

The Philips logo is displayed in a bold, blue, sans-serif font. It is positioned on a white background that is part of a graphic element resembling a document with a folded top-right corner. The bottom portion of this graphic is a dark blue rectangle containing the text 'White paper'.

White paper

# Implementing a successful population health management program

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# Executive Summary

In this paper, Philips offers a framework for implementing a successful population health management program (PHM) that addresses the broader factors beyond analytics and/or diagnosing and treating disease.

## **The framework is based upon the following definition of population health management:**

*“The organization of and accountability for the health and healthcare needs of defined groups of people utilizing proactive strategies and interventions that are coordinated, engaging, clinically meaningful, cost effective and safe.”*

This approach to population health management can be thought of as “Continuous health” – a way to better analyze, manage and account for the health of individuals and populations. Continuous Health means creating immediate and uninterrupted connections and interactions that promote ongoing health and proactive care. It works across the full spectrum of where, when and how health happens. However, achieving this vision requires transformation in all elements of the industry ecosystem. Providers must organize themselves around providing better health for a diverse range of populations through a variety of factors, including:

- Considering all factors that affect a person’s health;
- Defining and introducing strategies that provide coordinated care across the continuum;
- Engaging consumers in support of their own health;
- Employing caregivers and technologies best suited to a person’s needs;
- Leveraging established community and social services;

To help providers and other health organizations accomplish this, Philips has identified nine specific interconnected criteria. A comprehensive assessment of these criteria will identify areas requiring improvement, as well as areas of strength. Prioritizing them in light of an organization’s current capabilities and long-term goals will yield a PHM strategy and roadmap suited to its unique needs.

To begin, organizations need to consider their current state of readiness, and answers to many probing questions (some examples are outlined in each section) are required. However, in-depth questionnaires that underpin each puzzle piece represent the true building blocks of population health and will be used by Philips consultants to help you prioritize your near- and medium-term strategies.

## Vision and Strategy

The PHM vision should ground the organization and staff with a common definition of what it means to manage health, and the strategy should provide specifics to achieve that vision. Community assets, population health status, and market characteristics are just a few factors that will influence an organization's PHM vision and strategy.

## Clinical Care and Care Coordination

One of the most important criteria in this puzzle is whether the organization is able to provide effective, coordinated care across the continuum of health delivery. This requires organizations to evaluate their current capabilities which may dictate near-term opportunities for coordinated care. But over time, PHM demands that care be coordinated across all settings and managed using proactive strategies. Ultimately, Philips believes that organizations should consider a bottom-up approach in developing PHM capabilities – one that has executive oversight and accountability needed to build new care processes which are supported by performance incentives, sound data and outcome metrics.

## Network Development and Clinician Engagement

Conducting a gap analysis is one recommended strategy that compares the current network to anticipated needs. Many organizations will find that PHM requires a shift from their current network development approach. An effectively functioning network also requires well-thought out structure and governance, management and technology infrastructure, participation requirements and performance metrics, and financing and funds distribution.

## Financial Risk Management and Contracting

Organizations that bear financial risk are effectively assuming accountability for many factors that exist outside of their usual realm of influence. It is critical for organizations to prepare themselves to manage this risk. This may include necessary investments in new capabilities or potential partnerships.

## Telehealth/Virtual Care

Telehealth is an important tool to enable organizations to link providers, patient, distant locations, data and analysis in a way that facilitates coordination, communication and effective clinical action. The dimension of telehealth is not a single exchange or substitute for a face-to-face visit. Rather, telehealth and remote monitoring technologies are “enabling technologies” that wrap around other services provided to the patient, including medical, psychosocial, community services, and other support.

## Patient and Caregiver Engagement and Relationship Management

Effective PHM requires strategies to reach the individual consumer or patient at all stages of life – in the manner most appropriate for each individual. Philips uses a proprietary set of five phenotypes that describe people and their preferences and, based on this classification, helps organizations begin to understand how they want to receive information.

## Information Liquidity and Analytics

Useful data exist in many different locations, so widespread interoperability between EMRs and patient data in all locations is critical. The goal here is information liquidity – the free flow of information among multiple systems and sites of care. PHM also requires a deep understanding of consumer behavior and desires, so non-traditional data sources may unveil better insights into consumer behavior and patterns. To truly harness the data, organizations also need analytic capabilities which may require significant investments or development of new partnerships.

## Community and Social Services

Many community and social services fall outside the realm of traditional “healthcare,” but can have both an immediate and long-term impact on health. Identification of appropriate organizations that can provide assistance outside of the hospital and connecting people with the services they need are two elements of a successful PHM program.

## Population, Cohort Definition, and Market Share

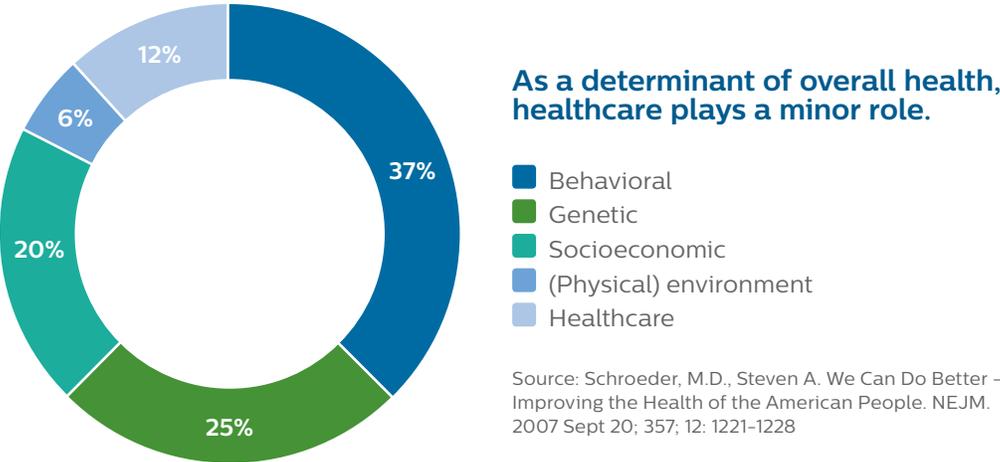
Each market and population is unique. Market position, service offerings, health status, predominant diseases, and geographic and community features are all unique factors that need to be addressed. As organizations gain greater understanding of their consumers, they will need to develop criterion that assigns them to specific population cohorts in order to define proactive health interventions and care delivery.

The component categories summarized here and the related questions detailed in the white paper offer a comprehensive approach for organizations to sort out their current capabilities and determine the best strategy given their unique circumstances. This framework provides a starting point to help organizations achieve a higher level of understanding and drive strategic implementation.

# Introduction

Population health management (PHM) is one of the primary strategies for achieving greater value in healthcare. However to fully realize the promise of PHM, healthcare organizations must take a new approach – one that looks at health and healthcare through a different lens.

Current healthcare spending is growing at an unsustainable rate. Yet the health treatments and services people receive for that money play a relatively small role in determining our overall health – only about 10 – 12%. Behavioral and socioeconomic factors play a much larger role, but unfortunately, most of today’s focus is still on spending associated with diagnosing and treating disease.



