OVERVIEW OF THE DIGITAL HEALTH LANDSCAPE

Digital health technology is emerging as an imperative in value-based care delivery models. For reasons including safety, geography, patient convenience, and others, digital health apps are gaining in volume and popularity in the market. This brief will keep you apprised of current and future trends in the digital health landscape.

While the health care system has been gradually transitioning to a more tech-enabled industry for several years, certain structural and cultural barriers have slowed the wide-spread adoption of many technologies. In a matter of months, the global pandemic has fast-tracked digital health care trends that have been primed and ready for greater investment and implementation. During the COVID-19 Public Health Emergency, technology has become a lifeline – necessary for receiving care, learning about the virus and safety protocols, projecting spread and health system capacity, communicating with loved ones, and more. The increased use of technology-enabled care protocols like telehealth and remote patient monitoring during the crisis has accelerated the acceptance and adoption of digital solutions for both health care professionals and their patients. As a greater number of payers and providers adopt value-based payment arrangements and innovative data management and analytic solutions emerge, digital tools will enable the collection and analysis of robust patient data to inform population health management strategies and equip providers to creatively inform and transform their approach to care delivery.

This brief takes a detailed look at the digital health landscape, analyzing major trends and recent merger and acquisition (M&A) activity, and outlines expectations for the future.

Background
What is Digital Health?

Digital health technologies operate on computing platforms and utilize connectivity, software, and sensors for health care related purposes. The application of these technologies is broad and encompasses the intended use to deliver health care services to patients but also as a medical product, in a medical product, as companion diagnostics, or as an adjunct to other medical products. Additionally, digital health technologies can be applied when developing or studying medical products.

Why has Widespread Digital Heath Adoption Been Slow to Date?

Though the applications of digital health technologies are many, adoption has been slow and unevenly distributed among various consumer populations. Even during the pandemic, when digital health services were a welcome alternative to potentially dangerous in-person visits, limited access to computers, smartphones, and broadband internet constrained the reach of technology. As a result, lower income households, older populations, and those living in rural areas all utilized virtual health services at lower rates than other Americans throughout the pandemic.

However, attitudes toward digital health technology may be the most significant barrier to advancing wide-spread adoption among consumers and providers. Awkward and unreliable digital health service experiences for consumers are coupled with valid concerns over trust, security, and privacy. For providers, implementing digital tools and services that seamlessly integrate into existing data infrastructures and their daily clinical workflows will be the key to widespread adoption, although achieving this is no small feat. Providers have had difficulty properly implementing new digital technologies; one survey revealed that many providers have no data governance plans and cannot share electronic health records (EHRs) securely. There is also an undersupply of skilled information technology (IT) staff who can integrate modern technology platforms that allow for interoperability and transparency with existing legacy systems.

Due to these challenges and others, widespread adoption of digital solutions in health care has been slow. However, over the past year and brought on by the necessity of the coronavirus pandemic, the health care industry has seen a massive increase in the adoption of digital tools. For example, prior to COVID-19 less than 20 percent of patients had ever utilized a telehealth visit, while today that number is closer to 60 percent. Likewise, in 2019, only 33 percent of consumers owned wearable smart devices, but in 2020, 43 percent report owning these devices.

The section below details several of the drivers motivating greater adoption of digital solutions in health care. While COVID-19 was a major catalyst for technology adoption, the pandemic has also led to certain structural and cultural changes that should perpetuate continuous use, assuming the regulatory and financial barriers can be overcome.

Drivers of Digital Health Adoption
Regulatory Flexibilities

The COVID-19 pandemic accelerated innovation and adoption across the digital health landscape by forcing consumers and providers to rapidly implement and use digital tools and services. Regulatory bodies extended flexibilities and altered reimbursement to enable this acceleration. For example, under the COVID-19 Emergency Declaration Blanket Waivers for Health Care Providers all providers that are eligible to bill Medicare for their professional services may offer and bill for telehealth services including audio-only telehealth. Significantly, the Centers for Medicare & Medicaid Services (CMS) also introduced payment parity for several telehealth services, reimbursing providers equally whether the service was delivered in person or virtually.

It is yet to be seen whether these reforms will be maintained beyond the duration of the COVID-19 pandemic among public and private payers, but the positive reception of these policies indicates some form of telehealth expansion will likely continue.

