

Designing The Consumer-Centered Telehealth & eVisit Experience

Considerations for the Future of Consumer Healthcare

WHITE PAPER

Prepared for

**The Office of National Coordinator
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SUMMARY

This white paper covers key elements of design for consumer-centered telehealth. Given the rapid growth of telehealth and overall disruption of healthcare reimbursement and care delivery, the Office of the National Coordinator for Health Information Technology (ONC) commissioned a design session focused on this topic on April 10, 2015 with over 30 stakeholders in attendance.

Key findings from this design session include the following guidelines for a consumer-centered telehealth experience:

1. There cannot be friction for the user.
2. Team-based care must include smart triggers.
3. Real world and online world must converge.
4. We must be sensitive to data overload.
5. Consumers are the hubs of their own healthcare data.
6. Converge data for interactions to be safe and meaningful.
7. Expand role for care team based on new data triggers.
8. Integrate technology and human interaction in the physical world.
9. Increase focus on patient data security.

In addition, and while not necessarily endorsed by ONC, several issues were raised that warrant further exploration and consideration:

First, telehealth is seen as a means to scale quality, lower cost, and increase convenience, however, integration of data back to the primary health record is needed to avoid fragmenting care and potentially impacting patient safety.

Second, consumer-centered telehealth technologies are rapidly evolving to meet the “on-demand economy” expectations of consumers, which potentially offers them greater control over their health and data.

Third, consumers must own and have access to their data and fully integrated telehealth may offer this access, especially important for more disenfranchised, vulnerable, or rural populations.

Finally, interoperability efforts are essential to keep pace with the proliferation of telehealth solutions that are finding their way to consumers. The ONC efforts around this, as well as Blue Button, moving forward would assist in secure and safe data support to this rapidly evolving field.

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INTRODUCTION

The Office of the National Coordinator for Health Information Technology (ONC) engaged the behavior design firm, engagedIN, to conduct background research and facilitate a design session with leading experts in health information technology (health IT) and telehealth. The goal of this session was for the ONC to develop an informed perspective on the design and behavioral considerations for consumer-centered telehealth. This white paper was written to reflect the findings from this research, as well as novel solutions and forward thinking recommendations created during the live design session. The ONC was primarily interested in better understanding the potential of telehealth capabilities to enable a consumer-centered healthcare ecosystem.

Both background research and the design session findings point to the future for telehealth-enabled care delivery as bright. There has been a significant amount of innovation from vendors and startups as industry stakeholders (including employers, providers, and payers) have embraced, and consumers have become increasingly open to, new care delivery models. These new models have the potential to increase convenience, improve access and better manage costs. Industry associations such as the American Telemedicine Association (ATA), the Alliance for Connected Care, and the Center for Telehealth and e-Health Law (CTeL), have proposed thoughtful approaches to define and structure these new care modalities, and their work can be instructive for policy makers and regulators.¹ Finally, ensuring a safe and convenient integration of telehealth into mainstream care requires significant forethought and strategic planning. This implies engaging representatives of relevant stakeholders to co-design the telehealth-enabled delivery system of the future.

This white paper, although touching upon many aspects of the current state regulatory and technological ecosystem of telehealth, is not to be interpreted as a definitive assessment of the telehealth landscape. It also is not meant to be interpreted as a policy statement about the ONC's position on telehealth. Rather, it provides: a) an overview of the purpose, structure, and frameworks used to facilitate the design session, b) a cursory evaluation of the current state telehealth landscape (as implicated by output from the design session), c) current state challenges resolved with future state designs, and finally, d) a review of the principles for future telehealth design that were highlighted by design session participants.

¹ <http://www.connectwithcare.org/what-is-connected-care/>
<http://www.americantelemed.org/about-telemedicine/what-is-telemedicine#.VVBEwUIzpiM>
<http://ctel.org/wp-content/uploads/2014/10/CTeL-Telemedicine-Medicine-Principles-1.0.pdf>

DESIGN SESSION BACKGROUND

As part of its mission, ONC aims to coordinate the adoption and use of health IT to support broader objectives of integrating data and continuity across diverse care delivery models towards better health outcomes. Additionally, the draft Federal Health IT Strategic Plan (2015-2020), for which ONC has made commitments, includes a stated goal to expand the adoption and use of a broader set of technologies, including telehealth and mobile health. Telehealth adoption is further underscored and encouraged in the *Connecting Health and Care for the Nation: A Shared Nationwide Interoperability Roadmap*². This design session provided an opportunity to gather subject matter experts, and develop an understanding of current and future novel use cases for telehealth,

At the request of the ONC, engagedIN held a half-day session on *Designing the Consumer-Centered Telehealth Experience*. Hosted at the U.S. Department of Health and Human Services headquarters in Washington, DC on Friday, April 10th, 2015, the session included over 40 private and public-sector stakeholders with representatives from consumer, provider, payer, vendor, health IT organizations, and other federal agencies (Appendix A). Using design-thinking exercises, participants provided input and insight into potential future consumer healthcare experiences enabled by telehealth, as well as challenges due to current limitations. The format of a design session was selected as a means to extract the distinct features of a consumer-centered experience, as well as the next generation of design for consumers.

