

Virtual Primary Care in a Large Delaware-Based Independent Academic Medical Center:

Impact and Opportunity

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Abstract

COVID-19 and related challenges to patient access necessitated the development of new models of care to ensure a healthy patient population. This paper describes the outcomes of a pilot virtual primary care program at a large independent academic health center in Delaware. The preliminary results are encouraging from the perspective of provider and patient satisfaction, as well as the utility of the operational model. A complete cost-benefit analysis was beyond the scope of the paper; thus, future operational research should focus on the metrics of cost and quality as key indicators of model sustainability.

Introduction

The key to unlocking better health outcomes and an overall better patient experience at a reduced cost is an attainable healthcare trifecta. Global experience has demonstrated effective primary healthcare to be the key driver of this set of outcomes.¹ The eminent primary care scholar Dr. Barbara Starfield described the four key elements of effective primary care as: ‘contact, comprehensiveness, continuity and coordination.’² When patients are more engaged with primary care, they achieve better health outcomes and higher rates of satisfaction at a lower cost to the healthcare system at large.³

The following describes the creation and deployment of a virtual primary care model for covered employees of a large, Delaware-based health system. We believe this to be an opportunity to leverage this model for improves patient access and better, more equitable outcomes.

Background

Primary care in general is well-positioned to pilot virtual care. We expanded primary care services to provide virtual (including telehealth) services in a multitude of care settings.^{4,5} Post-pandemic, the convenience that virtual care has proven to provide for both the patient and the provider has resulted in several health systems continuing to expand those services.⁶

As with other health specialties, there are a variety of ways in which virtual care is delivered in the primary care setting. For virtual visits, patients can be seen synchronously (in real-time by

audio or video) similar to the traditional patient visit that mirrors the care given in a ‘bricks-and-mortar’ facility. These synchronous visits can take place in a variety of settings such as the patient’s home, a medical facility, or mobile healthcare unit. Mobile units may provide at-home services or in-home technology such as blood pressure cuffs or digital scales.

By contrast, asynchronous virtual care is delivered through other means, such as secured text messaging, either inbound (from the patient requesting care) or outbound (from the provider who may send standard screening forms and check-ins). The patient receives care on time, but not in real-time.

Virtual primary care has grown tremendously due to the necessities of the COVID-19 pandemic but far from stopping at being a short-term solution, it continues to empower patients and providers with convenience, ease of use, and enhanced access that exceeds pre-pandemic levels.⁷ Although patients and providers seem positive about the convenience of switching to virtual healthcare, the value proposition of this model is less clear.

Primary care includes several medical disciplines (e.g. family medicine, internal medicine, pediatrics, and geriatrics). It incorporates services including chronic disease management, preventive care, urgent and acute care. The power of primary care lies in the continuity relationship of the patient and provider which can strengthen over time as providers learn the history, values, and goals of patients and families, and caregivers. Traditionally, this clinical relationship was more formal and took place through scheduled office visits. In a virtual setting, the provider can develop more of a rapport with the patient, as it is not limited by scheduled in-office visits. Since care can now be delivered asynchronously (e.g. texts, emails, messaging) the interaction between patient and caregiver is sometimes more frequent and less formal.

The virtual care model is considered high-frequency, low-intensity care with multiple “mini encounters” over weeks, months, and even years. Patients’ needs are addressed in real-time digitally; without the need to wait for a scheduled visit. When a visit is desired, patients can quickly visit their primary care provider in a real-time video chat. Patients have much broader access as virtual primary care providers are no longer constrained to scheduled office visits with most care and administrative tasks being accomplished asynchronously. This convenience can provide better health outcomes for the patient.

Methods

We examined virtual care in the state of Delaware for a limited patient population as part of ongoing monitoring of our program. This is a snapshot of the care received in our region and thus may help evaluate similar programs throughout the state or other regions.

The patients receiving virtual primary care in this sample population were employed by our health system. Data was collected and reported in aggregate using quality improvement indicators to measure care in this setting. This QI project was not considered human subject research.

