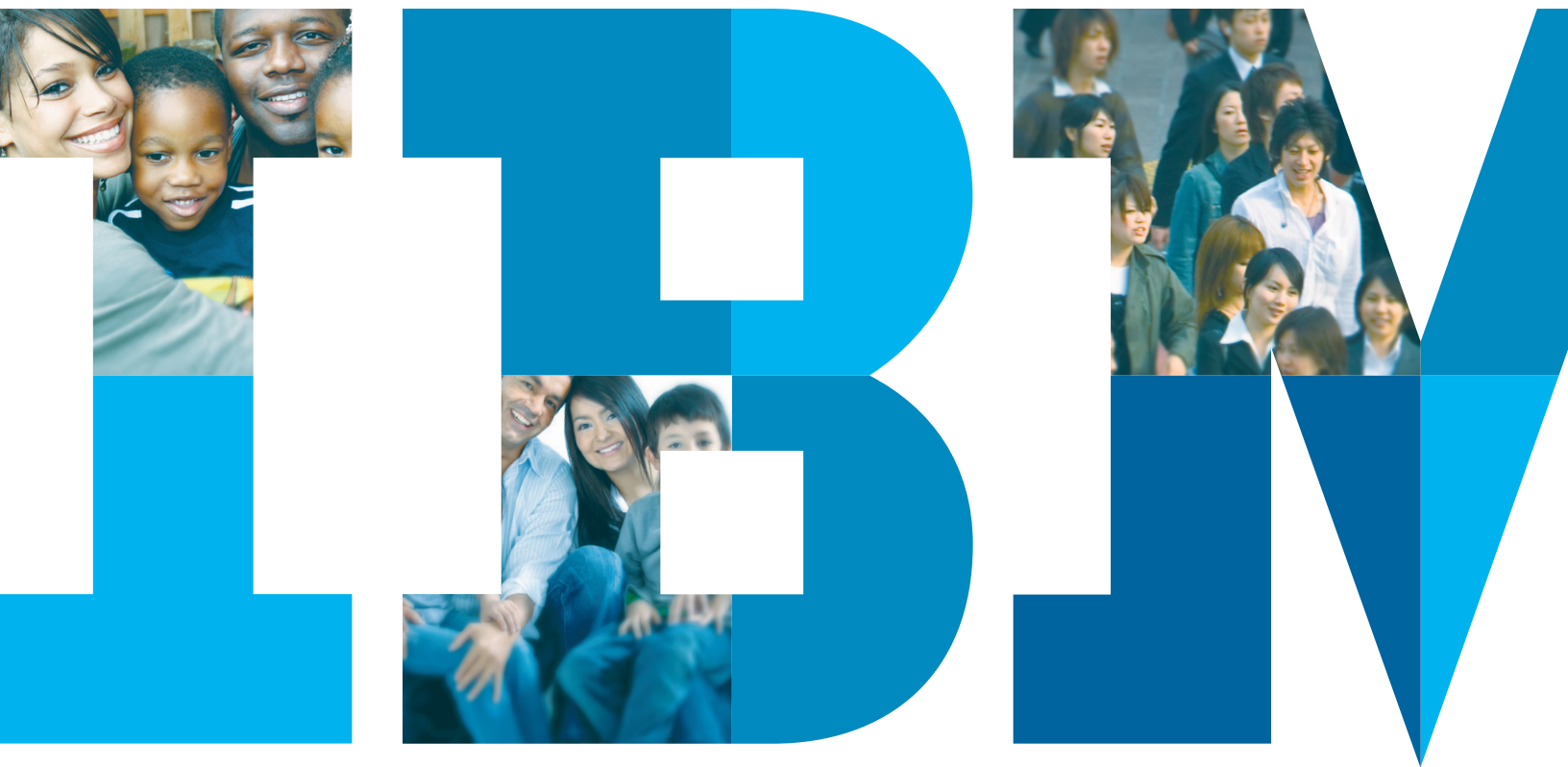


From evidence to insight: Achieving outcomes that matter



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Executive summary

The global healthcare industry is at a pivotal point to transform, reinvent and realign to a more vital and evolving new model. There is broad recognition that cost increases are unsustainable, yet results remain inadequate. Buyers of care, including governments, employers and individual consumers, are demanding better performance in both quality and outcomes. Yet the challenge cannot be met by continuing attempts to extract greater productivity from the industry's existing structure.