STRUCTURE OF DESIGN SESSION

The attendees of the session shared their perspectives in a fast-paced design session focused on the next generation of consumer-centered telehealth and eVisits. Participants self-organized into small groups and selected one of four consumer use case prompts to focus their design thinking: 1) rural access to care; 2) after hours urgent care; 3) post-acute passive monitoring with active outreach triggers; and, 4) chronic care passive monitoring with constant data and occasional outreach triggers. These use case prompts were meant to represent a range of real life clinical scenarios faced by patients within the current healthcare delivery system. The use cases also reflected scenarios addressed by telehealth and eVisit models today.

² "Connecting Health and care for the Nation: A Shared Nationwide Interoperability Roadmap"
<http://www.healthit.gov/sites/default/files/nationwide-interoperability-roadmap-draft-version-1.0.pdf>

Groups engaged in the design process in several steps. First, they were asked to design for empathy with their user. They developed the psychological, emotional, and demographic profile of their user persona (e.g., pediatric user with rare disease in rural community), the clinical scenario (e.g., ongoing health issues but limited access to specialist in-person), any geographic constraints (e.g., multi-hour drive from nearest medical center), and timing considerations (e.g., after hours). Next, teams used several behavioral and neuroscience concepts to guide their support or intervention design using real or imagined features of telehealth. They were instructed in designing for the subconscious and aggregate emotional experience of users. They then used their robust user personas as the foundation for spawning novel design solutions centered on the needs of their user. Participants were instructed to design without the constraints of current technology, workforce training, data integration, or other limitations. Their design solutions were meant to represent what would be possible in a strictly consumer-centered design. Participants were also asked to use “Fast Brain / Slow Brain” principles—principles renamed by engagedIN and derived from the work of Dr. Daniel Kahneman, a Nobel Laureate behavioral psychologist—to incorporate elements of behavioral psychology design into the solutions they had developed. These two groups of principles were defined as follows:

Fast Brain (aka System 1): Fast, automatic, frequent, emotional, stereotypic, (Example: all thoughtless habits, engrained routines, mannerisms, current use of technology (i.e. what we are used to), mental models, short-cuts, assumptions (biases), rules-of-thumb, heuristics, self-protective reactions (emotional or fight-flight) mindful, conscious)

Slow Brain (aka System 2): Slow, effortful, infrequent, logical, calculating, careful, sub/unconscious, familiar, habitual (Example: all plans, goals, problem-solving, intentional actions, instructions, training, tutorials, (most) first-times)

By incorporating elements of psychology- and behavior design thinking into the groups’ telehealth-enabled use cases, designs would be matched more closely to the thoughts and feelings of the consumer. Additionally, the groups, in conjunction with ONC counterparts, identified data flows and infrastructure that would be needed or developed to support these future state designs.

Ultimately, this session reflected for the ONC: 1) understanding how industry participants think about the evolution of telehealth and emerging technologies; and 2) identifying data interoperability challenges and barriers that may exist in the current infrastructure or may emerge as consumer-centered experiences evolve.

CHANGING TELEHEALTH LANDSCAPE

While telehealth is not new, numerous factors have recently been driving rapid growth and adoption of telehealth. According to Ken Research, in 2013, the market for telehealth generated annual revenue of \$9.6 billion, representing growth of 60 percent from 2012, when overall revenue was \$6 billion. This research also indicates that the telehealth market is expected to grow by approximately 32% compound annual growth rate (CAGR) from 2013-2018³. Factors spurring telehealth adoption include policy and reimbursement shifts, secular trends in technology, changing consumer preferences, and evolving technology. While the below is not a comprehensive list, let's examine some of the key drivers of these trends:

- **Continued Rise of Healthcare Consumerism.** 2014 saw the single largest one-year increase in enrollment in high-deductible consumer-driven health plans, from 18% to 23% of all covered employees⁴. As employers increasingly offer these plans to employees, and as employees increasingly shoulder a larger portion of out-of-pocket costs, telehealth becomes an increasingly appealing option for consumers to access care for the lowest-cost with the greatest degree of choice.
- **Consumer Expectations for Convenience.** Across many industries, consumers increasingly seek and expect convenience. Coined the "On-Demand Economy", this quest for convenience has attracted over \$4.8 billion in investment from institutional investors thus far⁵. This consumer mindset is now hitting healthcare, as seen in the recent rise of urgent care centers, eVisits, health kiosks, and an explosion of

³ "2015: Another Unstoppable Year for Telehealth." Alliance for Connected Care.

<http://www.connectwithcare.org/2015-another-unstoppable-year-telehealth/>. Accessed: April 20, 2015.

⁴ "Costs Slow as Health Care Consumerism Grows." Watts, Tracy and Umland, Beth. <http://ww2.cfo.com/health-benefits/2014/12/costs-slow-health-care-consumerism-grows/>. Accessed: April 20, 2015.