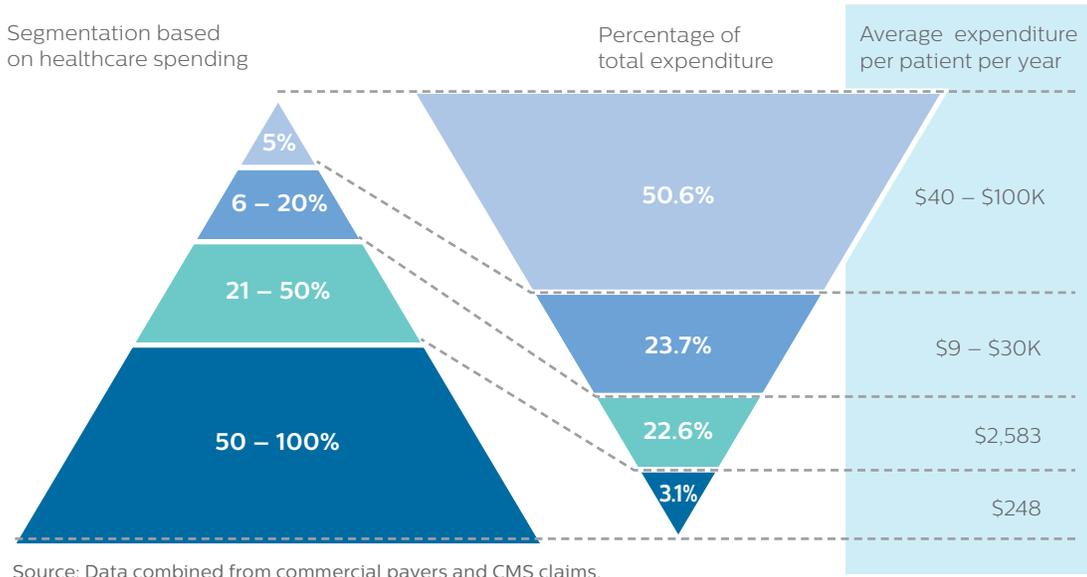
To truly improve population health, healthcare organizations must address these broader factors and re-examine their entire care delivery systems in the context of new payment models and cost overruns.

**Philips defines population health management in this way:**

“The organization of and accountability for the health and healthcare needs of defined groups of people utilizing proactive strategies and interventions that are coordinated, engaging, clinically meaningful, cost-effective, and safe.”

This definition offers a framework for implementing a successful population health program. Distinguishing between “health” and “healthcare” is of particular importance. Patients seek healthcare when they want screening or develop symptoms for an acute or chronic condition, and healthcare providers deliver this care. Bearing accountability for a population’s overall health, however, is much more complex. The majority of healthcare costs are incurred by a minority of patients so it is important to understand where to target investments that can yield the quickest return, both in improved outcomes and cost reductions. At the same time, a comprehensive PHM strategy also requires focus on maintaining or improving wellness to reduce healthcare expenditures over the long term.

## Healthcare costs are largely incurred by a minority of patients



We call this approach “Continuous health” – a way to better analyze, manage, and account for the health of individuals and populations. Continuous health means creating immediate and uninterrupted connections and interactions that promote ongoing health and proactive care. It works across the full spectrum of where, when and how health happens:



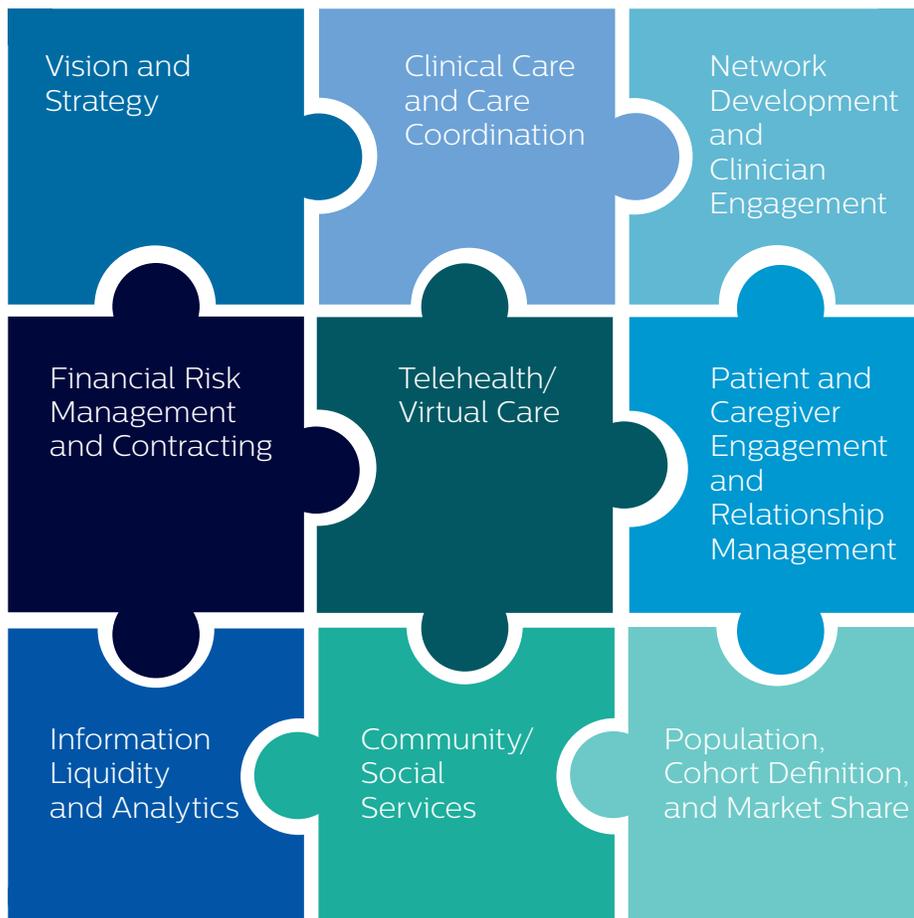
### Working across the full spectrum of where, when and how health happens

<b>Across settings</b>	Continuous care as patients transition from <b>one context to another</b>
<b>Across people</b>	Continuity across the <b>care team, populations, and conditions</b>
<b>Across data</b>	Continuous and holistic analysis of <b>all types of data</b>
<b>Across time</b>	Continuous, proactive engagements throughout a <b>person’s lifetime</b> .

Achieving this vision requires transformation in all elements of the industry ecosystem. Providers can no longer remain institutions that are paid only to provide medical services for the sick, and payers can no longer simply pass through premium increases as medical spending rises. All must organize themselves around providing better health for a diverse range of populations by:

- Managing care throughout a person's life;
- Considering all factors that affect a person's health;
- Defining and introducing strategies that coordinate care across the continuum;
- Engaging consumers in support of their own health;
- Employing caregivers and technologies best suited to a person's needs;
- Leveraging established community and social services;
- Accepting financial risk for improving the health of specific populations;
- Adopting population-focused information technology (IT) and organizational infrastructure; and
- Utilizing data and analytics to enable more predictive and relevant interventions to support health and healthcare across all groups.

This transformation requires exceptional execution in an environment of sweeping change. To help providers and other health organizations accomplish this, Philips has identified nine specific, interconnected criteria. Organizations seeking to deliver on the promise of PHM should begin with a thorough understanding of their current capabilities in each of these domains and develop an action plan to succeed in each:



A comprehensive assessment of these criteria will identify areas requiring improvement, as well as areas of strength. Philips encourages its partner organizations to dig into these components using its metrics-based analysis and prioritize them in light of their current capabilities and long-term goals. This will yield a PHM strategy and roadmap suited to each organization's unique needs.

## Vision and Strategy

As evidenced by the explosive growth of accountable care organizations (ACOs), many organizations desire a role in PHM. However, few develop a clear vision and strategy to align all parts of the organization and drive necessary change. The PHM vision should ground the organization and staff with a common definition of what it means to manage health, and the strategy should provide specifics to achieve the vision.