There is growing consensus among stakeholders that some pandemic-related telehealth expansions should be made permanent, including the expansion of tele-mental health services and the addition of virtual physical therapy. Several private payers expanded telehealth coverage and reimbursement policies alongside CMS during the pandemic, and providers have requested that telehealth flexibilities persist after the Public Health Emergency. The American Hospital Association, the Association of American Medical Colleges, and the American College of Physicians, among others, have submitted letters to policymakers outlining the benefits of telehealth and calling for the permanent adoption of regulatory expansion. Congressional leaders have likewise expressed their support.

Recent regulatory changes enabling digital health transformation have not been limited to telehealth nor only in response to the pandemic. In December 2020, CMS approved an e-prescribing standard intended to reduce provider burden and expedite patient access to needed medications. Under this new standard, clinicians will be able to see whether a drug requires prior authorization as they are prescribing it. Additionally, the US Department of Health and Human Services (HHS) has issued a series of rules intended to improve interoperability and access to data across health care stakeholders, including the CMS Interoperability and Patient Access Final Rule, the CMS Interoperability and Prior Authorization Proposed Rule, and the Office of the National Coordinator for Health Information Technology 21st Century Cures Act.

Together, these rules set requirements for certain payers and providers to improve their data infrastructure, easing the transfer of information and better enabling the development of mobile apps and other innovative technologies. Application program interfaces (APIs), one strategy CMS is encouraging stakeholders to adopt, allow data to be easily exchanged between different applications. Fast Healthcare Interoperability Resources (FHIR)

developed by Health Level Seven International (HL7) are specifically referenced in the CMS guidance and provide a standard framework for organizing data so it is easily retrieved and exchanged between systems through an API. Widespread adoption of these standards will allow health care organizations and technology vendors to develop and implement innovative digital tools that transcend the silos of traditional health care delivery. Given the aggressive timeline for implementation of some of the rules and the immaturity of the standards, entrepreneurial vendors are moving swiftly to offer solutions tailored to achieve compliance with the CMS rules. For example, Innovaccer is offering purpose-built solutions to facilitate compliance as well as clinical data integration (CDI) capabilities to optimize the value and utility of clinical data.

Workforce Demographics

As younger doctors enter the workforce, their familiarity with technology will drive increased adoption of digital health services. While older generations of medical professionals still show some resistance to newer technologies, younger generations are "digital natives" who already leverage digital tools in other aspects of their life and are quicker to adopt technologies in health care. Not only will these tools improve efficiency, they will also accommodate the changing work and lifestyle preferences of this younger generation, which tends to put a higher value on work-life balance than older physicians. If properly executed, digital health solutions have the potential to reduce burden and burnout in the next generation of physicians.

Consumer Demand

Just as provider preferences are evolving, consumer demand for digital offerings is increasing. In a recent survey, 57 percent of patients said they would use remote monitoring to manage health issues at home and 52 percent said they would use virtual platforms for routine health care appointments. While a majority of patients still

prefer in-person experiences, younger generations are increasingly seeking out digital experiences in lieu of traditional in-office visits. Though this surge in demand can be attributed in part to COVID-19, which made in-person visits risky and telehealth more accessible, patients responded well to the shift and many will continue to seek virtual services even after the pandemic has resolved, often preferring the convenience and short wait times of virtual care over in-person visits. Providers are responding to patient preferences, many citing consumer demand as the primary driver of investment in new technologies and data infrastructure.

Landscape

The pandemic has accelerated the development, adoption, and implementation of digital health technology. In addition to telehealth – one of the most ubiquitous digital health services – several other digital health technology tools have seen recent growth and new applications. Collectively, these digital tools support health care stakeholders in improving health care outcomes and transforming the landscape of the health care system.

Tools

Digital Health Coaching

Digital health coaching, including for mental health services and chronic condition management, has emerged as a $7 billion service market, with a strong growth outlook. Direct-to-consumer virtual therapy companies, like TalkSpace and BetterHelp, have become increasingly popular, enrolling over 1.7 million patients collectively. These services connect patients to qualified mental health care providers in a convenient app and offer therapy services through text message as well as video and phone visits. Both TalkSpace and BetterHelp work on a subscription model, charging between $260 and $400 for a variety of asynchronous and synchronous therapy options.

