



POPULATION HEALTH MANAGEMENT: OUR FRAMEWORK FOR OPTIMIZING SENIOR HEALTH ACROSS THE CONTINUUM

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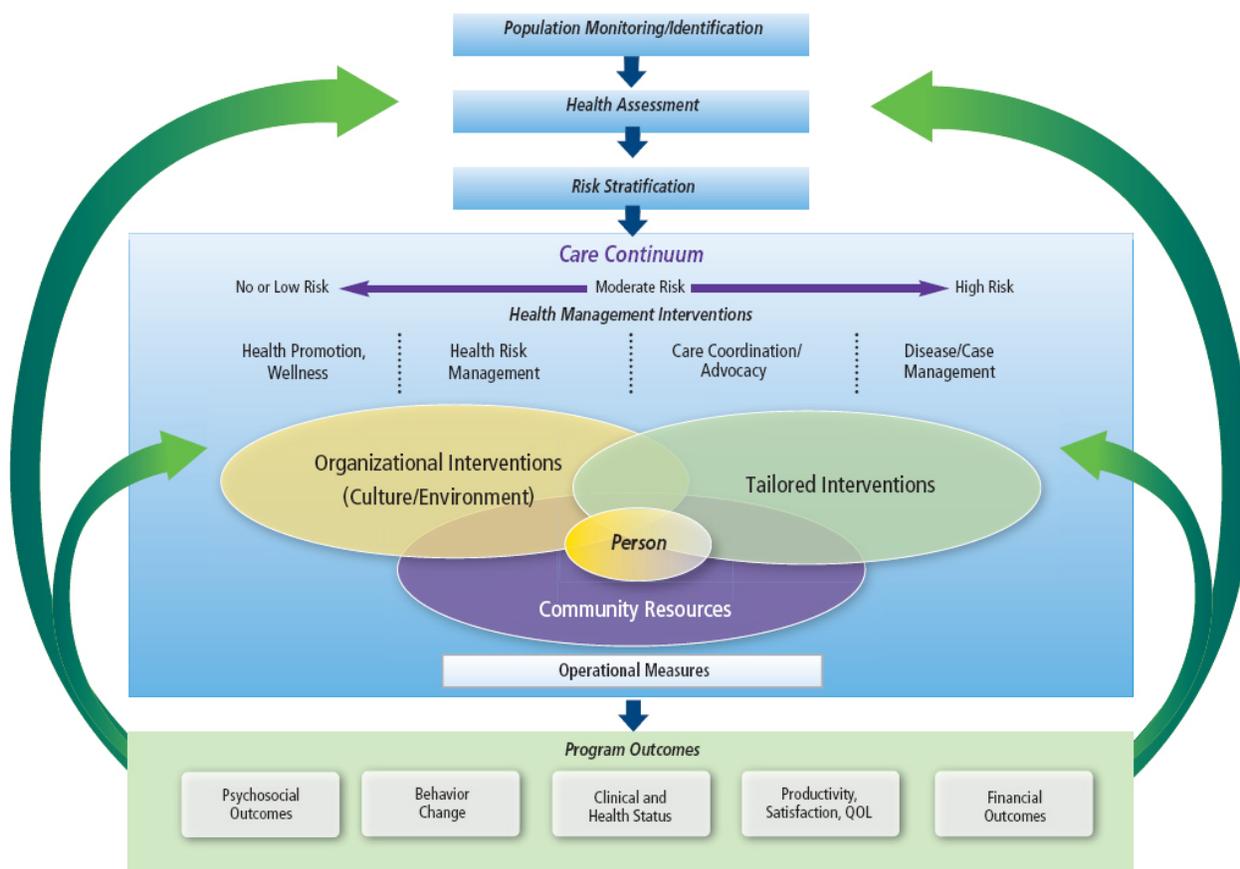
Introduction