### Questions to consider are:

- What are the organization's short-, mid-, and long-term goals related to PHM?
- How should service areas be defined, e.g. geography, service line, population cohorts?
- Is the market proactive or reactive? Should the organization lead or follow?
- How much financial risk can and will the organization accept?
- What acquisition or partnering strategies will the organization employ?
- What are the current and future obligations to serve local communities?
- What resources can the community provide?

From this will come the starting point of a PHM vision and strategy. As the questions show, many factors will influence that. Community assets, population health status, and market characteristics are just a few. Provider organizations, in particular, may need to rethink previously abandoned tactics, such as wellness programs/centers, as they look to engage with populations on a different level. A clearly-articulated vision with supporting strategy helps evaluate and prioritize these opportunities and balance potentially competing goals.

## Clinical Care and Care Coordination

One of the most important criteria in this puzzle is whether the organization is able to provide effective, coordinated care across the continuum of health delivery. Care for the whole person, not just sick patients, must engage a dramatically expanded community of people and caregivers, often separated by considerable distances. Holistic care of this kind includes providers knowledgeable in all aspects of health – healthy living, prevention, diagnosis, treatment, recovery, home care and end-of-life.

**To evaluate their capabilities, organizations should ask:**

- Is there an enterprise-wide approach to care coordination with high-level executive direction and accountability?
- Are care activities and information organized across different caregivers and settings, or along service lines?
- Are patients receiving care at the right time and in the right setting – optimizing enterprise capacities and cost-effectiveness?
- Who is responsible for transitions-of-care across settings – including into and out of the hospital and skilled nursing facilities (SNFs)?
- Where does palliative care fit into the organizational structure, and does such care cross all geographies? (Contact your Philips representative for an analysis of your palliative care program.)
- Is there effective interaction among care teams to address both clinical and psycho-social issues?
- What, if any, organizational or financial barriers prevent coordination?

These questions help frame important considerations for a coordinated health delivery system. Care that is organized effectively among different types of providers and locations can yield more timely and relevant interventions that are tailored to an individual or group of individuals that help:

- Maintain wellness;
- Reduce hospital admissions and length-of-stay;
- Reduce readmissions;
- Facilitate aging in place and avoid unnecessary SNF utilization; and
- Engage end-of-life care in an appropriate and timely fashion.

Organizational strategy and existing capabilities may largely dictate near-term opportunities for coordinated care. In the short run, that may mean care coordination goals focused only on specific population cohorts. But over time, care coordination must expand to achieve continuous health PHM goals, such as:

- Facilitating patient flow across geographic regions and care settings to enable patients to be cared for closer to their own communities, reduce “leakage” out of the system, and limit tertiary center transfers to those who will benefit from higher-acuity services;
- Avoiding hospital admissions for emergency department patients who may be cared for at home with more extensive monitoring and intervention;
- Providing optimized early discharge of select patients and a safety net of care and support until the newly-discharged patient can be seen by their primary care providers (PCPs);
- Improving communication to PCPs and supporting their efforts to manage the health of their patients;
- Enabling around-the-clock care to skilled nursing facilities to improve the quality of care and reduce the number of emergency department transfers; and
- Extending palliative care programs across all settings.

PHM demands that care be coordinated across all settings and managed using proactive strategies. Integrating and expanding existing functions of utilization review, case management, and quality improvement will not be enough. Organizations should consider a bottom-up approach in developing PHM – one that has the executive oversight and accountability needed to build new care processes which are supported by performance incentives, sound data and outcome metrics.

## Case Study

# Reducing Costs and Maximizing Bed Utilization for Critically Ill Patients

Multiple IDNs around the country have combined their eICU care teams and transfer centers to improve patient flow and maximize benefits. Baptist Health South Florida, Avera, and HealthFirst all saw a bottom-line impact, including increased transfer volumes while substantially reducing “leakage” out of the system. [Read more](#) ▶

## Network Development and Clinician Engagement

PHM demands a wide span of healthcare knowledge, expertise, and capabilities – the whole of which may not currently exist within the organization. Many health systems and some health plans undertake physician acquisition and alignment strategies, but in many instances, their focus is on securing market share in high-margin service lines. Though this may eventually serve as a foundation for PHM, healthcare organizations need a more robust and comprehensive approach to draw a range of health professionals and settings into a well-organized, integrated, and highly functioning network.

### **Organizations thinking through their delivery network should consider:**

- Does the delivery network support overall organizational strategic goals? If not, what are the gaps?
- Are the capabilities of the network in alignment with the health status and needs of the population?
- Does the network provide sufficient geographic coverage?
- Will acquisitions, joint ventures, or partnerships be required to fill gaps in capabilities?
- Are the network financial goals and incentives aligned for all participants? Do all participants understand their roles and responsibilities?
- Do clinician contracts adequately create incentives for behavior consistent with the goals of PHM?

Organizations should examine their market and the population they serve to determine current capabilities, as well as to understand health status and gaps in health support and care delivery. Those that have begun network development should consider conducting a gap analysis that compares the current network to anticipated needs. For example, in populations with a high incidence of obesity, the organization must consider whether the network has a sufficient number of providers with bariatric training and supporting community assets. Many organizations will find that PHM requires a shift from their current network development approach – including consideration of capabilities previously not considered, e.g. home health, rehabilitation, SNF, behavioral, etc. Organizations that choose to take financial risk for PHM will face the challenge of structuring, financing, and managing

a complex network of health delivery capabilities – including physicians, nurses, care coordinators, social workers, hospitals, ambulatory centers, and community services.

An effectively functioning network also requires well-thought-out structure and governance, management and technology infrastructure, participation requirements and performance metrics, and financing and funds distribution. Each of these components must balance the needs of all the participants, as well as the patients and the community. In particular, network participants should acknowledge the need for partnership and interdependence to achieve the goals of PHM. Thus the participation requirements and performance metrics should reflect and reward this commitment.

## Financial Risk Management and Contracting

Among the biggest challenges that organizations face in PHM is managing the financial risks that come with assuming accountability for patient populations. Those who pay for healthcare services have become weary of ever-escalating costs and are demanding that healthcare organizations assume financial risk for the quality and costs of the care they deliver.

Unfortunately, as noted earlier, healthcare spending contributes a relatively small fraction to overall health status. Thus organizations that bear financial risk are effectively assuming accountability for many factors that exist outside of their current understanding and realm of influence. How an organization prepares itself to manage this risk is critical to not only its basic mission, but also its survival.

### **Organizations should ask themselves:**

- What are the financial goals of the organization's PHM program?
- Does the organization have the skills and experience to effectively manage risk? Has it done so in the past and how successfully?
- Is a network of health delivery capabilities in place to manage factors outside of traditional care delivery?
- Does the network understand how risk will be shared – including possible losses and penalties?
- Does the organization have sufficient capital to assume risk without placing itself in a hazardous position?
- Are systems in place to track and manage performance indicators on which payment in risk-based contracts is based?
- What investments in infrastructure and technology, including IT for data analytics, will be needed?
- Will payers compensate the organization for interventions offered as part of a PHM program?

Many organizations lack both capability and experience in this domain. That should not preclude participation in PHM, but encourage necessary investments and/or potential partnerships. Aware that providers lack some of these critical competencies, some payers are offering them on a standalone basis. Because financial risk is new territory for so many organizations, they should pace the level of risk they accept to the development of the competencies necessary to manage it.

