost and patient satisfaction objectives will thrive in the quickly evolving ecosystem.

<sup>6</sup> In 2016, Medicare and Medicaid outlays are forecast to exceed US\$1.25 trillion and account for 49.9% of all US health insurance expenditures.

<sup>7</sup> Population health has been defined as “managing the health outcomes of a group of individuals, including the distribution of such outcomes within the group.” It is an analytical approach that aims to improve the health of a cohort or population.

## Leverage Longitudinal Data Analysis for Improved Patient Care and Outcomes

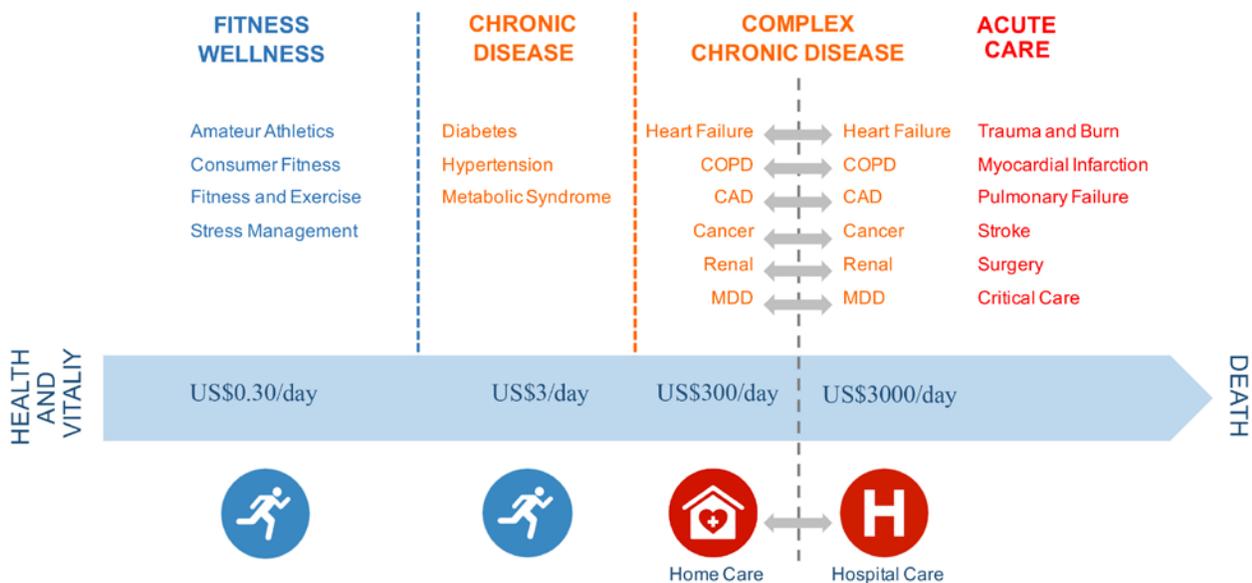
Historically, healthcare analytics has been used to manage care within the four walls of the traditional care setting. Healthcare reform, specifically the arrival of accountable care and payment reform, has led to a greater emphasis on care across the entire care continuum (see Figure 2).

Healthcare organizations are turning to longitudinal analytics to discover opportunities to reduce care delivery costs, streamline processes and enhance patient care across populations they serve. Cross-continuum analytics requires the integration of multiple disparate clinical and operational systems. Healthcare organizations need access to timely and accurate data across the entire continuum of care to leverage the power of information to develop meaningful and actionable insights.

One way to begin analyzing longitudinal data in the absence of full system integration is to leverage claims data to analyze claims by a certain population across different providers. This allows hospital systems to analyze their network leakage, share of patient care, readmissions, referral patterns and more.

Predictive analytics<sup>8</sup> uncovers insights from trends and patterns to determine the impact of operational adjustments and market forces on healthcare organizations. Statistical analysis and predictive modeling expand on the findings gained through business intelligence solutions to answer “What will happen?” given certain business and/or clinical situations.

Figure 2. Continuum of Care



<sup>8</sup> Predictive analytics sifts through and mines massive amounts of data to find patterns, assess probability of occurrence, predict outcomes and make informed choices.

