



ARTICLE

Digital Health: Closing the Gap on the Last Mile in Chronic Disease

The Centers for Disease Control defines chronic diseases as “conditions that last one year or more and require ongoing medical attention or limit activities of daily living or both.”¹ Approximately 60 percent of the adult population, or 154 million Americans, have at least one chronic condition; 40 percent, or 100 million, have two or more conditions.

Hypertension, hyperlipidemia and diabetes are exceedingly common:

- Forty-five percent of adults in America (113 million) have hypertension; 21 percent (53 million) do not have condition under control.²
- Twelve percent of adults in America (30 million) have high cholesterol; another 25 percent (63 million) have borderline to moderately elevated cholesterol (200-239 mg/dl).³
- Fourteen percent of American adults (34 million) have diabetes; another 35 percent (87 million) have pre-diabetes, with impaired glucose tolerance (IGT) or impaired fasting glucose (IFG).⁴

Risk factors for hypertension include age, race, family history, being obese or overweight, not being physically active, using tobacco, excessive alcohol intake, too much salt in the diet and stress.⁵

Risk factors for high cholesterol and diabetes are somewhat similar.

The last mile of chronic disease treatment requires consumer (patient) engagement, self-management, 24/7 access to care and timely intervention — all of which are facilitated by digital healthcare. A shift from facility to home management is ongoing.

In this article, we highlight the role of digital transformation in chronic disease care. We bifurcate the chronic disease digital health opportunities into those requiring and not requiring case management. We do not discuss the “front end” of finding care, nor the “back end” for the payment for care.

Patient engagement and self-management support are essential to behavior change

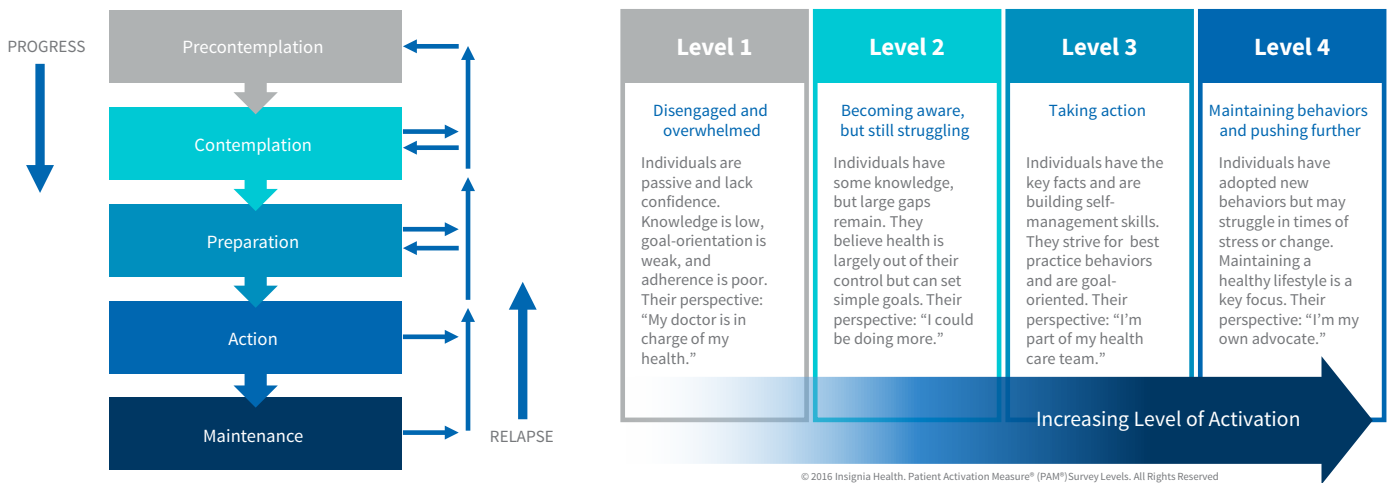
Patient engagement has been defined “as a concept that combines a patient’s knowledge, skills, ability, and *willingness to manage his own health care* with interventions designed to increase activation and promote positive patient behavior.”⁶ Patient engagement is critical, as behavioral (lifestyle) patterns and social circumstances represent 40 percent and 15 percent, respectively, of the contributors to premature death.⁷

Patient engagement requires self-management support, defined by the Institute of Medicine as “the systematic

provision of education and supportive interventions by health care staff to *increase patient skills and confidence in managing their health problems*, including regular assessment of progress and problems, goal setting and problem-solving support.”⁸ More specifically, this requires changing one’s lifestyle to promote health, adhering to a treatment plan (including medication regimens), making office visits for lab tests, physical exams and clinical consultations, closely monitoring signs and symptoms, and responding with appropriate actions, e.g., contacting a provider.

