

**SPECIAL REPORT**

**· Revolutionizing Population Health Through  
· Stratified Data, Analytics and Engagement**



**eHEALTH INITIATIVE**  
Real Solutions. Better Health.

**NEXTGEN**  
HEALTHCARE

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## I. INTRODUCTION

The healthcare system in the United States is severely encumbered by fragmented care and unsustainable costs. A challenging national economy, chronic disease, and an aging population combine to place a tremendous strain on the system. As the prevalence of chronic disease rises in conjunction with comorbid conditions such as obesity, new diagnostic and treatment options have been introduced at an accelerated rate.

In response to this convergence of economic stress, chronic disease, comorbidity, an aging population, and medical innovation, the population health management (PHM) model is evolving to effectively manage patients across the continuum of health and care by delivering appropriate intervention according to patient risk and disease severity. PHM has grown in prominence and practice, particularly as recent federal healthcare reform efforts stimulate the public and private sectors to adopt models of reimbursement and care delivery that rely upon PHM to bend down the cost curve and improve care.

Today, the healthcare system is transitioning from an inefficient, volume-based, fee-for-service model to a coordinated, integrated, and value-based paradigm for which PHM is ideally suited. This paper will explore how health information technology (health IT) and data analytics are lynchpins to PHM that can improve the quality, coordination, and efficiency of care while reducing cost and waste at both the individual patient and population levels.

## II. BACKGROUND: A BROKEN HEALTHCARE SYSTEM

### Rising costs

During the past four decades, adjusted health-related expenditures have surged from 7.2% to 17.9% of the national economy, growing faster than the nominal gross domestic product (GDP) by 2.4 percentage points. In 2010 alone, healthcare costs in the United States reached an all-time high; we spent more than \$2.5 trillion on health care. Although this unrelenting rise has slowed in recent years, healthcare costs will continue faster growth than the GDP and become unsustainable enough to cripple the economy.<sup>1</sup> However, unlike economic crises affecting countries around the world, the U.S. is faced with a unique predicament in its healthcare system plagued by high expenditures, and dismal results.

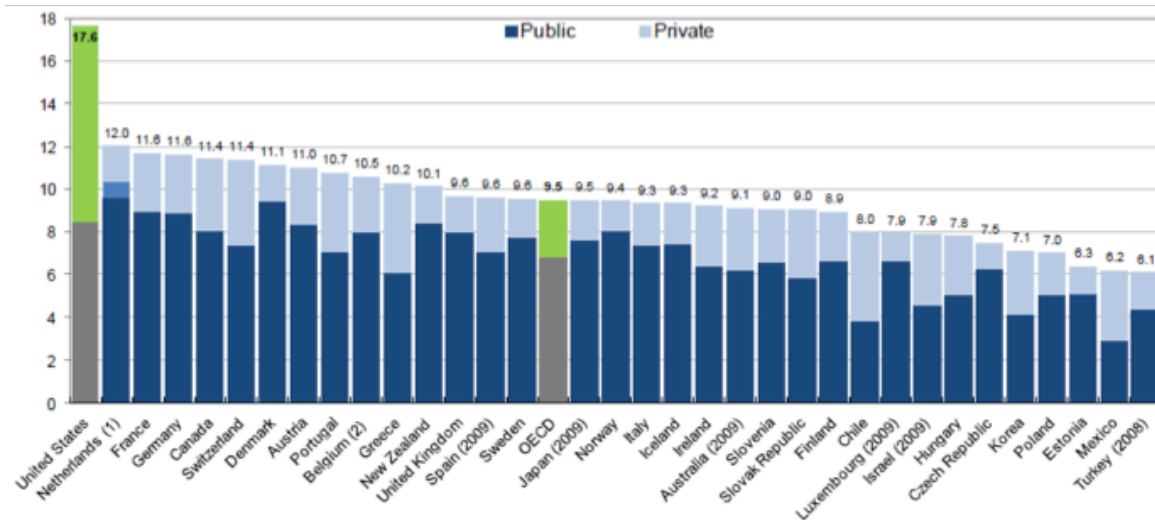


Figure 1: Health expenditure as a % of GDP, OECD countries, 2010

As shown in Figure 1, the U.S. spends significantly more on healthcare, dwarfing the expenditures of France, Germany, and other comparable countries in the Organization for Economic Co-operation and Development (OECD). Despite the vast amount of resources – time, money, people, training, and technology – spent on healthcare in the U.S., expenditures have not contributed to commensurate gains in health status at a population level. Life expectancy has increased over the past several decades in OECD countries; many countries have narrowed the gap and surpassed the United States. In 1960, the U.S. was 1.5 years *above* the OECD average; today it is more than one year below the average of 79.8 years.<sup>2</sup>