## Healthcare Transformation Agenda: Five Key Strategic Initiatives

To achieve better value, healthcare organizations need to focus on integrating evidence-based insights and digitized care management processes to create greater standardization and rapid adoption of best practices. They must also coordinate communications across the episodes and diverse settings of the care continuum to enable real-time coordination and to reduce gaps in care.

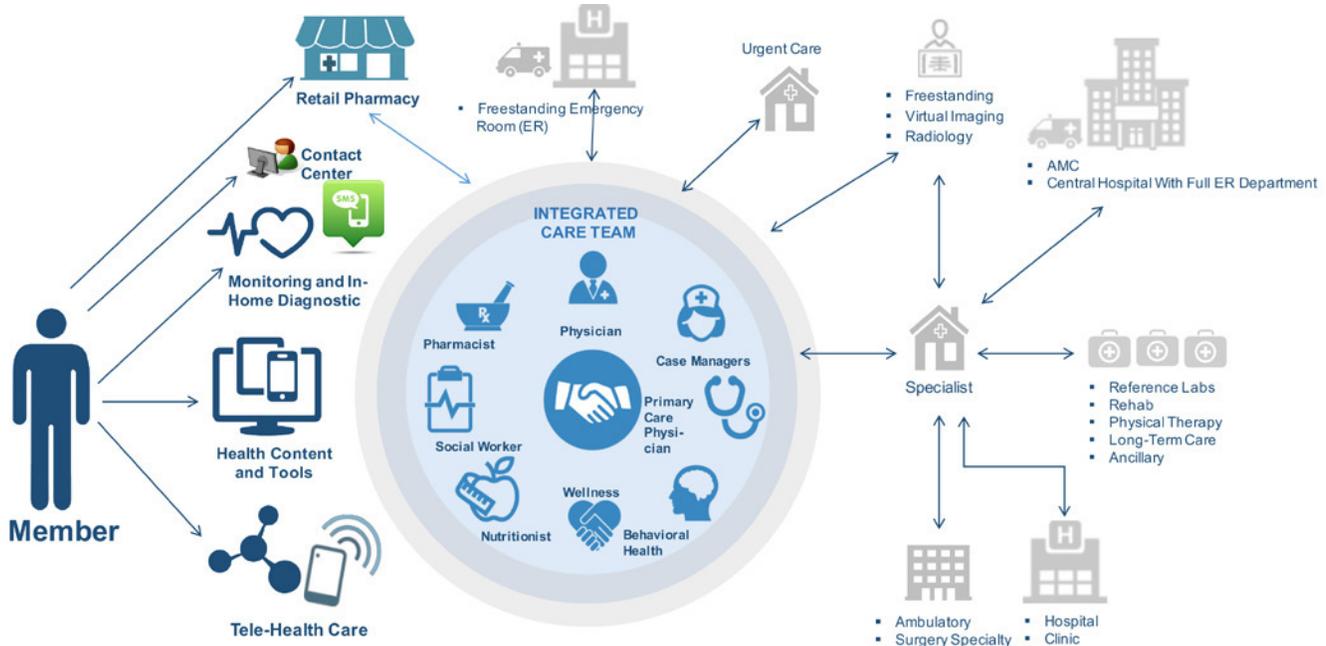
Figure 3 illustrates the emerging integrated care model that embeds process integration, connectivity and engagement. To make this vision real, significant modernization, reengineering and replatforming of current applications and infrastructure will be needed to meet next-generation integrated care requirements.

New systems of clinical care process measurement and analysis are needed. They are required to improve the targeting of individuals and their families for support, to reduce unnecessary process steps and to simplify care transitions across settings.

The following strategic imperatives emerge as key enablers to delivering greater value and achieving better outcomes for all stakeholders:

- Member 360: evidence-based and standardized care planning.
- Individual engagement and empowerment.
- Coordination across care boundaries: shared accountability and risk.
- Quality measurement and performance reporting.
- Understanding and influencing their populations.

