Discontinuity with the past: a curation-navigation-fusion model
Capacity to scale will be the turning point

Enabling technologies form a data-driven foundation for the health industry. The capacity to scale up new care models and settings through integrated pathways will deliver the quantum leap necessary to break with the past. In this section, we discuss a model comprised of several building blocks that structure the ecosystem and may deliver a clear route to achieve scale (Figure 1). We then address three key elements that we consider important in the transition toward an ecosystem.

We envisage an integrated system of interconnected attributes, all needed to operate and exist within an environment as a complex sum of its parts. Participatory health becomes possible through:

Unstructured and structured data feeds
- From personal devices as well as industry-generated information (such as clinical records and payer data) interfacing with curation and navigation technologies

Overall systematization behind the scenes
- Order is imposed on chaotic data through:
  - Cloud-based services, natural language processing, APIs, deep learning intelligence and data aggregation platforms
  - Integration of social determinants of health and behavioral, environmental and social network data
  - Insights based upon meaningful patterns for individuals and populations
Figure 1: Building blocks of a participatory health care ecosystem

**Global aggregators**
- Are formed where there are strong bonds between global players.
- Create a demand-driven marketplace based upon digital platforms delivering network effects, value and benefit.

**Data fusion platforms – the glue that holds the system together**
- Data fusion platforms are the glue that hold the system together. The point at which the curation and navigation data and insights interface in a structured way with the system as AI and analytics turn complex information into usable insights and new solutions.

**Personal health cloud (PHC)**
- Captures and curates a digital bio-portrait of deep personal data, including biometrics, and a lifelong narrative of health and wellness, and behavioral traits, including moods, emotions and propensity to act.

**Curation and navigation technologies**
- Technologies that steer through system complexity, connecting a patient through to diagnosis or treatment via a vast array of channels.

**Data fusion zone**
- The glue that holds the system together.
- The point at which the curation and navigation data and insights interface in a structured way with the system as AI and analytics turn complex information into usable insights and new solutions.
Building blocks

For individuals, the base is a **personal health and wellness cloud**. Highly sophisticated, this:

- Captures and curates a digital bio-portrait of deep personal data, including biometrics, a lifelong narrative of health and wellness, and behavioral traits, including moods, emotions and the propensity to act

- Inputs flow from environmental and social sources, including unstructured data feeds from wearables, IoT/loE, remote monitoring, environmental sensors and structured data from clinical information systems and payer portals

- Utilises multiple channels including mobile devices (phones and tablets), social media and wearables that link the individual to their PHC and to the broader health system

Curation and navigation: the interface between the consumer and the health care system

Functions as a care navigator or broker with tools that connect and capture, direct and deliver to assist consumers to make choices regarding the services they need and the experiences they prefer. A vital part of the participatory care team, curation and navigation technologies follow clear pathways and coordinated resources to help people make the right decisions regarding their care and to answer the burning questions of “where do I go for help?” and “what do I do next?”

These interfaces can automate many routine tasks and enhance the work of health professionals, freeing them to focus on more complex tasks and interpersonal relationships. Navigation is critical to improved communication and coordination of high-risk patients who typically have multiple chronic conditions and multiple health care providers in a number of settings.

Examples of curation and navigation models include:

- Solera Health (www.soleranetwork.com), which connects fragmented disease management programs into an integrated network to better coordinate care for chronic conditions and manage costs

- CommunityRx, a population health improvement program that combines ePrescribing and community engagement, and links patients with local resources and community-based services in a high-poverty urban area in Chicago for health and wellness management

- Next IT Health care (www.nextithealthcare.com), which uses cognitive-based digital health coaching technologies to support behavior change

At the health system-level, building blocks are those of:

- **Curation and navigation** connecting and steering a patient through the delivery system (real and virtual) from diagnosis through to treatment and lifelong learning

- **Data fusion platforms** are the glue that hold the system together. This is where the curation and navigation of data and insights interface in a structured way with the system as AI and analytics turn complex information into usable insights and new solutions

- **Supra-system** or ecosystem that is made up of strong bonds emerging between global players, with potential for alliances and benefits that trickle down through the system
Data fusion platforms: the glue that holds the system together

The integration of vast flows of data fused with AI form the backbone of the system where curation/navigation materials meet the health delivery system. Data fusion aggregates volumes of patient data from multiple sources (clinical, financial, social, environmental and operational) delivering insights into care management, risk stratification, performance and care gaps with respect to populations.

Through data mining, learning and predictions from captured data,33 “simple AI“ delivers an ability to organize, monitor and support a user, generate risk alerts from the data and deliver services. For example:

• Sentrian (www.sentrian.com) is a remote patient intelligence big data predictive analytics platform. It captures and analyzes a patient’s physiological data from a raft of sensors to build personalized disease deterioration models that detect subtle changes or warning signs in an individual’s condition and support clinical decision-making, especially for those at risk for hospital admission.

• HealthReveal (www.healthreveal.com) analyzes incoming data from medical records, claims, wearables/implantables, and directly from patients, to monitor continually high-risk clinical signals and sends diagnostic/treatment information directly to the patient and care team via mobile alerts.