The pace of risk assumption varies by market, and organizations must balance their pursuit of PHM against the pace within each market. In many cases, this will require investments to jumpstart capability in advance of specific risk contracting provisions. It must be noted in this context, however, that the Center for Medicare & Medicaid Services (CMS) is targeting a significant increase in value-based reimbursement, and commercial payers are following close behind. Thus, while some markets are moving slower than others, prudent organizations will look to build their risk management capabilities and competence ahead of demand from their market.

## Telehealth/Virtual Care

Effective PHM programs must have the dimension and scalability to meet the size and needs of a targeted population that sometimes spans a large geographic area. In addition, such programs must be able to link providers, patients, distant locations, data, and analysis in a way that facilitates coordination, communication, and effective clinical action. Telehealth is an important tool in achieving these goals.

Telehealth involves the use of remote sensors, communications, and data-processing technologies that enable dynamic interactions between the individual and care providers. This occurs in real-time or near real-time. The technologies include bi-directional audio/video, physiologic and behavioral monitoring, engagement prompts, and point-of-care testing. Because telehealth facilitates ease of interaction, providers gain access to remote teams of physicians, nurses, pharmacists, social workers, and health coaches, as well as to a broad span of clinically meaningful data. Among their benefits, such programs:

- Facilitate targeted care to address the needs of varying populations;
- Enable new ways of coordination across the care continuum, especially for high-cost patients with multiple chronic conditions;
- Reach more patients and reduce barriers caused by distance or other logistical factors;
- Use computer-based systems to enable a kind of “clinical workforce multiplier” – providing the scale necessary for an increasing population that requires ongoing care.

As this suggests, this dimension of telehealth is just not a single exchange or substitute for a face-to-face visit. Instead, telehealth and remote monitoring technologies are enabling technologies that wrap around services provided to the patient, including medical, psychosocial, community and others.

### **In evaluating a provider’s abilities in PHM, these questions are critical:**

- Is there executive leadership directing and accountable for telehealth services?
- Is there a strategy for coalescing different telehealth initiatives (e.g. telestroke, telepsych, trauma triage, ICU, home health, etc.) under a single umbrella?
- How large is the current population for which the provider would use telehealth services and how many more patients would the provider like to include?
- Is there the right mix of caregivers providing telehealth, and to what extent is telehealth “stretching” them (e.g. one intensivist can cover upwards of 150 ICU beds across any geography)?
- How are telehealth programs integrated with remote monitoring and community care programs?

## Case Study

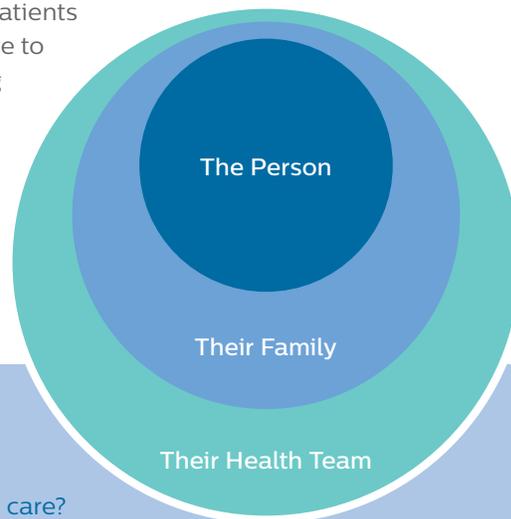
# Targeting Patients with Multiple Chronic Conditions

Banner Health piloted a new telehealth-enabled program that combines both “high-tech” technology and “high-touch” services to target patients with at least five chronic conditions. Data from the initial pilot showed a 27% reduction in cost of care, a 32% reduction in acute and long term care costs, and a 45% reduction in hospitalizations.<sup>1</sup>

[Read more ▶](#)

## Patient and Caregiver Engagement and Relationship Management

Engaging patients and their caregivers is vital for PHM. Patients are the most important factor in influencing their own health, followed by their immediate caregivers and then the health system providers. Effectively engaging patients should improve healthy behavior and adherence to care plans, thus improving quality and reducing costs. This might involve an overweight young person beginning a healthier diet, a patient with multiple chronic conditions complying with a medication plan, or a cancer patient working with her physician in choosing the care most appropriate for her needs and preferences.



### The questions at this stage in evaluating a provider's potential for PHM are:

- Does the provider currently engage people as active participants in any aspect of their care?
- Does the provider use some form of customer relationship management to reach-out to people/patients?
- Does it use any technology that gives it a touch point with the person?
- Is the provider including the patient's caregivers when reaching out or providing services?

Effective PHM requires strategies to reach the individual consumer or patient at all stages of life – early childhood, adolescence, adulthood and old age. It also requires that this be done in the manner most appropriate for each individual, such as text messaging vs video avatars, for example. Philips uses a proprietary set of phenotypes in conjunction with other tools that describe people and their preferences, and based on this classification, we can begin to

understand how they approach disease and want to receive information. We have adopted the principles of Hippocrates who said, “It is more important to know what kind of man has a disease, than what kind of disease a man has.”

For example, patient adherence to discharge instructions is generally poor. Thus, making audio/visual recordings of the discharge instructions that patients receive in their hospital rooms and then making them available via a patient engagement portal could be one effective approach. Also, creating a patient portal that is user-friendly and contains information designed to engage the patient might also prove useful.

In the home, seniors living independently consider safety and security to be of paramount importance. The Philips Lifeline system, which has been servicing this population for over 40 years, helps provide them with a sense of security. Fall detectors and GPS tracking services provide help for patients in their home or walking outdoors, and newer technologies will track ambulation and provide fall detection. These meet the needs of patients in the settings they prefer by helping reduce the burden and cost of falls. In addition, medication dispensers help by enabling patients with disabilities and taking multiple medications to help ensure accuracy and adherence – eliminating the need for caregivers to go to the home to monitor usage.

### Case Study

## Safety at Home and Caregiver Connectivity

Lifeline medical alert services can enable seniors to “age in place” and offer frail elders a sense of security with rapid access to a response center for help in the event of emergencies. New features such as GPS tracking services, fall detection and predictive analytics extend services beyond the home and provide access to help when and where it’s needed. [Read more ▶](#)

## Information Liquidity and Analytics

Today, more health data are available than ever before. Yet health delivery organizations struggle to not only capture these data, but more importantly to turn these data into reliable, actionable information. PHM demands that organizations be able to collect, combine, correlate, and share data pertinent to all factors that influence a person’s health and from a growing number of connected applications and devices (the internet of things-IOT). Often called information liquidity, these aforementioned capabilities allow organizations to better understand the health needs of their different patient populations and better target treatment plans and health management strategies.

Useful data exist in many different locations, such as Electronic Medical Records (EMRs), health information exchanges (HIEs), payers, picture archiving and communication systems (PACS), social media, oral and other home health devices (e.g. tooth brushes) and other databases like credit card expenditures (for pharmacy, food, and even cigarettes) that are

currently outside the purview of all health delivery organizations. As patients seek care, data are produced in inpatient, outpatient, emergency, ambulatory, long-term care, pharmacy, and other settings, but this information must now be combined with the formerly mentioned data to get a complete picture of the patient's health. These combinations of data create a foundation for understanding population needs, but interoperability between EMRs and patient data sources in these myriad locations is critical; and all of this information must be collated and easily accessed by different providers in diverse facilities and healthcare settings.