Fundamentally, the focus is shifting to create a *system* of healthcare, which requires new funding models, shared risk and greater accountability to the outcomes. The future requires a new definition of value for all stakeholders within the ecosystem, especially patients.¹ It will require new care models that promote coordination and sharing of knowledge among all caregivers to the benefit of the patient. It will require technology and tools to collect and analyze data to support decisions with trusted evidence.

For organizations to adapt, they must have good visibility into their own cost structures and capacities; it requires insight to both financial and clinical risk inherent in their populations, and it will require the ability to measure the impact of their services delivered.

The goal is to achieve better outcomes for our citizens, improved population health for our communities and decreased cost burdens on our societies.

Introduction

Improving health outcomes, controlling costs and reducing disparities across populations have become economic and social imperatives for governments around the world. Countries are faced with difficult choices on budgets and allocations amid the increasing burden of noncommunicable diseases and growing resource constraints. With the objective to create healthier and more prosperous communities, governments and organizations across the globe are looking for new ways to deliver health services and social programs that address the needs of their population and are informed by the unique needs of the individual, including medical, social, economic, environmental and behavioral characteristics. Transformation is being fueled by:

- *The shift toward value.* Escalating costs, critical resource shortages and the explosion in chronic diseases are fueling a fundamental shift from the volume-based, fee-for-service funding model that has dominated the healthcare industry for decades to a more performance-based, outcomes-driven approach.
- *A focus on quality.* There are growing expectations among all stakeholders for better quality and outcomes, while healthcare consumers become more aware and discerning as their access to health information increases. Healthcare organizations must measure quality and make rapid changes to improve it.
- *The availability of technology.* New modalities, diagnostics and innovative medical devices, as well as the use of telemedicine and remote monitoring, are adding to the enablement of the industry in unprecedented ways. Technology provides access to data, to information, to care models and standardization that were never possible before.

To reduce fragmentation and waste and to ultimately transform care delivery requires new systems of clinical care process measurement and analysis, to minimize process steps and simplify care transitions across settings. It also means using innovative technologies and data to personalize treatments and engage citizens in their own health management and disease prevention, while fostering collaboration across sectors that impact the social determinants of health.

Now is the time to embrace and plan for the healthcare industry of the future. It will move beyond the focus of treating acute illness to include more prevention and wellness promotion. Care delivery will be organized around the patient with comprehensive services coordinated across the continuum of care, while consumers have access to relevant information that will empower and engage them as healthcare becomes more personalized. Outcomes, not the volumes of service, will be rewarded. Precious resources will be deployed more efficiently as they are coordinated through connected care teams and social programs that are supported by evidence-based and patient-centric care plans and more standard work processes. Technology will be used to help automate, standardize and promote quality outcomes. IBM is committed to this vision.

To achieve the vision requires new thinking toward common goals: to achieve better outcomes for citizens, improved population health for communities and decreased cost burdens on nations. In order to leverage the opportunity to transform, stakeholders across the ecosystem need to actively focus on:

- Evidence-based and standardized care planning
- Individual engagement and empowerment
- Coordination across boundaries— share care, accountability and risk
- Quality measurement and performance reporting
- Understanding and influencing their populations

With the sheer scale and burden of chronic disease exploding across the globe, the ability to intercede requires a more systemic approach, with the participation across sectors to involve nonhealth resources. The goal is to coordinate and leverage efforts toward achieving the Triple Aim² objectives of improving population health, improving the patient experience in both quality and outcomes and bending the cost curve.