Digital health targets patient willingness while enhancing self-management capabilities.

Exhibit 1 - BEHAVIOR CHANGE IS A PROCESS



Recognition of behavioral change as a complex process requires a fundamental paradigm shift in the provider approach to patient interaction from “push” to “pull.” Unidirectional and infrequent contacts must be replaced with bidirectional, frequent and timely contacts focused on developing self-management and caregiver support skills. The availability of consumer portals, combined

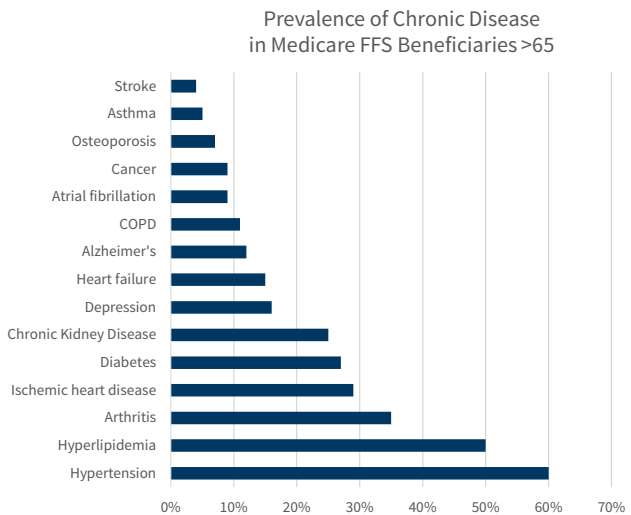
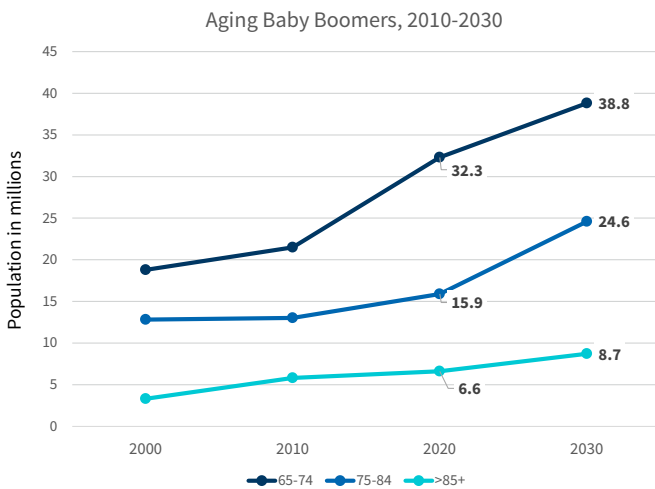
with the advent of multichannel digital media and enabling technology, facilitates the generation of a lower-cost “pull” approach to “whole person” care delivery. At least three to six months is required for effective behavior change, with another six to 18 months required for sustainability.

Digital Health and Medicare: An untapped and challenging opportunity

The U.S. population over 65 years old is projected to increase in 2020-2030 from 54.8 million to 72.1 million, or from 16.5 percent to 20.3 percent of the total population.⁹ The CAGR is highest for the 75-84 age cohort (4.5 percent),

followed by the over 85 cohort (2.8 percent) and the 65-74 cohort (1.9 percent); population growth in the under-65 age group is minimal at 0.2%.¹⁰ The age cohorts with the highest CAGR also have the highest average Medicare spending at \$13,194 for those 75 to 84 years old, and \$15,959 for those 85 or older; expenditures for the 65-74 age group are \$9,314.¹¹