Health insurers are also investing in virtual behavioral health services for their members. UnitedHealthcare recently acquired mental health startup AbleTo for $470 million, which will be wrapped into the payer's provider services arm, Optum. Aetna has also partnered with AbleTo, in coordination with MAP Health Management, to extend virtual behavioral health services and coordination to members in select states. MAP specializes in peer recovery for substance use disorders, further expanding the range of services Aetna will provide to these members. Additionally, Cigna recently finalized its partnership with Ginger, bringing on-demand therapy and psychiatry services to its 14 million customers in employer-sponsored and individual plans.

In addition to mental health services, digital health coaching platforms are uniquely positioned to support the treatment of chronic conditions. These platforms capture patient data in real-time and pair patients with health coaches to provide individualized education and foster long-term behavior changes. For example, startup company Virta recently entered Series E funding and is valued at $2 billion. The company's combination of daily nutrition coaching, blood glucose monitoring, and virtual physician visits successfully reduced or eliminated the need for diabetes medication in 94 percent of patients after a year. MyBiometry, a Boston-based digital health start-up, provides similar services, using biomarker data, machine learning, clinical oversight, and coaching to help patients better self-monitor and manage asthma, with plans to offer products for additional conditions in the future.

Wearable Medical Devices

The influx of chronic diseases and lifestyle-influenced conditions are projected to expand the wearable medical device market by 26.4 percent by 2027. Today's more tech-savvy and self-directed consumer wants to take control of their own health, and this growing demand has encouraged insurers, providers, and technology companies to incorporate

wearable medical devices in their health care service offerings. Fitbit, one of the nation's largest producers of wearable wireless technology, has partnered with over 1,500 employers and 100 health plans to support members with their devices. The company recently signed its first Medicaid contract with Georgia's Medicaid plan, WellCare, to support patients with type 2 diabetes.

For risk-bearing providers, the widespread adoption of wearable medical devices will result in access to larger datasets. As more providers move to risk-based payment models, effective population health management and more accurate predictive analytics for patient care needs are critical to take advantage of the data assets this technology will provide.

Remote Patient Monitoring

As health care provider organizations are transitioning to value-based care, investing in wearable medical devices, including those with remote patient monitoring (RPM) capabilities, will allow providers to better support high-risk chronically ill patients and potentially reduce unnecessary care. Several companies have emerged to address these needs. Babyscripts, for instance, uses RPM to monitor pregnant women's blood pressure, weight, and glucose levels remotely and provides prenatal guidance and education as needed. Providers are notified of abnormal findings real-time and can consult with patients through the app or request an in-person visit. Another RPM company, Bardy Diagnostics, focuses on cardiac health and designed an adhesive ambulatory heart monitor that can be worn for 14 days at a time to remotely detect arrhythmias.

Advancements in RPM technology have helped to facilitate the ongoing shift to care in the home, described in detail in the ACLC's Primary Care Innovation Part III: An Analysis of Trends and Investments in Home Care. With RPM, providers can safely deliver care to patients with higher acuity conditions in lower cost settings and monitor

patients after discharge to reduce the risk of readmission.

Artificial Intelligence

Artificial intelligence (AI) is another powerful digital health resource being leveraged by stakeholders across the health care sector. AI encompasses several specific technologies, but put broadly, uses algorithms to automatically perform tasks and processes without the need for a human operator. The rising volumes of patient data and the growing complexities of those datasets are the primary drivers for a growing demand for the application of AI in the health care IT landscape. A recent independent survey of unpublished data shows that a high percentage of the respondents (approximately 60 percent) are looking to buy AI-enabled solutions in the next 6-18 months, with an emphasis on improving clinical operations and further improving overall health care outcomes.

Machine learning is one of the most common forms of AI, and is frequently used in health care to assess disease risk, determine optimal treatment protocols, and even to diagnose disease. Google Health's DeepMind, for instance, developed an algorithm that more accurately identified breast cancer in mammograms than human readers. Another Google subsidiary, Google Cloud recently partnered with Hologic to use machine learning to detect cervical cancer and pre-cancerous lesions from cytology slides. Kinsa Health thermometers detect more common illnesses, tracking customer temperatures and symptoms to suggest possible diagnoses and recommend treatments.