Crossing societal sectors to overcome inefficiencies

Of all the world's industries, healthcare has the greatest opportunity to improve itself. Economists have estimated the amount of waste within the global healthcare industry is roughly equivalent to the combined amount spent each year on healthcare by the United Kingdom, France, Germany, Japan, India and China.³ Those same economists estimate that healthcare's inefficiencies can be reduced by nearly 35 percent. This starts with the coordination of resources to define and eliminate the unnecessary or the redundant and to reduce errors. Yet studies have shown that health outcomes are determined largely by what happens beyond the walls of the hospital or physician's office. It will take a more holistic view to effect better outcomes—to identify the interdependencies within healthcare processes and between surrounding social and environmental support structures. Hastening the need for this approach is the growing complexity in managing patients with multiple chronic conditions and vulnerabilities.

A World Health Organization (WHO) report published in 2010 indicated that in most middle- and high-income countries, noncommunicable diseases (NCDs)—principally cardiovascular diseases, diabetes, cancers and chronic respiratory diseases⁴—were responsible for more deaths than all other causes of death combined.⁵ In the United States, patients with multiple chronic conditions accounted for over 80 percent of Medicare costs.⁶ As populations age, annual NCD deaths continue to rise, with the greatest increase expected to be seen in low- and middle-income regions of the world.⁷ Given the burden of NCDs, the industry can no longer afford to focus on acute care and its traditional delivery and business structures, while chronic care consumes more and more of its resources.

To combat these trends, we foresee greater integration and collaboration among healthcare and social sector stakeholders, both private and public resources, to address the needs of vulnerable populations. It has been estimated, for example, that the healthcare delivery system accounts for less than a quarter of the health status of populations (see Figure 1), and that most of the 20th century's 30-year increase in life expectancy has been attributable to public health interventions in societal sectors other than the healthcare delivery system, such as water, food transportation, workplace safety and smoking reductions.⁸

Determinants of Population Health

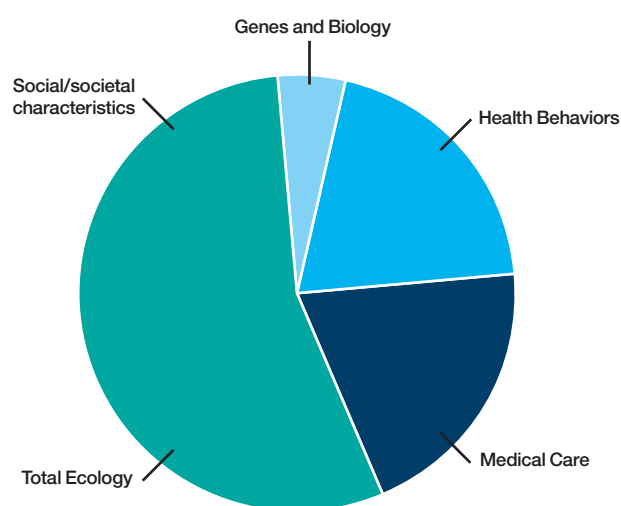


Figure 1: Estimates of how each of the five major determinants of health influence population health⁹

The integration and use of data from multiple industry domains, or “subsystems,” such as education, employment, energy, food and agriculture—and not just the medical care delivery system—are key to making easier healthy choices and obtaining improved clinical and financial outcomes in such a complex and dynamic system. For example, from listing calorie counts on menus and reducing trans fats in foods to promoting exercise breaks within the workplace, these efforts provide influence on the decisions individuals make toward their own health. In addition, within the healthcare delivery system improving efficiencies at the point of care can liberate resources needed for innovation in these other sectors that underpin health and wellness in today's societies.