Figure 3. Integrated Member-Centric Care Management (integration, connectivity, engagement)



### Member 360: Evidence-Based and Standardized Care Planning

In healthcare, information comes from a variety of sources, including electronic medical records (EMR), clinical discharge summaries, claims, lab reports, provider portals and monitoring tools. Aggregation of this data provides a 360-degree view of the patient and delivers insights that are critical to enhancing patient care. It is important to remember that predictive analytics should link to clinical priorities and measurable events, such as cost, gaps in care, drug adherence and patient outcomes and preferences.

This vast array of information can be complicated and confusing, especially when it comes to making important medical decisions. New tools around medical economics and informatics are emerging to provide more guided decision support.

To achieve outcomes that matter, the clinical care plan should be specific to the patient's condition and environment, supportive of the requirements of the individual, and based on the practice guidelines and protocols that have been most successful for the given population.

As more data become available through EHRs, the ability to mine those data for evidence presents opportunities never before available to the clinician. For example, studying populations that are very similar to an individual patient provides the insight not only to project outcomes and risks, but also to select interventions that have been shown to be most effective for this patient.

By digitizing the care planning process, a balance between standardization and personalization can be achieved, thus aligning resources with population health needs while enabling individualized care.

## **Individual Patient Engagement and Empowerment**

Engaging individuals to better manage their own health and wellness begins with empowering them with a voice in their care decisions. Empowerment gives them the ability to personalize treatment decisions, to partner with their providers and to assist them in managing goals.

Access to information enables choice and the opportunity for consumers to understand the trade-offs of their decisions, while also encouraging actions that support their best health and financial interests. Providing care management and supportive programs makes it easier for patients to comply with their medication schedules as they are able to remotely monitor therapeutic compliance. Improving the delivery of recommended care protocols creates greater access for a population and improves equity in services received and outcomes experienced.

Remote monitoring capabilities; access to information through portals, smart phones and kiosks; and exploitation of telehealth technologies can provide both scale and support to remote populations. The use of telehealth, mHealth and remote monitoring and capture of biometric data is expanding as the industry continues to see the benefits of delivering healthcare through these methods. In addition, new regulations and policies are being implemented to encourage the widespread use of these services.

Empowering patients and members is not simply making healthcare more accessible and patient-focused. Rather, it is the creation of data-driven personalization: understanding the critical characteristics that inform a person's choices, actions and responses to their own health requirements, to influence their participation in their own health management.

Successfully influencing behavior depends on understanding what motivates patients and members, as well as what resources they will access, and then providing them with a set of tailored services that leverages that understanding.

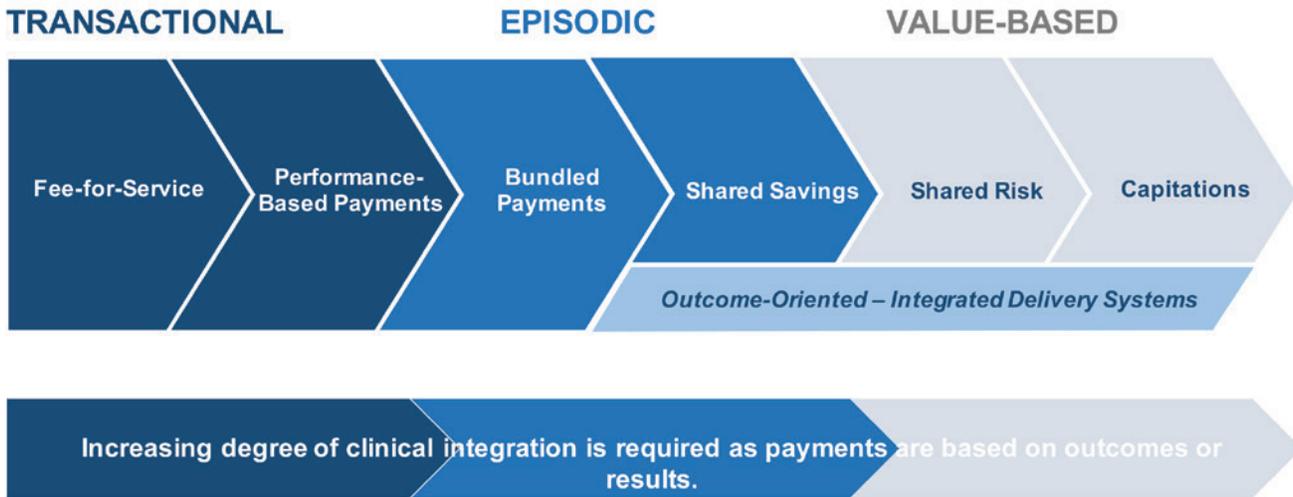
## **Coordination Across Care Boundaries: Shared Accountability and Risk**