The basic building blocks for an interoperable and meaningful data infrastructure and liquidity includes the following:

- Manages, updates, monitors, and remotely controls connected devices
- Aggregates, stores, and manages data from supported applications and devices
- Securely identifies users, protects data privacy, and tracks user activity
- Provides managed infrastructure to host, operationalize, and monitor systems and applications
- Standardizes interfaces between enabled applications and devices with external third-party systems and industry standard protocols
- Provides functionality to help complete routine tasks and coordinate communications among users
- Enables the foundational infrastructure to build, deploy and maintain decision support algorithms and machine learning applications
- Is open source and able to accept third party applications

As described above, PHM also requires a deep understanding of consumer behavior and desires. Health delivery organizations should consider nontraditional data sources that may unveil better insights into consumer behavior and patterns, (e.g. social networking, spending, etc.) This process is aided by new devices that can collect data which – while not previously considered suitable for diagnosis or treatment – provide insights into health status, and may serve as an indicator for patient engagement and treatment efficacy, and support true patient-centric, continuous health programs.

If all these health data create a complex map of people and populations, then advanced analytics and algorithmic insights act as a GPS system for health delivery organizations. Analytics help providers better understand populations and make informed judgments about how best to cost-effectively care for these populations and patients. For most health organizations, this will require significant investments in analytic capabilities or development of new partnerships that will bring these advanced competencies. Also, by marrying patient data with outcome studies and evidence-based practice guidelines, providers are better prepared to optimize care for specific population segments – across treatment settings, clinical conditions, or stages of a patient's life.

Most health delivery organizations aggregate some level of clinical data within one or multiple system(s) for use in decision support activities. However, the data structures and access privileges are generally not setup to support collaboration and integration of personal, wellness, health and treatment data across the continuum. This creates siloes of data that are accessible to relatively few practitioners and fails to amalgamate data for true PHM. The Philips HealthSuite digital platform (HSDP) was developed to overcome these challenges and enable a new era of connected, personalized health delivery. Using HealthSuite enabled devices and applications, security and analytics, health systems, care providers and individuals can access data on personal health, specific patient conditions

and entire populations—so care can be more personalized and people more empowered in their own health, wellbeing and lifestyle.

**To prepare, organizations should consider:**

- Does the organization have a department, with senior leadership oversight dedicated to abstracting and interpreting these newfound data, their relationships and outcomes?
- Does the current information infrastructure provide support to the entire continuum of care? Does it fully integrate with connected applications and devices?
- Is your CIO comfortable with cloud computing, data governance and the required security measures?
- Can the current IT platform support evidence-based practices? Will it provide variance reporting?
- What capabilities does the organization have to identify targeted patient populations? Stratify their risk and attribute patients? Attribute patients to specific network providers and services?
- Does the organization have access to data sets outside of the delivery network, (e.g. spending, social networking, etc.)?
- How does the current IT architecture support the aggregation of disparate data sets?
- Are robust, predictive analytics capabilities available and built into the longitudinal network? If not, what strategies will the organization consider to acquire them?
- Does the organization accurately track all data and particularly the costs associated with care and with specific clinical interventions (e.g. total hip replacement, etc)?
- Does the organization have access to experts related to all data sources to ensure analysts and users are sufficiently informed of data quality issues to allow for valid interpretation?
- What data is needed for behavioral management and outreach to patients and caregivers?
- Will the existing infrastructure support patient engagement initiatives?

**Case Study**

## Readmissions Reduction

When a regional center needed help to lower readmission rates, claims data were analyzed over a multi-year period and results used to develop predictive models. These models were used to identify patients who were likely to readmit, and equally importantly where they were likely to return within the care system. [Read more](#) ▶

## Community/Social Services

The impact of community and social services in helping maintain and improve the health and well-being of a given population cannot be underestimated. Understanding the right services for the right people in the right place (proximity to where they reside) achieves two goals. First, it enables case managers and health coaches to identify the organizations able

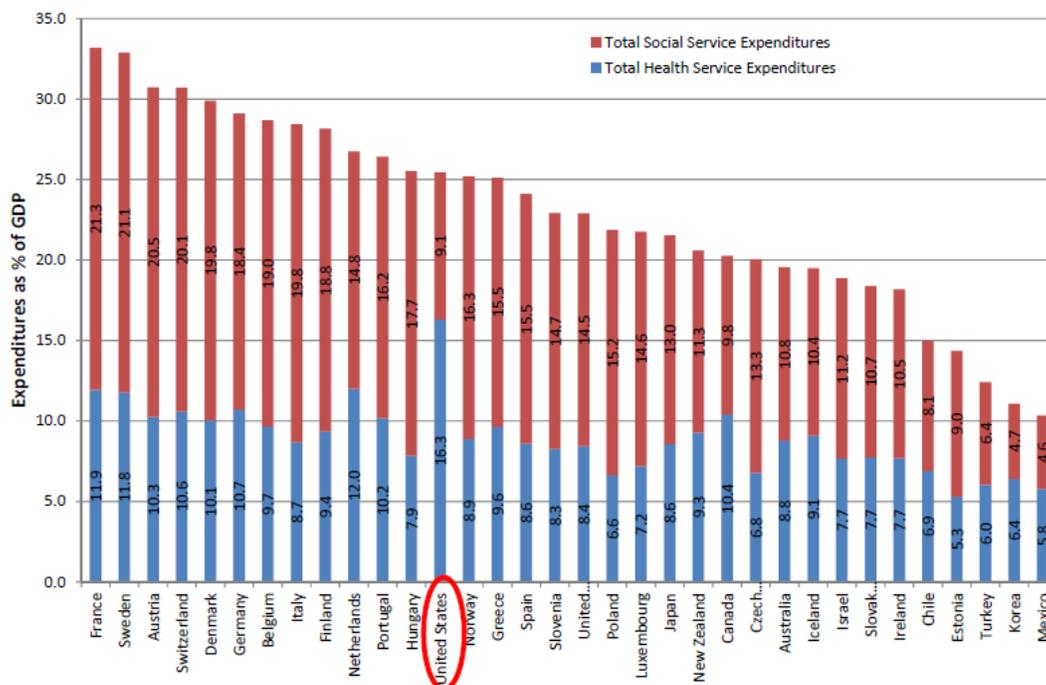
to provide assistance outside of the hospital, and secondly, it connects people with the services they need. Those include:

- Buying medications
- Getting to follow-up physician appointments
- Putting food on the table for their families
- Keeping the heat on during winter months
- Providing financial assistance

While many of these services fall outside the realm of traditional “healthcare,” they can have both an immediate and long-term impact on health. The difference in health and spending between the US and other OECD countries may be partially or even fully explained by the differences in supportive social services among countries.

### Adding social services increases total healthcare investment

In OECD, for every \$1 spend on healthcare, about \$2 is spent on social services.  
 In the U.S., for \$1 spent on healthcare, about 55 cents is spent on social services.



Source: Bradley & Taylor, “The American Health Care Paradox: Why Spending More is Getting Us Less”, *PublicAffairs*, 2013

Many hospitals now realize, for example, that addressing food needs is an integral part of any population health management program. Healthcare costs related to hunger in the U.S. are estimated at \$130.5 billion each year, of which hospitalizations account for \$16.1 billion.<sup>2</sup> Likewise, the ability to afford medications is estimated to have a significant impact on medication compliance, a big indicator for readmissions. As it relates to hospital readmissions, socio-economic status (by zip code) is linked and the Centers for Medicare & Medicaid Services in the U.S. is considering a payment adjustment to account for this. In a study published in the health policy journal *Health Affairs*, researchers found that many seniors, particularly those with multiple chronic conditions, continued to have difficulty paying for prescriptions even after Medicare Part D drug coverage was implemented. As

a result, some cease taking medication altogether, skip pills, cut pills or forgo other basic needs to pay for them.

