Strategies for Evaluating Telehealth

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Strategies for Evaluating Telehealth

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Abbreviations: NQF (National Quality Forum), COVID-19 (Coronavirus Disease 2019), ED (Emergency Department)

Table of Contents Summary: This Perspective emphasizes the urgent opportunity to study telehealth’s impact on health outcomes, healthcare delivery quality and cost, and experience during the COVID crisis.

Contributors Statement Page:

Dr. Chuo drafted initial manuscript and table, reviewed and revised manuscript, and lead SPROUT metrics workgroup in development of STEM framework.

Dr. Macy reviewed and revised manuscript, contributed to the SPROUT metrics workgroup in the application of the STEM framework to COVID-19.

Dr. Lorch reviewed and revised manuscript, advised on STEM framework and its application to COVID 19.

All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.
Abstract:

The COVID-19 crisis has forced the entire country to integrate telehealth into our health delivery systems for all patients in an unprecedented way. To deliver essential care, lawmakers, providers, patients, payors and health systems have adopted telehealth technology and redesigned delivery processes with accelerated speed and coordination. We must take the opportunity to learn the lessons afforded by this unfortunate natural experiment and shape a better healthcare system that leverages telehealth to optimize care delivery overall and be ready to sustain this level of care during disasters and health crisis. In this article, we sound the alarm to learn from this experience by proposing an evaluation framework, built on the tremendous work of predecessors, that can guide implementers as they evaluate the impact of telehealth on health outcomes, health delivery value, individual experiences, and clinical programs. Evaluating programs on these four domains is designed to organize actionable data for creation of policies and legislation influenced by four key stakeholder groups – patients, providers, health systems, and payors.

The ability for our healthcare system to adapt with extraordinary speed under crisis has never been more evident than now as we face the COVID-19 pandemic. Ambulatory clinics and primary care providers have seen shifts in patient demand for their services and hospitals have reduced elective and scheduled care to mitigate the spread of infection. Almost overnight, the healthcare system has shifted towards providing care through telehealth platforms to avoid the catastrophic consequences of “doing business as usual”, making telehealth a leading modality of healthcare delivery.

Why Now?

The Telehealth alternative to in-person healthcare expanded rapidly as new federal and state legislation passed and payers reimbursed telehealth more broadly. Jefferson Health, one of the nation’s early pioneers in telehealth, reported a 10-fold surge in demand, scheduling up to 600 telehealth visits a day. As with many hospitals across the nation, the Children’s Hospital of Philadelphia saw telehealth visits increase from 5-10/ day to over 1500 / day. Ann & Robert H. Lurie Children’s Hospital of Chicago trained and privileged more than 800 providers in a matter
of weeks to expand telehealth services. Now is a critical opportunity to systematically evaluate telehealth care delivery, identify patient cohorts who can benefit, and explore ways to incorporate telehealth into patient care workflows. This knowledge will evolve our healthcare system to improve how care is delivered now and during crises.

Telehealth features that distinguish it from conventional, face-to-face methods of care delivery include the heavy reliance on technology for encounters and inability to “lay hands on” patients. As telehealth usage surged during COVID-19, and patients and providers become accustomed with the technology, outcome information is largely disorganized and dispersed amongst organizations. While a few measurement standards exist to guide the assessment of telehealth’s impact on care delivered, current literature lacks a unified approach to evaluate telehealth in pediatric healthcare delivery. The National Quality Forum (NQF) framework offers a comprehensive guide for developing telehealth measures under four domains (Access to care, financial impact/cost, experience, and effectiveness) and 53 measurement concepts\(^2\). The World Health Organization (WHO) framework applies similar measurement concepts in an approach that considers the maturity stage of a telehealth program\(^3\). For example, a pilot telehealth program may focus on feasibility while a more mature program that may focus on scalability and impact to the health system. The Agency for Health Research and Quality (AHRQ)’s technical brief describes available research on patient outcomes and telehealth use and therefore emphasizes the criticality of including impact on health outcomes in any telehealth evaluation\(^4\).

