# A Framework for Effective Population Health Management

The shift to value-based care is occurring and driving innovation and investment across the healthcare continuum. A suite of complementary population health management solutions and capabilities are required to be successful in a value-based care environment.

TripleTree is a healthcare merchant bank focused on mergers and acquisitions, growth capital, strategic advisory and principal investing services. Since 1997, the firm has advised and invested in some of the most innovative, high-growth businesses in healthcare.

We are continuously engaged with decision makers including best-in-class companies balancing competitive realities with shareholder objectives, global companies seeking growth platforms, and financial sponsors assessing innovative investments and first-mover opportunities.

# CONTENTS

# EXECUTIVE SUMMARY

Value-based care (VBC) is not a new phenomenon, but has been accelerated in recent years by virtue of the Affordable Care Act (ACA) and the Medicare Access and CHIP Reauthorization Act (MACRA), government-led efforts to improve quality and outcomes, and recognition that growth in healthcare costs is unsustainable. Irrespective of efforts to replace the ACA and recent CMS policy changes that make some VBC models voluntary instead of mandatory, we feel strongly that the core elements of VBC, a payment system tied to outcomes and quality of care delivered, are here to stay.

In this *Industry Perspective*, TripleTree identifies a framework for what we view as essential capabilities to effectively execute a Population Health Management (PHM) strategy in the era of VBC. While PHM has turned into something of a catchall across the industry, and will continue to be marketed in various forms, TripleTree believes there are four core functions required for an effective provider PHM strategy (see Figure 1):

- **Data Integration –** the incorporation and classification of clinical, financial, social, and environmental (among other) data to support analyses on patient populations

- **Clinical Analytics –** the capture and use of discrete data to identify treatment interventions, provide decision support, measure clinical effectiveness, and reduce variability in care delivery

- **Care Management –** coordination and management of care by facilitating collaboration of multiple stakeholders across the care continuum

- **Patient Engagement –** engagement of the patient and caregiver/family to take responsibility in the management of their care and deliver interventions designed to increase activation and promote positive patient behavior

**FIGURE 1.**
**CORE FUNCTIONS OF EFFECTIVE PHM STRATEGY**
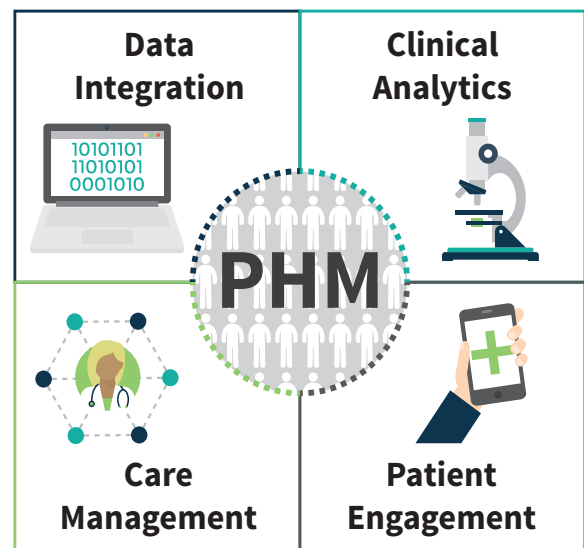


© 2018 TripleTree, LLC. All Rights Reserved.

Consistent with our belief that PHM has an important role to play in the era of VBC, the M&A market for PHM companies is strong and accelerating. Recent transactions indicate three common themes supporting M&A activity:

- Advancing analytics capabilities

- Enhancing an organization's ability to participate in value-based or risk-bearing contracts

- Increasing consumer engagement
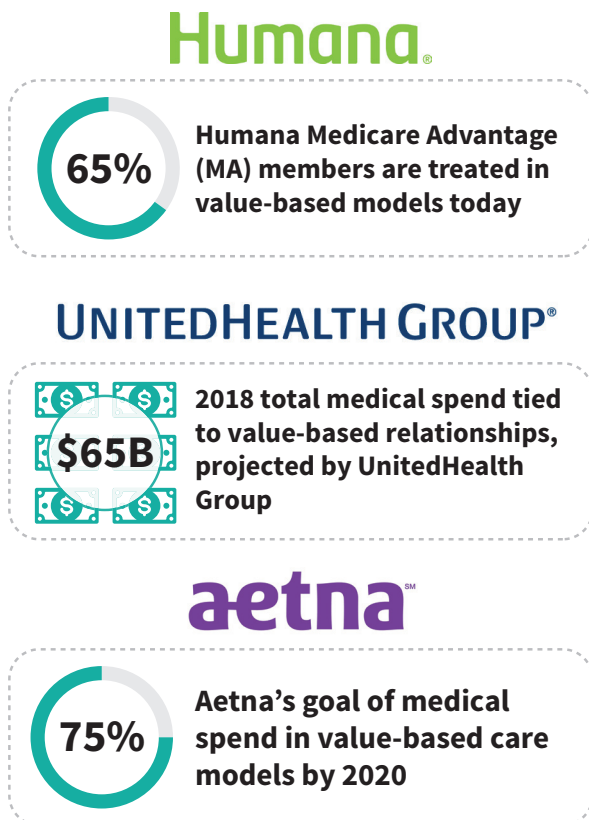
At TripleTree, we are closely tracking the evolution of VBC initiatives and their impact on the healthcare system at large. In this report, we provide a perspective about the importance of an effective PHM strategy, in the era of VBC.

"We feel strongly that the core elements of value-based care, a payment system tied to outcomes and quality of care delivered, are here to stay."

# THE INDUSTRY SHIFT TO VALUE-BASED CARE

At a foundational level, the most integral entity fueling the shift to VBC delivery is the country's largest payer, the Centers for Medicare & Medicaid Services (CMS). In 2015, the Department of Health and Human Services (HHS), the regulatory body that oversees CMS, announced its goal to shift traditional, fee-for-service Medicare payments to alternative payment models (APMs). Specifically, HHS set a target to have 50% of Medicare reimbursement running through APMs by 2018, effectively shifting $130 billion into APMs over a four-year period.[1] Several marquee payers followed suit and set similar goals:

**FIGURE 2.**
**VBC GOALS FOR SELECT HEALTHCARE COMPANIES**

**Humana.**

**65%** — Humana Medicare Advantage (MA) members are treated in value-based models today

**UNITEDHEALTH GROUP®**

**$65B** — 2018 total medical spend tied to value-based relationships, projected by UnitedHealth Group

**aetna**

**75%** — Aetna's goal of medical spend in value-based care models by 2020

In conjunction with these goals, various programs and initiatives aimed at transforming care delivery and reimbursement to value-based models have been established. These programs encompass a variety of economic arrangements: from pay for performance, offering upside potential and no downside risk (payer and provider share savings if treatment costs are lower than benchmark); to full risk (provider keeps savings if costs are below benchmark and is responsible for extra costs if above benchmark); to capitation (provider receives a fixed payment per attributed patient and bears all treatment cost). In 2015, MACRA was introduced as legislation to repeal the sustainable growth rate (a method used to control costs by ensuring the yearly increase in expense per Medicare beneficiary did not exceed the growth in GDP) and encourage participation in value-based initiatives for Medicare patients. MACRA requires providers to participate in one of several new payment models, each with varying degrees of potential reimbursement upside and level of downside risk. Some of the various VBC programs introduced to date include:

- **Merit-Based Incentive Payment System (MIPS) –** Places performance of each clinician on a curve and adjusts Part B payments based on performance relative to peers  (see Figure 3)

- **Medicare Shared Savings Program (MSSP) Track 1 or MIPS ACOs –** A program that rewards Accountable Care Organizations (ACOs) that lower growth in health care costs while

meeting performance standards on quality of care. Providers in Track 1 are not exposed to downside financial risk, but do participate in upside through shared savings
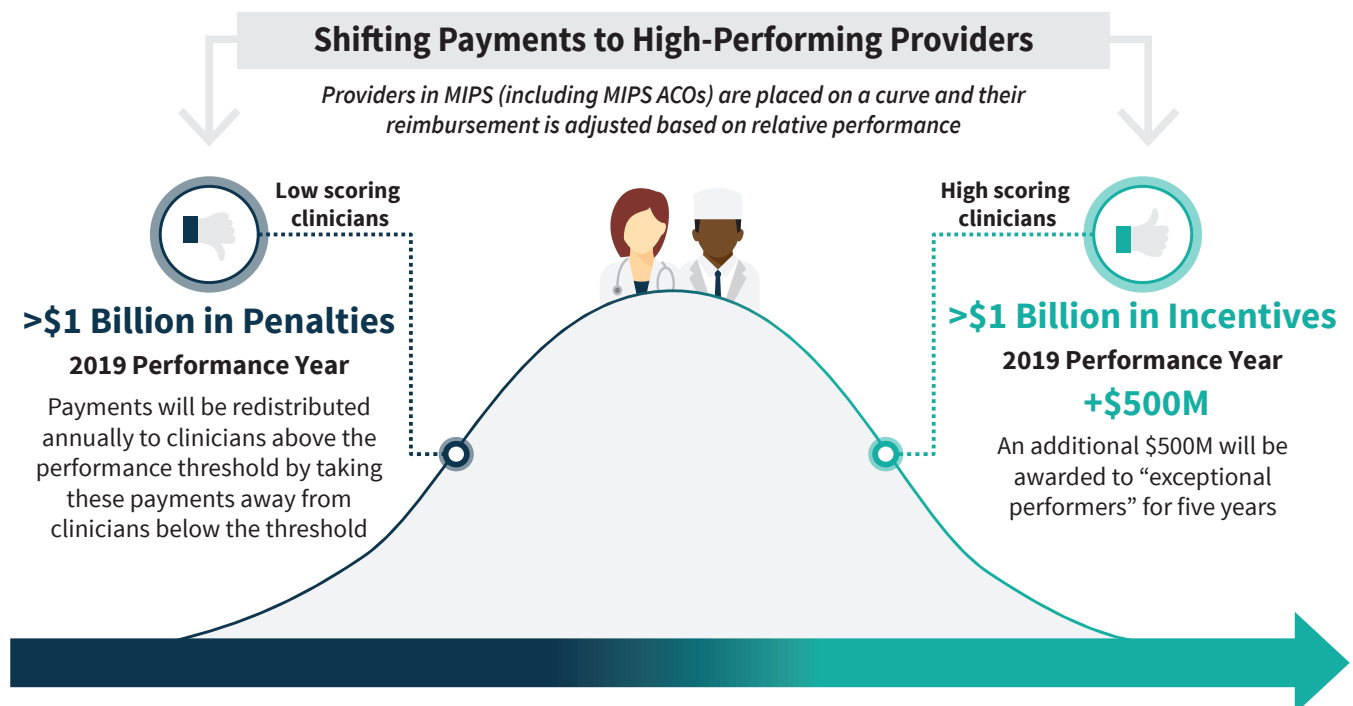
## Other Alternative Payment Models