⁵ "The 'On-Demand Economy' Is Revolutionizing Consumer Behavior - Here's How." Jaconi, Mike. July 13, 2014. <http://www.businessinsider.com/the-on-demand-economy-2014-7>. Accessed: April 20, 2015.

health and wellness mobile apps, now numbering over 100,000⁶. This trend will continue to provide tailwind for the adoption of telehealth.

- ***Shifting Revenue Models that Reward Value, Not Volume.*** Today, 744 Accountable Care Organizations (ACOs) cover a total of 23.5 million lives⁷. The number of organizations and covered lives has grown more than tenfold since 2011. The January 2015 announcement by the U.S. Department of Health and Human Services (HHS) to move 50 percent of Medicare payments towards alternative payment models by the end of 2018 will bolster this trend⁸. UnitedHealthcare, the largest payer in the U.S., announced in February 2015 that its total payments to physicians and hospitals that are tied to value-based arrangements have nearly tripled in the last three years to \$38 billion. Rewarding providers for value requires moving encounters to lower cost options while maintaining quality care delivery. Telehealth will be a critical pillar enabling the cost-effective and safe provision of value-based care.
- ***Ubiquitous and Affordable Mobile Broadband.*** Globally, and in the United States, smart phone adoption and broadband use are on the rise. It is estimated that by 2016, smart phone subscriptions will outnumber those for basic phones, and mobile data traffic is set to grow at a compound annual growth rate of 40 percent⁹. With an almost ubiquitous mobile technology and data-enabled infrastructure, the stage has been set for healthcare to deliver new, more convenient access points for consumers needing to interface with the medical system.

⁶ "Mobile health app revenue to grow tenfold by 2017, study predicts." Frank, John. May 22, 2014.

<http://www.modernhealthcare.com/article/20140522/BLOG/305229997>. Accessed: April 20, 2015.

⁷ "Growth and Dispersion of Accountable Care Organizations in 2015." Muhlestein, David. HealthAffairs Blog. <http://healthaffairs.org/blog/2015/03/31/growth-and-dispersion-of-accountable-care-organizations-in-2015-2/>. Accessed: April 20, 2015.

⁸ "Better, Smarter, Healthier: In historic announcement, HHS sets clear goals and timeline for shifting Medicare reimbursements from volume to value." January 26, 2015.

<http://www.hhs.gov/news/press/2015pres/01/20150126a.html>. Accessed: April 26, 2015.

⁹ "Ericsson Mobility Report On The Pulse of the Networked Society. February 2015.

<http://www.ericsson.com/res/docs/2015/ericsson-mobility-report-feb-2015-interim.pdf>. Accessed: April 20, 2015.

AN INDUSTRY DEFINING ITSELF

The increased demand for, and adoption of, telehealth solutions has resulted in a diverse and expanding industry of stakeholders and definitions. While the ONC is not proposing any policy position on defining telehealth, it is worth noting that many definitions exist to define this space. Prior to the design session, attendees were briefed by leaders in federal government (Marc Hartstein of the Centers for Medicare & Medicaid Services (CMS) and John Peters of the US Department of Veterans Affairs (VA)) on existing telehealth policies and the below were some of the definitions shared. Also included are some definitions from trade associations – note this is not a comprehensive list of all telehealth definitions that exist.

DEFINITIONS

[01]	Medicare Telehealth Services
	Limited to services that normally require a face-to-face interaction with the patient's physician such as an office visit or a psychotherapy service. These services are furnished via a telecommunications system where the physician or practitioner is not at the same location as the beneficiary. The communication must include two-way, real-time interactive audio and video communication between the patient and physician or practitioner ¹⁰ .

[02]	Medicaid Telehealth
	To improve a patient's health by permitting two-way, real time interactive communication between the patient, and the physician or practitioner at the distant site. This electronic communication means the use of interactive telecommunications equipment that includes, at a minimum, audio and video equipment ¹¹ .

[03]	Veterans Health Administration	
	Clinical Video Telehealth	Real-time video consultation that covers over 45 clinical specialties.
	Home Telehealth	Care and case management of chronic conditions and provision of non-institutional care support to patients.

¹⁰ Presentation by Marc Hartstein to Office of the National Coordinator for Health Information Technology. April 10, 2015.

¹¹ "Telemedicine. <http://www.medicaid.gov/Medicaid-CHIP-Program-Information/By-Topics/Delivery-Systems/Telemedicine.html>. Accessed: April 20, 2015.

		Uses in-home and mobile technologies to manage diabetes, chronic heart failure, hypertension, obesity, traumatic brain injury, depression, etc.
	Store & Forward Telehealth	Includes services where images or other data is captured and sent for reading later by a clinician ¹² .

There also exist definitions put forth from trade groups and industry associations:

[04]	American Telemedicine Association
	Telemedicine is the use of medical information exchanged from one site to another via electronic communications to improve a patient’s clinical health status. Telemedicine includes a growing variety of applications and services using two-way video, email, smart phones, wireless tools, and other forms of telecommunications technology ¹³ .