**Answering the Call for Telehealth Evaluation and Measurement Tools.**

Invaluable work by the above organizations inspired the American Academy of Pediatrics Section on Telehealth Care’s SPROUT (Supporting Pediatric Research in Outcomes and Utilization of Telehealth) to synergize the above work into a single framework that researchers
can use to study telehealth’s impact on patients. The SPROUT Telehealth Evaluation and Measurement (STEM) Profile (Table)\textsuperscript{5} reorganizes NQF, WHO, and AHRQ concepts into four measurement domains: (1) Health Outcomes, (2) Health Delivery - Quality and Cost, (3) Experience, and (4) Program Implementation and Key Performance Indicators (KPIs). The STEM Profile is meant to communicate telehealth’s value to four key stakeholder groups: patients, providers, health systems, and payers.

\textit{Health Outcomes}

Identifying health outcome targets early is equally important as identifying quality outcomes when implementing telehealth services. Health measures are available through various federal agencies, national committees, and academic societies such as the NQF, which summarizes the work from over 40 measure steward organizations such as AHRQ and the Centers for Medicare and Medicaid Services (CMS)\textsuperscript{6}. Telehealth’s rapid adaptation creates an opportunity to compare outcome measures following telehealth and in-person visits among patients with chronic conditions, such as HgbA1C in children with type 1 Diabetes, BMI percentile to monitor obesity, or psychometric questionnaires to assess anxiety disorder symptoms in children. Publicly available data on COVID-19 disease burden and policy changes in specific geographies\textsuperscript{7} can be used to compare endemic areas with and without telehealth.

\textit{Health Delivery – Quality and Cost}

Telehealth has the potential to impact the quality and cost of healthcare delivery, including areas of access, effectiveness, cost, safety, and equity. With “Stay at Home” mandates in many communities, telehealth can help to increase access and minimize the need for in-person appointments. Such impact can be measured at the pandemic’s start in terms of the proportion of
in-person appointments that were successfully converted to telehealth encounters. Conversely, access may be impacted negatively in populations without access to internet services, computers, or smartphone technology necessary for Telehealth visits. Effectiveness is known typically as the extent evidence-based care is delivered reliably and consistently to patients; this care is often described by clinical recommendations. While the convenience of telehealth may afford providers more opportunities to improve patient compliance, providers must continue to follow recommended practices and not skip safeguards, as reported recently on the tendency to over-prescribe antibiotics in treating upper respiratory infections when patients are seen via telemedicine.

Travel time and miles avoided using telehealth can be translated to cost-savings using standard conversion formulas (e.g., $0.57 per mile as business travel for providers or $0.17 per mile as medical purpose travel for patients). However, recent telehealth surge has exposed an equity gap in families who can’t access telehealth due to lack of technology resources.

Experience

The provider and patient experience with a telehealth encounter and the logistical impact on their daily lives are important consideration. The Telehealth Usability Questionnaire, Telemedicine Satisfaction and Usefulness Questionnaire, Patient Assessment of Communication during Telemedicine, and the Net Promotor score are examples of assessment tools that can be used to assess satisfaction with the provider-patient communication, technology, and usefulness. The impact on provider’s workload and disruption of family routines (i.e. work, school) are personal burdens that may affect appointment adherence and overall satisfaction. Other experiential factors like encounter duration, video and audio quality, and connectivity should also be tracked.
Program Implementation and Key Performance Indicators

In a time of rapid healthcare system transformations, it is critical to monitor both the creation of new telehealth programs and how existing programs change. Future economic analyses will be possible if programs gather data on the costs of telehealth service expansion and delivery, such as time and resources spent to credential and preparing members of the care team, establishing new billing procedures, and provision of telehealth tools. As implementation science frameworks guide program execution, programs should track key performance indicators to self-assess and benchmark with peer institutions.

In conclusion, telehealth offers valuable opportunities to improve the process of healthcare delivery that may translate to better health outcomes. Identifying and studying these opportunities require a measurement strategy that allows data to be aggregated across multiple health systems making possible studies of rare conditions and comparisons of different locations and methods for delivering services via telehealth. The STEM Profile offers a construct to define and organize telehealth measures in terms of health outcome, health delivery quality and cost, individual experience as well as emphasizes program implementation and benchmarks. Findings from rigorous telehealth program evaluation in these areas can inform data driven reimbursement and policy changes that encourages appropriate telehealth use, especially amidst the explosion of telehealth services associated with the COVID pandemic.