We see change occurring in reform initiatives and projects around the world, both in developing and established markets. These initiatives are laying the foundation for the emergence of more purposeful and integrated systems, as the following examples illustrate:

In the United Kingdom, the newly created Care Quality Commission (CQC) has implemented a common regulatory framework for providers from all sectors (that is, public, private and third sector) and across healthcare and adult social care services. This framework places the service user or patient at the center of the standards and decision making. The goal is to meet essential standards of quality and safety focused on the outcomes rather than the systems or processes. The aim is to ensure better care is provided by caregivers and supportive resources, whether it's within a hospital, in care facilities, in people's own homes or elsewhere.¹⁰

In Boston, the Prevention and Access to Care and Treatment (PACT) program to support HIV/AIDS patients, based on a model pioneered in rural Haiti, has focused on integrating community health workers into primary care and mental health teams to help participants negotiate complex social issues. They focus on poverty and mental illness, which can affect the patient's health and ability to care for him or herself. The program has helped participants understand their HIV/AIDS, connect with their healthcare providers and prioritize their healthcare needs, reporting significant improvement in enrollees' health, including a 50 percent drop in costly hospitalizations.¹¹

In Mexico, where universal coverage is synonymous with social protection of health, the national health insurance program introduced in 2003, Seguro Popular, provides access to a package of comprehensive health services with financial protection for more than 50 million Mexicans previously excluded. Just one example of success is the Fair Start in Life program, which includes a safe motherhood component that strengthens care networks and provides focus to high-risk pregnancies and improved emergency response, reducing maternal mortality by 32 percent since the program's inception.¹²

In Brazil, the Associação Saúde Criança (ASC) provides additional food, medicine, medical equipment, nutritional and physiological guidance and psychiatric support to families of children being discharged from hospital stays, resulting in a 60 percent reduction in rehospitalization days.¹³

Changing business models

As expectations grow from buyers demanding more value from their healthcare dollars, and as consumer visibility to quality and performance increases, healthcare organizations are being pressured to change. Embracing new models for care and service delivery, and to reinforce movement into new directions, will require tremendous commitment and change in organizational mindsets. Organizations with strong cultures that are value based and committed to engaging their customers as individuals are likely to benefit early from these business model changes.¹⁴

Transformation presents new opportunities for any organization that is ready to define its role in the new ecosystem, whether a pharmaceutical company developing remedies, a provider interacting with patients or a health insurer providing health and wellness programs to members. Organizations that have a clear vision of the services they provide and how they contribute to the wellness, productivity and quality of life of the individuals they serve will have a significant opportunity to improve their relationships with consumers and partners and increase their brand value.

While IBM sees changing models across all segments of the industry, this paper presents an illustrative case from the pharmaceutical industry. Commercial manufacturers are moving “beyond the pill” into value-added services, and they are actively pursuing new roles and relationships with other stakeholders as they test new business models. Their years of therapeutic research offer a base of scientific knowledge to combat chronic disease. For many, they are evaluating their future and whether to remain a traditional product provider or to transform into a new type of solutions provider that shares risk for a population of patients.¹⁵ Some will continue down current paths, producing and selling products to providers to treat specific medical conditions; others may develop care-coordination services that compliment their products or deliver a value-added service focused on product differentiation. Evolving into a new type of solutions provider requires business-model innovation and new relationships with providers and payers, with each strategy demonstrating value within the system.

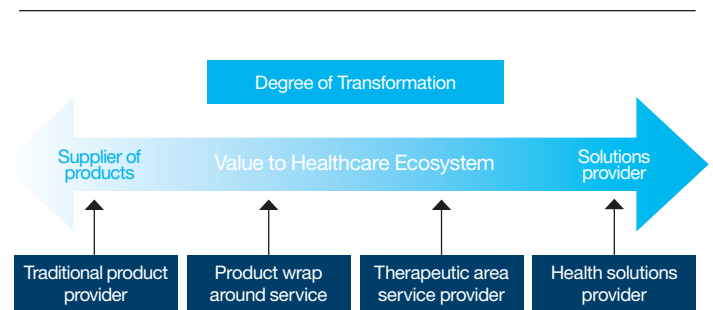


Figure 2: Life Sciences organizations are defining paths forward that are consistent with the role they want to play in the healthcare ecosystem