Our purpose in writing this article is to highlight how Population Health Management (PHM) strategies apply to and integrate with the lives of people over the age of 50, applying our framework for supporting healthy lives. We follow these individuals along the aging continuum—moving with the individual from being active and well, to becoming chronically ill or possibly frail disabled, or as they age with optimal health in mind and body. Our discussion of the PHM framework highlights how PHM principles follow the individual, always working to support and extend wellness and maximize independence. We will discuss components of the PHM model, how PHM works in a real world setting and highlight trends, gaps, and opportunities for improving the lives of people in our communities. This paper follows Patrick and Maria, two hypothetical individuals, as they age, and discusses how our health care delivery system, paired with PHM and community resources, can support their healthier aging. We began with an examination of the Population Health Alliance (PHA) Framework for Population Health Management Exhibit 1.¹ We then conducted a series of interviews from experienced population health clinical and business executives representing the PHA Board, the PHA Alumnae Board and other PHA members. In parallel, we completed a review of the literature for relevant trends, interventions and opportunities that may impact PHM for seniors. The research team then combined and applied the PHA PHM Framework, results of the literature review and interviews to create insights for addressing seniors age 50 and over across the health continuum. We believe the resultant discussion that follows comprises a firm but evolving foundation for addressing the health-related needs of our growing senior population.

Patrick is a 75-year-old man who is about to go for coronary artery bypass surgery. He was athletic in his youth, earned a degree in nursing home administration and, for 30 years, has worked as an administrator in a dozen facilities. He started smoking in college and stopped when he was 42. He found his work extremely stressful, consuming and sedentary and, over the years, he gained 50 pounds. At age 45 he was diagnosed with high blood pressure, and at 50 he was diagnosed with depression and anxiety. At 55 he was started on medication to lower his high cholesterol. At 65 he was found to have high blood sugars and was diagnosed with diabetes. Last night he awoke from sleep with crushing chest pain, was rushed to the hospital and found to have blockages in three of the blood vessels for his heart. He needs bypass surgery to ensure blood flow to his heart.

Maria is an 80-year-old female who has been an entrepreneur, owning a chain of coffee shops in Manhattan. Maria, like Patrick, was athletic in her youth and ran track in high school and college. She earned a degree in business and, with her love of coffee and entertaining, opened a local Starbucks-type coffee shop. She also married, had 3 children, and managed a busy home and business life with the support of her husband. By age 50, she was diagnosed with an underactive thyroid for which she was given medication. She maintained her weight, was very conscious of her diet and exercise and continued to run her company till she was 70. At that time, she and her husband retired and moved to an Arizona senior community where she remains very active on their condominium board and swims daily.

EXHIBIT 1:
The Population Health Alliance Population Health Management Framework



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Well and At-Risk Seniors

The overall objective of PHM is to optimize the state of overall wellbeing of an identified population and the individuals that comprise that population. Wellness is defined by the World Health Organization (WHO) as “the optimal state of health of individuals and groups.”ⁱⁱ PHM fosters wellness strategies that emphasize preventing illness, prolonging life and maintaining our

These seniors both started out being well, but their paths diverged. At age 50, Patrick is overweight, has high blood pressure and is under treatment for depression and anxiety. Even though there are disease conditions present, Patrick perceives himself healthy and not presently afflicted leading to inaction to manage health risks. Maria at 50 is still very active, exercising and maintaining her weight. Each of them can benefit from PHM supportive processes which work to effect optimal health.

personal independence. PHM works by identifying, stratifying, and managing health risk. PHM uses data to personalize messaging, interventions, and support systems to support health goals and keep people well. The goal of PHM is to “compress morbidity”: delaying the onset of chronic disease and disability, maximizing the wellness phase of each person’s life and making the number of days that people are sick or dependent (i.e., in their view, “bad days”) as few as possible.

All health is not medical. In fact, it has been estimated that medical conditions and biological and genetic factors only determine, on average, about twenty percent of one’s health status.ⁱⁱⁱ Of course, this is an average and, for some people biological and genetic factors may be dominant determinants and for others they may be trivial. Much of our health is determined by ‘social’ factors, such as economic stability, social connections, education, and the physical environment.^{iv} Many PHM interventions reach into these realms. PHM is a multi-tiered, multiple dimension group of tools and interventions that reach the individual in their work place, home, physician office, and in the community.

Trends and Opportunities in Senior Wellness and Why PHM is Important Early On

Aging workforce, with higher incidence of chronic conditions. The workforce in the United States is aging. In 2014, 22% of the US workforce was over the age of 54, compared with 12 % in 2004. By 2024, this number is expected to rise to 25%.^v This means that one can expect increased prevalence of chronic disease in the workforce which, coupled with increased use of technology and biologicals, will drive costs higher.^{vi} This makes prevention and delaying the onset and progression of chronic conditions essential.