Exhibit 2 - AGING POPULATION ASSOCIATED WITH RISING CHRONIC DISEASE BURDEN



Source: U.S. Census Bureau; Medicare Chronic Condition Warehouse

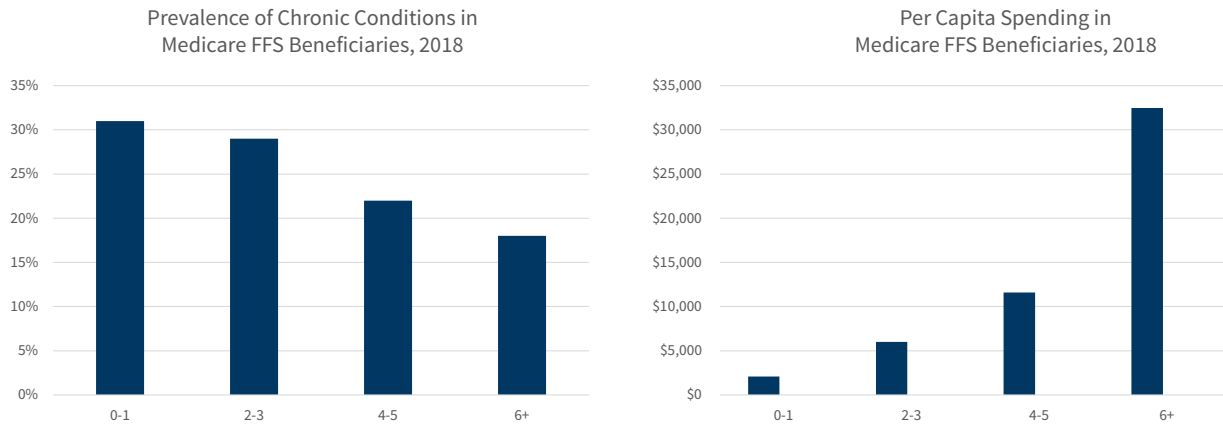
Higher spending among the aged reflects an increase in the number of comorbidities, worsening condition severity and a higher mortality rate. Serious chronic conditions are complicated by the presence of depression in 25 percent to 33 percent of patients and activity limitations.^{12,13} End-of-life spending accounts for 25.1% of Medicare spending and exceeds \$100,000 per patient.¹⁴ Heart disease and cancer are the leading causes of death, followed by COPD, stroke and Alzheimer’s disease.

Population health has been defined by Kindig and Stoddart as “the health outcomes of a group of individuals, including the distribution of such outcomes within the group.”¹⁵ Medicare spending is concentrated among the 18% of patients with more than six

chronic conditions and accounts for 54% of spending. Opportunities exist for digital transformation of the process of care for this cohort.

In 1998, Dr. Edward Wagner introduced the Chronic Care Model based on six principles: self-management support, delivery system design, decision support, clinical information systems, organization of healthcare and community.¹⁶ Wagner recognized the centrality of primary care physicians to manage and coordinate the care of aging patients with multiple chronic conditions across the continuum of care. Care extenders are increasingly being used to support primary care physicians.

Exhibit 3 - MEDICARE SPENDING IS CONCENTRATED: 18% OF PATIENTS ACCOUNTS FOR 54% OF SPENDING



Source: CMS.gov Chronic Conditions chartbook

Shortage of primary care physicians

There are currently 817 thousand active physicians in the United States, of which there are 109 thousand family practice/general practitioners and 106 thousand internal medicine physicians to treat the burgeoning chronic disease population.¹⁷ The number of active FP/GPs and internists grew by 5.4% from 2014 to 2019; 47 percent are over the age of 55. There are an additional 6,000 geriatric medicine specialists. A shortage of primary care physicians already exists and is projected to reach 21,400-55,200 by 2033.¹⁸

The physician workforce crises have been described as a mismatch between demand and supply. Opportunities exist to reallocate work to advanced nurse practitioners, physician assistants and others.¹⁹ Transfer of preventive care activities — cancer screening, risk reduction (smoking cessation, healthy nutrition, activity) — to nonclinical personnel such as health coaches could save 10% of clinician time. Productivity opportunities have also been identified in chronic and acute care, representing 36 percent and 47 percent of a physician's time, respectively.²⁰