New collaborative relationships are already forming. Merck & Co., Inc. and Geisinger Health System have recently announced a multiyear collaboration to improve patient adherence to treatment regimes, while helping primary care physicians identify risk factors for certain diseases.¹⁶ Sanofi and the Joslin Diabetes Center are collaborating on the development of new medicines to treat diabetes and related disorders. Their additional research will address the challenges of insulin resistance and personalized medicine, with the goal to improve the lives of people living with diabetes.¹⁷ The goal of these programs is better patient health and lower costs, providing examples for collaboration between multiple entities, systems and resources. As life sciences companies work to define new roles to support their business objectives, similarly, healthcare business leaders will require a better understanding of the complex interactions between multiple stakeholders and participants to create greater synergies and derive better value for their organizations.

Coordinating around the patient to reduce costs

There is substantial evidence that improved care coordination and enhanced access can result in improved health outcomes, patient satisfaction and decreased total costs for a defined population.¹⁸ Where a more coordinated approach of care processes and care teams has been deployed, the benefits can be quite dramatic.

In the US, the Patient Centered Primary Care Collaborative's recently published progress report¹⁹ on patient-centered medical homes (PCMH) presents data that demonstrates better coordination improves health outcomes, enhances the patient and provider experience of care and reduces expensive, unnecessary hospital and emergency department use.

Patient-centered medical homes (PCMH) are a model of primary care centered on strong patient-physician relationships and comprehensive, team-based, coordinated care focused on quality and safety. The PCMH is supported by robust health information technology, such as electronic medical records (EMR); it includes provider payment reform that is focused on patient outcomes and health system efficiencies; and team-based education and training of the health professions workforce.

For example, two of the largest US-based private health insurers have announced plans to adopt the medical home model for their care networks. United HealthCare Services, Inc. estimates that it could save twice as much as the PCMH programs typically cost to implement.²⁰ WellPoint, Inc. projects its investment in medical homes across its network will reduce projected medical costs by up to 20 percent.²¹

At the community level, the Southcentral Foundation, an Alaskan Native-owned healthcare organization, achieved same-day access to care through its medical home initiative, resulting in a 50 percent reduction in emergency department and urgent care visits, while decreasing hospital admissions by 53 percent.²² Community Care of North Carolina, a public-private partnership of community health networks that focuses on population health management in rural settings, has reduced emergency department use, outpatient care and pharmacy costs for an estimated savings of USD382 million in one year.²³

In Canada, a team approach is strengthening primary health resources to address the increasing number of citizens with chronic conditions. With one in three Canadian adults having one or more chronic diseases, cross-discipline teams allow physicians to focus on medical diagnosis and management, while other health professionals (such as nurses, dietitians and social workers) provide other services and work with patients to help them improve their health habits and the management of their health conditions. This new model has resulted in greater primary care coverage, improved health outcomes and reduction in emergency department visits.²⁴

In China, with over 200 million people suffering from hypertension and 90 million diabetics, a key aspect of China's healthcare reform initiatives is an increased emphasis on prevention—adding a prevention mindset to treatment in order to improve therapeutic outcomes and reduce costs. To support its plan, the government is building a strong population management system at the community level, providing substantial investment in primary care professionals through general practice education and training. Results will guide future directions of primary care and general practice for China, strengthening its capacity in public health for the world's largest population and echoing the WHO's policy on enhancing primary care.²⁵

These are but a few examples, yet they point to the value of coordination. However, to achieve scale and to deliver better quality and value, information will need to be used in new ways; it will need to be communicated among all participants; and information barriers will need to be removed to improve care planning and enable more primary and preventive care.