Similarly, a 2000 report evaluating health system performance around the world by the World Health Organization (WHO) ranked the United States first in expenditure but 37<sup>th</sup> in performance.<sup>3</sup> In light of rising costs and poor performance of the healthcare system, the Institute of Medicine (IOM) has recently advocated for the American healthcare delivery system to adapt and evolve to the clinical, logistical, psychosocial, and economic challenges of chronic conditions by embracing a data-driven holistic approach to care and population health.<sup>4</sup>

**The Burden of Chronic Disease**

Compounding the overall challenge of rising healthcare costs are the sobering facts of where and how we spend resources to manage health in this country. Chronic diseases have skyrocketed across the country over the past several decades. A corresponding increase in resources has been required to effectively coordinate care, prevention, control, treatment, and management of diseases such as cancer, heart disease, diabetes, and dementia.

Today, the nation’s healthcare expenditures are concentrated primarily among the elderly and individuals with chronic condition(s). These two populations – a significant portion of which are both old and chronically ill – account for approximately 75% of total healthcare costs.<sup>5</sup> Chronic disease is not only the leading cause of death and disability in the U.S. but it is also immensely expensive to treat across the continuum of care given the tendency for many individuals to develop multiple comorbid conditions.

For example, Table 1 lists some of the many preventive care and treatment protocols recommended for a 79 year-old woman with comorbidities common for her age.

**Table 1: Example of preventive care treatment required for a patient with comorbid conditions<sup>i</sup>**

Disease	Preventive Care	Medication with Potential Interactions
Hypertension	Blood pressure measurement	Hydrochlorothiazide, lisinopril
Diabetes	Eye exam, foot exam, HbA1c control, urine protein screening, retinopathy	Glyburide, metformin, aspirin, atorvastatin
Osteoporosis	Counseling regarding Vitamin D and exercise	Calcium, alendronate
COPD	Assessment of oxygen saturation, spirometry evaluation, inhaled bronchodilator therapy	Short-acting β-agonists

Proper management of chronic conditions extends well beyond episodic and infrequent visits to a provider’s office. Patients must become responsible for their day-to-day disease management. Not only are patients frequently required to self-monitor their health indicators, observe symptoms, and note behavior, but they must also adhere to complex medication regimens. It’s critical for providers to devote a portion of their consultations to patient education; inform patients about their conditions and how to prevent, treat, and manage them. As telemedicine becomes more widespread with the rise of internet- and mobile-based platforms of communication and education, patients may have improved access to the information they need. However, many health providers fail to appropriately engage their patients through outreach and reminders to assure that health conditions are being properly self-managed.

<sup>i</sup> © NextGen Healthcare Information Systems

### Wasteful and Inefficient Care

There is also overwhelming evidence that a substantial portion of healthcare spending is wasted. The IOM estimates massive waste – more than \$750 billion annually – to fraud, unnecessary services, inefficient care, and failures to prevent disease while growing the coordinated care movement. The IOM estimate of waste is about 30% of total healthcare spending in the nation! And these flaws have led to more than 75,000 unnecessary deaths.<sup>6</sup> While the U.S. has lagged in the adoption and overhaul of implementing information and communications technology nationwide, health IT holds tremendous promise to reduce administrative costs and the misuse, underuse, and overuse of care.

However, given the clinical complexities, costs, and logistics associated with chronic care, many patients cannot afford or cannot access preventive care. Instead, Americans often seek care in the emergency room for treatment that could be managed more cost-effectively in an outpatient setting. Poor access to care has led to only 42% of Americans receiving acute care from their primary physicians, while approximately 28% seek such care in the emergency department.<sup>7</sup> As a result, many patients don't receive the continuity of care, attention, and education normally available from their personal physician – not to mention be attended by a provider familiar with their medical history.