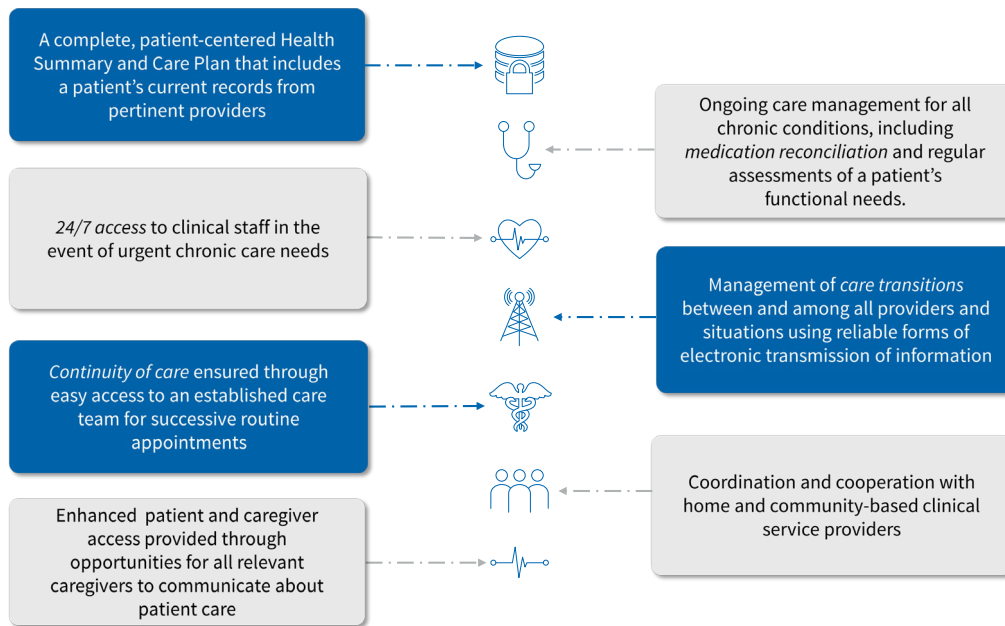
Digital transformation, delivery system design and case management

Successful delivery system redesign requires a focus on secondary prevention (early detection and intervention), tertiary prevention (treating established disease to prevent deterioration), closing gaps in care, managing care transitions (e.g., from hospital to home), treating behavioral health issues, facilitating self-management and, if appropriate, offering palliative care. Home-based care is preferential to hospitals and skilled nursing facilities. Digital transformation, as exemplified by telehealth, potentially enhances timely access and intervention and facilitates care coordination.

Digital transformation requires clinical information systems and decision support

Electronic medical records facilitate physician documentation, computerized physician order entry and closed-loop medication administration, provide clinical decision support and create a central repository for input by multiple providers. A problem list is clearly identified; quantitative test results are recorded. Health information exchange within and across health systems and stand-alone providers, clinical labs, pharmacies, community organizations, patients and their caregivers has been somewhat limited.

Exhibit 4 - CASE MANAGEMENT



Claims data are retrospective and consist of billing codes submitted by providers to payers. They provide a 360° view of resource utilization (e.g., high utilizers), facilitate segment review (by reimbursement code: ICD-10, CPT/HCPCS, DRG), identify compliance with medical guidelines (i.e., gaps in care) and adherence with the treatment plan (e.g., medication prescriptions), and stratify risk.

Most recently, the amount of patient-generated data has increased. Remote monitoring (connected health) tools have been developed for glucose (continuous or intermittent glucose monitors), hypertension, heart rate, respiratory rate, blood oxygen saturation (pulse oximetry), activity levels, heart rhythm (EKG), stages of sleep and other health data. Exception reporting is required for physicians interested in above- and/or below-threshold readings.

Systems have been and are being developed that integrate electronic medical records, claims and remote monitoring data, as well as social determinants of health. The latter include metrics related to healthcare access and quality, economic stability, education access

and quality, neighborhood and social and community context.²¹ Algorithms driven by artificial intelligence and machine learning are being developed and applied to case management platforms and elsewhere to generate actionable insights.

Digital transformation, organization of healthcare and the community

Digital transformation requires a strategic, longer-term approach and integration with quality improvement initiatives. It will accelerate the transition to a value-oriented, proactive, personalized and home-centric delivery model focused on the total cost of care. Primary care rather than procedure-oriented specialists require primacy.

Lifesprk, a homecare and hospice company, has identified seven elements of patient well-being: social supports, identity, purpose and passion, health and wellness, home and safety, thinking and memory, and finances.²² Community partnerships (e.g., churches, civic groups, social service agencies) should be formed to supplement traditional healthcare activities.

Conclusion

We are at the beginning of digital transformation in healthcare. Chronic diseases account for a disproportionate amount of spending. Opportunities clearly exist to increase patient engagement, improve

clinical workflow, and enhance clinical outcomes. Healthcare needs to become more efficient and effective for affordable sustainability. The alternative is likely Medicare-for-All or another single-payer initiative.

Endnotes

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