- **MSSP Track 2 –** Track 2 adds downside risk with additional incentives for participating ACOs

- **MSSP Track 3 –** Track 3 allows even more downside risk and adds even more incentives for participating ACOs

- **Pioneer ACO –** An initiative for coordinated provider groups to move rapidly from a shared savings model to a population-based model separate from MSSP

- **Next Gen ACO –** Initiative for experienced ACOs with more financial risk and reward than is available under the Pioneer program

- **Bundled Payments –** Providers receive a single amount to cover the costs associated with a hip or knee replacement over a 90-day period, holding providers accountable for costs of all care involved in the episode

Inherent in many of these programs is the philosophy of promoting preventive care initiatives to encourage wellness and identify disease progression prior to it becoming an acute event. As part of the ACA, Medicare added coverage for "wellness visits" and eliminated cost sharing for a variety of preventive services. Specific medical

**FIGURE 3.**
**MACRA: LINKING MEDICARE REIMBURSEMENT TO VBC INITIATIVES**



### Shifting Payments to High-Performing Providers

*Providers in MIPS (including MIPS ACOs) are placed on a curve and their reimbursement is adjusted based on relative performance*

**Low scoring clinicians**

**>$1 Billion in Penalties**
**2019 Performance Year**
Payments will be redistributed annually to clinicians above the performance threshold by taking these payments away from clinicians below the threshold

**High scoring clinicians**

**>$1 Billion in Incentives**
**2019 Performance Year**
**+$500M**
An additional $500M will be awarded to "exceptional performers" for five years

© 2018 TripleTree, LLC. All Rights Reserved.

codes have been established to clearly define the fee-for-service reimbursement available for preventive services. Medicare has put a focus on management of chronic patient populations and aligned reimbursement to be commensurate with the treatment of those individuals. In addition, benefits have been extended for behavioral health treatment, promoting the primary care physician's role in diagnosing and treating behavioral conditions. These initiatives permeate through the various VBC programs with the intention of reducing overall healthcare spend and improving outcomes.

Experience with these advanced models is a starting point to inform providers on the relative strength of their systems and where they can most appropriately participate in VBC arrangements. These initiatives have also stimulated the next generation of clinical delivery models.

"HHS set a target to have 50% of Medicare reimbursement running through APMs by 2018, effectively shifting $130 billion into APMs over a four-year period."

# THE ROLE OF POPULATION HEALTH MANAGEMENT IN VALUE-BASED CARE

The VBC programs that providers are evaluating or undertaking are driving the need for PHM strategies. From our perspective, we define PHM as the capabilities, tools, actionable data, and processes that engage individuals in their health with active participation from the broader healthcare system to improve overall health of the population. PHM extends care delivery beyond traditional facilities and encourages coordinated clinical care across the delivery system to engage individuals comprehensively at the right point of intervention.

As a core component of enabling VBC, improving quality and outcomes, and reducing costs, PHM strategies require investments across many complementary solutions and capabilities. While the capabilities of an effective PHM strategy are distinct, the reality is that an integrated PHM solution provides a multitude of benefits (see Figure 4):
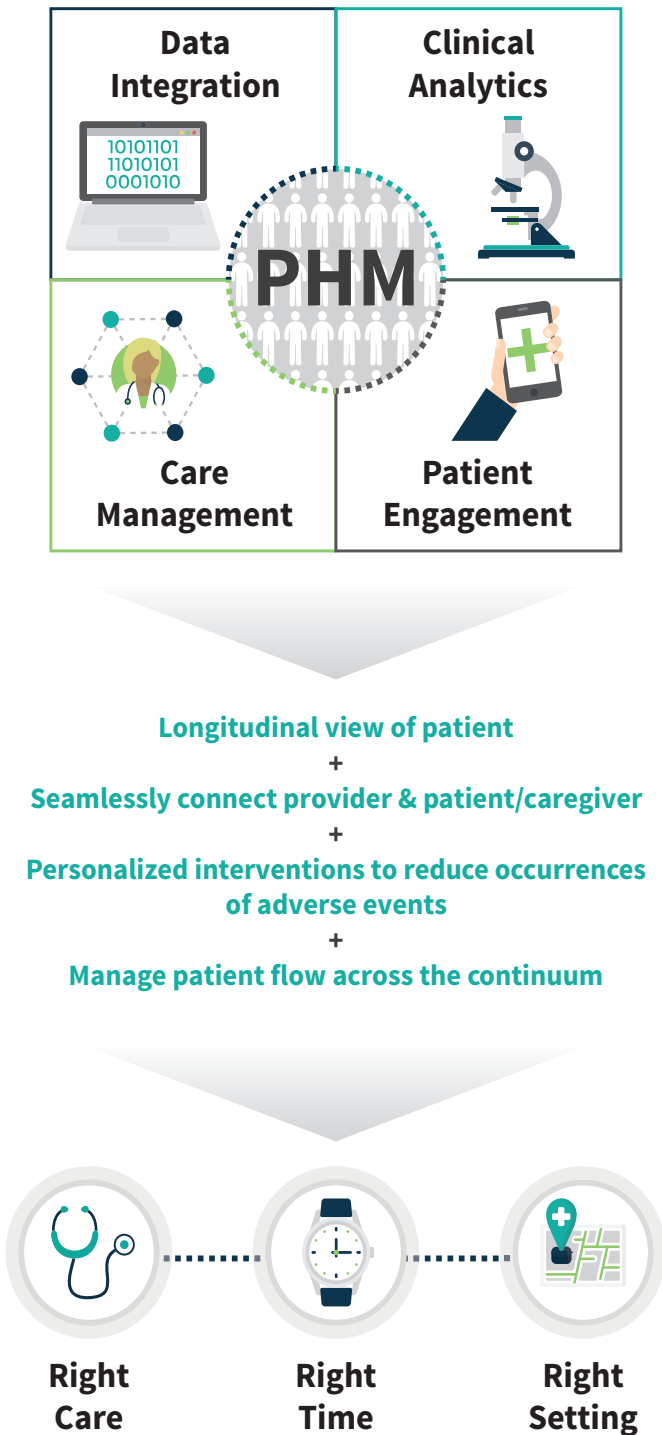
- Creates a longitudinal **view of the patient**

- Seamlessly **connects provider and patient/ caregiver**

- Delivers **personalized interventions** to reduce the occurrence of adverse events

- Manages **patient flow** across the care continuum

- Supports the **delivery of the right care, at the right time, in the right setting** (which often occurs outside of a facility)

Solutions that meet these objectives are most effective in the hands of the primary care provider. Therefore, a key focus of development for many PHM vendors revolves around how they can either integrate with or easily complement the existing workflow of the physician. The value proposition for implementation of any solution needs to be constructed with the physician in mind for it to gain traction within an organization.

## The Role of EHR Vendors

This leads to an important discussion regarding the position of Electronic Health Records (EHRs) as the technology backbone to deliver PHM strategies, given their foundation as the core workflow solution for the vast majority of physicians. The widespread adoption of EHRs has placed EHR vendors (**Epic**, **Cerner**, **Allscripts**, and others) in a unique position to deliver upon the management of populations at scale. Through the data assets inherent in EHRs and their prevalence across the desktops of providers, EHRs are particularly well-situated to deliver several of the core functional areas of a strong PHM solution. However, investment in PHM technology development has not kept up with the needs of the market.[2] That said, some of the large EHR vendors are starting to roll out improved solutions that look to be on more competitive footing with specialty vendors. Most recently, **Cerner** introduced its HealtheIntent PHM solution which, according to **Gartner** surveys, has received strong reception for its data integration and patient-centric architecture.[3]

**FIGURE 4.**
**EFFECTIVE POPULATION HEALTH MANAGEMENT FRAMEWORK**



**Data Integration**

**Clinical Analytics**

**PHM**

**Care Management**

**Patient Engagement**

**Longitudinal view of patient**
+
**Seamlessly connect provider & patient/caregiver**
+
**Personalized interventions to reduce occurrences of adverse events**
+
**Manage patient flow across the continuum**

**Right Care**

**Right Time**

**Right Setting**

Creating a strong platform for data integration could establish a competitive advantage for large EHR vendors when considering the substantial data asset they already possess and the ability to run advanced analytics directly within the workflow. One of the largest challenges for providers today is combining clinical and claims data in a way that creates a comprehensive view of the patient for actionable clinical intelligence. Any solution that can digest, analyze, and interpret this combination of data at scale could make a huge leap ahead in terms of effective PHM.