Increased out of pocket health spending for insured and many remain uninsured. Job insecurity and the lack of affordable insurance remains a major barrier for people when trying to access health care professionals and services. Seniors are disproportionately affected by cost and access issues due to age related job insecurity, preexisting conditions, and greater chronic disease burden which drives increased clinical care needs. The Affordable Care Act (ACA) has significantly increased health care insurance accessibility, affordability and portability (the insurance follows you as you go from job to job). Approximately two million individuals aged 55-64 gained health insurance coverage through the ACA;^{vii} however, this legislation has met with considerable opposition due to a number of logistical factors such as instability of insurance risk pools and its future is not clear. For those with employer-sponsored coverage, there have been significant increases in employee premium contributions and deductibles recently.^{viii} High costs are driving these working seniors into High Deductible Health Plans (HDHPs).^{ix} This employer strategy often results in lower costs for employers in the short term through reduced use of services by employees and their covered families.^x Despite the intention that these plans incentivize consumers to reduce waste and unnecessary costs, consumers do not reliably discriminate between low- and high-value services; rather, they just consume fewer services (e.g., fewer medication refills, fewer office visits).^{xi xii xiii} For those insured, PHM makes an important contribution by identifying these at-risk seniors and helping guide their choices and navigate the associated costs.

Increasingly fragmented healthcare delivery system. Many more medical providers are involved in an individual's care. People have so many more choices and often convenience, cost and accessibility are important factors. Seniors may see Clinicians in walk in clinics, virtually on the web, in the Emergency Department (ED), primary care or consultant office.^{xiv xv xvi xvii} In addition, complementary and alternative medical interventions (e.g. chiropractic, naturopathic, acupuncture, etc.) have also become an integral part of seniors' health care, with a reported prevalence over 53% for those aged 50 and above).^{xviii} As we age and accrue medical conditions, we get more complex, our history matters more and someone knowing our history, our personalities, concerns and goals, is essential for that person to be able to help translate and guide us through the healthcare maze. PHM strategies have been demonstrated to help bridge these gaps.^{xix} By connecting data from disparate sources, PHM can help create an individual's health, lifestyle, medical and preference profile, coalescing many data points to help the individual share their history with all involved clinicians, making the health and medical record the individual's own property and not the property of the clinician. A byproduct of this change is a more educated and engaged senior, better able, and more motivated, to actively stay well.

HealthCare payment reform is increasingly based on the value of the care. Managed Medicare Programs (Medicare Part C or Medicare Advantage plans) are supporting health benefits and care for more and more of our senior population.^{xx} Additionally, provider groups (hospitals, clinicians and other care providers) have begun to work together in what are called Accountable Care Organizations (ACOs). As these provider groups contract with Medicare, and health insurance plans to care for populations of people, they become, not only clinically responsible for the participants' overall healthcare needs, but financially responsible as well. Managed Medicare and health insurance plans, in conjunction with the associated ACO's, have recognized that, to be successful, they must keep people well and provide quality care in the setting associated with lowest possible cost. Numerous community hospitals and clinicians have stepped up to realize these objectives. However, often times the missing ingredient is still effective patient engagement and community supports. PHM can make significant contributions in this arena. Tools that help stratify populations, highlight care gaps and need to set the stage for personalized communications will be important in efforts to cost effectively extend clinical resources and more effectively connect to and engage with seniors.

Access to wellness and care management programs is not universal among employers and workers may lose support of and benefits from these programs as they transition to Medicare. PHM programs, such as wellness and chronic care management, are often available to individuals with employer group-based coverage plans, so seniors enjoy the benefit while they remain in the workforce. Seniors age 65 and over who transition to Medicare Advantage programs may be able to continue these programs and expand on them. These programs provide education and support development of lasting self-management skills. They often include home visits, healthcare-related transportation, as well as exercise and nutrition programs. When people do not transition into Medicare Advantage programs, they will need to seek these services through their community senior centers or purchase through fee per service Medicare. At this stage, Patrick will benefit from being engaged in programs and activities that encourage him to develop a healthier lifestyle and reduce his risk for developing diabetes. Patrick's frequent job changes and work-related travel makes it difficult for him to establish a continuous relationship with a primary care practitioner (PCP) who could help him manage his risk factors. Workplace wellness programs may help compensate for this lack of continuity. That Patrick's

motivation is aimed at his career during this time and he is not yet able to see the connection between health and long term career productivity, creates additional challenges.