This population studied was assessed using multiple outcomes: total emergency department utilization, avoidable emergency department utilization, urgent care utilization, patient satisfaction, and provider satisfaction.

Insurance claims data was collected from a period of July 2020 to May 2023; our review included data collected for 683 patients who had at least 12 months of measurable claims activity

to before enrollment with virtual primary care as well as 12 months of measurable claims activity after enrolling to create a pre/post comparison. In addition, claims data for the same July 2020 to May 2023 period were collected for a comparison group of 17,825 patients who were attributed to or had visits with one of the traditional primary care offices. Due to claims availability, the population of 683 patients consisted entirely of ChristianaCare employees, spouses, and adult dependents. During the period measured, ChristianaCare benefits were administered by two different payors resulting in two claims datasets that were combined for purposes of analysis. Thus, a weakness in the generalizability of this work is that it examines those employed in a health system population.

Avoidable emergency department visits where individuals sought care in the emergency department for conditions that could have been managed at a lower acuity of care or prevented altogether with appropriate primary care were calculated from claims-based diagnoses compared to the New York University Emergency Department (NYU ED) visit severity algorithm.

Using the guidelines of the 2010 validation study of the NYU ED algorithm,⁸ avoidable visits were determined using the 50% probability threshold.

Anonymous surveys were sent to all primary care teams in the virtual practice including physicians, nurses, and medical assistants. The survey requested feedback on how well teams worked together, the likelihood to recommend the practice as a place to work, and the likelihood to recommend the practice as a place to receive care. Fourteen of the team members surveyed responded. Clinical quality metrics for all patients were calculated from electronic medical record data, payor claims files, and Health Information Exchange (HIE) data aggregated in Oracle Cerner HealthRegistries. HealthRegistries is based on the Healthcare Effectiveness Data and Information Standards (HEDIS®) developed by the National Committee for Quality Assurance (NCQA). The data on clinical quality was then compared to Delaware's traditional brick-and-mortar practices that opened about the same time as the Center for Virtual Health. Comparison populations not derived internally from HealthRegistries were found via literature review with sources indicated in the results below.

Note that patient satisfaction survey methodology changed during the analysis period resulting in too few data points to reasonably determine a Net Promoter Score (NPS). However, prior scores were routinely at or above national averages for the healthcare industry.

Results

Data Analysis Results

Claims-Based Utilization

The data collected and analyzed shows that virtual primary care patients experienced a significant decline in utilization at urgent care clinics, emergency departments, and inpatient facilities when compared to utilization a year prior to joining the virtual primary care practice. It was also demonstrated that virtual primary care patients utilized significantly less than the general population of primary care patients who received care at traditional primary care practices.

Of note is the decline in the virtual practice patient population of avoidable emergency department visits. Avoidable visits were observed to be 9% higher than those of patients in

traditional practices in the pre-enrollment period but declined to 9% lower than the traditional patient population by 12 months after enrollment with virtual primary care (table 1).

Table 1. Avoidable Emergency Department Visits

Service Category	Utilization per 1000 patients			Variance	
	Traditional Primary Care	Virtual Care Pre	Virtual Care Post	Pre vs Post	Post vs. Traditional
Urgent Care	715	359	119	-67%	-83%
Emergency Department	328	143	68	-53%	-79%
Avoidable ED %	38%	47.0%	29.0%	-18.0%	-9%
Acute Inpatient	116	41	33	-18%	-71%

ED=emergency department; pre=pre-enrollment; post=post-enrollment

Provider Satisfaction

Care team members in the virtual practice, including physicians, nurses, and medical assistants from both primary care and specialty teams, were surveyed anonymously in May 2023 with respondents giving agreement (8=strongly agree) or disagreement (1=strongly disagree) to the statements as shown in table 2.

Table 2. Anonymous Virtual Practice Team Member Survey Results

Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The Virtual Primary Care clinical team works together to meet the patient's needs.	5	6	2	1	0
I prefer providing care in a virtual primary care practice over a traditional primary care practice	5	5	4	0	0
I can provide safe and high-quality care in the virtual primary care environment	7	4	3	0	0

An 8-point scale (1= Strongly Disagree, 8=Strongly agree) was also used to ask the questions in table 3.