**Identifying and addressing the multifaceted socioeconomic needs of target populations is a necessary component of PHM. Key questions at this stage include:**

- What percentage of the provider's patients have some form of socio-economic need (e.g. Medicaid, dual eligible, etc.)?
- Are case managers using the most current data to support social services in their regions?
- Is the provider partnering with organizations that can connect patients with the appropriate services?
- Are case managers/health coaches working with current high-risk/high-cost patients?
- Does the provider have an effective way of tracking its case management interactions and discovering which agencies are providing these services well?

### Case Study

## Addressing Patients' Socioeconomic Needs

A new mobile-ready, cloud based service was used to successfully connect community-based care managers and health coaches with appropriate social services. The eHealthify platform utilized its services database to identify the social services that are eligible and available to a given person based on their particular needs and geographic location. [Read more](#) ▶

## Population, Cohort Definition, and Market Share

As this paper has shown, any organization wishing to implement PHM will be faced with many challenges. And while organizations can learn from the experience of others, each market and population is unique. Market position, service offerings, health status, predominant diseases, and geographic and community features are all unique factors that will need to be addressed.

**Organizations seeking to understand their market and population should ask:**

- Where do we rank against our competitors in size, services, geography, and populations served?
- What are the population and health status trends in our market?
- What risk factors that cause disease (e.g. the effect of obesity on diabetes) are prevalent in the communities that our organization serves?
- Does organizational service mix align with the health status of our population? What are the gaps?
- What platform will we use to stratify patients according to risk across all settings?
- Can we identify consumers with high utilization rates or low utilization rates that align with our network?
- Do we understand utilization trends among the population cohorts we serve?
- Do we have the staffing and resources to manage care for this population?
- Are there options for partnerships to achieve our goals?
- What is our strategy to promote consumer loyalty?

Although market leaders have the distinct advantage of population scale – depending on the health status of that population – organizations with smaller populations may be better positioned. They will need to determine the level of healthcare resources used by different segments of the population. They should also identify “split” populations – those who seek care from multiple networks – and implement strategies to develop consumer loyalty. For example, using advanced mobile technologies to create “frictionless” access may create a wedge in existing loyalties that opens the door for market share gains. Those organizations that choose to lead and take risk for PHM face the challenge of structuring, financing, and managing a complex network of health delivery capabilities – including physicians, nurses, care coordinators, social workers, hospitals, ambulatory centers, community services, etc.

As organizations gain greater understanding of their consumers, they will need to develop criteria that assigns them to specific population cohorts. These serve as the foundation for defining proactive health interventions and care delivery.

One approach segments populations into bands like:

- Healthy people
- People at risk of disease
- People managing a disease
- People with one or two chronic conditions
- People with multiple chronic conditions
- Frail elderly
- Hospitalized medical-surgical patients at high risk
- ICU Patients
- Post-acute patients at home

Population analytics, including predictive algorithms, will help segment consumers based on their conditions and health profiles and help design cost-effective interventions. These may involve wellness and lifestyle strategies for the healthy, long-distance monitoring and preventive care for those suffering chronic diseases, post-acute care or home care for those recently discharged from the hospital, or palliative care for those with serious illnesses. Tailoring care should also involve providing psychosocial care for those with mental health

conditions, or, for that matter, behavioral health for virtually all segments of the population, given the fact that individual actions have a powerful effect upon health and wellness.

### Case Study

## Keeping People Well

Philips wellness programs and partnerships that are targeted at specific needs and populations have shown promising results. Some are applicable for the general population, including sleep, exercise and the “worried well,” while other programs are targeted at people with cardiac diseases, diabetes and obesity. [Read more](#) ▶

# Conclusion

## Preparing for PHM

By changing the lens that we use to view health and the healthcare delivery system, both opportunities and threats can arise. Healthcare organizations must transform to succeed in this new, broader, and more challenging landscape. Yet the transformation from an institution for sick care to an organization devoted to preserving health and improving care for given populations is formidable.

Based on Philips’ experience with PHM, the component categories and questions in this document provide a useful approach for organizations to sort out their current capabilities and determine the best strategy given their unique circumstances. This framework provides a starting point to help organizations achieve the next level of understanding and implementation.

Not all organizations will take the same approach because the circumstances of each vary widely. While one may choose to work aggressively on building a connected and coordinated network of providers linked via a telehealth network, others may choose to first focus on building an effective data infrastructure or developing a strategy for handling and segmenting financial risk. Whatever the case, to succeed in this changing world, healthcare stakeholders must understand and address this complex array of issues and opportunities for improving population health.

# Appendix: Case Studies

## Case Study

### Reducing Costs and Maximizing Bed Utilization for Critically Ill Patients

The eICU Program has demonstrated that it delivers statistically significant reductions in hospital mortality, and both ICU and hospital length of stay for ICU patients.<sup>3</sup> However, for organizations tasked with PHM, a centralized eICU care team with a transfer center also provides a coordinated regional strategy for maximizing critical care bed utilization.

**The benefits of a centralized ICU care team and transfer center has been shown to:**

- 1) improve retention of ICU cases at regional community hospitals by “exporting” the knowledge base and confidence to care for sicker patients locally,<sup>4</sup>
- 2) create capacity and improve the transfer of appropriate ICU cases from regional community hospitals to tertiary centers maximizing revenue,<sup>5</sup>
- 3) transfer any patient (emergency department, medical-surgical, etc.) to a similar or higher level of care maximizing bed utilization across the hospital network<sup>5</sup> and
- 4) maximize ICU bed utilization within a large tertiary center by moving patients across different specialty ICUs.<sup>6</sup>

In a published study, there was a 35% reduction in transfers to an Avera Health regional tertiary hospital from 11 community and rural facilities.<sup>5</sup> This resulted in a substantial reduction in costs for fixed wing, helicopter and ambulance transfer. The ability to remain in their local hospital leads to greater satisfaction by patients and families. By keeping a sub-set of patients locally and only transferring those that will benefit from care at tertiary centers, a hospital-based or country-based regional integrated delivery network is able to reduce the cost of care (community costs are lower than tertiary) and maximize revenue at the tertiary center for surgeries and interventional radiology. Patients are also able to be repatriated back to their communities more quickly with the eICU care team involved in the continuum of medical management.

Multiple IDNs around the country have combined their eICU care teams and transfer centers to improve patient flow and maximize benefits. Baptist Health South Florida was one of the first sites to do this and they have expanded their program over the ensuing years, now transferring over 32,000 patients annually. They saw their transfer volumes increase while “leakage” out of the system has been substantially reduced. They have also had zero EMTALA violations since the Program was instituted in 2010.

HealthFirst (Melbourne, Florida) has set up a similar transfer center that has been operational since Nov of 2013. Here they have shown a consistent uptick in the volume of transfers (over 2.5X increase). This has been associated with a corresponding decrease in the time required to successfully accept patients into the health system (from over 2 hours to now less than 15 minutes). Many of these cases are from outside hospitals and the contribution margin for transfers in has doubled In a soon to be published study from the

University of Massachusetts, seven adult ICUs on two campuses of an 834 bed academic medical center an eICU team was leveraged to support patient flow. The remote team worked in collaboration with an experienced nurse who provided key insights into staff availability and a bed control clerk with knowledge of infection control, isolation, and gender restrictions for bed assignment. Implementation of the program was associated with a significant increase in contribution margin from adult critical care cases, primarily driven by increased case volume which was evident in the first post-implementation year and increased in a step-wise fashion over the three-year graded implementation and has been stable over the subsequent four years.