Today, the United States has a higher rate of hospital admissions for chronic conditions such as asthma than other developed countries.<sup>8</sup> Although health providers can effectively diagnose, control, and manage chronic conditions when patients present themselves for a consultation, many chronically ill individuals do not seek care until their conditions have progressed into higher stages of risk or severity. Moreover, due to the complex nature of chronic diseases, these patients are more likely to see multiple providers across disparate settings of care to manage their conditions over time.

Health IT can enhance the coordination of care, reduce the burden and risk of costly and preventable chronic conditions, and enable best practice health management of patient populations and communities.

## **III. HEALTHCARE REFORM**

### Breaking Digital Ground

In response to the groundswell to contain healthcare costs and repair the U.S. healthcare system, two recent federal initiatives were critical first steps to refocus care delivery on population health, wellness, and prevention. Enactment of the Health Information Technology for Economic and Clinical Health (HITECH) Act in 2009, as part of the American Reinvestment and Recovery Act (ARRA), was a watershed event that lay the foundation to digitize the nation's healthcare industry. By encouraging the adoption and use of electronic health records (EHRs) in health care practices and hospitals across the country the HITECH Act has been a catalyst to improve outcomes through the timely and secure electronic use, exchange, and reporting of health information.<sup>9</sup>

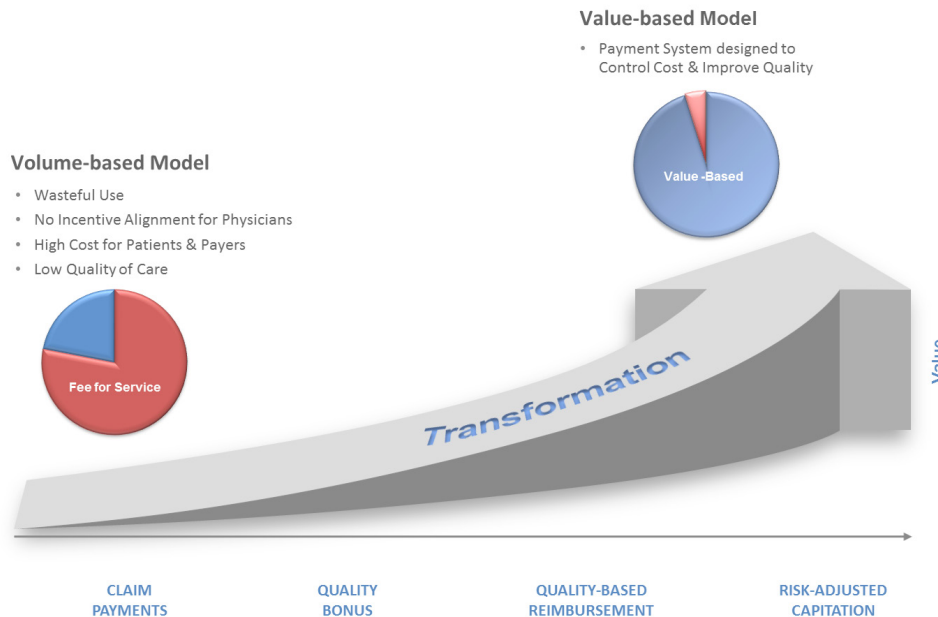
In the aftermath of the HITECH Act, a vibrant ecosystem of diverse but disconnected EHR solutions has emerged to harness digital clinical, administrative, and claims-based data. By accessing, collecting, monitoring, and analyzing real-time data, EHRs can effectively provide a complete medical history that tracks a patient as he/she moves across the continuum of care (e.g. pathology, labs, radiology, and ambulatory care). Furthermore, EHRs can not only deliver clinical decision support at the point of care according to evidence-based protocols, but they can also aggregate patient data to facilitate PHM at a community or regional level.