Care coordination requires communication between healthcare teams, families, care settings and community support agencies. To facilitate care transitions assumes new levels of relationship and collaboration, as well as integration across health, government and community agencies to provide needed resources, social programs and services.

New funding and payment mechanisms, such as outcome- and value-based payment models, are requiring healthcare stakeholders to share risks and rewards for the populations they serve. These new models support a renewed focus on care transitions, requiring a more proactive approach to effective resource deployment, including assessment for risk, skill levels required and integration of process across care teams and multiple settings. True coordination facilitates the delivery of the right healthcare services in the most expeditious order, at the right time, into diverse and numerous environments.

Coordination allows expansion of the care team to take advantage of diverse resources, from clinicians, nurses, assistants, care coaches and pharmacists to behavioral and mental health workers, home health aides, outreach service providers, extended care givers, family members and the patient. Effective coordination requires placing the patient, not the clinician, at the center of the system, so that activities can take place with a shared goal and accountability for the outcome.

Figure 4. Evolution of Payments From “Fee for Service” to “Fee for Outcome”



### Quality Measurement and Performance Reporting

Fee for service is engrained in existing architecture and reimbursement models (see Figure 4). Changing this model will take significant funding, infrastructure transformation and leadership.

Value-based models are data-centric models. Consumers, regulators and partners all require greater levels of reporting and access to quality and price information to enable evidence-based choices and decisions (for outpatient versus inpatient services). Innovators are already implementing smarter decision-making using health analytics, publishing metrics at the point of care, and disclosing performance outcomes to promote behavior change.

Transparency is a real requirement for value, an imperative for an organization to track and evaluate its own performance and to participate in shared funding models. Quality improvement is driven by a closed-loop process of measurement and analysis to gain insight that is used to inform behaviors and actions that can drive change within and across payers and providers.

### Understand and Influence Population Outcomes

Targeting specific populations for intervention and the identification of gaps in care begins with the aggregation and analysis of data to derive insights and evidence that become the basis for evidence-supported practices (see Figure 5).

Healthcare payer and provider organizations are developing the necessary skills to manage growing data stores, including advanced analytics, regression analysis, data mining and text mining.

These tools aid the identification of risk factors that are predictive of patient outcomes to construct risk prediction models and the prediction of overall risk levels, from the broader population of patients down to the individual.

Comparative effectiveness analytics for a population, starting by defining cohorts of similar patients and examining differences in outcomes, can reveal information that can be used to make decisions about individual patients as well as groups.

To take on risks associated with the transformation of payment structures, evidence-based insights into population health requirements are essential.