Working together, an eICU and Transfer Center can be a powerful tool for population health management of your most costly patients.

## Case Study

# Targeting Patients with Multiple Chronic Conditions

One of the biggest challenges – and opportunities – for organizations considering population health management are patients with multiple chronic conditions – often called the “super-users” of healthcare. In addition to being the most challenging population to manage, they also are the costliest. While they make up only 5% of patients, they account for up to 50% of all healthcare spending.

In 2013, Banner Health took this challenge head on by partnering with Philips to pilot a new telehealth-enabled program that specifically targets patients with at least five chronic conditions. One of the first lessons learned was that identifying the patients who need this level of patient support is not easy; however, accurate patient identification is one of the keys to success. Even among patients with chronic conditions, Banner found a substantial variation in the level and intensity of support that would be required. Healthcare claims data alone proved insufficient to ensure that resources were targeted appropriately, so Banner and Philips developed additional methods that have proven instrumental in identifying these patients. We also discovered that these patients have a tremendous psychosocial burden so they now are evaluated for psychosocial needs during the onboarding process. A survey designed with behavioral psychologists called the MAY tool (More About You) is used, the results of which help categorize patients into different needs categories and personality phenotypes. The care team uses these to help personalize messaging and tailor services. And because the use of phenotypes helps personalize the care plans, patient satisfaction scores also are positively impacted.

The unique feature of the Banner program is that it combines both “high-tech” technology and “high-touch” services to address the needs of this population. The “high-tech” component of the program includes a variety of technologies designed to enable safer care of these patients in the home. A HIPPA-compliant Android tablet called eCareCompanion provides patients with two-way audio-visual software and messaging. Additionally, eCareCompanion delivers videos and surveys in the home. Custom software and a range of biometric sensors for blood pressure, oxygen saturation, weight, and heart rate allow caregivers to monitor physiologic data remotely and flag problems before they become

critical. Also included is Philips Lifeline – a personal emergency response service with automatic fall detection that delivers near-instant access to patients by an entire care team.

Combining team-based continuous care with remote delivery is a key part of the success. The “high-touch” component of the program matches patients with health coaches, nurses, social workers, pharmacists and an intensivist primary care physician who has experience in working with this population. This team-based approach ensures that patients have access to the right caregivers, no matter what the issue. Even though patients continue to see their own doctors, the addition of the intensivist PCP to the team provides daily critical remote support and expertise. Behavioral and psychological issues such as depression can greatly impact the outcome of the patient, and adding the non-clinical caregivers was another important learning. Finally, because of the complexity of managing between 500-1,000 patients, a team “quarterback” is assigned to keep work assignments flowing.

Data from the initial pilot of 132 patients was very promising. Banner saw a 27% reduction in cost of care, a 32% reduction in acute and long term care costs, and a 45% reduction in hospitalizations.<sup>1</sup> The program was so successful that they are increasing the number of patients in the program, 90% of whom are Medicare patients. Banner also credits its decision to include patients most at risk its PHM strategy as key to its ability to return significant shared savings as part of the Medicare Pioneer ACO (Accountable Care Organization) program. In Performance Year 3 (2014), Banner returned more than \$29 million in savings over the predicted financial benchmark, while at the same time improving its quality score by nearly 10 percent over the previous year.

## Case Study

### Safety at Home and Caregiver Connectivity

Enabling seniors to live independently at home is a key consideration for any PHM program. However, the fall statistics among senior adults are unsettling: One out of three older adults (65 or older) falls each year. Without rapid help, these elderly individuals may also suffer prolonged pain, emotional distress, secondary medical problems like dehydration, pneumonia, renal failure, pressure ulcers, or potential death.

Philips Lifeline medical alert service enables seniors to “age in place” and offers frail elders a rapid response in the event of emergency. When a signal is received from a Lifeline help button, trained staff in the 24/7 response center establish voice communication with the person, and depending on the situation and preferences of the subscriber, a neighbor or family member caregiver or emergency services will be contacted. For example the case of Connie K. who wrote to thank us, “I had a stroke and couldn’t talk, pushing your button brought the paramedics right away. They took me to the nearest hospital where I was able to get treatment in time and avoid any major long-term effects.”

In addition to hospital transport, there are other cases where different support is provided at the request of the subscriber. For example, Elberta W., a 94 year old widow who got locked in her bathroom, and the only assistance she needed was a helping hand from her neighbor to open the door.

When designing a service for the frail elderly to use in emergencies, simplicity is key. Help at the press of a button, or with the AutoAlert feature,\* whenever a fall may be detected, even if the button is not pressed. Gerry O. described his experience “I was taking out my trash when I lost my balance and fell. I tried to push the button but couldn’t do it. I didn’t realize that when I fell it went off. In a very short time I heard a siren – it was the paramedics and my son had been called and was on his way. I was taken to the hospital and was told I had a broken hip. I believe Lifeline saved my life!” The involvement of family caregivers like Gerry’s son are common and the typical subscriber has four family members who may respond if they are located nearby or notified if they are at a distance.

This example also highlights that help can be needed outside the home. The new GoSafe mobile solution works across the country using GPS and leveraging the AT&T network and 6 state-of-the-art locating technologies to track events anywhere (adequate coverage required).

Lifeline also provides valuable reassurance, and subscribers are encouraged to press their button any time they need support, even if they are anxious about something or concerned about a symptom. This connection is valued by socially isolated seniors.

And a medical alert service does not merely have to be reactive. This year Philips introduced a predictive analytics tool that health systems can use to identify when their at-home patients are likely to require hospital transport. Soon, data from additional devices, including vital signs will advance the accuracy of this identification so that clinicians can intervene much earlier, to help reduce avoidable hospitalizations. We are also testing a senior mobility monitor with Lifeline that will track gait disturbances and changes in mobility. Using this technology we will be able to potentially identify those at greatest risk of falling and provide early intervention to minimize falls.

Lifeline provides a comfort level to both seniors and their family caregivers against, falls, emergencies and isolation. It supports a safer environment for aging in place and potentially avoiding costly assisted living and skilled nursing facility costs.

\* AutoAlert does not detect 100% of falls. If able, users should always push their button when they need help.

## Case Study

# Predictive Analytics to Identify Patients at High Risk for Readmission

Health delivery organizations seeking to achieve PHM goals must address challenges across the continuum of care. Gaps in care coordination and failure to engage with patients and caregivers can result in poor outcomes and higher costs. Predictive analytics provide a way to look at your populations and identify opportunities for proactive interventions.

Readmission following an acute hospital stay is a significant contributor to the cost of healthcare – 13.8% of acute care admissions result in readmission accounting for \$41.3 billion annually.<sup>7</sup> In an effort to curb this spend, CMS issued regulations to reduce avoidable hospital readmissions – enacting penalties for those hospitals with higher readmission rates.

To reduce readmissions, health systems have implemented a number of cross-continuum initiatives – mostly focused on transitions of care from acute to post-acute providers; including educational initiatives around medication management and pre-scheduling post-discharge physician office visits. These programs have seen varying degrees of success and, given their “one size fits all” approach, result in higher costs to the hospital.