[05]	Alliance for Connected Care
	Connected Care is the real-time, electronic communication between a patient and a provider, including telehealth, remote patient monitoring, and secure email communication between clinicians and their patients ¹⁴ . The current telehealth landscape is comprised of solutions ranging from virtual visits (also known as eVisits) to “store and forward” (remote imaging and diagnostic capabilities) to remote patient monitoring (using devices and communications where the patient stays).

INTEGRATED VS. FRACTURED CARE & DATA

Concern over data cohesion emerged as a key discussion point in the design session. Telehealth solutions vary widely in the degree to which they integrate back into the traditional delivery system, connect the Primary Care Physician (PCP)-patient relationship and load to the main health record. As a result, tradeoffs between consumer convenience and data cohesion have

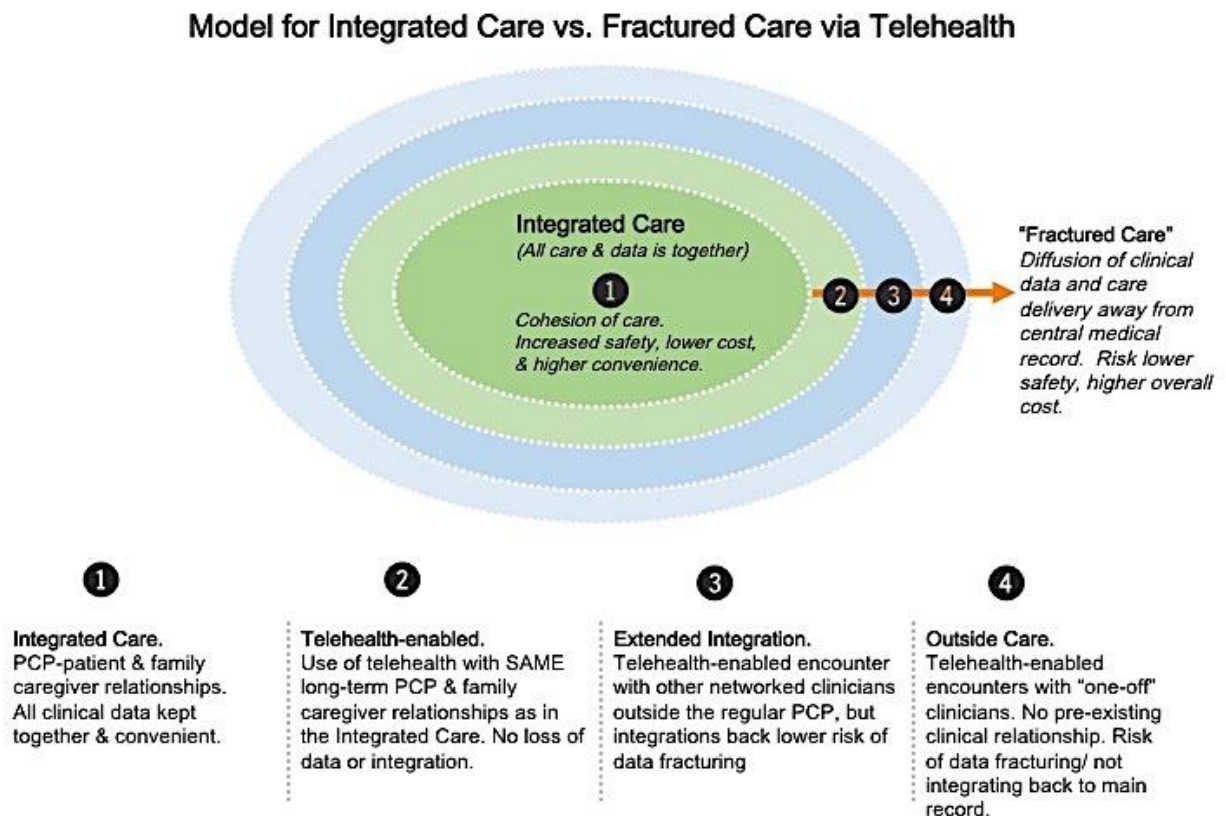
¹² Presentation by John Peters to the Office of the National Coordinator for Health Information Technology. April 10, 2015.

¹³ “What is Telemedicine?” <http://www.americantelemed.org/about-telemedicine/what-is-telemedicine#.VTKhC5PthKo>. Accessed: April 20, 2015.

¹⁴ “What is Connected Care?” <http://www.connectwithcare.org/what-is-connected-care/>. Accessed: April 20, 2015.

arisen as a potential issue for patient safety and continuity of care. In Figure 1, we represent a model of various degrees of tradeoffs that telehealth could enable care and data. This cursory model offers a schema for evaluating how individual telehealth solutions are contributing to integration or whether they are potentially fracturing care.

Figure 1. Model of how telehealth can promote integration, versus fracturing, of care and data.



Four levels of integration-to-fracturing of care.