Figure 5. Population Health Outcomes



## Data-Driven Transformation of Care

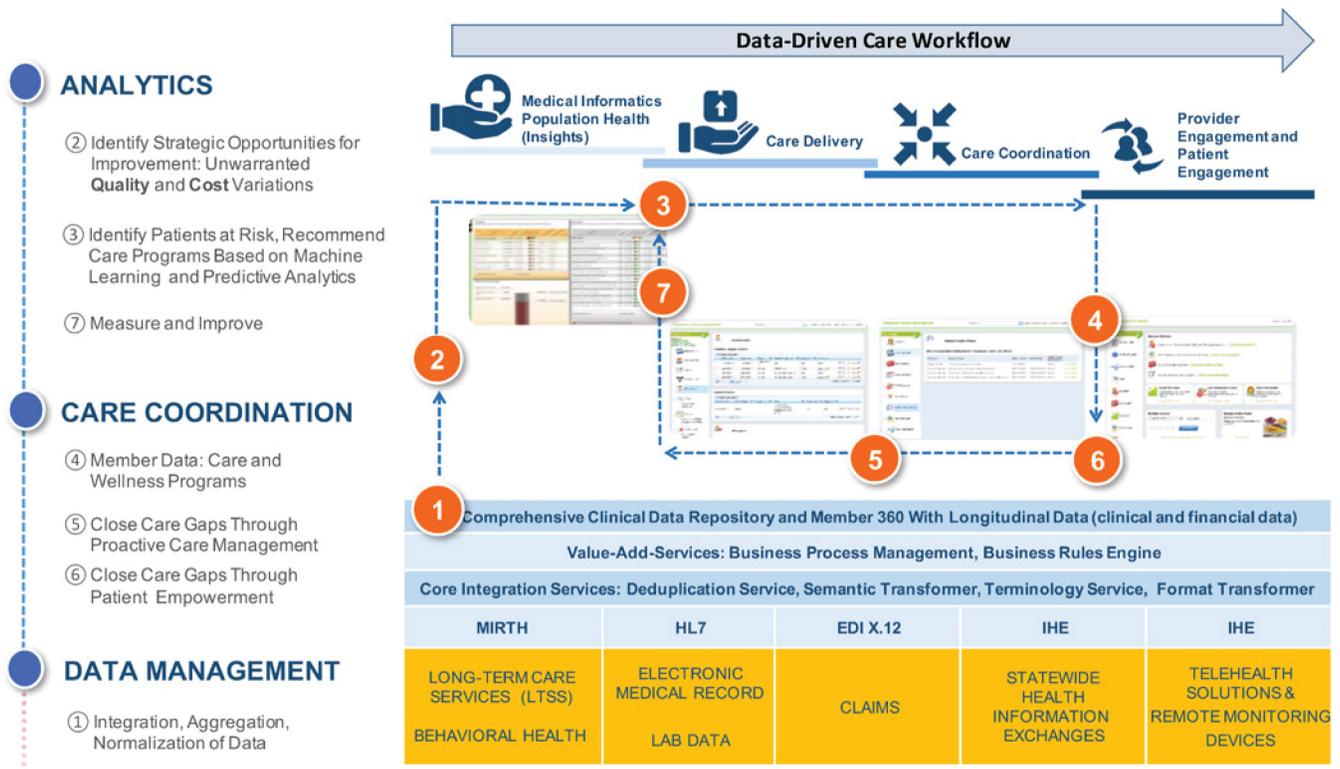
To achieve outcomes that matter, everyone providing care needs to be making better decisions: decisions that are more evidence supported, value-driven and directed toward the member, patient, individual and care-giver.

Figure 6 illustrates a medical economics-driven workflow that is increasingly being implemented by leading providers and health plans. Effective data management is at the core foundation for care coordination and delivery. Healthcare payers and providers are leveraging predictive analytics to:

- Reduce patient readmissions.
- Increase the accuracy of patient diagnoses.
- Deliver more targeted care to high-risk patients.

This vision of integrated care requires the ability to gather and use relevant information, not just to collect more data. Good decisions require that data are analyzed, prioritized and delivered to the decision-maker in a timely and actionable way. Personalizing healthcare for an individual also requires new ways of using healthcare information. For patients with multiple diagnoses, optimizing the outcome for that patient is unlikely to be accomplished by focusing on the individual diseases. Resolving potentially conflicting treatments, incorporating patient preferences, engaging the patient in the decision process and coordinating among all of the participants in the process represent a fundamental change in how healthcare is provided.

Figure 6. Analytics-Driven Integrated Care



Integrated care with a focus on outcomes requires more difficult decisions and higher expectations. The amount of data available, both structured and unstructured, is voluminous and increasing exponentially. This requires organizations to become exceedingly proficient in data management and analytics. How organizations capture, store, use and share information is a critical competency in enabling the transformation strategy. The ability to access the wealth of clinical information across the care spectrum is necessary for making better decisions, and is required to correlate cost and quality information.

Collaboration among all the participants in the healthcare process is essential to taking advantage of the efforts described above. Unless information and care plans are developed, implemented and shared with all the participants, including the patient, the potential for improvement will be limited.