## The Provider Perspective

On a broader scale, providers are still navigating a complex environment of VBC models and are at various stages of adoption, with many still trying to determine which programs they are best suited to participate in, what additional capabilities are required, and if those capabilities should be insourced or outsourced. We spoke with several health systems to get their views on where they see themselves along the continuum of VBC, where the market is heading in the shift to value, and where they are making investments to be successful in a VBC environment. While each had unique needs as it relates to the implementation of strategies that work best for their organization, several common themes emerged (see Figure 5):

- Regardless of size, many health systems are early in the development of appropriate PHM strategies

- Integrating and aggregating data into a common platform is creating a burden

- Assimilation into the typical clinician workflow is important—either through direct integration or an ability to seamlessly push clinical intelligence into it

- VBC is driving changes in both technology adoption and clinician behavior in order to best deliver care

- Leadership alignment and physician buy-in on goals is critical

- Some provider organizations that have been operating in risk-sharing relationships have highly sophisticated PHM capabilities and cultures

Regardless of the technology strategy employed, it is critical for provider organizations to assess the needed behavioral modifications necessary to effectively participate in VBC. Putting structure around new levels of clinician accountability and performance standards is a critical step to successfully execute on PHM goals. In fact, many of the health systems we spoke with are preparing their organizations from a human capital standpoint to ensure they can get the most out of new technology tools once implemented.

The decision to internally develop capabilities or outsource an organization's needs largely depends on the skill sets of the provider's internal

## *What We Heard From Providers*

**1** PHM strategy implementation is early in development

**2** Integrating and aggregating data is creating a burden

**3** Assimilating/integrating into clinical workflow is important

**4** VBC is driving technology adoption and behavior change

**5** Leadership alignment and physician buy-in on goals is critical

**6** Providers in risk-sharing relationships have sophisticated PHM capabilities and cultures

IT organization. In addition, we found there can be strong preferences that vary by functional area. Overall, the health systems we spoke with are taking a balanced approach with a mix of insourced and outsourced functions—focusing internally on areas where they feel they have an appropriate level of technical depth but outsourcing in areas they know they have a foundational need and have struggled to develop an effective strategy to date.

In the next section, we take a deeper look into the core capabilities needed to develop an effective PHM strategy, focusing on the current state of solution delivery and introducing what we see as the emerging technological developments within each category.

"PHM extends care delivery beyond traditional facilities and encourages coordinated clinical care across the delivery system to engage individuals comprehensively at the right point of intervention."

# DATA INTEGRATION AND MANAGEMENT
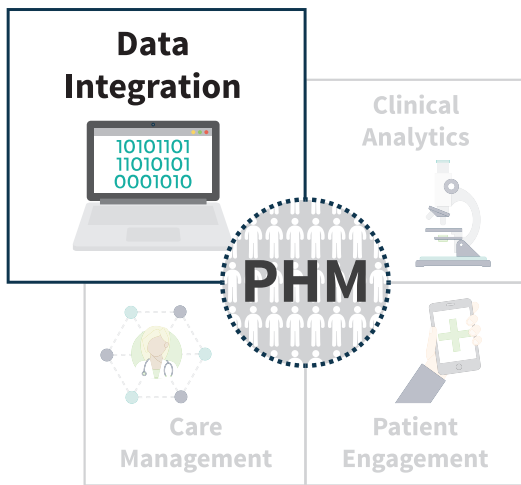


**Data Integration**

Clinical Analytics

**PHM**

Care Management

Patient Engagement

PHM begins with a healthcare organization's ability to aggregate, integrate, and manage data in a way that allows it to analyze and monitor various aspects of a population, coordinate care across the continuum, engage patients and optimize outcomes. The onset of VBC models and the shift in focus around the patient have magnified the need for these foundational capabilities in a PHM strategy, both to manage internal resources to properly execute according to value-based contracts, and increasingly to share data with external parties.

Similar to other industries, roughly 80% of data in healthcare is "unstructured," not stored in a data warehouse, and not able to integrate with other "structured" data.[4] The universe of healthcare data is further complicated by the growing number of data sources and amount of data available – clinical data from an EHR, claims/payer data, pharmacy, lab, financial/revenue cycle, socio-

economic and behavioral, biometric, mobile, social, patient-reported, and more. As new types of data are produced and collected, the demand will continue to increase for technologies that can consume and leverage these disparate data sets.

## Key Components of Today's Data Integration and Management Technologies *(See Figure 6)*

- **Clinical data standardization** is critical to integrating data from disparate sources and creating one consistent, holistic view of the patient. Various taxonomies exist today that map and standardize data such as ICD-10 (standard diagnosis code set), Systematized Nomenclature of Medicine (SNOMED) and Logical Observation Identifiers Names and Codes (LOINC) that are often built into data integration and data warehouse solutions.

- **Financial and administrative data integration** capabilities capture and integrate cost, revenue cycle, contract, and other non-clinical information that is needed to monitor costs alongside outcomes and improve decision making and reporting in a VBC environment. As providers begin to take on risk through shared savings, bundled payments or other alternative payment models, understanding and monitoring costs is a key component of success.

- **Data warehousing** tools aggregate massive volumes of data and provide the foundation that allows healthcare organizations to mine the data to support clinical analytics, statistical analyses, reporting, and other data intensive activities. Today, vendors such as **Health Catalyst**, **IBM Watson Health**, **Orion Health**, **Arcadia Healthcare Solutions**, and **Lightbeam Health Solutions** are evolving their enterprise data warehouse (EDW) solutions to capture information to provide users with the timely, actionable information needed to improve quality and outcomes. Such capabilities allow for real-time alerts, immediate identification of gaps in care, and clinical decision support at the point of care.
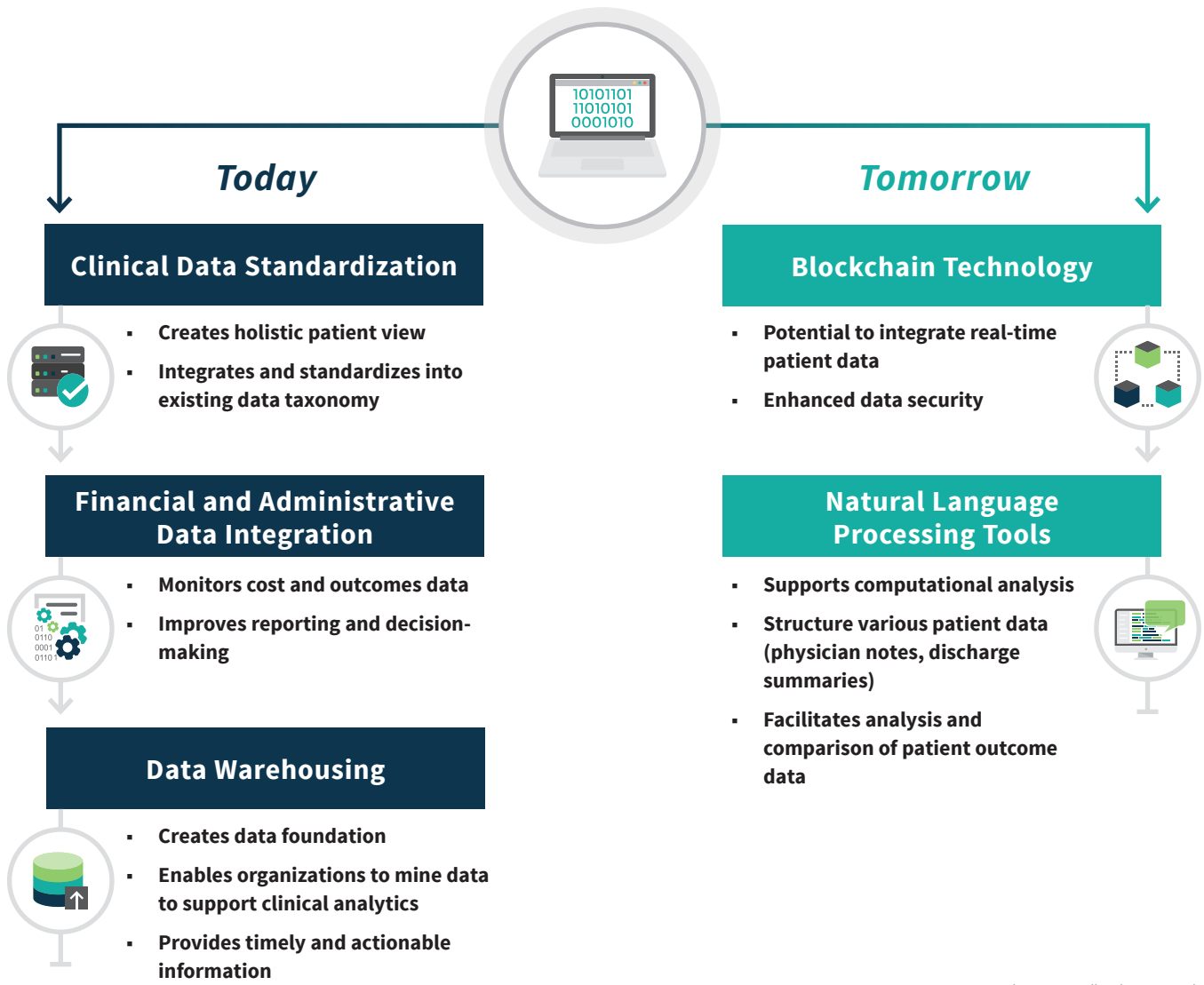
## Next Generation Data Integration and Management Functionality

- **Blockchain technology** is making its way into healthcare and could prove useful in a PHM strategy by addressing some of the industry's interoperability and data security challenges. The technology could be a means of integrating and providing healthcare constituents across the care continuum with access to real-time patient data. **PokitDok** and **Intel** recently announced a partnership to co-develop a blockchain technology called "Dokchain" to provide a solution that increases information security, enhances identity management, speeds claims workflow, and improves pricing transparency.[5]

- **Natural language processing tools** are being utilized to support computational analysis by putting structure around things such as physician notes and patient discharge summaries. IBM Watson Health is combining natural language processing with its machine learning tools to analyze thousands of variables for a patient's condition and medical history, and comparing results to others with similar conditions to review potential outcomes.

