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Digital Translucence: Adapting Telemedicine Delivery Post-COVID-19

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Abstract

In nearly 1 month, with a rapidly expanding corona virus disease 2019 (COVID-19), telemedicine has been transformed into an essential service for delivering routine clinical care. This transformation occurred as a crisis management response—driven by the need to provide care for patients with physical distancing measures in place. However, the current rapid adoption of telemedicine presents a transitional state between one that existed before the pandemic and one that could potentially be better aligned with the delivery of a personalized model of care. Using the conceptual framework of digital translucence—situating virtual encounters with more nuanced information regarding patients—we describe the role of integrated remote monitoring and virtual care tools aligned with the patient’s electronic health record for adapting telemedicine delivery post-COVID-19.

Keywords: telemedicine, electronic health records, pandemic, artificial intelligence, m-health

Telemedicine has the potential to expand the reach and capabilities of clinical care ranging from delivering care in rural settings to remote monitoring of patients during and after hospitalizations.¹ Even with technological advances, a 2018 Centers for Medicare and Medicaid Services (CMS) report found that telemedicine encounters involved only 3% of its fee-for-service beneficiaries.² However, in nearly 1 month, with a rapidly expanding corona virus disease 2019 (COVID-19) pandemic, additional federal funding, and the loosening of regulatory provisions, telemedicine has transformed into an essential

service for delivering care.³ The *New York Times* aptly called this abrupt transformation as “10 years of change in one week.”⁴

This transformation occurred as a crisis management response—driven by the need to provide care for patients with physical distancing measures in place.⁵ However, current infrastructure for telemedicine can be described as necessary, although rudimentary. The rapid adoption of telemedicine presents a transitional state: one that currently exists and one that could be better aligned with the personalized, predictive, preventive, participatory, psychocognitive, and public model of medicine.⁶ There exists a real opportunity to operationalize “health web science”—a combination of telemedicine and e-health—on a national scale, wherein patient-generated health data can be actively used in targeted preventive care, wellness, and treatment. This is especially important as recent reports have highlighted the lasting toll of COVID-19 on mental health and well-being, and have suggested telemedicine as a strategic solution to the secondary pandemic that may quickly follow—that of mental and behavioral illnesses (e.g., anxiety and depression)⁷ and chronic comorbidities (e.g., cardiovascular diseases).

For telemedicine to be a viable solution after this pandemic, as health systems face increased demands for mental and chronic care services, current telemedicine processes must be adapted. This is because telemedicine visits are *touchless*, introducing a level of opaqueness to the patient-provider interaction that is potentially not conducive to routine patient care and support. During telemedicine encounters, digital environments mediate provider-patient interactions, affecting the quality of interactive communication. In design terms, translucence—or the ability to provide visibility, context, and awareness during interactions—can help in overcoming opacity.⁸

Metaphorically, translucence can be visualized using a two-way door: one wooden and opaque with a sign that says “open slowly” versus a glass door that serves the same purpose, but engenders different user interactions. It is hard to predict how users would interact with a wooden

door, with some people following the posted sign and others ignoring or not seeing it; in contrast, a glass door allows seamless interactions, nullifying the need for instructions.⁹ In a telemedicine context, “the glass door” can be described as *digital translucence*, a concept that entails creating digital features for situating patient-provider interactions.

Here, we describe two possible considerations for adapting telemedicine to future care delivery post-COVID-19, using a health web science approach to integrate remote monitoring and virtual care tools, all aligned with the electronic health record (EHR).

First, digital translucence in telemedicine can be enhanced by incorporating remote monitoring using mobile technology. Mobile and wearable devices can be used to track a number of physiological (e.g., heart rate) and physical activities (e.g., steps). Such patient-generated health data should be (1) captured using seamless interfaces that are integrated with the EHR, (2) used to develop digital phenotypes using machine algorithms for generating clinically meaningful insights (e.g., predicting fall risk for an older patient), and (3) presented using innovative visualization techniques for assisting in clinical decision making at the point-of-care (e.g., physical activity for a chronic heart failure patient).

Achieving these would require data and algorithms to be integrated within an EHR workflow, allowing providers access to clinically informative findings from these data similar to how they access other clinical data. Such access affords clinicians a window into a patient’s routines, situating and contextualizing the telemedicine discussions. For this, patients should be able to easily share their data seamlessly through their patient portal within an EHR. In cases wherein such native features do not exist, integration efforts must utilize EHR interfaces such as fast health interoperability resources, allowing for platform-agnostic integration.¹⁰ Such data exchange formats will help in incorporating novel predictive algorithms and in creating an ecology of applications that can be shared and used across multiple health care systems.

In addition, physical, behavioral, and emotional health indicators should be captured using Patient-Reported Outcomes Measurement Information System (PROMIS) or similar adaptive techniques. Integrating PROMIS tools within an EHR allows for longitudinal tracking of patient progress, and also automated administering, scoring, viewing, and diagnostic interpretation, providing clarity during telemedicine encounters.

Second, ensuring continuity of care is an important consideration for successful telemedicine encounters. One of the fast growing areas, spurred by advances in artificial intelligence, is that of conversational agents.¹¹ Traditional conversational agents, relying on text-based interactions, play an important role helping patients with basic self-care and health maintenance tasks (e.g., medication reminders).¹² More recently, with voice-based personal devices gaining popularity (e.g., Alexa), there is considerable interest in virtual agents for delivering structured, evidence-based behavioral counseling, and wellness interventions. Similar to seeking care from a therapist, these virtual services can provide ongoing support; these should also require “referrals” from within an EHR, with the ability to track patient adherence, use and progress, and to coordinate patient care over time. This would require integration of the virtual applications within the EHR, and additional research efforts regarding the conceptual, technical, and privacy implications.

As health care systems eventually return to a new normal, telemedicine is inevitably going to be an integral part. Although it is difficult to predict how “routine practice” will return, in a rare upside to the pandemic, we have an opportunity to create a positive impact with a strategic vision for telemedicine to achieve translucence by incorporating digital tools that can result in more meaningful and situated practice. With foresight, health systems that leverage the telemedicine transition to incorporate delivery processes to integrate patient-generated health data and virtual care platforms will emerge out of the pandemic to better meet the increases in mental and chronic health care needs among their patients.

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