### Laying the Foundation for Population Health Management

PHM is the backbone to realizing three aims: improved experience of care; improved health of populations; reduced per capita costs of health care. Developed originally by the Institute of Healthcare Improvement as an approach to optimize health system performance, the “Triple Aim” framework was a cornerstone

of the provisions established in 2010 by the Patient Protection and Accountable Care Act (ACA). These ACA reforms have led to a variety of strategies and solutions to foster patient-centric, quality care at lower costs.<sup>10</sup>

These integrated components seek to redesign the nation’s healthcare system to improve the overall value of care, a process illustrated in Figure 2.



**Figure 2: Transformation from volume- to value-based reimbursement model**<sup>1</sup>

A hallmark component of ACA is the creation of accountable care organizations (ACOs) through the Centers for Medicare and Medicaid Services (CMS). Instead of fee-for-service reimbursement, ACO models compensate an integrated network of providers, specialists, and caregivers responsible for a patient’s overall care across the continuum. The primary goal of ACOs is to achieve high quality and efficient care at lower costs. The strategy is to deliver care through a team-based, systems approach of care coordination and shared responsibility from which payment is calibrated and savings result.

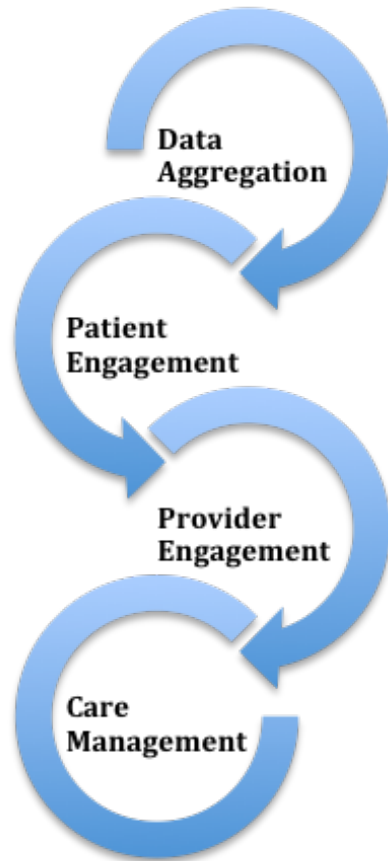
At the heart of ACOs is a structured approach towards facilitating communication, management, and organization with a robust data and analytics infrastructure that can continuously monitor, collect, assess, and produce actionable patient information. Given their data-dependent nature, ACOs rely on health IT to perform critical PHM tasks: Identify at-risk populations; analyze and recommend appropriate intervention; drive quality improvements for costly diseases; and monitor results over time to help ensure health and wellness improves.

Over the past two years alone, payers and providers have partnered together to form hundreds of ACOs of various shapes and sizes across the country. But the shift towards value-driven care is not unique to accountable care; the field of healthcare at large is being disrupted as hospitals, health networks, physician groups, payers, specialists, pharmacists, and other stakeholders coalesce around the core principles of population health management.

#### IV. KEY COMPONENTS OF HOLISTIC POPULATION HEALTH MANAGEMENT

Population health management relies heavily on analytics and data management to improve the ongoing health and wellness of specific patient populations. To support these efforts, a holistic PHM approach requires tight integration of patient outreach, care coordination, and workflow management across the continuum of care. As patients move throughout a series of healthcare settings the volume, availability requirements, breadth, and complexity of data demands a robust health IT infrastructure to collect, process, and share information across the continuum of care. PHM goes beyond the capture of data through EHRs to drive meaningful and actionable value out of overall health information. Access to and exchange of real-time patient data allows provider teams to make more informed decisions, provide safer care, avoid redundancies, and reduce inefficiencies. Moreover, a complete and accurate medical history is critical for chronically ill patients who've consulted with multiple and disparate providers and/or have undergone a variety of treatments over the years.

However, many EHRs used today were not designed to be interoperable with other systems much less support PHM with enhanced capabilities such as disease registries, patient identification, locator services, or predictive modeling. An integrated approach to PHM is fundamental to unlocking the potential of health IT. To illustrate these concepts, we will explore how NextGen Healthcare's practice management, EHR systems, patient outreach, and health information exchange (HIE) capabilities are designed to provide key components that support and improve PHM.