Aggregating data from disparate sources and normalizing, cleaning, and integrating that data is not only necessary to support other components of a PHM strategy, but is also essential in securing and maintaining the trust of caregivers and patients who rely on the data. Many system implementations have failed due to lack of adoption by providers who saw inaccurate data about their patients. Because many healthcare constituents rely on timely, accurate, and actionable information, all while the massive universe of data continues to grow, we view these technologies as ones that will continue to be provided by specialized vendors that have expertise in data aggregation, integration and normalization.

**FIGURE 6.**
**KEY COMPONENTS OF DATA INTEGRATION AND MANAGEMENT**

## Today

### Clinical Data Standardization

- Creates holistic patient view
- Integrates and standardizes into existing data taxonomy

### Financial and Administrative Data Integration

- Monitors cost and outcomes data
- Improves reporting and decision-making

### Data Warehousing

- Creates data foundation
- Enables organizations to mine data to support clinical analytics
- Provides timely and actionable information

## Tomorrow

### Blockchain Technology

- Potential to integrate real-time patient data
- Enhanced data security

### Natural Language Processing Tools

- Supports computational analysis
- Structure various patient data (physician notes, discharge summaries)
- Facilitates analysis and comparison of patient outcome data

"PHM begins with a healthcare organization's ability to aggregate, integrate, and manage data in a way that allows them to analyze and monitor various aspects of a population, coordinate care across the continuum, engage patients and optimize outcomes."

# CLINICAL ANALYTICS



Clinical Analytics

Data Integration

PHM

Care Management

Patient Engagement
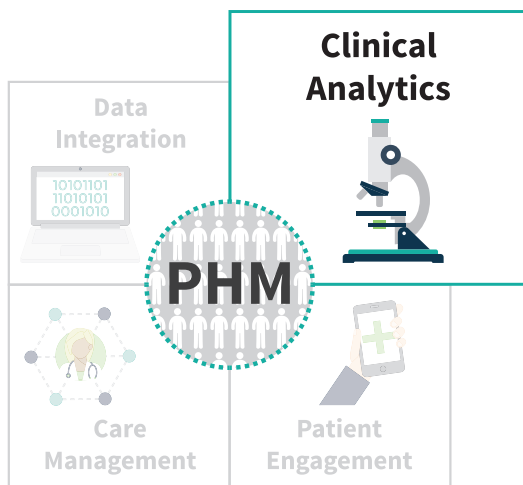
While aggregating, integrating, and managing data is a core component of a PHM strategy, the data is meaningless unless it is used to assess and monitor a population, drive action and accountability, and quantify outcomes. There is an opportunity to use clinical analytical tools and capabilities across the continuum of care in primary and acute settings, with care teams in a post-acute environment, and by executives and administrators of healthcare providers, health plans, accountable care organizations, and more.

Today leading-edge providers are using clinical analytics to optimize treatment plans, identify gaps in care, and measure quality and outcomes. They can also be used across the patient population to identify opportunities to improve care and educate providers on how to improve their practice. Analytics programs are most often being used to identify patient cohorts in need of care management. In addition, provider organizations are using analytics to track and

report on network utilization and identify areas of care delivery variation. Data analytics are also being used to aid physicians in clinical decision-making according to evidence-based guidelines.

## Key Components of Today's Clinical Analytics Technologies *(See Figure 7)*

- **Attribution tools** are relied on to assign patients to a specific provider in order to drive accountability and measure and improve outcomes. A number of attribution methods exist with most determining a score based on how many visits occurred or the amount of charges incurred at each provider. These tools are typically employed to help manage risk-based or value-based contracts. Benefits of a robust attribution engine include greater transparency for (and buy-in from) providers, more granular and accurate reporting, and an ability to leverage best practices for quality improvement initiatives.

- **Registries** are clinical databases that track, report, and evaluate specified outcomes for a population defined by a particular disease, condition, treatment regimen, or set of other variables.

- **Risk stratification** is core to any analytics package and has historically focused on analyzing clinical and/or claims data to identify high-risk members within a population that account for the largest cost, therefore allowing care teams to more effectively prioritize their

efforts. Increasingly these tools are integrating socioeconomic, wellbeing, and behavioral data to further stratify populations and optimize care plans.

- **Clinical decision support** capabilities utilize evidence-based medical guidelines enabling healthcare providers to make informed treatment decisions at the point of care. These tools present the most appropriate content for the given patient at a given point in time.

- Tools that **identify gaps in care** recognize when an appropriate treatment protocol has been missed down to the patient level, to support intervention strategy and development as well as report on trends in the broader patient population.

As risk increasingly shifts to providers and the breadth and complexity of value-based reimbursement models expand, healthcare organizations need to move beyond simply stratifying patient populations into risk pools and develop capabilities that actively monitor patient panels. The goal is to ensure that patients are getting the care and attention they need in the proper care setting, while ensuring the physician knows what is needed at the point of care.

A helpful starting place for many organizations would be to effectively combine clinical (EHR) and claims data to achieve a more holistic view of the patient. Providers are at a disadvantage in this regard as they are multi-payer, and to date,

payers have not made it easy for providers to get the data they need in a structured format to run proper analytics. Providers also do not typically have structured data on all patients seen outside of their health system. **Forward Health Group**, through its PopulationCompass solution, is beginning to help providers take advantage of EHR and claims data to track the cost and quality of care over time in and out of their network. To move clinical analytics from a retrospective view of the patient to a prospective view, providers need the ability to analyze data beyond the clinical encounter from much less structured data sources. Incorporating socio-economic, biometric, mobile, social, and patient-reported data is becoming of increased importance. Understanding a patient's lifestyle is just as important as understanding their clinical chart in driving effective interventions. A number of vendors are developing exciting next generation tools to drive the advancement of clinical analytics.

## Next Generation Clinical Analytics Functionality

- **Artificial Intelligence (A.I.)** tools are utilizing data assets and next generation computational techniques to provide precision interventions. These techniques allow providers to target very specific populations in an iterative manner, and enhance the speed of intervention efficacy measurement. **Lumiata** is using artificial intelligence techniques to determine how various healthcare data sets relate to each other to map out current and future health trajectories of individuals and provide detailed reasons behind every prediction.

- **Behavioral analysis and engagement analytics** identify patient behavioral trends that increase the risk of care plan non-compliance and develop engagement strategies to keep the patient on the right treatment path.

- **Predictive analytics** tools leverage socioeconomic, wellbeing, and behavioral data and are often used alongside risk stratification tools to predict events (e.g., readmissions) and the economic value of early intervention. **VigiLanz** leverages a variety of data sources to support ongoing patient surveillance and predictive modeling to deliver real-time alerts and interventions at the point of care.

The challenge for providers, and ultimately PHM vendors, is to develop scalable solutions that effectively integrate claims data and handle various levels of unstructured data to deliver clinical insights in a timely manner to improve outcomes. The data needed to support analytical engines extend beyond the provider's EHR into unstructured data environments. As a result, clinical analytics is likely to continue to be an area many providers outsource to specialized vendors that have expertise in data integration and advanced computational analysis. We continue to see smaller, nimble vendors make significant technological progress in clinical analytics with many of the EHR vendors slowly building out their technological infrastructure.

"The data is meaningless unless it is used to assess and monitor a population, drive action and accountability, and quantify outcomes."