Natural language processing (NLP), another subset of AI technology, trains machines to interpret and analyze human language. ThinkAndor uses NLP in this way to collect and analyze data from electronic health records (EHR) and provide clinicians with actionable insights to guide care delivery. Some NLP technologies train computers to not only understand language, but to communicate directly with patients. One example is Sensely, a virtual

nurse assistant platform that boasts empathy-driven conversations via a digital nurse avatar, who checks in with patients on a daily or weekly basis and adjusts the conversation based on a patient's mood. Similarly, Woebot offers users on-demand therapeutic services via an automated chatbot. The founder says the anonymity of online services and the entirely automated experience can help users be more transparent and attract those uncomfortable with traditional therapy.

Blockchain Technology

Through blockchain, data can be collected and stored securely with the assurance that it will not be altered. The technology initially emerged to keep track of Bitcoin transactions, but because all transactions on a network are documented and immutable, it quickly became popular among health care stakeholders. When used in an EHR, blockchain can improve medical history tracking, ensuring health practitioners have a comprehensive file of patient information and provide better context for each visit. Combining blockchain technology with wearable medical devices can result in timestamped and verified records of all health data collected by the device. Blockchain can also provide digital identity validation, which patients could use to easily determine with which entities to share their health care data.

One company which has uniquely utilized a blockchain platform to improve health outcomes is doc.ai, which captures real-world data to generate insights for patients, providers, and researchers. The company performs digital health trials and allows consumers to conduct personalized medical research. Blockchain technology, as well as a new technology called "federated learning" (a distributed machine learning approach that can hold samples of data without exchanging them) ensure the security of personal health data. Doc.ai recently partnered with Anthem to launch a data trial using machine learning to predict allergy patterns based on patient characteristics and environments. Medicalchain uses blockchain to enable clinical

research, allowing patients to grant researchers access to specific aspects of their health data. The company also applies blockchain to offer a user-focused EHR and records interactions with data in a way that is auditable, transparent, and secure. Companies like BurstIQ and Factom similarly use blockchain to secure and share large patient datasets in a HIPAA-compliant manner, streamlining data sharing and administrative processes.

Digital Therapeutics

Digital therapeutics (DTx) deliver evidence-based therapies via software, like mobile health apps, that prevent, manage, diagnose, or treat a medical disorder or a disease. Unlike other tools on the digital health market, DTx must be approved by regulatory bodies and display clinical proof-of-concept. DTx have the ability to expand physicians' impact by overcoming time, place, and staffing constraints that limit health care delivery and elicit behavior change on a large scale.

Diabetes prevention and management is one area where DTx capabilities have thrived. The Centers for Disease Control and Prevention (CDC) now fully recognizes and approves 14 online versions of the National Diabetes Prevention Program (NDPP). Noom Inc. was the first fully virtual NDPP to be recognized by the CDC, but Omada and Canary Coaches, a branch of Canary Health, have also begun to offer digital versions of the NDPP.

DTx exist for other conditions as well. Propeller Health helps patients with asthma stick to their treatment plans and tracks data on flare-ups using a sensor attached to a patient's inhaler. Freespira delivers a 28-day protocol to treat patients suffering from post-traumatic stress disorder, panic attacks, and other behavioral conditions, and is currently the only DTx approved by the US Food and Drug Administration (FDA) to treat these conditions.

Telehealth

Telehealth adoption swept the nation during the COVID-19 pandemic and became the preferred method to deliver and receive care when rates of in-office visits dropped. Although this surge in adoption was born of necessity, it helped patients and providers recognize the convenience and accessibility of telehealth and overcome previous discomfort with the technology.

Early 2021 has already seen a flurry of major telehealth activity among health care incumbents and disruptors. In March, Amazon unveiled plans to expand its virtual health care service, Amazon Care, to all employees nationwide, with the intent to offer the telehealth services to other employers later this year. Shortly after this announcement, Optum announced Optum Virtual Care, the company's new virtual care product, which has now been deployed in all 50 states. Recent telehealth ventures from Amazon and Optum can serve as accelerators – inspiring other disruptors and creating opportunities for partnerships.

Other telehealth providers are also answering the call. For example, in March, large telehealth provider Doctor on Demand and clinical navigation platform Grand Rounds announced a merger agreement. The integrated, multibillion-dollar virtual care company will leverage Grand Rounds' navigation and patient advocacy tools with Doctor on Demand's virtual care services with the goal of helping coordinate every stage of the patient journey, including the administrative and financial processes.