Population Health Management can help both Patrick and Maria.

Being able to engage Patrick either directly or through his medical and health support team truly has a life changing potential impact.

Big data, comprising multiple diverse and dynamic sources, can provide rich sources of insights about individuals, whether they be public records, social media or consumer purchasing data. These person and household-level data can provide insight into social determinants of health (the environments and circumstances in which people are born, grow, live, work and age) as well as personal preferences. This information enhances the ability to target the most appropriate candidates for given interventions. Combined with other predictive modeling techniques and risk stratification tools these data can help keep people from becoming chronically ill and impaired by identifying issues of concern earlier on in the process. When big data is utilized to identify Patrick's needs (e.g., risk for developing diabetes based on lab results and existing diagnoses) and appropriate interventions are offered to and accepted by Patrick (e.g. weight loss program and diabetes screening tests) and his health care team is aware and also engaged (e.g. monitor Patrick's weight, order the screening tests, help control his other conditions and offer additional support resources), Patrick's risk for developing a chronic illness (e.g. diabetes) will be reduced.

Senior Engagement is fundamental to affecting health outcomes; mHealth and telemedicine are promising approaches to improve both the quality and quantity of our patient touches.

mHealth refers to a means to support care and health management support via mobile devices and networks including a collection of smartphone apps, secure messaging and wearable devices that are intended to engage individuals in their health and care. These apps and devices typically collect and store data about daily activities (e.g., steps taken), diet (e.g. calories consumed), sleep and stress and allow users to track their status and work toward goals. These tools are often connected to social networks and are "gamified." Adoption of these devices have historically been primarily by younger, healthier seniors but today are ubiquitous even in third world countries where they may be the only means of communicating and delivering care support.

Telemedicine, the remote diagnosis, treatment, and monitoring of patients by means of telecommunications technology (the simple definition), has a vast number of manifestations from automated blood pressure machines, that communicate results to a web-based service, to live streaming video acute care or therapeutic visits to robots rolling through hospital that enable physicians to see and examine patients. The telemedicine that can make a difference to Patrick and Maria at this stage of their lives is about improving access and engagement. Having the ability to monitor blood pressures, track, and share them with their clinicians, can improve medication compliance and prevent strokes. Additionally, using medically secure bidirectional video conferencing can allow people to see their physicians more regularly and without much of the annoyance inherent in an "office visit" and in rural areas can make the difference of a 6-hour long car ride or a two month wait to get care. This enhanced connectivity can markedly improve engagement and effect clinical change.^{xixi}

Predictive analytics focused on adherence, care plan compliance and risk of complications.

Combining predictive analytics with Patient Generated Health Data (PGHD) as described above can assist in helping to predict who is at risk for further medical problems, what type of challenges the individual is likely to encounter, and what might be the best strategy to apply to

keep the person well. By gaining important insights from these data sets and personalizing the interventions we can most efficiently use our resources and be cost effective as we work to achieve healthy individuals and communities. More specifically, the data helps to focus our attention on what matters most. For example, knowing that a person has had trouble filling their prescriptions, has been depressed and has missed days at work would be “red flags” that, if not addressed, could result in further deterioration of health and higher health care costs.

PHM also can help seniors build their medical literacy and make better decisions in conjunction with their care team. Consumer Decision Support (CDS) tools assist with informed decision-making, helping seniors understand the natural course of medical conditions and the anticipated clinical outcomes. For instance, if Maria developed low back pain but had no acute injury or other symptoms, her doctor’s office visit could include her demanding an MRI to image her back to find out what is wrong. Instead, CDS tools would help Maria understand that she is likely to recover from this type of back pain over the next 3 weeks and that there is no need for the MRI ,and the unnecessary, associated radiation exposure. Services that readily improve access to thoughtful, unbiased medical information can support clinicians as they practice evidence-based medicine and help seniors choose interventions and spend their health care dollars wisely.

At this stage, Patrick has progressed to having diabetes with high cholesterol along with his high blood pressure and depression.