[1] Integrated Care. The center of this model, level 1, contains 100% of the consumer’s health relationships, whether with primary care provider (PCPs), family/caregivers, or ancillary professionals. It represents 100% of all health record data. It is the same as many industry terms, synonymous to the “medical home”, “universal patient record”, and supports patient (and caregiver) self-efficacy. Additionally, consumers, and their care team, gather,

diagnose, translate and act on healthful insights based on their health literacy.

[2] Telehealth-enabled. Due to disruptive forces aforementioned, such as the need to scale affordable, quality care, telehealth in this level supports the original Integrated Care relationships between the consumer and their care team (including caregivers). Telehealth simply enables the in-person care team to be more efficient, available, and scalable.

Telehealth solutions that qualify as level 2 would not fundamentally alter pre-existing in-person, long-term care team relationships, but use technology to enrich them and capture all data and care back to the main health record. An example of a level 2 telehealth use case would be a live, secure video-enabled consult between a doctor-patient who have a pre-existing, long-term relationship as long as all data from the consult loaded back to the patient's primary medical record. Diagnoses could be made based on thorough knowledge of the patient's history and include the use of peripheral telehealth devices. At level 2, a pre-existing relationship is simply continued by using technology as an enabler.

[3] Extended Integration. In level 3, telehealth still helps to integrate care but the risk of fracturing of care and data emerges due to the extension of care through additional provider relationships that are still peripherally linked to the care team. An example would be nurse remote monitoring that supports the PCP-patient relationship but adds additional clinicians and ancillary professionals. Other examples include referrals to specialists, use of telehealth in rural clinician shortages, home visits, integrated urgent care and online eVisits with referral clinicians. Even though the sheer number of additional clinicians may pose a risk for fracturing, the data from each of these ideally would be integrated back into the primary health record, thereby mitigating it.

[4] Outside Care. The farthest out, layer 4, of the model, and furthest from the center of Integrated Care, would lay telehealth that functions completely separately from the existing care team and their network. This would include encounters that are one-off, stand-alone, like some employer-sponsored eVisits, community-based retail clinics and kiosks, as well as solely consumer apps and devices.

Telehealth technologies in this layer run the risk of diffusing patient data and disrupting continuity of care without an integrated data. Risks to the

consumer in this layer may include repeated tests, incomplete diagnoses (due to partial data), inappropriate use of telehealth where in-person exam is indicated, medication interactions, and low patient adherence. This outer layer of the model has seen rapid proliferation of new models and companies too numerous to provide a comprehensive review here. The following notable examples show the types of innovations increasingly available to consumers today:

Employer-sponsored eVisits: Companies such as Teladoc, American Well, MDLive to name a few are made available to employees of large companies by their insurance carriers or employers. These offerings tout convenience and improved access to after-hours care. Some early evidence from a study produced by the RAND Corporation on Teladoc demonstrated improved convenience, and perhaps cost, for a limited set of clinical conditions. The study's population of telehealth visitors made more than one third of their Teladoc visits on weekends or holidays, and experienced shorter clinician wait times¹⁵. Despite its convenience, the information generated from these encounters do not currently get integrated back into the patient's medical record, and data does not flow back into the core, presenting risks outlined above.

Retail-pharmacy telehealth offerings: Retail pharmacy chains have also been entering the telehealth space. A notable recent example is the partnership announced between Walgreens and MDLive, providing access for consumers to board-certified doctors through MDLive's platform (initially offered only for customers in California and Michigan)¹⁶. While this relationship could create the potential for greater care coordination and information flow between pharmacy records and providers, driven by the consumer, it still lacks the fundamental connection back into the Core medical record held by providers and other care team members.

Payer-sponsored eVisits: In April 2015, UnitedHealthcare announced it will be expanding consumers' access to affordable health care options with its virtual physician visit benefit coverage. By the end of 2016, up to 20 million commercial plan participants across the country will be able to choose from in-network virtual care provider groups, then see and speak with a doctor

¹⁵ "First Assessment of National Telemedicine Services Finds Efforts Appear to Expand Access to Acute Medical Care." February 4, 2014. <http://insurancenewsnet.com/oarticle/2014/02/04/first-assessment-of-national-telemedicine-service-finds-efforts-appear-to-expand-a-455307.html#.VTLKqPthKp>. Accessed: April 20, 2015.

¹⁶ "Walgreens Joins MDLive To Access Doctors Via Telemedicine." December 8, 2014. <http://www.forbes.com/sites/brucejapsen/2014/12/08/walgreens-joins-mdlive-to-access-doctors-via-telehealth/2/>. Accessed: April 20, 2015.

using real-time audio and video technology to obtain a diagnosis and any necessary prescriptions for minor medical needs.