Leadership at an 895-bed regional quaternary center with the highest case mix in the country asked Philips to help them lower readmission rates. Adding to the complexity of the project was the need to measure and monitor readmissions to both this regional referral center and the community hospitals in the area.

Philips consultants, data scientists and statisticians researched and gathered an extensive array of public readmissions data for the entire state using a myriad of sources. They then created a detailed analysis of inpatient claims over a multi-year period – identifying all patients who were discharged from the regional referral center and readmitted to one of the local community hospitals within 30 days.

The Philips team developed predictive models that could forecast not only whether a patient was likely to readmit, but if they were likely to return to the regional referral center or community hospital. The predictive models used patient features – both expert-driven (Delphi technique) and data-driven – to identify patients at highest risk for readmission. Data-driven features were discovered using a number of data mining and machine learning approaches – including PCA and random forests. These factors are currently being compared to a clinical model under study at another health system that includes demographic, clinical and behavioral elements to provide additional accuracy to the predictions.

Once developed, the predictive algorithms were used prospectively on a validation data set to simulate the cost and impact of the readmission reduction solution (e.g. patient education, enhanced discharge planning, and timely clinical follow-up and interventions); enabling the client to prioritize the interventions according to their level of investment.

The team’s analysis led to a further recommendation that the readmissions reduction project be expanded from a penalty avoidance initiative to an enterprise-wide strategy. The client successfully launched a readmissions reduction initiative which has been embraced and employed by connected community providers – hospitals, long-term care providers, referral physicians, and others – to lower 30-day readmissions across the entire care system.

## Case Study

# Socioeconomic Needs of Patients for Population Health

Addressing the societal needs of patients increasingly is understood as a critical component of any PHM program. For example, food insecurity has demonstrated effects on admission and readmissions statistics. Studies have shown that diabetics are 27% more likely to be hospitalized in the last week of the month compared to the first week due to exhaustion of food budgets at month’s end.<sup>8</sup> Additionally, children who experience food insecurity or poor housing conditions are 30% more likely to be hospitalized by age three.<sup>9</sup>

Realizing this, Banner Health and its care management staff rely on strong community based organization (CBO) networks and other social services to provide the best care to their patients dealing with social and behavioral health needs. However, like many U.S. integrated delivery networks and Accountable Care Organizations, Banner had issues identifying appropriate resources, and maintaining them current, and connecting patients to the right service at the right time. In addition, their health coach team wanted to get a better understanding of the true social needs in their community.

To address these needs, Banner partnered with Philips and Healthify (private label as eHealthify), to support their care managers and health coaches in connecting patients to appropriate social services in the Phoenix Metropolitan area. eHealthify uses a survey tool to identify the social services that are eligible and available to a given person based on their particular needs (e.g. war veteran, income level, etc). This includes Medicaid, Medicare and dual eligible people. Healthify readily compiled social service data in the region electronically and then trained health coaches on their Resource Platform. The Healthify resource platform is a mobile-ready, cloud based service that allows users to search for services based on resource programs offered (food pantry etc) and eligibilities (living with cancer etc). This software application enables providers to dramatically scale their case managers by providing the most currently and geographically relevant services to them. Furthermore, this software application enables providers to visualize the results of these interactions and to obtain information about the quality of these interactions using a back-end “yelp-like” tool.

Since the Banner Health coach team was initially focused on an elderly population, eHealthify utilized its services database to represent the most appropriate services for this population. The eHealthify team engaged health coaches every two months with follow up training and to receive feedback. Health coaches were also able to get support from the eHealthify team when connecting patients to services by logging in and using the system’s live chat system. Banner Health administrators were trained on the eHealthify platform as well to view analytics on health coach usage and search trends to establish goals. After five months into the program, the eHealthify database had 3,412 resources to access in Arizona. The most common type of needs identified:

Type of Need	Top Search	% of Search
Community	Caregiver	17.7
Food	Food boxed	15.2
Transportation	Medical transit	10.4
Health	Med equipment	7.3
Housing	House repair	6.2
Good	Loan closet	4.8
Financial Support	Financial help	3.1

The program has been so successful that Banner recently increased the number of case managers who have access to the services database.

## Case Study

# Keeping People Well

Wellness programs are an important element of population health management. However, lifestyle changes are not easy to initiate and maintain, even when people are motivated. To achieve the goals of any wellness program, behavioral changes that are based in science and empower people to take greater control of their health are key. To this end, Philips Personal Health Solutions (PHS) helps people adopt healthy habits, and has developed and introduced several programs designed for different groups based on their needs. Some are applicable for the general population and the “worried well,” which includes sleep and exercise, while other programs are targeted to people with disease such as cardiac diseases, diabetes and obesity. Philips wellness programs and partnerships that are targeted at specific needs and populations have shown promising results.

### **Addressing Sleep Issues**

Sleep was added as a new topic to Healthy People 2020, the federal government’s third-generation treatise on improving the health of all Americans, yet few wellness programs address this issue. Continuous positive airway pressure (CPAP) is the primary treatment for Obstructive Sleep Apnea (OSA), one of the most common sleep disorders. It is very effective in eliminating upper airway collapse during sleep, improving sleep fragmentation, and decreasing daytime sleepiness. Philips used its expertise in treating sleep apnea and CPAP to address a recognized issue – compliance with CPAP therapy. Using Philips DreamMapper\* mobile application a study of 15,000 patients (7,500 with DreamMapper and 7,500 without DreamMapper) demonstrated that patients who had a DreamMapper account showed a 22% increase in adherence versus those patients who did not have a DreamMapper account. Improvements were also seen in patients who historically struggled with adherence. DreamMapper also helped patients who struggled early with therapy. Thirty-three percent (33%) of those who struggled and had DreamMapper were able to achieve adherence by 90 days compared to only 11% of those who did not have DreamMapper. These Sleep programs are now being targeted at the greater wellness population where “better sleep” may impact obesity and general well-being.

### **Partnering for Weight Loss**

Philips has brought to market dedicated lifestyle change programs to help employers engage their employees in healthy lifestyles, specifically improvement of activity/exercise and sleep. A well-known leader in weight loss worked with Philips around activity monitoring which is important to sustain and further improve weight loss. We worked together to integrate the Philips activity program into their weight loss program. The program, called ActiveLink, focused on sustainable behavior change to not only achieve – but to sustain – weight loss.

### **Wellness Begins at Work**

Employers play an important role in the health and wellbeing of their employees, and are more often making programs available for employees to improve their health. An innovative chemical company with a highly skilled workforce was an early adopter of our programs. The company has seen strong results in engagement with 28% of their staff participating in the program (without a need for any financial incentive). Also retention and program

\*In a retrospective review conducted by Philips Respiroics of approximately 15,000 SystemOne patients, patients who used SleepMapper, which has been rebranded to DreamMapper, demonstrated 22% greater adherence to the therapy than patients who did not use SleepMapper.

effectiveness are high with 50% of sedentary participants increasing their activity by at least 30 minutes per day. Engagement was achieved at the individual level, through an innovative web service and coaching.

### **Helping Consumers Manage Their Health**

Philips recently released a suite of wellness products aimed at allowing consumers to obtain insights into their general health status and health content. This suite includes a health watch with clinically validated accuracy and online coaching, with actionable insights and achievable goal setting for general health. This suite will also enable any Philips home device to link into the system, providing additional data like weight, blood pressure and others. Using these tools, Philips is now partnering with Allianz to develop a more comprehensive program focused at employers, health insurers and consumers.

Wellness is a necessary component of population health management because it is the “insurance” that cohorts of people will maintain their health and others will not progress.

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