Seniors Living with Chronic Conditions

PHM is now more important than ever. Using patient-specific data and applying the tools and principles described above, PHM has the potential to move Patrick from his current downhill health course to a safer, better life trajectory.

Trends and Opportunities- PHM for the Seniors Living with Chronic Conditions

Increasing longevity. Seniors are older longer and, therefore, may bear the burden of chronic disease for many years. Between 2004 and 2014, life expectancy at birth increased 1.4 years for males and 1.1 years for females; in 2014, life expectancy at birth for the total population was 78.8 years—76.4 years for males and 81.2 years for females.^{xxi} Average life expectancy at age 65 increased from 18.4 to 19.3 years, and at age 75 from 11.5 to 12.2 years, during the same period.^{xxii} In the 65 years and older group, although cancer and heart disease continue to be responsible for half of deaths, Alzheimer’s Disease has climbed to the fifth leading cause of death in 2014.^{xxiv} A large cohort of baby boomers who are surviving to retirement age are expected to live longer with higher rates of chronic conditions and comorbidity. Even though average life expectancy (longevity) is increasing, some research suggests that the maximum expected lifespan is not; hence the compression of morbidity model.^{xxv} More recent reports indicate, however, that the absolute lifespan potential of a homo sapiens is still an open question.^{xxvi} The compression of morbidity model describes the concept of being healthy and

active for much longer periods of time, having a much briefer impaired lifespan, but dying on time as genetically dictated. This is in fact the goal of PHM: to extend and enhance our healthful lives.

Professional caregiver shortages. As the population is aging there is a growing gap in between the demand for professionals in the healing sector and the people being trained to be able to care for this rapidly expanding population. Shortage estimates range up to a 52,000 PCPs by 2025^{xxvii} and 900,000 nurses by 2030.^{xxviii} This is compounded by a lopsided distribution of caregivers relative to seniors.^{xxix} Making the healing arts an attractive profession and calling for young people will require a large scale societal strategy. However, making our health care system more efficient and effective is the domain of PHM. Strategies to fill the expanding caregiver gap include broader integration of nurse practitioners and physician assistants, increased use of telemedicine, and eliminating low-value and ineffective care.^{xxx} The evolution of physician offices from a physician-dominated delivery model to “team medicine”, empowering medical assistants, dieticians, care managers and others has the potential to improve the efficiency of care. Moving care out of the office and into the home by deploying telemedicine strategies may be a very important development, especially for the chronically ill. PHM has the potential to help focus our resources on those people who will most benefit while helping to motivate, educate and support our aging seniors.^{xxxi}

Fragmentation of care delivery. The specialization of care has continued to evolve. Historically, the PCP was the first person you saw, your starting point. Your PCP would orchestrate any specialty visits you required (e.g., cardiologist) and would follow you wherever you went, to the hospital, nursing home or even your own home. Over the last 20 years, we have restructured the work flow of the doctor. Doctors now specialize in the site of care. There are doctors who specialize in caring for people just in the hospital (Hospitalists). There are doctors just working in their office and others who just attend in nursing homes (SNFists). This has worked well for the physicians as it has increased their productivity and income, however, it has disrupted the relationship between the physician and their patients, fragmenting care and limiting the physician’s ability to truly “know” their patient. It has diminished some of the personal responsibility the physician once held for their patient, the sense that their practice was a calling and not a job. The corollary to less personal physician engagement is that the senior is less connected to their PCP and less likely to take their counsel and guidance. This is concerning as personal engagement is a critical factor as we try to impact behavior changes.^{xxxii} Now it is even more important for the individual “to know thyself” and “heal thyself”. Here again PHM can make a big difference.

Obesity and overnutrition are significant contributors to chronic disease. Obesity, defined as a BMI ≥ 30 ,^{xxxiii} is epidemic. The ease of availability of high caloric foods, our body’s pleasure with eating and our sedentary lives has made obesity a national health problem. Obesity accelerates frailty and disability. It is associated with diabetes, hypertension, heart disease, lung disease and depression to name just a few.^{xxxiv} There are industries devoted to fighting obesity, from fitness centers and diet programs to medical interventions such as medications and surgeries. PHM strategies are at the center of many of the programs that have effectively worked to help people prevent and control obesity. By early identification, and individualized messaging and motivation, PHM programs can activate people to change and connect them to community

based resources such as fitness centers and weight loss programs that work. These are almost always lifelong endeavors that require ongoing support.