Outcomes that matter

Outcomes that matter are achieved by applying the evidence, resources and process to meet the unique requirements of the individual. To achieve better value, organizations will need to focus on integrating evidence-based insights and automate care management processes to create greater standardization and rapid adoption of best practices. They must also coordinate communications across the episodes of care and the diverse settings of the care continuum to enable real-time coordination and to reduce gaps in care. New systems of clinical care process measurement and analysis will be required to improve the targeting of individuals and their families for support, reduce unnecessary process steps and simplify care transitions across settings. From our work with clients around the world, we see the following strategic activities emerge as key enablers to delivering greater value and achieving better outcomes for all stakeholders:

- Evidence-based and standardized care planning
- Individual engagement and empowerment
- Coordination across boundaries—share care, accountability and risk
- Quality measurement and performance reporting
- Understanding and influencing their populations

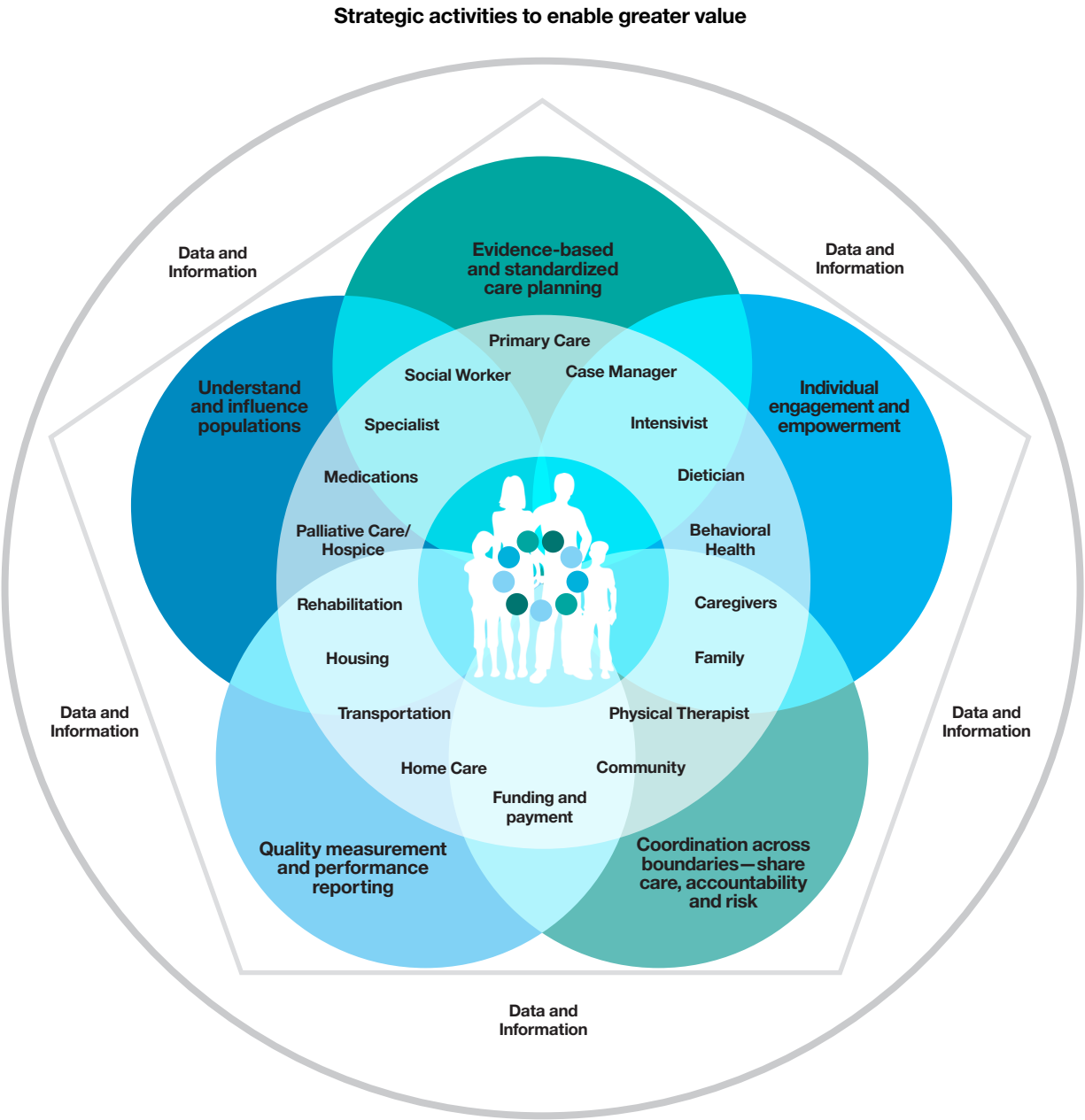


Figure 3: Five strategic activities to enable delivery of greater value and to achieve better outcomes

1. Evidence-based and standardized care planning

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 becomes available through EMRs, the ability to mine the data for evidence presents opportunities never before available to the clinician. For example, studying populations that are very similar to an individual patient provides not only the insight to project outcomes and risks, but also to select interventions that are proven to be most effective for this patient. By automating the care planning process, a balance between standardization and personalization can be achieved, thus aligning resources with population health needs, while enabling individualized care.

2. Individual engagement and empowerment

Engaging individuals to better manage their own health and wellness begins with empowering them with a voice in their care decisions—to personalize treatment decisions, to partner with their providers and to assist them in managing to goals. Access to information enables choice and the opportunity for consumers to understand the trade-offs of their decisions, to encourage actions that support their best health and financial interests and, ultimately, to make healthier choices. Providing care management and supportive programs that make it easier for patients to comply with their medication regimen, being able to remotely monitor therapeutic compliance and improving 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 exploiting telehealth technologies can provide both scale and support to large and distributed or remote populations.