**FIGURE 7.**
**KEY COMPONENTS OF CLINICAL ANALYTICS**

## Today

### Attribution Tools

- Assigns patient to specific provider
- Drives accountability
- Measures and improves outcomes

### Registries

- Tracks, reports and evaluates specified outcomes for populations

### Risk Stratification

- Analyzes clinical and/or claims data to identify high-risk members
- Enables care teams to effectively prioritize their efforts

### Clinical Decision Support Capabilities

- Enables providers to make informed treatment decisions at point of care
- Utilizes evidence-based medical guidelines

### Gaps in Care

- Recognizes when an appropriate treatment is missed
- Helps structure intervention strategies
- Understands trends in broader patient population

## Tomorrow

### Artificial Intelligence

- Utilizes next generation computational techniques to provide precision interventions
- Targets very specific populations

### Behavioral Analysis and Engagement Analytics

- Identifies patient behavioral trends that increase risk or care plan non-compliance
- Develops engagement strategies to keep patient on right treatment plan

### Predictive Analytics

- Predicts events and the economic value of intervention
- Leverages various data sets (socioeconomic, well being, behavioral) and risk stratification tools

# *THE IMPACT OF ARTIFICIAL INTELLIGENCE*

Through increased computing power and the mass expansion in available data, the nature and applications of A.I. technologies are fundamentally changing. Programmers are now teaching computers to "learn" on their own, rather than simply following a series of instructions that eventually results in an output. Programs are being developed to find patterns and correlations in data that were previously impossible to detect. Much is being discussed surrounding A.I.'s (and its derivatives – machine learning, natural language process, and deep neural networks) ability to significantly advance the healthcare industry's view into disease progression and fundamentally improve the way in which healthcare is delivered today.

One of the more successful and well documented applications of A.I. in healthcare has been in medical imaging. As a specific example, researchers at **Stanford University** targeted skin cancer by creating an algorithm which can identify whether or not a mole is going to lead to skin cancer with 91% of the accuracy of a human dermatologist.[6] The program was trained by using a data set of 130,000 images along with information regarding the progression of cancer for each image. With this data, the program was able to teach itself to look for tiny, seemingly unrelated factors that had a high correlation with cancer development in each image that would be impossible for humans to identify. Now when the program is shown an image, it uses its store of knowledge to make a prediction regarding the prospects of future cancer development. The Stanford team plans to continue training the program to increase its accuracy and to create a mobile

app. This app would allow consumers to use the camera on their smartphone to take a picture of a suspicious mole and discover whether or not it needs further treatment.

Another meaningful application of A.I. within healthcare is in the proliferation of virtual assistants for physicians. A.I.-powered assistants already on the market such as **Apple**'s Siri and **Amazon**'s Alexa are both continuing to grow in their capabilities to handle complex interactions with users. As innovation increases, doctors will soon be able to leverage the knowledge of an A.I. assistant to provide real-time feedback and decision support at the point of care. The assistant will incorporate patients' past medical history, along with other massive quantities of data pertaining to population health and risk factors in order to provide recommendations to the physician as to how best to proceed with treatment.

Lastly, A.I. and machine learning are being used to discover new risk factors in disease progression. Deep learning algorithms can study vast amounts of data surrounding disease progression and understand the previously hidden correlations and risk factors that can predict disease occurrences within a patient population. The software can then apply this information to individual patients and paint a picture of the evolution of health over a patient's lifetime. With this prediction, physicians are empowered to proactively create personalized treatment plans that seek to provide preventive care in an attempt to both improve outcomes and limit the necessity for expensive, acute treatment.

# CARE MANAGEMENT
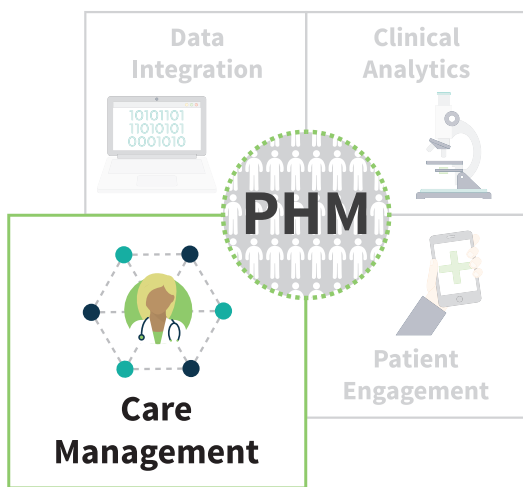


An important function of an effective PHM strategy is the ability to coordinate and manage care delivery by facilitating collaboration of multiple stakeholders across the care continuum. Effective care management requires a combination of data, technology, and clinical staffing to proactively manage at-risk populations and drive interventions when warranted. Several factors, including the advent of VBC reimbursement models, have triggered the need for new care management capabilities that drive workflow, adhere to evidence-based care plans, manage transitions of care and intervene with patients at the appropriate time.

Despite acceleration in market forces driving the need for effective care management, high fragmentation and differing incentives across the continuum of care make it difficult for hospitals and physician practices to be accountable or effective with full episodes of care. Unfortunately, this fragmentation further complicates patient

engagement and introduces additional patient risk, especially when managing transitions of care. Effective care management strategies have the opportunity to align providers in the delivery of team-based care, resulting in improved outcomes, increased patient satisfaction, and reduced overall healthcare costs.

Constituents across the provider continuum, in addition to health plans, are increasingly seeking tools that identify gaps in care, optimize intervention strategies, improve efficiency of care delivery, and help reduce financial penalties for readmissions. This has created a need for effective workflow and care management solutions that enable care managers and other providers to appropriately prioritize clinically or financially at-risk patients for interventions.[7] A large portion of the care coordination and care management functions can occur outside the four walls of an acute setting emphasizing the need for more effective management of patients across the continuum.

## Key Components of Today's Care Management Solutions *(See Figure 8)*

A robust care management infrastructure should support care plan design, taking into account the clinical, social, and behavioral factors of the specific patient, enable interaction and collaboration among all care team members, and quickly prioritize and track at-risk patients. Effective care management will always require a human element to drive adherence and

engagement, and many of the most successful models are those that create a personal relationship between a care management nurse and the patient. However, in order to be efficient and optimized, these personal relationships must be augmented by cloud and mobile technologies to enhance care manager workflow and connect to the patient. Care management capabilities that can be deployed via multiple channels, allow participants to connect in their preferred mode of engagement, promote care team interaction, and engage both patients and family members will achieve the most success. Key components of effective care management include:

- **Care plan design and execution** tools that incorporate patient-specific clinical data, assign care goals and interventions based on evidence-based medical guidelines, and incorporate progress tracking. Innovative solutions allow providers to develop their own care plans while coming pre-loaded with care plans that follow best practices.

- **Event alerts** that send notifications to care team members notifying them of patient admission(s), discharges or transfers, along with any needed follow up. When care is being managed across multiple organizations it becomes increasingly important that providers have tools to ensure the right provider is acting at the right time in a coordinated manner.

- **Dashboards** that incorporate patient clinical data and care delivery metrics to allow organizations to track and identify trends that impact operational efficiency and quality of care delivered. They often incorporate administrative views that summarize patient status, progress, care team efficiency, costs versus benchmarks, and adherence to quality metrics.

- **Referral management** tools that allow care teams to refer to high quality specialists, track those referrals and follow up to ensure care is being well accounted for across multiple care settings. These tools ensure appropriate specialty care is being provided and summary reports are being received and tracked by the referring provider.

- **Care gap intervention** tools that are integrated into the clinical workflow and help physicians and care providers identify and close treatment gaps.

## Developing Components of Next Generation Care Management Solutions

Important capabilities under development within the care management landscape include:

- Solutions that enhance the tracking of the patient across the care continuum

- Solutions that influence transitions of care by taking into account relevant clinical aspects of the patient to steer them to the most appropriate care setting

- Solutions that activate the patient and caregiver to establish a frequent dialogue with care management staff

As we contemplate the future, components of next-generation care management capabilities will need to include:

- **A complete longitudinal care plan** that includes both the patient and caregiver. Adherence to the developed care plan is the responsibility of all involved parties, most importantly the patient. Solutions need to go beyond simply providing access to the care plan for the patient to fully engage. By connecting the patient and caregiver to care teams through its cloud platform, **Wellbe** is generating patient reported data and engaging the patient in compliance with their care plan. **Conversa**, through its mobile Digital Checkup platform, gathers clinical status and biometric data from the patient and seamlessly feeds that data back to physician practices to show how patients are doing and determine which ones need to be contacted or brought in for additional visits.

- **Effective discharge planning** tools are placing patients in the appropriate post-acute setting and avoiding unnecessary high cost default discharges into the highest acuity setting. **Remedy Partners** has created a discharge tool that evaluates the most critical domains impacting post-acute care, providing evidence-based decision support to clinicians and patients on the best alternative for the next site of care.

- **Interactive care plan management** tools create a personalized interactive environment for medication and activity reminders, educational content, and wellness planning. All information is routed to care coordinators to ensure proper management of each patient's health condition. **Wellframe**, through its mobile app, is supporting the individualization and adherence to care plans by developing engagement strategies that leverage consumer technology.

One of the biggest challenges for care management technologies, and generally across population health, is designing technologies that can easily be assimilated into the physician workflow to enhance treatment and ultimately outcomes (see page 24 for additional information). Often, provider organizations participating in VBC arrangements must create new processes and capabilities for effective care management. Advanced workflow designs that engage the physician are critically important for adoption among providers. Physicians are generally accustomed to visit-centric care and shifting to a longitudinal view of the patient relationship will require tools with robust workflow enablement capabilities. There are several leading edge companies working to address these challenges. **Enli**, with its CareManager platform, is integrating disparate data sources with evidence-based guidelines to create a longitudinal view and unified care plan that is embedded within provider workflows.

**Caravan Health** is providing technology and analytics services to provider organizations to enable care management nurses in clinical practice to provide annual wellness visits and care management services to patients, with a focus on the ACO market. **Navvis** works with its provider and health plan clients to develop tailored care plans that can enable either a provider's internal care management operations or Navvis's care management staff working remotely or deployed onsite within the client's clinical setting. **Caresync** and **MD Revolution** offer call center models that leverage proprietary technology integrated with providers' EHRs and contract with physician groups and health systems to manage their patients with chronic conditions.