Electronic Health Records (EHRs) and Health Information Exchanges (HIEs) Great strides have been made to transform the consistency, accessibility and appropriate sharing of healthcare documentation. EHRs have replaced patients' paper charts while HIEs are an attempt to connect data from multiple EHRs and other health data sources creating a patient and population specific repositories. The Health Information Technology for Economic and Clinical Health (HITECH) Act incentivized the implementation and meaningful use of electronic medical records through financial subsidies.^{xxxv} EHRs and HIEs have great potential to improve care, drive clinical best practices, and integrate doctors and other clinical care providers into a team. Clinical prompts, decision support and patient registries can help clinicians better care for their patients and adapt to changes in the medical sciences more quickly.^{xxxvi} EHRs help to support care in which there are multiple clinicians involved residing in different locations. EHRs also make telemedicine more effective and easier to implement. EHRs enable physicians who are newly treating a patient to have a better understanding of a patient's medical history. EHRs have their challenges as well. Doctors and their teams may spend less time in actual communication time with patients, and much more time documenting. Their actual efficiency has decreased as clinicians see fewer people per day. There have also been issues of preset notes, and copying and pasting notes, all of which decrease the credibility of documentation.^{xxxvii} However, EHRs are here to stay, are evolving, getting better and more efficient over time and continue to have great potential for improving care. PHM strategies are being built into EHRs. Software that connecting the EHRs to other patient-specific devices, such as smart phones and apps, and drives patient reminders and clinical alerts are now being deployed in multiple settings and has potential to positively impact health outcomes when consumers are actively engaged.

Targeted and individualized care management programs. Engagement is critical to making a difference in people's lives. Care management program teams must understand the individual and create personalized approaches based on a person's conditions, risks, preferences, and motivators. Such targeted programs can keep individuals engaged in managing their wellness and adopting productive, sustainable behavior change.^{xxxviii} As in wellness, it will be important to provide these services after patients transition to Medicare. This may mean finding ways to channel them into Medicare Advantage plans or ACOs, or demonstrating a value proposition for self-pay. Care management and coordination especially through transitions of care is a vital component of an overall PHM strategy. Focusing our resources to those most in need and helping frame the conversation and approach, personalizing each encounter is paramount. These strategies are now being deployed in health plans, by care management companies, large employer based programs and by health systems and medical groups.

Provide alternatives to traditional care that encourage aging in place. Seniors are continuing to act more like consumers and demanding different approaches than their parents including more use of technology and services that allow them to remain independent at home longer.^{xxxix} As baby-boomers age with higher rates of chronic disease, it is expected that they will prefer to continue working and remain contributors in their community. The anticipated increased prevalence of chronic disease in the workplace should be accompanied by workplace wellness initiatives which make it easier to stay well. These programs support employers' goals, as they help control health care costs and maintain productivity.^{xxxix} Once retired, care management

services can provide additional support to replace workplace-based chronic condition management programs. This is especially true of Managed Medicare Advantage programs.

Patrick was found to have blockages in several arteries in his heart requiring heart surgery. In addition to having diabetes, high blood pressure, high cholesterol, and depression he has slowed down over the years and has significant pain and stiffness with walking. Following his heart surgery, Patrick will be at increased risk for complications and additional vascular events due to his multiple comorbidities.

Complex, Frail and Disabled Seniors

Managing Patrick's recovery and the frailty that may follow will be the focus during this episode and beyond. Often there are events which instantaneously change our lives forever. Patrick is at just such a turning point as he undergoes heart surgery. Is he healthy enough to survive the procedure and will it be successful enough to allow him to rehabilitate and return home, or will he start down a path toward increased frailty and dependence?

Trends in Complex Care and Supports

While still a small percentage of the population, the number of seniors that are frail or disabled is expected to continue to increase and account for a large share of healthcare costs. Centennials are our most rapidly growing segment of the population.^{xi} A potential byproduct of chronic disease can be frailty but does not have to be. Our aging population and the accumulation of chronic diseases, compounded by our ability to better care for people with chronic diseases, equates to living longer perhaps with many physical limitations, and high costs. Costs will be driven by need for caregiver assistance, more procedures, use of medical devices, and acute and long-term care hospitalizations. Our challenge as a society and community is how to slow or prevent decline and to treat our frail elderly with respect and dignity by offering choices that allow them to live optimally.