To empower patients is not simply making healthcare more accessible and patient-focused, but it is creating personalization—understanding the critical characteristics that inform a person's choices, actions and response to their own health requirements in order to influence their participation in their own health management. Successfully influencing behavior depends on understanding what motivates people and what resources they will access, then providing them with a set of services that leverages that understanding.

3. Coordination across boundaries — share care, accountability and risk

Coordination requires communications across 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 in an integrated fashion. New funding and payment mechanisms, such as outcomes- 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, outreach service providers, extended care givers, family members and the patient. To coordinate effectively requires placing the patient—not the clinician—at the center of the system, such that activities can take place with a shared goal and accountability for the outcome.

4. Quality measurement and performance reporting

The ability to measure, analyze, compare and disclose performance-based outcomes will become increasingly important as organizations face intense pressure on both quality improvement and payment mechanisms. Consumers, regulators and partners all require greater levels of reporting and access to quality and price information to support the choices they make. Organizational 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, 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, which is used to inform behaviors and actions that can drive change within an organization and across its borders. Ultimately, greater value is derived from the continuous, iterative improvement cycle and transparency in reporting to all stakeholders.

5. Understand and influence populations

As new partnerships and payment arrangements take shape, stakeholders who are accountable for outcomes must first understand the nature of the people they serve. Targeting specific populations for intervention and to identify gaps in care begins with the aggregation of data and its analysis to derive insight and evidence that becomes the basis for evidence-supported practices. Organizations are developing the skills to apply to their growing data stores,

including advanced analytics, regression analysis, data mining and text mining. These tools aid the identification of risk factors from the accumulated data that are predictive of patient outcomes in order to construct risk prediction models and the prediction of overall risk levels—from the broader population of patients down to the level of 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 transformation of payment structures, evidence-based insights into the population health requirements are essential.

It's in the data

To achieve outcomes that matter, organizations need to be making better decisions, decisions that are more evidence-supported, value-driven and directed toward the individual. It requires the ability to gather and use relevant information, not just collect more data. Good decisions require that data be 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 the participants in the process represents a fundamental change in how healthcare is provided.