While there has been an explosion of new offerings and models of telehealth, two things are clear: 1) there is a real need for additional objective evidence on the cost, quality, and access implications of these new telehealth innovations far from the core, especially as they move from niche offerings to mainstream; and, 2) the need to solve for consumer-driven data exchange is emerging as a critical element in supporting these models and connecting them back to the Core. An early initiative that moves us closer in this direction is the Blue Button Initiative, spearheaded by the ONC. This initiative focused on giving consumers easier online access to their health data, enabling portability so that patients can securely move their data as they please; rather than seeing the data reside in legacy systems owned by payers and health systems. However, Blue Button ubiquity is far from complete and the growth of telehealth further identifies a fragmentation risk for which industry should align and expand Blue Button. As a related opportunity, additional focus is needed on enabling data exchange in order for these new models to have positive, widespread impacts on care delivery without fracturing care or jeopardizing patient safety.

CHALLENGES IDENTIFIED FROM THE CONSUMER-CENTERED TELEHEALTH DESIGN SESSION

Participants in the Consumer-centered Telehealth Design Session identified common requirements and challenges as they designed for the next generation of consumer telehealth. Each group of participants created a use case for future telehealth that was highly convenient, and centered around consumer needs. This was perhaps a different focus from existing care delivery entities that may focus on their own facility's needs, e.g. covering brick and mortar costs with revenue from in-person care, at the consumer's expense and inconvenience. These designs, which will be discussed in greater detail in the next section, yielded basic tenets of a consumer-centered design. However, the participants also highlighted several challenges existing in the current state environment and, among these, three themes of challenges emerged across all of the groups:

1. Payment for Telehealth Services

Current reimbursement from Medicare is limited to a subset of the telehealth use cases existing in the market. In the commercial market, employers have embraced specific uses of telehealth as well. According to a 2014 Towers Watson survey, 37 percent of employers expected to offer their employees a

telehealth benefit by 2015 for nonemergency issues¹⁷. Despite a recent growth in reimbursement models for telehealth services, the consumer-centered telehealth use cases of tomorrow will require additional forms of reimbursement for consumer adoption. Some current reimbursement rules constrain activities that could be cost savings (e.g., group visits or leveraging ancillary clinical staff for patient care in certain use cases).

2. Physician Licensure

Currently, most states require physicians to be licensed to practice in the originating site's state, and some states require providers using telehealth technology across state lines to have a valid state license in the state where the patient is located. Opportunities are growing for multi-state or regional consortiums for licensure with some experts pointing to federal licensure as a possible solution. Either way, a streamlined physician licensure process, that also tracks and exacts accountability for bad actors, will enable an expansion of telehealth, and will open up the breadth and depth of provider supply¹⁸.

3. Care Fragmentation and Data Fracturing

Recent research by the RAND Corporation indicated that telemedicine may expand access and reduce costs for specific types of health concerns. However, researchers who performed the study indicated that further investigation is needed to better assess the quality and safety of these services, and raised concerns of care fragmentation from not having access to the same information that could be gathered during a live patient exam or diagnostic test. Further questions exist with regard to what happens to the data collected during the telehealth consult. There was near unanimous consensus from design session participants that new use cases would generate enormous volumes of data, which would need to be integrated back in a meaningful way into the consumer's Core record of care with the PCP¹⁹.

¹⁷ "2015: Another Unstoppable Year for Telehealth." Alliance for Connected Care.

<http://www.connectwithcare.org/2015-another-unstoppable-year-telehealth/>. Accessed: April 20, 2015.

¹⁸ "Are there state licensing issues related to telehealth?" <http://www.healthit.gov/providers-professionals/faqs/are-there-state-licensing-issues-related-telehealth>. Accessed: April 20, 2015.

¹⁹ "First Assessment of National Telemedicine Services Finds Efforts Appear to Expand Access to Acute Medical Care." February 4, 2014. <http://insurancenewsnet.com/oarticle/2014/02/04/first-assessment-of-national-telemedicine-service-finds-efforts-appear-to-expand-a-455307.html#.VTLKqpPthKp>. Accessed: April 20, 2015.

FUTURE STATE: CONSUMER-CENTERED TELEHEALTH DESIGN PRINCIPLES

Design session participants, leaders in their respective organizations, developed a compelling set of principles for how future, consumer-centered telehealth can be designed to deliver safe, efficient, and consumer-centered care. Output of the session, distilled below in a set of thematic principles, offered an important first step in understanding potential and novel use cases for the future of telehealth, and the data infrastructure and integration required to enable them. Participants and ONC representatives were unanimous in the belief that future workshops and initiatives should be scheduled in order to recognize and represent additional important viewpoints.

Nine (9) key principles of consumer-centered telehealth design emerged across the work product each group developed:

1 There cannot be friction for the user.

Solutions must be easy for patients to use. As telehealth has evolved from early prototypes and gained consumer appeal, the user interface and experience has inevitably become more attractive and easier to navigate. These are table stakes for consumer-centered health information technology (HIT), in contrast to historically less attractive and more complicated enterprise type HIT software. Health is but one item competing for consumer mindshare. Consumer-centered applications must consume less, not more, mindshare to enable a seamless and efficient interaction with the healthcare system. One group suggested tackling the issue of convenience through an “Uber for Urgent Care”, reducing the search costs for identifying available after-hours clinicians, and having emergency responders or doctors come to the patient’s home.