Providers organize to provide high-quality episodes of care and Accountable Care

Organizations. The health care system is pivoting to a more outcomes-based system rather than the previous system which just rewarded for how many visits the clinicians completed and tests and procedures performed (i.e., fee for service). Clinicians are financially incentivized to provide value by participating in now highly prevalent commercial and government payer ACOs^{xii} and Episode-of-Care Bundled Payment Programs.^{xiii} In both of these approaches, the emphasis is not how many visits the clinician completes, but rather on the patient outcomes that result from the care interventions prescribed. Outcomes are measured by quality indicators as well as by cost. The rewards come from efficient, effective care that prevents further deterioration, reduces errors and supports in-home treatment, (the generally preferred site of care), as much as possible. Many of the trends referenced above that are impacting people with chronic conditions are even more accentuated for the more severely impaired population. This is particularly true when we consider the fragmentation of care for the individual and the coordination of services. Patrick's

medical team includes a variety of individuals. His PCP, who will see him once he returns to the office, may not even know he has had a heart attack. In the hospital, he was seen by strangers: hospitalists, cardiologists, heart surgeons, intensivists (practitioners who specialize in caring for people in the intensive care unit, ICU, after surgery) a psychiatrist and an anesthesiologist. When he goes for rehabilitation he will be seen by a new practitioner in the nursing facility. No one practitioner truly knows him or is his advocate. Each transition of care increases the risk of adverse medication events as different formularies require the use of different brands of medications^{xliii} and seniors with multiple conditions are subject to risky polypharmacy, with those aged 80-84 years filling an average of 18 prescriptions per year.^{xliv} This fragmentation leads to potential medical errors, adverse events and a sense of isolation on the part of the senior. There are great efforts being made at every clinical transition point to do detailed medication reconciliations.

Opportunities in Supporting and Treating Seniors with Complex Needs

Certainly, Patrick's path is not entirely under his control. Fortunately, in addition to those mentioned above, there are other services and programs that can maximize the likelihood of Patrick residing in the community and remaining relatively independent.

Predictive analytics needs to focus on key avoidable events. It is important to identify individuals who are at risk for institutionalization and identify appropriate interventions and strategies that allow them to remain in the community—to “age in place”—before opportunities are missed or decisions made that will be difficult to reverse. For instance, an avoidable ED visit may lead to an inpatient admission, the consequences of which may be overtreatment of a related or unrelated issue and include a prolonged post-acute stay from which recovery is uncertain due to a hospital acquired infection, delirium or fall unfortunately common in hospitalized seniors.

Care coordination is essential. The Medical Home model is perfectly suited to helping manage Patrick's illness and recovery. Medical Homes are physician offices which focus on prevention, keeping people out of the hospital and functioning to their maximal abilities. Often there are educational forums, group meetings and care managers who work with high risk, frail patients to increase the likelihood that the care plan is followed. Care managers also help to assure care coordination between the various specialists. Patrick has follow up appointments with his heart doctor, heart surgeon, and kidney doctor. The care manager makes sure Patrick has the supports he needs to keep the appointments and that the PCP is kept informed.

Use mHealth or remote patient monitoring (RPM) to cost effectively monitor health conditions, deliver support and engage with seniors. RPM is a type of telehealth that allows a patient to use a mobile medical device to perform a routine assessment or vital sign check and transmit the test data to a practitioner in real-time for review. Remote monitoring with exception reporting is as cost-effective as, and more scalable, than nurse-based usual care for diabetes control.^{xlv} Further mobile remote technology to monitor for falls or changes in activity level or symptom changes are gaining further traction. It allows patients to remain in their preferred setting of home longer and avoid frequent trips for monitoring at a facility or office which become increasingly taxing as frailty increases. When Patrick first goes home from the rehabilitation center, his blood pressure is low and he has some breathing problems. He can be sent home with automated blood pressure and oxygen monitoring devices that transmit his vital signs to the appropriate practitioners. This allows for early detection of changes in his condition.

The goal is to prevent him from having a relapse. These types of interventions are becoming easier to deploy and integrate into the care delivery model.