## Summary and Next Steps

Changes in the way the healthcare industry operates need to occur to reduce the high degree of fragmentation, waste and inefficiency that has affected cost and quality performance. Three core industry trends that we highlighted in this white paper are:

- Payment and delivery are becoming more interdependent.
- Healthcare is becoming more like retail (consumerization).
- New clinical care models are transforming care delivery.
- Government is playing a larger role.
- Technology changes are forcing business models to change.

With the growing focus on access, quality and cost, it's clear that the healthcare industry is headed in a new direction, with increased scrutiny and demand for better value. Any stakeholder organization in the industry, including payers, providers, pharmacies, patients and pharmaceutical manufacturers, must evolve its way of thinking, as the parts that have been the hallmark of its past are being commoditized.

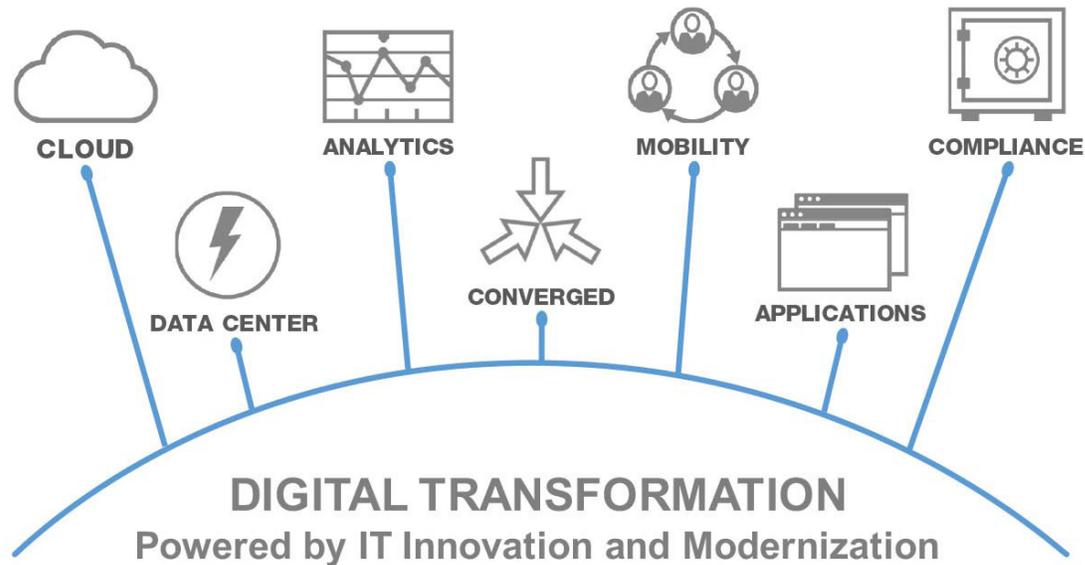
Healthcare organizations need to better understand their cost of delivering services, the extent and breadth to which their services contribute value and the risks inherent in their communities. The shift to a focus on outcomes can be seen as threatening, but it can also be seen as a great opportunity to engage in the whole provider network. To effect greater health value for the populations they serve, organizations need answers to these questions:

- How will they change the way they deliver value to their patients, consumers and partners?
- How will they operationalize that value within their ecosystem and with their stakeholders?
- How well do they understand the financial implications of this new approach?

Incremental thinking is no longer sufficient. Forward-thinking organizations are gaining advantages from data-driven insights and deep population analysis to enable patient-centered care processes, coordinate care and deliver higher value. This industry is poised to achieve those values, including ease of use, quality, access and cost, that matter.

In addition to introducing new technologies and offerings, healthcare providers must phase out outdated applications and infrastructure. If they are unable to do so on a cost-effective basis, they could experience reduced profits. In addition, there could be legal or regulatory restraints on the ability to phase out current services. Modernization of IT is a key foundational element of every digital healthcare transformation (see Figure 7).

Figure 7. Strategic IT Initiatives in Typical Healthcare Provider



### Data-Driven Digital Transformation, Powered by Hitachi Vantara

Healthcare transformation in today's volatile market is at the core of business survival. While business leaders expect IT to remain focused on results, enable innovation and provide continual improvements, it's not enough to rely solely on technology to transform the business.