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References


### Table: Four Measurement Domains of STEM

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<thead>
<tr>
<th>Domain</th>
<th>Example of Potential Measures</th>
<th>Details and Specifications for Examples</th>
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| **Health Outcomes**  
(Measuring the individual or population level related to physiology, mental health, quality of life. These measures may come from diagnostic tests and encounter records or from patient-reported outcomes) | Mortality | Number of deaths from COVID-19 divided by the number of patients who test positive for COVID-19 |
| | BMI and percentile | Patient’s BMI over time, > 95% (Obesity) |
| | Type 1 Diabetes blood glucose management: monitoring and treatment - Hemoglobin A1c (HbA1c) target (<7.5%), with individualized considerations | % of children and adolescents with type 1 diabetes whose most recent HbA1c level is <7.5% (American Diabetes Association Guidelines) |
| **Health Delivery - Quality and Cost**  
(Measuring timely access, effectiveness of care, costs, safety, and equity) | Access: children and young adults 12 months-19 years old who had a visit with a primary care practitioner | A HEDIS measure  
| | Access: follow-up care for children ages 6-12 years old prescribed an ADHD medication | A HEDIS measure  
https://www.ncqa.org/hedis/measures/follow-up-care-for-children-prescribed-adhd-medication/ |
| | Effectiveness: Preventive Care guidelines | Compliance with Preventive care guidelines (i.e. counseling on nutrition and physical activity for Children/Adolescents done either through in person or telemedicine) |
| | Effectiveness: Vaccination rate | Vaccination coverage in specific pediatric age cohorts |
| | Safety: Antibiotic Prescription rate | Rate of Children 3 months to 18 years old who were given a diagnosis of upper respiratory infection and were not dispensed antibiotic prescription (HEDIS)  
https://www.ncqa.org/hedis/measures/appropriate-treatment-for-children-with-upper-respiratory-infection/ |
| | Safety of telehealth visits: Percentage of Unanticipated ED Visits | Number of completed telehealth visits with unanticipated subsequent ED visits divided by the number of completed telehealth visits |
| | Patient Cost: Average miles saved from not traveling to the provider’s office | Miles from home to clinic or hospital setting  
Tracking distance allows for calculations of time saved and dollars saved |
<table>
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<tr>
<th><strong>Equity: Percentage of clinical encounters delivered via telehealth in communities with low and high income</strong></th>
<th><strong>Number of telehealth visits divided by the number of clinic encounters (telehealth and in person visits) among patients from different income levels</strong></th>
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</table>
| **Individual Experience**  
(Measuring the quality and characteristics of the telehealth encounter itself and its impact on the individual patient or provider in terms of workload burden, satisfaction, and experienced issues with technology and logistics) | **Net Promotor Score**  
A common customer experience metric used to measure customer loyalty to a company that provides a specific service for that customer. Often an estimator of customer satisfaction. |
| **Patient Centeredness: Responses to survey questions about patient-centeredness** | **How much did the provider include you in the decision making? How much did you feel that the provider heard all your concerns?** |
| **Staff Wellness and Burnout** | **Examples tools - Maslach inventory, Oldenburg inventory, Physician Work-Life Study Single Item Measure (Rohland et al), Professional Fulfillment Index, Well-being Index** |
| **Patient burden reduction: Saved workday or reduced missed school days** | **# of lost workdays or missed school days due to health appointments** |
| **Usability** | **Did you have difficulties getting to your appointment? (either travel to the clinic or using the telehealth system). Did you have any technical difficulties?** |
| **Program Implementation and Key Performance Indicators**  
(Measuring program performance, implementation process, and benchmarks with peer programs. Measuring how the system adapted human resources, processes and tools) | **System changes**  
Number and type of changes to system to accommodate the program (e.g., hiring of remote diabetes educators, purchase of devices, investment in technology support services, and telehealth platforms) |
| **Key Performance Indicators** | **Number of telehealth visits completed within timeliness of care targets set by the program** |

**Abbreviations:** NQF (National Quality Forum), COVID-19 (Coronavirus Disease 2019), ED (Emergency Department)
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<th>Updated Information &amp; Services</th>
<th>including high resolution figures, can be found at: <a href="http://pediatrics.aappublications.org/content/early/2020/08/16/peds.2020-1781.citation">http://pediatrics.aappublications.org/content/early/2020/08/16/peds.2020-1781.citation</a></th>
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