2 Team-based care must include smart triggers.

The notion of team-based care isn’t new. However, what participants recognized was that informing and motivating members of the team to perform behaviors on behalf of the patient requires smart trigger design. Participants referenced addictive behavioral loops that are prevalent on existing social platforms (such as Facebook and Instagram), and which encourage users to continuously check the social platforms for updates. Their intent was to reference those similar behavioral patterns through

“positive triggers”, telling the patient all that they have done well, and incorporating elements of altruism, whereby members of her family and engaging their intrinsic motivations.

3 Real world and online world must converge.

Increasingly, the online world and “real” world are converging as mobile technology becomes increasingly pervasive in our lives. The next generation of telehealth solutions would be consumer-centered by perfecting this balance. It would be used to help people connect to their real world healthcare providers for conveniently and continuously using technology, rather than creating alternate and disjointed care episodes with virtual providers who do not have an integration point into the person’s real world. One group, designing for the needs of a troubled youth, designed a solution that leveraged online social media and resources affiliated with the school—meeting the youth where she was both online, and in-person. The data flow between the online and in-person would enable meaningful interactions to support an intervention.

4 We must be sensitive to data overload.

With an increasingly digital world, and with the proliferation of connected health devices such as wearables and patient monitoring, we must recognize the present problem of overwhelming patients and providers with the ever-increasing volume of data. Consumer-centered telehealth solutions must leverage smart algorithms and preference-sensitive alerts to cut this data down to size and reduce user fatigue. One group identified this increasing volume of data—both the traditional (clinical) and non-traditional (emotional, preferential) data—and designed a solution that enabled patients, providers, and care team members to set notification alerts based on what mattered to them. This was especially noted as providers now are inundated with exponentially expanding data streams generated from connected technologies.

5 Consumers are the hubs of their own healthcare data.

Participants raised the point that, in an increasingly mobile world, there exists an increasingly important role for the consumer to play in managing and sharing medical data. By serving as “quarterbacks” for their health data, consumers can ensure that all required stakeholders have access to the information required for safe and cost-effective care. With an ever-growing

number of touch points with providers, the “consumer as data quarterback” will become an increasingly important role. One group explicitly addressed this by allowing the patient to direct her data through the app, to pre-verified/licensed (as indicated by an imagined certification icon) providers and care team members, before an online visit. It was recognized that in the cases of patients who are unable to direct their data, such as vulnerable populations, the system must create default advocates.

6 Converge data for interactions to be safe & meaningful.

A recurring theme across designs was to combat the fragmentation of data across sites and modes of care. In all of the groups’ future state designs, data freely flowed from clinical interactions leveraging telehealth solutions back into patients’ Core medical records. Without this convergence, these telehealth-based interactions run the risk of creating opportunities to further fragment care and create new data silos.

7 Expand role for care team based on new data triggers.

Groups included many ways to increase ability to gather additional contextual information about the patient through mobile technology. In addition to clinical data, groups discussed the increasing ability to marry psychological, emotional, and other data elements with clinical data collected about the patient. Participants felt that new alerts based on these contextual data elements could increase consumer engagement as well as leverage the use of non-clinicians on their care team. One group also viewed this information as a means to generate patient insights and self-awareness—when clinical data is married to contextual data, for example behavioral or GPS data, an opportunity is afforded to help educate the patient about the clinical implications of non-clinical lifestyle patterns.

8 Integrate technology & human interaction in the physical world.

The groups’ consumer designs implied the need to intelligently integrate technology and humans. In one design, technology drove human interaction (e.g., an Uber-like application that resulted in a clinician coming to the patient), and in another (from that same group), the humans enlisted a technology interaction (e.g., a physician prescribed drugs, which were delivered by a drone to the patient’s front door). What was clear across teams is the many new ways in which smart design can drive intelligent

workflow, leveraging both human-based and technology-based interaction for consumer-centered healthcare.

9 Increase focus on patient data security.

As the number of PCP-patient touch points and data continue to rise with new technologies and use cases, the groups agreed that consumer-centered telehealth must ensure the safeguarding of patient data. One group explicitly designed into their solution a method to validate care team and provider information in order to ensure patients were interacting with authorized individuals. An emerging theme from the group discussion was that as these new models evolve, so too must security standards and enforcement mechanisms, while allowing for expanded innovation and consumer focus.

These principles, although developed in the context of future consumer-centered telehealth experiences, can inform solutions in the current state, and serve as the platform for informing how regulation might support and serve consumer-centered telehealth.

CONCLUSION

Combining the results of industry trends with those of the Designing Consumer Telehealth design session, the future of telehealth-enabled care delivery has the potential to disrupt the current healthcare system and create a truly consumer-centered system. Innovators from a range of industries and disciplines are creating new ways to access care, leveraging an increasingly interconnected set of mobile devices and services. Federal agencies such as the ONC are taking increasing interest in understanding how the industry is evolving. Major consumer industry players, such as Walgreens, UnitedHealthcare, Aetna, and others are making these services available to their customers at scale.