In healthcare industry, this value realization game plan translates into the following outcomes:

- Achieve cost savings and accelerate time to market by rethinking operations and processes.
- Increase customer loyalty and grow revenue through improved customer experience.
- Uncover new revenue streams and reach new markets with new business models.

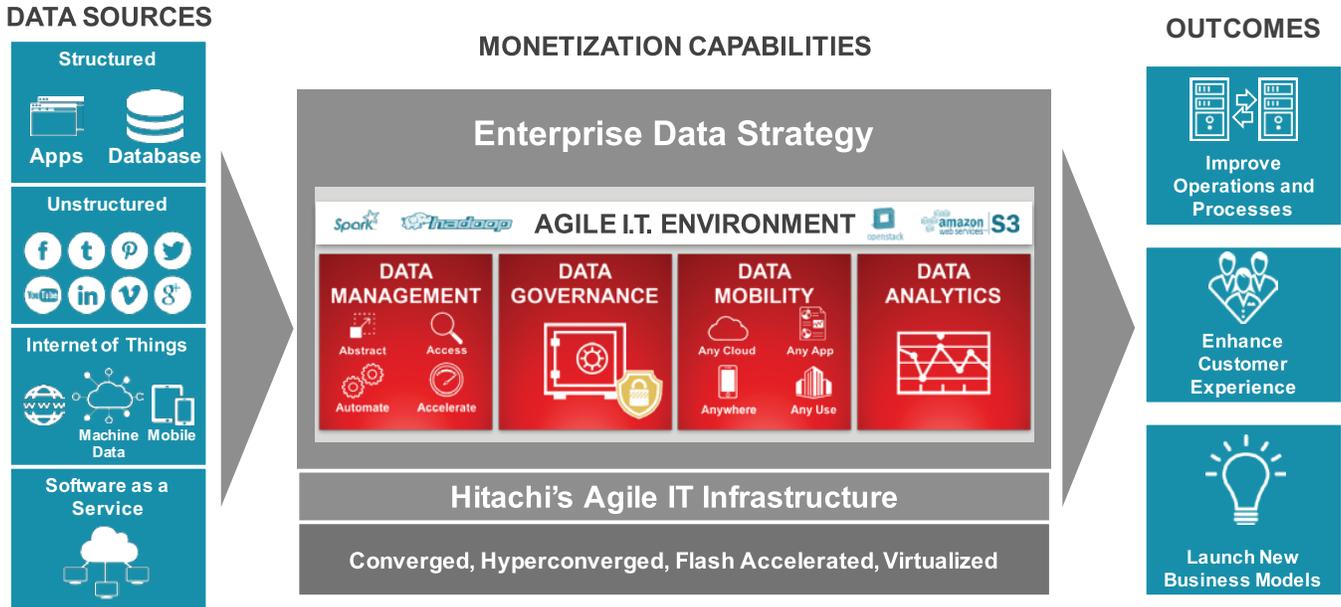
Accomplishing this begins by transforming IT. A transformative organization must:

- Modernize its technology stack to address how data are managed and governed.
- Integrate siloed application platforms to centralize data to address mobility and analytics.
- Deploy automated tools for development and operations.
- Use data analytics for continual improvements, balanced utilization and new opportunities.

Successful digital business transformations are entirely dependent upon taking a strategic approach to your enterprise data. If you are like most companies, you have multiple data silos. Enterprise transformation starts with bringing those disparate data sets into a single data strategy, whether structured, unstructured or machine-generated. At Hitachi Vantara, we offer our customers an integrated and secure way to manage, govern, mobilize, analyze and ultimately turn those data into insights that create new opportunities for industry-specific use cases.

Figure 8 illustrates the data-driven digital transformation model from Hitachi Vantara, depicting the notion that data are the engine behind a transformation, but change quickly. With data continuing to originate from various sources, and presented in evolving types, ensuring the veracity of your data is key to monetizing it, and is the basis of your market leadership and ability to achieve your transformational outcomes.

Figure 8. Data-Driven Digital Transformation From Hitachi Vantara



We are a trusted advisor and guide our clients through the full business-transformation life cycle. A call to us to learn more about each element of our recommended data and analytics strategy could be the difference between success and failure.

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WP-550-E BTD May 2019