Virtual-First Health Plans

Virtual-first health plans are capitalizing on growing consumer preferences for digital health and an increased adoption of telehealth services. By designing "virtual-first" health plans, insurance companies are making telehealth the foundation of their care delivery strategy, giving insured patients quick and convenient access to providers via virtual health services, with in-person care available when necessary or requested. These plans often offer tools to help patients determine the most appropriate site of care and hope to reduce costs by eliminating unnecessary in-person visits and improving care coordination by increasing patient touchpoints.

Several large insurers have recently rolled out virtual-first plans. Oscar Health, a technology-enabled insurance start-up, recently announced the launch of its zero-dollar copay Virtual Primary Care offering, which includes virtual visits with primary care providers, orders and referrals to specialists, and some in-home care services. Kaiser Permanente is launching Virtual Plus for members in Washington State. This plan offers phone and video visits, online chats, and email communication with Kaiser Permanente providers, home delivery of prescriptions, and in-person visits when telehealth is unable to address patient needs. Humana's On Hand, a partnership with Doctor on Demand, Anthem's recent partnership with K Health, and Aetna's partnership with 98point6, similarly aim to leverage virtual primary care services to drive patients' utilization of the health care system, making telehealth and other digital portals their primary access point.

Trends

Optimizing the Health Care Workforce

The COVID-19 pandemic has exhausted the health care workforce, creating staffing shortages and seeding job burnout. Attention is turning toward using analytics and automation to optimize workflows and reduce physician task load to help foster a resilient, flexible workforce. Services like healthfinch, recently acquired by Health Catalyst, integrate into EHRs to automatically identify care gaps and provide insights into clinical workflows, streamlining care decision-making and alleviating burden from physicians. Many tools reviewed in the previous section also relieve pressures on the health care workforce, allowing technology to supplement and extend the reach of clinicians.

Advances in Technological Capabilities

The COVID-19 pandemic has accelerated the pace of digital transformation and providers have been obligated to pivot quickly and respond to this change. As part of this adaptation, health care providers appear more willing to move toward adoption of cloud-based platforms to support their digital technology and health IT infrastructure.

Further, it is estimated that the amount of electronic data in the US health care system more than doubles every two years. As digital health technologies proliferate, the source, types, and amounts of data that will need to be blended and optimized for patient care will only increase. Most providers operate within a multi-vendor data analytics environment because it can be difficult for a single vendor to offer an integrated solution. Forward-thinking providers will seek to leverage innovative data frameworks that bring together disparate data sources, then ingest, process, and analyze health care data to derive clinical insights, ultimately enabling providers to act on those insights.

Similarly, Customer Relationship Management (CRM) tools are becoming an increasingly popular choice for providers and have proven to be effective at enhancing patient experience. An effective health care CRM solution can become a centralized data source to seamlessly integrate and manage patient information from different data streams, including communications, analytics, and other patient interactions.

Addressing the Social Determinants of Health

The COVID-19 pandemic has highlighted the significant role that social determinants of health (SDOH) play in determining health care outcomes. As technology enables the collection and integration of more robust patient data, the identification of social vulnerabilities like low literacy, a lack of transportation, and food or housing insecurity becomes more possible. For example, vendors like Innovaccer equip their

clients with externally-derived socioeconomic, demographic, and other data on individuals from public sources, third-party vendors, and from individual assessment data when available. This kind of intelligence informs more customized risk and care management activities through the use of proprietary regression techniques and is often calculated down to the zip code level.

> *Historically, the healthcare sector, among all other sectors, has been reluctant to catch up with the pace of adopting newer technologies. It can be attributed to several factors like data security, complex regulatory environments, or simply the need for preserving business continuity. Against this backdrop, with healthcare finally moving into the cloud, the boost to digital innovation is inevitable. Healthcare organizations today require a robust data foundation to gain deeper insights into population health and make intelligent evidence-based decisions. I believe the concept of an Enterprise Health Cloud would dramatically change the digital health space and bring in the capability for healthcare organizations to rationalizing value-based care operations and thus creating a more scalable, flexible enterprise data fabric. -David Nace, MD Chief Medical Officer, Innovaccer*