For most provider organizations that have been focused on fee-for-service payment models, care management capabilities are nascent with a lack of standardization (roles, responsibilities, and protocols). While VBC arrangements support the implementation of technologies and strategies, success will require sizable organization behavioral and operational change. There is also a wide degree of separation in the sophistication of care management strategies across organizations. However, there is widespread agreement that effective care management is critical to successfully delivering healthcare in a value-based environment. Some providers prefer to manage these activities using their own homegrown capabilities while others will partner with vendors

to help accelerate their care management competencies. Given all of the supportive dynamics and financial return characteristics of these activities, care management technologies and outsourced services have the opportunity to be one of the fastest growing areas of PHM.

---

"Effective care management requires a combination of data, technology, and clinical staffing to proactively manage at-risk populations and drive interventions when warranted."

**FIGURE 8 .**
**KEY COMPONENTS OF CARE MANAGEMENT**

## Today

### Care Plan Design and Execution

- Incorporates patient specific clinical data
- Assigns care goals and interventions based on evidence-based guidelines

### Event Alerts

- Sends notifications to care team members
- Alerts care team of follow-ups, patient re-admission(s), or transfers

### Dashboards

- Incorporates patient clinical data to allow organization to track quality data at the patient-level

### Referral Management

- Tracks referrals and follow-ups to ensure care across multiple care settings

### Care Gap Intervention

- Help physicians and care providers identify treatment gaps

## Tomorrow

### A Complete Longitudinal Care Plan

- Connects patient and caregiver to care teams to drive adherence to developed care plan

### Effective Discharge Planning

- Places patients in the appropriate post-acute setting
- Avoids unnecessary high cost default discharges

### Interactive Care Plan

- Creates a personalized interactive environment for medication and activity reminders, educational content, and wellness planning

# PHYSICIAN WORKFLOW INTEGRATION

As EHRs have become the core workflow application for physicians, there is constant debate about how other technology solutions can integrate with EHRs and/or how they can get into this workflow. The ultimate integration argument focuses on the ability for solutions to make use of the trusted relationship between patient and physician, and drive the most important interventions at the point of care. However, full participation in VBC models requires certain critical tasks to reside outside the inpatient and outpatient workflow in the form of well-designed care management practices. The reality is both approaches are required to truly put an effective coordinated care strategy in motion, incorporating a blend of proactive and reactive activities.

Significant advancements have been made in the ability to gather clinical data from the EHR and combine it with other data outside the system of record to support more advanced clinical decision support in the workflow. The introduction of open APIs is accelerating the flow of data allowing for more seamless integration with EHRs, which has supported a robust innovation wave for these tools. These solutions are allowing clinicians to inform decision making in support of more personalized care delivery and manage care delivery according to evidence-based guidelines. The ultimate result is improved diagnostic screening, better management of patients according to VBC contracts, improved prescription recommendations, proper consideration of co-morbidities, and better management of transitions across sites of care; among many other improvements. While these functions are typically done once a patient is already at a site of care, the integrated nature of the solutions are extremely important to properly manage each patient across multiple settings and smoothly manage transitions back into the community.

Additionally, a complete PHM strategy requires a proactive care management function to manage at-risk populations outside a physician setting. These care management functions are often performed by nurses utilizing clinical and other data sets to ensure adherence to care plans and drive interventions when deemed appropriate. This proactive approach should take into account the complete needs of the patient through a coordinated care plan, directing patients to the highest value care settings, reducing self-referrals and activating patients for self-management.

Given technology advancements and providers' requests to their technology vendors for improved interoperability, it will likely become easier for best-of-breed vendors to integrate with EHRs and grab valuable real estate in the core clinical workflow of the physician. The more that can done at the point of care, and the more those activities can be prioritized to accomplish the highest value tasks, the more effective point-of-care interventions will be. Given high costs of care and physician shortages in some areas, we must also make sure the right resources are providing the services they are best suited to provide.

Effective care management can augment the physician with nurses and other clinical and non-clinical resources, freeing up physicians to practice the kind of medicine they prefer. Some components of this coordinated care approach are best served to take place while the patient is in a clinic, while others can be done in the home or via phone.

# PATIENT ENGAGEMENT



**PHM**

Data Integration | Clinical Analytics | Care Management | **Patient Engagement**
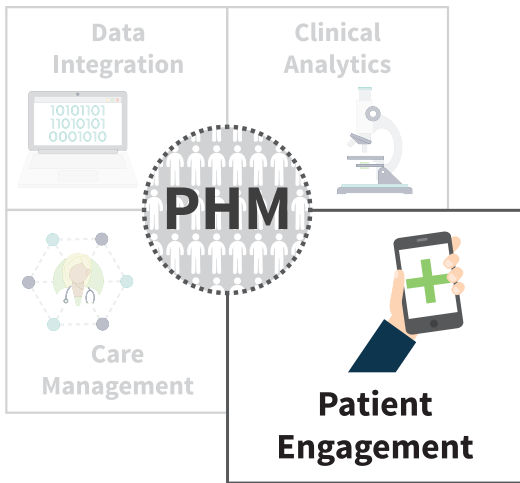
The healthcare industry is quickly realizing that to properly manage cost, quality, and outcomes, we need to find ways to engage patients in the management of their health. Across the industry, it is generally believed that a more engaged patient leads to better individual outcomes, higher patient satisfaction, and realizes healthcare delivery at a much lower cost. Significant time and resources are being dedicated to the development of patient engagement strategies across the provider landscape. Certain regulatory mandates have precipitated resource allocation of effective patient engagement strategies, but further understandings between the patient-provider relationship and the extension of healthcare management beyond the four walls of an acute setting is creating additional focus on patient engagement as a key tenant of an improved healthcare system. Improving the quality of communication between the patient and their clinicians encourages patients to take control of their health. Encouraging patients to understand more about their health and condition(s) positively

influences decision making regarding their health. All of these factors are driving healthcare organizations to seek robust technology tools that most effectively connect with and influence the health management of their managed populations.

Patient engagement strategies incorporate technologies that seek to influence and manage the health and wellness of defined populations as well as drive marketing communications to highly valued populations for that specific provider. Providers are seeking strategies that help them create an interactive relationship with the patient to drive adherence to care plans and more effectively manage at-risk populations.

Similar to the care management landscape, the vendor landscape for patient engagement technologies is filled with vendors specializing in other population health disciplines and incorporating engagement functionality as part of their solution offering. Vendors specializing in patient engagement tend to be earlier stage, but their focus on integration with consumer technologies and enhanced user interfaces is driving growing adoption within the provider community. A number of innovative companies are emerging with a leadership position in the development of next generation technologies for engaging the patient in the management of their health. Below we highlight some of the core and next generation capabilities we are seeing in vendor technologies:

## Key Components of Today's Patient Engagement Technology Solutions
*(See Figure 9)*

- **Patient portals** provide patients online access to clinical information, diagnostic results, financial information, and educational tools. They provide a venue for secure patient-provider interaction. Patient portals were incorporated into Meaningful Use 2 incentives driving widespread adoption within the provider community.

- **Campaign management** tools create customized marketing communications to support individual health maintenance or influence diagnostic or in-person visits. This automated outreach is often initiated with patients identified through a disease registry and includes customized clinical content. More advanced solutions are using consumer retail marketing competencies to create more targeted campaigns. **Revel**, through its Revel Connect patient engagement platform, helps providers and payers create targeted outreach focused on specific conditions with the goal of creating a dialogue that drives patients/members to take action on their healthcare.

- **Patient decision support** capabilities are interactive tools that help patients make more informed decisions regarding treatment, medication, diagnostic, and end-of-life alternatives. These tools have applications that support a patient's decision on timeliness and venue of care to be received as well as incorporating educational content.

- **Health management** tools are interactive tools that support the patient's management of their health condition through interactive features. These tools most often connect patients and family members with nurses or health coaches to support health and wellness through messaging and reminders

## Developing Components of Next Generation Patient Engagement Solutions

Emerging patient engagement solutions are incorporating elements that help to provide an understanding of the behavioral characteristics of a patient, particularly what influences certain habits, what motivates them to specific actions, and what modes of communication are most effective. Next generation solutions are multi-modal, seeking to be delivered through a variety of devices to enable patient engagement at the time and setting of the patient's choosing.