##### Data Aggregation

Patients today often visit multiple physicians, specialists, and providers especially when seeking advice and treatment for chronic conditions. In order to integrate, document, and share clinical data from disparate sources, patient data needs to be accessed and aggregated across the continuum and community from clinical, claims-based, administrative, and other sources available through health information exchanges (HIEs). Health information can subsequently be used to build patient and disease registries within a community or network. Seamless data exchange can be facilitated by health information systems that are flexible enough to share and store diverse file formats and standards from stakeholders and sources such as providers, payers, pharmacies, home care, labs, and imaging.

In response to the roadmap stipulated by the Medicare and Medicaid EHR Incentive Programs for the meaningful use of certified EHR technology, Continuity of Care Documents (CCDs) are widely utilized today to exchange clinical summaries in a common format with mandated vocabularies such as Logical Observation Identifiers Names and Codes® (LOINC®), Systematized Nomenclature of Medicine Clinical Terms (SNOMED CT), and the Unified Medical Language System® (UMLS®) which includes RxNorm.

The stratification of subpopulations according to their risk and/or severity of illness enable providers to target disease prevention, education, care, and management efforts more effectively to those who need it most. Because risk stratification is implicitly dependent on the up-to-date condition of patients, patient monitoring must be ongoing to track changes in health status.



### Patient and Provider Engagement

A holistic approach to PHM maintains an intrinsic focus on an interactive patient-provider relationship. Providers must not only deliver evidence-based medicine and quality care to patients, but also prepare patients to manage their condition independently between clinical and/or treatment encounters. Conversations and visits must focus not only on patient education about the disease, risk factors, treatment, and corresponding care plans but also motivational coaching to encourage adherence – and real time adjustments when required – to the care plan. Upon identifying at-risk patient populations, providers may conduct outreach and remote monitoring by communicating via telephone, email, patient portal, text message, or other mobile devices and applications.

Following discharge or commencement of a care plan, health data can be made actionable to identify gaps in care and generate reminders for patients that are due for an appointment, screening, or prescription refill. Similarly, remote monitoring can allow providers to track a patient's condition over time, be prompted when a patient's record is opened, or receive emergency alerts when a patient develops a critical condition requiring urgent care. With real time informational prompts, patients and providers are empowered to make accurate decisions and take action with appropriate next steps of disease management or intervention. Finally, these alerts, reminders, and prompts can be automated to allow providers to manage patient populations effectively within the course of their daily clinical workflows. Providers can be further engaged in care delivery by regularly monitoring and comparing their performance with local and national benchmarks across health outcomes and patient satisfaction.

### Care Management

As patient and disease registries are populated with data, predictive modeling algorithms and analytics tools can refine risk stratification of patient populations. This approach allows providers to forecast patients with specific characteristics, behaviors, or health statuses that may warrant early intervention to prevent a worsening condition or a developing complication. Data analytics can be used for clinical decision support to determine what evidence-based guideline(s) of care may be most effective for a patient based on subpopulation characteristics. Due to the complex nature of chronic disease care, a care team is often employed to manage long-term patients and address their ongoing needs with the help of nurses, care managers, physical therapists, health coaches, and others.

As the primary care professional shortage grows over the next decade, it is expected that care *teams* will grow in importance and practice across the country – via telemedicine, Internet consultations, and other collaboration technologies – to help manage the shortage and reallocate resources across an organization. Health IT thus becomes critical to reducing fragmentation and seamlessly coordinating a patient's transition of care to ensure maximum value, quality, and efficiency.