The challenge facing the healthcare industry is that it has become an intensely complex world, with more difficult decisions and higher expectations. The amount of data available, both structured and unstructured, is voluminous and increasing rapidly. It requires organizations to become exceedingly proficient in information management. How organizations capture, store, use and share information is a critical competency in enabling an organization's strategy. The ability to access the wealth of information across the enterprise is necessary to making better decisions, and is required to correlate cost and quality information and to apply insight back into business processes that can inform action and drive change in behavior. Collaboration among all the participants in the healthcare process is essential to take advantage of the efforts described above. Unless information and care plans are developed, implemented and shared mutually with all the participants, including the patient, the potential for improvement will be limited.

Conclusion

The healthcare industry is under pressure so profound that quantum shifts in the way it is structured and operates will need to occur to reduce the high degree of fragmentation, waste and inefficiency affecting cost and quality performance. It is inevitable that the healthcare industry is headed in a new direction, with increased scrutiny and demand for better value. Any stakeholder organization in the industry must fundamentally shift its way of thinking, as the piece parts that have been the hallmark of its past are being commoditized.

Healthcare organizations will 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 that's occurring to focus on outcomes can be seen as threatening, but it can also be seen as a great opportunity to engage in the whole care system to support the delivery of outcomes that matter. To effect greater health value for the populations they serve, organizations need to determine answers to these questions:

- How will you change the way you deliver value to your patient, consumer and partners?
- How will you operationalize it within your ecosystem and with your stakeholders?
- How well do you understand the financial implications of this new approach?

It comes down to making changes that will ultimately create a true system for healthcare that can bring care and social resources together around patients and families that will have enormous impact on access, quality, equity and cost.

IBM believes in this vision for healthcare—where it will become a true system that is focused on value, coordinated around the patient, and integrated into the world's communities. IBM sees forward-thinking organizations acting now to transform and believes incremental thinking is no longer sufficient. By gaining full advantage from data-driven insights and deep population analysis to enable patient-centered care processes, coordinate care and deliver higher value, the industry can achieve outcomes that matter.

Innovation that matters

Few areas of health and medicine have gone untouched by the technology, research and innovation generated by IBM over the past century. From the first continuous blood separator that led to treatment for leukemia patients, the first heart-lung machine used to keep patients alive during surgery and the excimer laser used in LASIK eye surgery to technologies of the future that will one day allow nanoscale particles to enter the bloodstream and fight drug-resistant infections, IBM touches more points in healthcare than anyone else.

IBM has created technologies and solutions specifically designed to improve the process of care, diagnostics and treatment of disease, and advancing how medical knowledge is shared. This goes far beyond computers. New areas of research, including breakthroughs in gene sequencing and nanotechnology, and even innovations in chip design, are improving healthcare around the world.

Using principles and technologies from computing, physics, materials science and chemistry, IBM Research has a track record of successfully transferring technology to create new solutions for healthcare. The company spends billions each year on research and has large teams of physicians and other clinicians on staff to ensure it is addressing healthcare's most pressing needs. With 12 laboratories on six continents, IBM Research is working on a range of projects, many of which assist healthcare organizations in achieving better outcomes.

When it comes to big data, IBM is uniquely positioned to address this opportunity with the industry's broadest portfolio of capabilities, including software, hardware, services and innovations developed by IBM Research, such as stream computing and the DeepQA project of the IBM® Watson™ system. IBM provides proven software and services that deliver complete, end-to-end integration of big data and advanced analytics to give organizations the information and intelligence they need to transform to achieve outcomes that matter. With proven expertise in handling complex data and information, IBM software supports the integration of structured and unstructured data from many different sources and locations, and provides a robust data model designed especially for the healthcare industry that scales to meet the needs of even the largest organizations.

For more information

IBM can be your partner in your transformation toward achieving outcomes that matter. For more information about IBM solutions for healthcare, visit ibm.com/healthcare



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