- The growth in **Wearables**, such as **Fitbit** and Apple Watch, are creating enormous biometric data sets and when incorporated with other patient-reported data (such as nutritional tracking), are helping to create a much more holistic picture for a patient's care plan. Most importantly, their incorporation into daily living gets people thinking more and more about their health maintenance. **Remote monitoring** of specific conditions, such as diabetes and

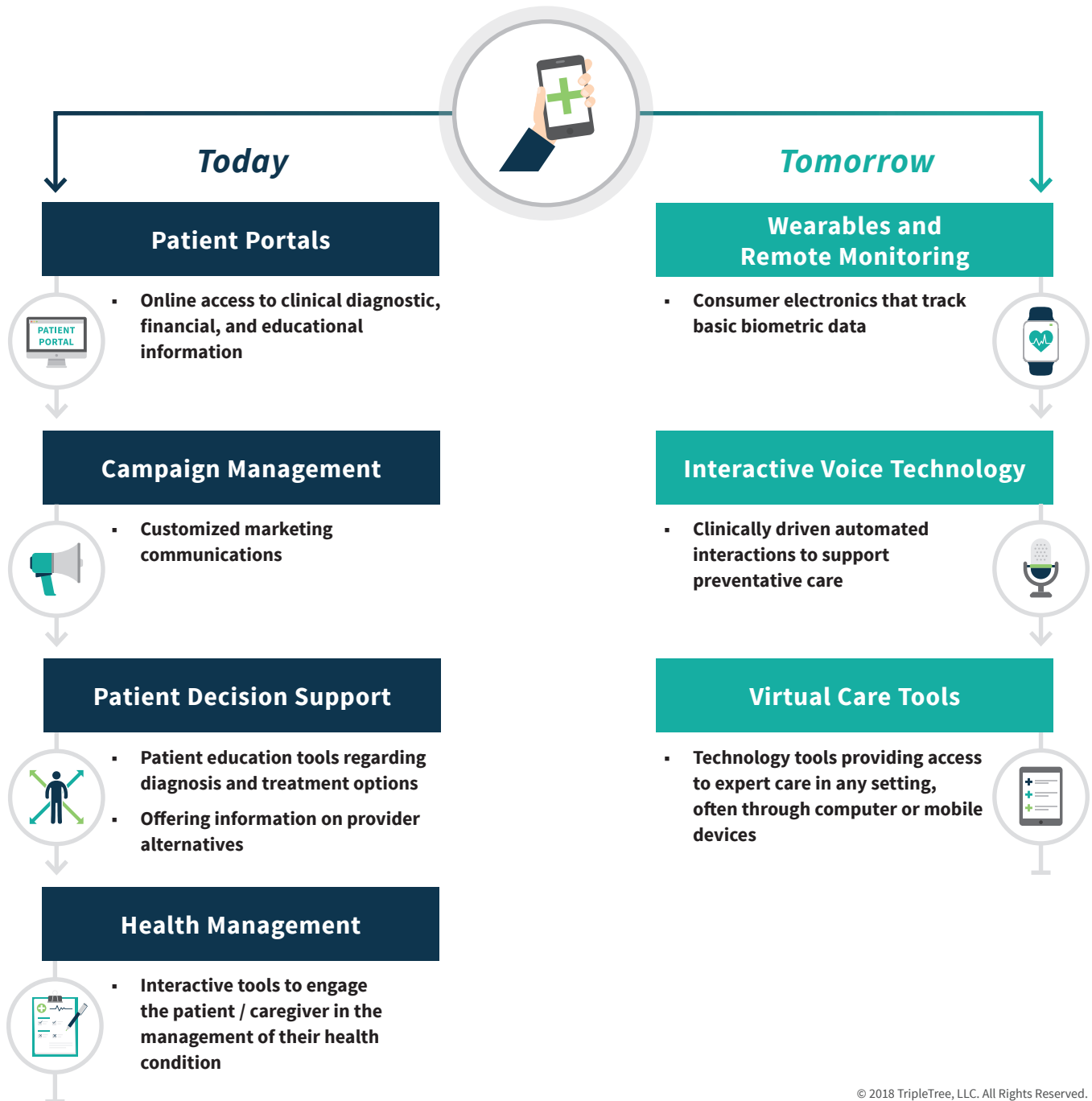heart disease, is becoming an increasingly valuable element of effective care delivery. **VRI** has designed a device-agnostic platform that continuously aggregates, monitors, and analyzes real-time data to manage patients with chronic conditions and engages family members, caregivers, health plans, and providers to improve overall patient care.

- **Interactive voice technology** supports call campaigns aimed at improving preventive care. By creating call campaigns based on clinical data and creating customized messaging based on individual interaction, these tools can influence preventive care and drive care delivery to the most appropriate setting for cost and quality. **Emmi**, through its EmmiPrevent platform, uses their understanding of consumer behavior and interactive voice technology to customize patient engagement efforts to support preventive care while at the same time generating patient reported data to offer providers a more holistic view of a patient's health.

- Provider teams are often incorporating **virtual care tools** as a benefit for their patient populations. Telemedicine options offer around the clock availability for patients and enable providers to direct care to the most appropriate setting based on presenting conditions. These solutions often leverage computer and mobile devices and include functionality for secure communication.

Substantial opportunities exist for technology innovators who are able to activate the patient populations that have traditionally been unengaged to begin using these tools on a regular basis. Consumer technology has advanced to a point where it can be leveraged to educate, diagnose, monitor, and support care plans. As consumers increasingly access healthcare on mobile-enabled devices, advanced user interfaces and interactive capabilities will drive buying decisions. In addition, opportunities exist for innovators to develop clinical applications that reach more patients and collect more substantive data to ultimately improve care. **HealthGrid** has developed a mobile CRM platform that allows providers to efficiently connect directly with patients in real time. Through a robust rules engine, defined by advanced care protocols, HealthGrid automates connections with patients to manage the care process with a platform that supports secure messaging, patient education, medication adherence, preemptive alerts, referral coordination, and assessments and screening.

The combination of consumer technology and clinical data needed to create an effective engagement platform suggests these capabilities are best addressed by the vendor community. As such, patient engagement technology is likely an area where providers will continue to seek best-of-breed partners to enhance communication and management of their populations' health conditions.

**FIGURE 9.**
**KEY COMPONENTS OF PATIENT ENGAGEMENT**



### Today

**Patient Portals**
- Online access to clinical diagnostic, financial, and educational information

**Campaign Management**
- Customized marketing communications

**Patient Decision Support**
- Patient education tools regarding diagnosis and treatment options
- Offering information on provider alternatives

**Health Management**
- Interactive tools to engage the patient / caregiver in the management of their health condition

### Tomorrow

**Wearables and Remote Monitoring**
- Consumer electronics that track basic biometric data

**Interactive Voice Technology**
- Clinically driven automated interactions to support preventative care

**Virtual Care Tools**
- Technology tools providing access to expert care in any setting, often through computer or mobile devices

"It is generally believed that a more engaged patient leads to better individual outcomes, higher patient satisfaction, and realizes healthcare delivery at a much lower cost."

# ACTIVE M&A AND FUNDRAISING ENVIRONMENT

As reimbursement constructs and participation in VBC arrangements continues to expand, the growth profile for emerging companies is accelerating. These factors have created a strong environment for both M&A volume and capital raising (see Figure 10 and 11), with three common market themes underlying many of the transactions:

- **Advancing analytical capabilities.** Ways of applying advanced computational techniques to shape healthcare delivery is informing M&A strategies for several healthcare organizations. These technologies are increasing the efficacy of existing predictive algorithms, and helping drive early intervention and inform care protocols.

- **Enabling participation in value-based and at-risk contracts.** Aligning human capital, data integration, and reporting strategies has become a critical component to participation in value-based contracts. The market for these services is growing rapidly, particularly as providers are seeking to establish their own health plans. **Evolent Health**, a key player in the solution category, made a significant investment in acquiring **Valence Health**. This acquisition expanded their Medicaid offering and created significant opportunities for cross-sales to its existing customer base through

added operational scale and distribution. The most successful platforms operating in this space are delivering both services and technology capabilities to support health systems in aligning and executing on their PHM strategies.

- **Increasing consumer engagement.** Leading engagement companies are influencing the manner in which providers and patients interact to improve health outcomes. Health systems are seeking ways in which to market their value and attract and retain the right patient population, as well as drive preventive care. Increased transparency, simplified access to care, and reduced administrative burden on the patient are all themes being addressed in recent activity. **IBM** acquired **Phytel** to secure an automated patient engagement platform to support its population health efforts within its Watson Health unit. Additionally, **Castlight** acquired **Jiff** to tap into its capabilities around social networking and digital health apps that allows consumers and providers to build personalized and private community care.

**FIGURE 10.**
**SELECT M&A TRANSACTIONS IN PHM (ACQUISITIONS)**

| Date | Acquirer | Target | Description | TEV* |
|---|---|---|---|---|
| Oct-17 | STAYWELL | MedHelp | Provides a suite of health tracking and monitoring solutions focused on diabetes and other chronic conditions | - |
| Jun-17 | TELADOC | Best Doctors | Provides access to medical experts who review current treatment plans and advise the acting physician and patient on how to better tailor that individual's care | 440 |
| Apr-17 | Lumeris | FORECAST HEALTH | Developer of predictive analytics software designed to help health and hospital systems select and manage clinical and financial risk | - |
| Apr-17 | castlight HEALTH | Jiff | Provider of a platform that allows consumers and healthcare professionals to build personalized and private communities of care in a HIPAA-compliant environment | 154 |
| Feb-17 | jvion | Predixion Predict Everything. | Provides machine learning software that analyzes current clinical data to make predictions about patient outcomes | - |
| Nov-16 | evolent HEALTH | Aldera advance with confidence | Provides a web-based benefit administration and claims management platform to health plans and risk-bearing providers that enables clients to optimize performance by improving operational efficiency while reducing costs | - |
| Oct-16 | Wolters Kluwer | emmi Expertly Designed to Drive Results | Provides a multi-modal platform that combines voice, image, text, and interactivity to increase health literacy and encourage patients to actively participate their care program | 170 |
| Jul-16 | PHILIPS | wellcentive | Provider of analytic solutions that transforms and enables preventive care, evidence-based chronic disease management, clinical integration, and participation in performance-based and risk-based reimbursement programs | - |
| Jul-16 | evolent HEALTH | Valence Health | Provides value-based care solutions for hospitals, health systems and physicians to help them achieve clinical and financial rewards for more effectively managing patient populations | 219 |
| Jul-16 | MERCK | STAYWELL | A health engagement company that helps its clients engage and educate people to improve health and business results | - |
| Dec-15 | Welltok | Silverlink | Provides a consumer engagement and communication technology that leverages consumer behavior sciences to drive outcomes and results | - |
| May-15 | Welltok | Predilytics | Provider of machine learning and propriety technologies that more accurately segment patients based on risk, receptivity, and impactabilty to provide more actionable insights to the patient's healthcare team | - |
| Apr-15 | IBM | explorys | Provider of a cloud-based performance management platform that assists providers in identifying patterns in diseases, treatments, and outcomes from their patient data | - |
| Apr-15 | IBM | PHYTEL | Provider of patient engagement and PHM software solutions designed to improve the care coordination efforts between providers across the care continuum | - |