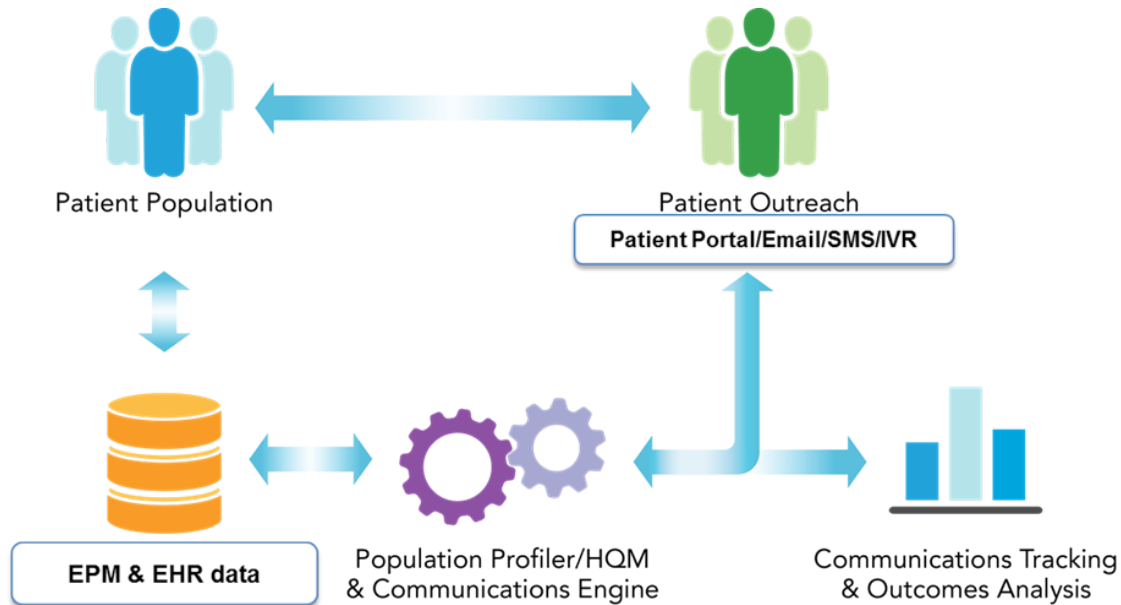
A holistic solution to PHM combines automated and interactive tools for providers to use as they monitor and manage the care and health of patient populations. After conducting initial health risk assessments of patients, patients can be stratified into different categories of risk and need. This helps organizations allocate and use their resources effectively while reducing redundancies and reducing overall waste. For example, patients could be stratified into three general groups: low-risk patients who need little oversight or follow-up; medium-risk patients with chronic conditions in need of care management; and high-risk patients in significant need of care coordination to prevent costly events, including unnecessary hospital readmissions.

Once risk scores are established, a hospital or physician group can create a patient registry to enroll and track patient outcomes over time. Automated health management tools can be leveraged to identify low-risk patients in need of preventive care and send follow-up reminders to foster compliance to care plans. By storing and sharing patient information on an EHR linked to a robust health IT infrastructure, an integrated practice management approach allows for data to be rapidly accessed without disrupting the



workflow. As care is coordinated and interventions are delivered, evidence-based clinical decision support and guidelines can not only inform the decision-making process but also provide tailored, personalized interventions. Face-to-face visits between patient and provider can be supplemented with telemedicine as patients become engaged to self-manage their own conditions.

Figure 3 displays a diagram of some of these processes:



**Figure 3: Population Health Management Workflow**

During these steps across the continuum of care, a holistic PHM solution continuously monitors a patient from prevention to wellness, measuring and analyzing outcomes such as physician performance or patient health to provide feedback loops on the quality, cost, and efficiency of care delivered at both an individual and population level.

## V. HOW INNOVATIVE HEALTHCARE ORGANIZATIONS MANAGE POPULATION HEALTH

Presented below are two case studies of healthcare organizations that use NextGen Healthcare solutions to manage population health. These case studies provide real world examples of processes described in this white paper.

### Reid Hospital & Health Care Services

Based in Richmond, Indiana, Reid Hospital & Health Care Services (RHHCS) serves approximately 280,000 people across seven counties in Indiana and Ohio. With 207 beds and 100 outpatient providers in more than 35 locations, RHHCS provides a variety of medical services including primary care, internal medicine, rehabilitation, hospice, oncology, cardiology, and pediatrics. RHHCS continued their transition towards PHM status in 2009 when they adopted the NextGen® Ambulatory EHR solution for outpatient care in an effort to seamlessly integrate with their Siemens inpatient EHR system.

Following this initial rollout, RHHCS implemented a patient web portal in 2012 and began work to exchange data with the local health information exchange in addition to implementing the NextGen® Population Health (NextGen® PH) solution to improve patient outreach and communication. Since 2010, RHHCS has maintained their focus on wellness and greater continuum of care by improving patient quality of life through prevention, disease management, and intervention.