While factors related to SDOH have not traditionally fallen under the purview of the health care system, payers and providers, particularly those assuming risk for patient outcomes, are also increasingly adopting strategies to address the social needs of their patients, leveraging technology to connect them with supportive services to meet identified needs. Aunt Bertha, NowPow, and Unite Us are such screening and referral platforms. UniteUs recently expanded its network to partner with CVS

Health, Humana, and Ochsner in Louisiana. Rather than utilizing technology to facilitate referrals, some providers have partnered directly with technology companies to meet social needs. Both Uber and Lyft have recently announced partnerships with several provider organizations. For instance, Cerner integrated Uber capabilities into its platforms, allowing providers to schedule rides for patients directly from the EHR. Additionally, Florida Blue and Alignment Healthcare have partnered with Lyft and Uber respectively to build medical transportation benefits into certain health plans.

Unfortunately, studies have revealed that some digital health tools demonstrate less reliability in accurately tracking health data for people of color, posing a risk that the adoption of new technologies will perpetuate or exacerbate existing biases and inequities. Additionally, the "digital divide" limits the ability of technology to address the social needs of patients without access to broadband or connected devices, who are frequently among the most vulnerable. To adequately address SDOH, the health care system needs to overcome these access barriers, include diverse participants in research to develop innovative digital tools, and ensure technology is one of many approaches included in a multifaceted SDOH strategy.

Adoption of Value-Based Payment
To successfully manage populations under downside risk, providers must be able to identify and proactively close care gaps and accurately predict the care needs of attributed patients. This need existed prior to the pandemic, though the increasing pressure to move to risk-based payment models makes effective population health management an imperative. Digital health tools and the collection of more meaningful and robust patient data enable better population health management, but without the proper application can add distraction rather than clarity to the process. Companies like Innovaccer offer a comprehensive set of digital services to support a variety of stakeholders in their efforts to improve

population health and succeed under value-based contracts. According to a recent study of unpublished data that includes responses from over 3,000 health care professionals, more than 50 percent of respondents believe that the use of the right analytics with the right technology is the most crucial element for success in value-based care arrangements.

Owning the Digital Front Door
As discussed previously, health insurers have begun to offer virtual-first health plans to encourage greater utilization of virtual services over in-person visits. These plans allow payers to drive patient traffic toward specific settings and services that will be lower cost, but also allow them to own the data from the first interaction. This so-called "digital front door" will become increasingly important as payers continue to shift risk to providers through value-based arrangements, wherein both providers and payers need to critically examine patient utilization and predict future patterns.

Merger and Acquisition Activity
Last year was record-setting for digital health mergers and acquisitions, with a total of 64 digital health acquisitions recorded by the fourth quarter and expectations for even greater growth in 2021. In addition to the various deals already detailed in this brief, several recent acquisitions will likely have a meaningful impact on the digital health landscape. A global leader in consumer-centered virtual care was cemented when Teledoc acquired Livongo late last year for $18.5 billion. Teladoc's telehealth capabilities paired with Livongo's chronic disease management and remote patient monitoring services enables Teladoc to be the only virtual care organization to deliver full spectrum, whole person care. Also of significance is Evernorth's acquisition of MDLIVE, one of the largest telehealth vendors in the US, with services including urgent care, dermatology, therapy, and psychiatry. With this acquisition, Evernorth, Cigna's delivery services arm, hopes to leverage MDLIVE's strong virtual provider network to improve

affordability and accessibility of care for members. Optum's plans to acquire Change Healthcare also made an impression this year. If the deal is finalized (it is currently under review by the Department of Justice) it will allow Optum to offer additional software, data analytics, revenue cycle management, and advisory services to clients and clinicians and streamline clinical, administrative, and payment processes.

In addition to M&A activity among established players, new entrants also sought to take advantage of the booming market. In 2020, $7 billion dollars of venture capital funds went to health care start-ups and hundreds of new apps entered the market, including over 100 just dedicated to mental health. As the availability of digital service offerings grows, benefits executives warn that the market is becoming saturated with duplicative and expensive tools and advise digital health providers to focus on integration with insurers and developing a single platform to address a variety of patient needs and conditions.

Expectations for the Future

The recent advancements and accelerated adoption of digital health technologies have the potential to bring better insights to clinical care, streamline delivery, financial, and administrative health care processes, and empower patients to manage their own health data and access services at times and locations that are most convenient for them. The movement to value facilitates this trend, incentivizing providers and payers to focus on population health management and deliver care in lower cost settings.