Telemedicine to both treat ‘in place’ and compensate for key practitioner shortages and mal-distribution. Telemedicine is widely acknowledged for its potential to ameliorate health care workforce issues by creating efficiencies and extending the reach of existing practitioners. With the potential to overcome access barriers, telemedicine is also viewed as a means to reduce health disparities for aging and underserved populations, as well as reduce costs and burdens for patients.^{xlvi} Telemedicine has been used in the management of heart failure and in the hospital ICU setting, and appears to lead to similar health outcomes as on-site clinical care.^{xlvii} More recently, telemedicine has been used in nursing homes for after-hours care of patients with an acute changes of condition and has been shown to reduce hospitalizations of skilled nursing facility residents while reducing Medicare costs.^{xlviii} Bringing the physician to the bedside when people have a change of condition has a significant impact on people’s care and clinical outcomes and avoids admissions to the hospital where they are less known by staff and susceptible to over treatment. Telemedicine in the home is an important innovation as it can transform a home into a medical office or even a low-level hospital. Treating people in the comfort and safety of their homes, while avoiding many of the ill effects that come with hospitalization, can make a huge difference both clinically and in the cost of care and most importantly honors their preference. ⁱⁱ

Conclusion

The aging of the baby-boom generation will see larger numbers of seniors, living longer with more chronic conditions and higher rates of clinical complexity and potentially more frailty and disability. At the same time, more of these patients will prefer to remain in the workforce longer and remain in the community versus an institution-aging in place. They will need innovative supports powered by emerging technologies and the high touch of caring team members to enable them to age safely and in optimal health.

PHM strategies play a growing and increasingly important role in our evolving health care system. PHM has significantly evolved over the last 20 years. Historically, in some cases these efforts have been discontinuous and parallel to the physician’s office and the direct care delivery system. Many of these efforts have been health plan funded and often employer based. As people transitioned from their employer, they would often lose their current support program, need to join a new one or have none at all. With the ACA and increased portability of health insurance, a growing Medicare Advantage population and the development of provider communities taking financial risk for patient outcomes these programs are now offered in more diverse settings. In particular, PHM strategies are more and more becoming a constant in the lives of our senior population and are being embedded into the physician office and medical delivery system.

In addition to wellness-related activities, Patrick now needs to learn to self-manage his conditions. He needs support to understand the potential consequences and complications of not prioritizing his health and health care. He also needs regular, ongoing primary care that is convenient, of high quality, and coordinated. He needs a health self-management program that can integrate into his life and improve his physical and mental status. Maria, on the other hand, needs programs that make it easy and fun to maintain her exercise routine, control her stress

level, and identify risk factors and any new or worsening symptoms early on as she manages a household and a business.

Outcomes or results are the focal point of the PHA Population Health Management Model. With proven PHM strategies both Patrick and Maria can achieve their goals as numerous examples exist to support PHM across the full continuum from health and wellness to end of life. Studies support positive health benefits from staying active coupled with social supportⁱ and success with preventing falls in community dwelling senior by improving balance^{ii,iii} Once hospitalized or chronic conditions exist, outcomes are improved when transitions of care or movement from one setting to another or hospital to home are well managed to include education and early follow-up.ⁱⁱⁱ For people with diabetes or other and multiple chronic conditions, coordination of care among primary care and specialists and support for self management result in improved clinical and cost outcomes.^{iv,lv} In addition, programs applying evidence in real world settings are emerging to demonstrate prevention or slowing of progression of disease previously documented in clinical trials.^{vi} Finally, PHM strategies applied in advance illness has been shown to reduce hospitalizations and subsequent days in the hospital and overall health care costs. Additionally there was a significant increase in hospice enrollment and deaths at home, where most seniors prefer to spend their last days.^{vii}

We are living at an exciting time in human history. The medical advances and new approaches to keeping each other well are rapidly evolving. Patrick and Maria have many more options and opportunities to age well. Applying PHM strategies to include data analytics, digital engagement, clinical decision support, high tech and high touch care management interventions coupled with community resources can have a profound effect on our ability to age in place. These efforts will help people live well and die well when that time comes, maintaining their independence and dignity. PHM strategies and interventions are an essential and growing part of our overall health optimization strategy and health care solution.

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