RHHCS conducted a pilot study using NextGen PH to assist patient outreach. By analyzing aggregated data using specific criteria sets to identify patients in need of a telephone reminder for a flu shot, RHHCS reached more than 21,600 patients during a three week period in late-October of 2012. Before the height of the flu season, 3,667 flu shots were administered at RHHCS physician practices – an increase of 22.5% from the previous year. NextGen PH was critical to expand the reach of RHHCS' limited staff by automating basic administrative processes. As RHHCS scales up its use of NextGen PH to other areas of its practice, new pilots will employ risk stratification to improve targeting of at-risk patient populations and promote health and wellness.

### Infinity Primary Care

Based in Southeast Michigan, Infinity Primary Care (IPC) is an ambulatory care network of 13 locations with 60 full-time providers and 100 resident physicians. Founded in 2004, IPC services approximately 56,000 unique patients each year. After adopting and implementing NextGen® Ambulatory EHR and practice management systems in 2005, IPC has maintained a steady focus on incorporating health IT into daily practice.

In 2012, all of IPC providers attested for Meaningful Use and currently engage in monthly reporting sessions across the organization to review quality and performance measurements. Since the introduction of EHR and practice management systems, IPC has been able to seamlessly integrate technology and care to prevent traditional workflow barriers and automate otherwise inefficient processes.

By taking a holistic approach towards PHM, IPC has streamlined standard administrative, communication, and outreach procedures through technology and reallocated human resources into other higher value areas. IPC has employed a variety of communication methods including text, email, telephone, and portal to engage its patients – but rather than flood its entire population with outreach, IPC sends targeted reminders to those with an upcoming visit, or at-risk patients who may have fallen through the cracks of care over time. IPC has used NextGen PH for pilot interventions to develop a rules list based on health quality measures to further automate communication with specific patient populations according to their level of health maintenance (e.g. routine tasks such as flu shots, mammograms, etc.); risk of developing conditions such as diabetes or hypertension; and/or severity of illness. Although still in early pilot phases, IPC's automated contact attempts are achieving a response rate of more than 30% from targeted outreach during a two-month period. As their efforts mature, IPC plans to expand this approach to other chronic conditions and leverage demographic information to reduce potential disparities in care.

## **VII. CONCLUSION**

By harnessing health information technology, data, and analytics for PHM, healthcare organizations can take advantage of an integrated package of automated, targeted, and interactive tools to actively monitor the health and care of patient populations. As the final stages of the HITECH Act roadmap are implemented over the next several years, physicians and healthcare organizations will continue to adopt and use EHRs in a meaningful way and qualify for federal incentive revenue. In turn, EHR adoption will have the desired ripple effect on the greater goals of interoperability and data exchange to support the emerging models of collaborative and accountable care. Critical to achieving these goals will be the design and use of comprehensive PHM suites that provide modeling, benchmarking, profiling, reporting, and HIE to enable evidence-based medicine and value-based, quality care.

## ENDNOTES

- 1 [www.kff.org/insurance/upload/7670-03.pdf](http://www.kff.org/insurance/upload/7670-03.pdf)
- 2 <http://www.oecd.org/unitedstates/BriefingNoteUSA2012.pdf>
- 3 <http://www.nejm.org/doi/full/10.1056/NEJMp0910064>
- 4 <http://www.iom.edu/Reports/2012/Best-Care-at-Lower-Cost-The-Path-to-Continuously-Learning-Health-Care-in-America/Report-Brief.aspx>
- 5 Centers for Disease Control and Prevention. [Rising Health Care Costs Are Unsustainable](#). April 2011
- 6 <http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=13444>
- 7 [http://www.rand.org/pubs/external\\_publications/EP201000195.html](http://www.rand.org/pubs/external_publications/EP201000195.html)
- 8 <http://www.oecd.org/unitedstates/BriefingNoteUSA2012.pdf>
- 9 <http://jamia.bmj.com/content/18/5/678.full>
- 10 <http://content.healthaffairs.org/content/27/3/759.abstract>

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