Sources: TripleTree Analysis, S&P Capital IQ, Pitchbook

*Total Enterprise Value (TEV) in $ millions

## FIGURE 11.
## SELECT INVESTMENT ACTIVITY IN PHM (PRIVATE EQUITY INVESTMENTS)

| Date | Investor(s) | Company | Description | Amount |
|------|-------------|---------|-------------|--------|
| Dec-17 | biomatics CAPITAL, MARYLAND VENTURE FUND, venrock, GV, McKesson Ventures, ARCH Venture Partners | Aledade | Provides services to primary care physicians to form and operate accountable care organizations | $28 |
| Nov-17 | TTCP | REVEL | Provides engagement applications that work seamlessly together to create integrated, multichannel programs that empower consumers to take a more active role in improving their health | 17 |
| Oct-17 | HBM Healthcare Investments | BaseHealth Precisely. | Provider of a predictive, evidence-based, and data-driven population health management solutions | 9 |
| Jul-17 | BlueCross BlueShield Venture Partners, PRIMARY VENTURE PARTNERS, ACTIVATE VENTURE PARTNERS | Healthify | Provides community referral and social determinants management software to help health plans, hospitals, and provider networks better manage the health and of their patients | 7 |
| Jul-17 | F-PRIME, DFJ, WATERLINE VENTURES | Wellframe | Provides a platform that improves care management, converts care protocols into mobile checklists, enables patients and providers to stay connected, and gives providers real-time alerts | 15 |
| Apr-17 | 7wire ventures, GENERAL CATALYST, Glikvest, WANXIANG AMERICA HEALTHCARE INVESTMENTS GROUP | OM1 | Provides a platform that collects outcomes data, allowing healthcare providers to leverage the data to meet patient reported and clinical outcomes requirements | 15 |
| Mar-17 | WARBURG PINCUS | Alignment Healthcare | Provides a framework for population health transformation by combing an advanced clinical model, IT and enablement systems, risk experience, and capital | 115 |
| Nov-16 | EXCEL, Mayfield | zipongo | Provides a platform for employers, health plans, and wellness companies to reduce chronic disease and improve the health of their employees and members through personalized dietary recommendations | 18 |
| Oct-16 | Undisclosed | MD REVOLUTION | Combines technology, services, and analytics to produce scalable, high touch care models that enrich the patient-provider experience and reduce the cost of care | 10 |
| Oct-16 | CLAYTON DUBILIER & RICE | agilon health GET BETTER | Develops integrated clinical, administrative, and technology solutions for physicians and health systems to accelerated value-based care strategies | - |
| Aug-16 | Undisclosed | bioIQ Connect Measure Achieve | Provides at-home health testing programs and multi-channel communication tools for engaging and motivating patients | 8 |
| Jun-16 | KPCB KLEINER PERKINS CAUFIELD BYERS, John Doerr | NUNA | Provides software that analyzes insurance claims data and makes predictions regarding patient outcomes | 60 |
| Mar-16 | ALEXANDRIA VENTURE INVESTMENTS, TCP Venture Capital, HUDSON RIVER CAPITAL PARTNERS, MERCK, EXCEL, SAMSUNG, Adage Capital Management, Johnson&Johnson | WellDoc | Provides digital health solutions focused on chronic disease management, supporting and improving the lives of people living with a chronic disease | 30 |
| Feb-16 | LabCorp, Envision HEALTHCARE, ASCENSION Ventures, UPMC | vivify health | Provides a home-based remote monitoring solution that connects healthcare providers with patients in their homes to reduce hospital readmissions | 17 |
| Feb-16 | HEARSTHEALTH ventures | Lightbeam Health Solutions | Provides data management tools and services in including Enterprise Data Warehouse, physician and patient engagement analytics, and care management | - |
| Jan-16 | Roche, STRIPES GROUP, ALLEN & COMPANY, BAILLIE GIFFORD, CASDIN CAPITAL | flatiron | Provides decision support and data intelligence tools for oncology physicians and researchers | 190 |
| Oct-15 | GREYCROFT, TULLIS HEALTH INVESTORS, CLEARWELL GROUP, MERCK, Herbert Management Corporation, CDH Solutions | caresync | Combines technology with 24/7/365 clinical services to facilitate care coordination among patients, families, caregivers, and healthcare providers | 18 |
| Oct-15 | TTCP | NAVVIS | Provides end-to-end PHM solutions to provider organizations and health plans participating in value-based care | - |

Sources: TripleTree Analysis, S&P Capital IQ, Pitchbook

*Investment amount in $ millions

# TRIPLETREE'S PERSPECTIVE

As we look forward, it is clear from our industry interactions and discussions with health systems and leading technology vendors that we are at an inflection point when it comes to the adoption of technology solutions that support an effective provider PHM strategy. TripleTree views the growth of the PHM landscape as being defined by the following themes:

## 1. Forward Looking Providers will Accelerate PHM

The ongoing deployment of MACRA will attract participation from forward looking providers. This will in turn accelerate the demand for technology and services that address the clinical and operational requirements of these value-based contracts.

## 2. Balanced Technology and Human Capital Investments to Ensure Successful VBC Implementation

Many providers are in the early innings of formalizing their PHM technology and services utilization roadmap. Modifications of clinician care protocols and performance assessments need to align with the strategies implemented. Providers that are able to balance investment in workflow integrated technology tools and service-oriented proactive care management strategies will accelerate their ability to execute on VBC.

## 3. Providers will Use Both Internally Developed and Best-of-Breed Solutions

For the near term, provider organizations are likely to utilize a mix of internal capabilities and vendor solutions to meet their PHM needs. Enhancements to interoperability and the capacity to push clinical intelligence into the workflow will likely accelerate a shift to best-of-breed PHM software over the longer term. A key question will be what function provider organizations will own internally and what functions they will outsource.

## 4. We are at a Key Inflection Point for the Rapid Adoption of PHM Technology Tools

The availability and utilization of all forms of data is being leveraged to enhance care delivery at a rapid pace. We are nearing a place where health systems will be aligned on a value-based strategy from a human capital standpoint and will begin expanding technology adoption to accelerate their ability to succeed under value-based models.

## 5. Specialty Vendors Will Find More Competitive Footing

Smaller and nimble specialty vendors have made meaningful strides in technology development relative to the incumbent EHR systems, finding creative ways to access and utilize unstructured data to produce clinical insights. Significant investments in PHM technology tools over the past several years by the large EHR incumbents are just now being introduced; however, it's too early to tell if the solutions are strong enough to create a competitive advantage. Regardless, the lengthy provider sales cycles may be ending as health systems are now at a point to move forward with key technology decisions with all available options on the table. A tremendous market opportunity exists for vendors that are able to demonstrate their value proposition to providers looking to participate in VBC programs. In today's highly fragmented vendor landscape, being able to clearly articulate a value proposition and where they fit into a VBC strategy is critical for vendors to succeed.

"It is clear from our discussions with health systems and leading technology vendors that we are at an important inflection point for rapid adoption of technology solutions as organizations align behind their PHM goals."

# ENDNOTES

1. "2017 Annual Report of the Board of Trustees of the Federal Hospital Insurance and Federal Supplementary Medical Insurance Trust Funds." *CMS*, 13 July, 2017. https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/ReportsTrustFunds/Downloads/TR2017.pdf

2. Moore III, John*.* "Population Health Management — Aligning IT Solutions to Strategy." *Chilmark Research*, 7 Apr. 2015.

3. Craft, Laura. "Cerner's HealtheIntent Begins to Meet HDO's Population Management Needs." *Gartner,* 28 Jun. 2017.

4. Smithwick, John. "Unlocking the Value of Unstructured Patient Data." *Becker's Hospital Review,* Health IT & CIO Review, 25 Aug. 2015, https://www.beckershospitalreview.com/healthcare-information-technology/unlocking-the-value-of-unstructured-patient-data.html

5. "PokitDok Advances Healthcare Smart Contracts With Intel® Blockchain Technology." *Pokitdok*, 10 May 2017, https://blog.pokitdok.com/pokitdok-intel-blockchain-technology/

6. Kubota, Taylor. "Deep Learning Algorithm Does As Well As Dermatologists in Identifying Skin Cancer." *Standford*, News Service, 25 Jan. 2017, https://news.stanford.edu/press-releases/2017/01/25/artificial-inteltify-skin-cancer/

7. Wennberg, David and Scott Kolesar. "Creating Value with Effective Care Management." *Deloitte*.

| HEALTHCARE MERCHANT BANKING | TRIPLE-TREE.COM |