Supra-system: strong bonds between global players

Digital technologies are borderless. As the inflection point is reached and the reduction of fragmentation becomes possible, an overarching supra-system or ecosystem will likely appear. The catalyst to shift to scale will be rising interest from players who see opportunity in a global ecosystem of peer value creation, such as large retailers, venture investors, large integrated networks and global technology companies. Network orchestrators, or “digital platform organizations that leverage a growing and virtual network of suppliers and customers,” will seek to build and manage global networked platforms.35 A supra-system will draw together dynamic groups of players (traditional and non-traditional) into communities that evolve and change over time, and new models of collaboration and competition will ultimately create value. For example, consider the potential for the “Fab Five”35 trusted brands of consumer, tech and electronics companies with a global audience to build upon existing platform know-how and forge partnerships with leading health industry players. Partnerships are likely to emerge that blend the technical capabilities of one partner with the service and health care expertise of another. In so doing, global alliances could offer interesting opportunities if they were to get off the ground. New business models will prompt a rethink of talent, culture and organizational forms. To illustrate:

• Finnish multinational communications and information technology company Nokia (www.nokia.com) acquired Withings digital health start-up in 2016. From this base, it intends to build out beyond consumer wearables and devices to advanced sensors, AI and insights arising from large-scale data.36

• Qualcomm, a multinational semiconductor and telecommunications equipment company through Qualcomm Life (www.qualcommlife.com) medical-grade connectivity network in partnership with Philips HealthSuite, aims to develop a scalable ecosystem.37
It is early days

The curation/navigation marketplace is beginning to emerge through start-ups and new organizations that are driving change. Governments, particularly in the United States through the Office of the National Coordinator for Health Information Technology (ONC), the United Kingdom through the National Health Service (NHS) and Australia through the Digital Health Agency, are setting ambitious digital Health Information Technology (HIT) and consumer-empowerment agendas. Improving access to quality health care is a priority in emerging health care markets and in economies facing extreme pressures through population aging and rising chronic health problems. Some countries are moving to digital platforms as a model for affordable, universal and patient-centric care. For example, when Estonia transitioned to a digital economy after leaving the Soviet bloc,38 a national e-health system was launched in 2008 that covers electronic health systems, patient portals and e-prescriptions. Telemedicine is under trial in remote areas of South Korea39 and nationally in Indonesia.40 Finland is positioning as a leader in digital and personalized health, actively promoting a start-up and venture investment culture with the Vertical Accelerator41 and exporting health technology through the Digital Hospital program.42 Japan is pursuing a portable personal health information system via cloud computing,43, 44 and Portugal is implementing a nationwide telemedicine and telemonitoring program across the national health system.45

"Creating a connected health ecosystem will establish structure, priorities and collaboration to truly advance the market, leading to a more cohesive and successful endeavor, eliminating the 'noise' and focusing on winning ideas and services."

Joseph Kvedar, MD Vice President, Connected Health, Partners Health care

The courage to lead: Mercy Virtual, a virtual care center first

The US$54 million Mercy Virtual Care Center, the world’s first virtual care center, opened in October 2015 in Chesterfield, MO. With no beds and no on-site patients, it’s a virtual facility connecting patients to the care they need 24/7, 365 days a year. A team of medical and health professionals, along with leading-edge telemedicine technologies, is housed in the four-story, 125,000m² building. Dr. Randy Moore, president of Mercy Virtual, spoke with EY about the innovative and forward-leaning medical care.

The facility is bed-free and technology-rich, with clinicians treating patients remotely, monitoring vital signs and health status and providing expert advice to patients and health professionals alike. Currently keeping an eye on care to patients at 34 hospitals in six states, Mercy Virtual supports and cares for people in their local communities. While virtual care reduces travel costs and inconveniences for patients, Mercy Virtual is focused on identifying a person’s medical needs earlier, reducing hospitalizations and keeping people healthier.

Mercy Virtual is improving quality of life and delivering a better care experience for the patient, which is paramount. As Moore notes, “We’re treating the sickest patients with the highest needs. They’re engaged, they’re getting care and their quality of life is much better.”

And the concept is working. For Mercy Virtual’s Engagement @Home patients, it has meant a 50% reduction in hospital admissions and emergency room use. Besides a 98% satisfaction by patients, staff too have experienced lower stress levels. Clinical teams have accurate data and the right decision-support tools at their fingertips. “We are reaching more patients in more places, providing care when and where they need it most,” said Dr. Moore. “In the past year alone, Mercy Virtual has served more than half a million people.”

The result of 10 years of hard work and a US$300 million investment is paying off with reduced costs and healthier patients. Insights gained inform future care and financial models to develop and extend the reach of the virtual care platform. Mercy Virtual is keen to partner with others, sharing what they know with a firm belief that transforming the entire health care process lies at the core of their strategy to optimize health seamlessly.

“We have shown the transformative power of virtual care.”

Randy Moore, MD, MBA

Mercy Virtual Care Centre can be found at https://www.mercyvirtual.net/.