Table 3. Anonymous Virtual Practice Team Member Survey Results, part 2

Question	1	2	3	4	5	6	7	8
How likely is it that you would recommend the virtual primary care practice as a place to work for a friend or colleague?	0	0	0	1	3	3	2	5
How likely is it that you would recommend the virtual primary care practice as a place to receive care to a friend or colleague?	0	0	0	0	0	4	3	7

As shown in Table 3, 79% of virtual practice staff responded positively about the virtual environment being safe and effective with 21% remaining neutral on the question. Additionally, 71% preferred practicing in a virtual practice as opposed to prior roles in a traditional in-person practice while the remaining 29% were neutral. A total of 71% of team members said they agreed or strongly agreed (responding with a 6-8 on the scale) with the virtual practice as a place to work while 100% agreed or strongly agreed (6-8 on the scale) that they would recommend the virtual practice to friends or family as a place to receive care.

Clinical Quality Outcomes

As demonstrated in Table 4, virtual primary care results were equal to or better than traditional brick-and-mortar practices in both measures of patient access and measures of clinical quality. These results were gathered in May 2023 via comparison of HEDIS® measure outcomes between Center for Virtual Health patients and deidentified patient data from multiple traditional primary care practices in the State of Delaware. Access particularly stands out as an advantage in the virtual model with new patients having the option to schedule a new patient appointment on the same day that they enroll.

Table 4. Clinical Quality Outcomes

Quality Measure	Virtual Primary Care (N=~1600)	Traditional Office (N=~14,000)	Virtual Primary Care Improvement
Patients Seen Annually	97%	87% ¹	+10%
Time to New Patient Appointment	Same Day	26 Days ²	-26 Days
Blood Pressure Control	81%	67% ¹	+14%
Diabetic Control (HBA1C<8)	66%	64% ¹	+2%
Depression Screening	89%	56% ¹	+33%
Breast Cancer Screening	80%	49% ³	+31%

Discussion

The results from our work demonstrate that, if adequately resourced, avoidable visits to emergency and urgent care settings can be reduced. We also showed a high level of patient and provider satisfaction with this model; this is consistent with literature from across the U.S. following the COVID-19 pandemic.⁹

While a detailed discussion of the social determinants of health is beyond the scope of this paper, access to care has been studied as a critical determinant of health.¹⁰ Virtual primary care has the potential to positively impact this factor. Other related determinants include transportation and even crime and safety, which might render physical access more challenging than a virtual model. While our work was not designed to address these larger societal factors at this time, we

are pleased to contribute positively to a mechanism to enhance access and perhaps bypass factors that may impede access, whether a pandemic exists, or not.

It should be noted that there exists a “digital divide” which may create new access barriers for some. The availability of a device with high-speed connectivity as well as audio and video capability may be a barrier as well, and this issue will need addressing if a virtual model is scaled up more broadly.

This project assessed improvements made in healthcare quality and access in a specific patient sample. As such, the results may be generalizable to employees of similar organizations such as large health systems. We cannot yet comment on the generalizability of this model to a statewide population. However, since in Delaware, our employees are demographically representative of the state, it is a reasonable assumption from this pilot study that the methodology could be tested on a larger population level.

An important question concerns the return on financial investment for large-scale virtual programs. The capital investment costs for such programs can be significant, and while our virtual health program was internally funded and expanded out of necessity in the COVID-19 pandemic, future expansions will need to show financial feasibility. Delaware is not unique in considering these issues. Nationwide, models are underway to test telemedicine as a high-quality, reimbursable mechanism for providing primary and specialty care.¹¹ We encourage expanded testing of these models and further exploration into the impact of our model on future use cases in Delaware and beyond. We also encourage a holistic assessment of the benefit, not just in billable hours of care, but of true improvements in population health, patient satisfaction, and provider satisfaction. Our initial results are promising, and further assessments are warranted to validate these on a larger scale.

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