The continuous advances in technology are expected to create new and, as of yet, unimagined ways for consumers to interact with each other, access clinical professionals, and direct more of their own care. Furthermore, consumer perceptions of healthcare will continue to evolve and become subject to typical consumer behaviors such as shopping, ratings/reviews, and behavioral economics. The consumer perception of their health as a thing to be managed, much like a 401(k) account, will develop as new consumer-grade devices and tools give them greater access to and control of their own health and data.

The healthcare, and specifically telehealth, industry must respond to this evolution through continuous innovation and experimentation. Risk-bearers must continue to offer solutions that increase access and convenience while controlling costs for their populations, and providers must explore and test new ways to interact with patients, without forfeiting or ignoring basic principles of patient safety, quality, and regulation. And while this innovation presents much opportunity for improving access, and better controlling costs, it must not come at the expense of patient safety and quality of care.

Currently an impedance to innovation and safety combined, health data must flow around the consumer. Data that exists at the core of the PCP-patient relationship must be available outside of the core, in order to expand the overall diameter of cohesive continuity of care and prevent diffusion, and fracturing. Patient data must be available wherever the consumer clinically needs it *and whoever is acting on their behalf at their direction*. Existing silos would need to be broken down, and consumers must be empowered and encouraged to take greater ownership and responsibility for ensuring data are available to providers with whom they work at all points outside of the Core. For consumers who may not have the literacy, self-efficacy, or

functional capacity to fully direct their data and care, data flow and consumer-centered design is even more critical. Telehealth may serve as an important lifeline to the disenfranchised, vulnerable, or rural populations. This data “liquidity” appears essential to enabling patient safety and quality of care for the rapidly evolving future of consumer-centered telehealth solutions.

And while it seems that telehealth is poised to move into its next phase of explosive growth, regulators may play a key part in ensuring appropriate frameworks that not only enable innovation and data liquidity, but also enforce appropriate standards of care. Organizations like the ONC are actively evaluating the implications of these future telehealth use cases for data sharing and interoperability. Indeed, existing initiatives towards data consolidation taken on by the ONC, such as Structured Data Capture, and data provenance, are steps towards this end. This document, and the design session that served as the major input to its content and key areas of focus, were only a first step. Additional work sessions and planning will be required in order to build upon the initial output of the design session.

APPENDIX

List of attendees and organizations represented:

Name	Organization
Nina Antoniotti	Southern Illinois University School of Medicine (RN, MBA, PhD)
Dr. Thomas Morrow	NEXT IT
Dennis Robbins	Chief Health Innovations Officer KPN Health, Dallas and Adjunct Professor, NYU & Pepperdine
Erin Mackay	Associate Director, Health IT, National Partnership for Women & Families
Terry Mayer	CEO, AccessCare Telehealth
Matt Thorn	Carena, Inc
Dr. Jim Mault	Qualcomm Life, CMO (Medical)
Karissa Price	Care Innovations CMO (Marketing)
Dr. Wesley Valdes	Medical Director Telehealth, Intermountain
Dr. Seth Bokser	Clinical Informaticist and Medical Director of Information Technology for the UCSF Women's and Benioff Children's Hospital
Dr. Adams Dudley	Associate Director for Research at UCSF's Institute for Health Policy
Carson Porter	Healthcare Solutions Connection
Nick Dawson	Society for Participatory Medicine
Elizabeth Joseph	University of Mississippi Medical Center, Center for Telehealth
Dr. Prashant Deshpande	MD, FAAP
Krista Drobac	Alliance for Connected Care
JP McMenamin	McMenamin Law Offices, LLC
Marcia Levetown	Healthcare Communication Associates
Elliot Vice	Director of Government Affairs, National Council of State Boards of Nursing
Dr. Rebecca Hafner-Fogarty	CMO, Zipnosis
Karen Scott	Director of Marketing & Product Innovation, United Healthcare
Nate Gladwell	University of Utah Health Care
Lisa Robin	Chief Advocacy Officer, Federation of State Medical Boards
Barbara Ryan	Office of the Army Surgeon General
Dr. Chris Gibbons	Associate Director of the Johns Hopkins Urban Health Institute, FCC Distinguished Scholar In Residence

Sherilyn Pruitt	HRSA
Brendan Carr	ASPR
John Peters	VA Telehealth Services
Jodi Daniel	ONC staff
Simone Myrie	ONC staff
Lana Moriarty	ONC staff
Caroline coy	ONC staff
Samantha Meklir	ONC staff
Chitra Mohla	ONC staff
Erin Siminerio	ONC staff
Maya Uppaluru	ONC staff
Danielle Sims	ONC staff
Michael Wittie	ONC staff
Penelope Hughes	ONC staff
John Petito	Health IT product behavior design, engagedIN, co-facilitator
Dr. Kyra Bobinet	CEO, engagedIN, lead facilitator