As digital health technologies continue to mature, health care stakeholders must consider several weaknesses which have yet to be resolved, including:

- ► **Privacy and security of personal data** – For many consumers, 38 percent according to a recent survey, concern about the privacy

and security of data is the primary barrier preventing their adoption of digital health tools. While blockchain has the potential to protect health data, the increasing number and variety of organizations collecting, accessing, and sharing data could increase vulnerabilities.

- ► **Impact on cost and health outcomes** – Impact evaluations on patient outcomes and health care costs related to emerging digital health technologies are almost nonexistent. In fact, the few studies that have been conducted did not examine high-burden populations and did not measure impact in terms of reducing cost. It is imperative that policymakers and stakeholders in the digital health industry work in concert to establish an evidence-based environment where services and products are built to add value and improve patient outcomes.

- ► **Bridging the digital divide** – Digital health solutions offer low cost, convenient access to the health care system. Unfortunately, people who could most benefit from this sort of access – including low income populations, people living in rural areas, and seniors – may be unable to take full advantage of digital advances because they lack broadband access, connected devices, or have lower digital literacy. Overcoming these disparities will be essential to helping digital health reach its full potential.

- ► **Imperfect user interfaces** – While the adoption of digital tools and services skyrocketed during the pandemic, experts warn that some of this surge could be due to lowered consumer expectations of products in the face of a deadly virus. As the pandemic begins to resolve, consumers may be less willing to accept a less than perfect tool.

► **Integrated workflows and burden reduction** – While many technologies discussed in this brief specifically aim to reduce provider burden, when improperly implemented, the addition of new tools can increase clerical burden, time spent navigating EHRs, and "alert fatigue". In order for digital health to truly optimize workflows, tools must be carefully evaluated to consider usability under different scenarios and adopters must invest the time and resources necessary to properly train staff on their use.

Looking forward, digital solutions that empower patients to be informed consumers of health care and play a more active role in their own health care journey are sure to gain popularity. As a greater number of digital natives enter the working age population, consumers and providers alike will not only accept digital tools but expect them. Additionally, the market will see the emergence of new technologies applied to health care in innovative ways, including virtual reality treatments and the gamification of lifestyle change programs. Finding creative avenues to reach new customers, or existing customers in new ways, has brought a plethora of digital health technology tools into the hands of patients, providers, and payers. Though rapid growth and adoption has not come without its

setbacks, if stakeholders work together to address the barriers preventing digital health from realizing its full potential, the market is sure to continue

> *Days aren't far when care would be extremely personalized and collaborative at the grassroots level. This decade would be the decade of connected care, and this shift would be orchestrated by a data foundation. With the ever-increasing focus on digital health, organizations would collectively be evangelizing a more real-time and interoperable future, where care would come to patients at their comfort, right at the level of primary care. Invariably, powerful data platforms would be the cornerstone for success in the years to come, as we embark upon an exciting journey of healthcare transformation and patient-centricity.*
>
> *-Paul Grundy, MD*
> *Chief Transformation Officer, Innovaccer*

About the ACLC

The Accountable Care Learning Collaborative (ACLC) is a non-profit organization with a mission to accelerate the readiness of health care organizations to succeed in value-based payment models. Founded by former Secretary of Health and Human Services, Gov. Mike Leavitt, and former Administrator of the Centers for Medicare and Medicaid Services, Dr. Mark McClellan, the ACLC serves as the foundation for health care stakeholders across the industry to collaborate on improving the care delivery system. To learn more about the ACLC, visit accountablecareLC.org.

About Innovaccer

This brief was sponsored by Innovaccer. Innovaccer Inc. is a leading San Francisco-based healthcare technology company committed to helping healthcare care as one. The Innovaccer Health Cloud unifies patient data across systems and settings and empowers healthcare organizations to rapidly develop scalable, modern applications that improve clinical, operational and financial outcomes. Innovaccer's solutions have been deployed across more than 1,000 care settings in the U.S., enabling more than 37,000 providers to transform care delivery and work collaboratively with payers and life sciences companies. Innovaccer has helped organizations integrate medical records for more than 24 million people and generate more than $600 million in savings. Innovaccer is recognized as a Best in KLAS vendor for 2021 in population health management and a No. 1 customer-rated vendor by Black Book.