

Using Virtual Visits to Care for Primary Care Patients with COVID-19 Symptoms

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ABSTRACT

Purpose: Examine utilization of office resources by primary care patients who were initially evaluated through telehealth, telephone, or in-person encounters.

Methods: Retrospective electronic health record review on 202 patients seen from March 3-31, 2020 in a large California academic family medicine practice for evaluation of potential COVID-19 symptoms, to assess the total number of interactions (electronic messaging, telehealth, telephone, and in-person office encounters) with physicians and office staff.

Results: Of 202 patients, 89 (44%) had initial telehealth, 55 (27%) telephone, and 52 (25%) in-person encounters. Patients initially evaluated through telehealth, telephone and in-person encounters had a mean of 6.1 (SD=3.7), 5.2 (SD=3.6), 4.5 (SD=3.0) total interactions with the office, respectively ($p=0.03$), and 9%, 12.7%, and 19.2%, respectively, had a subsequent in-person or emergency department visit ($p=0.22$). Five patients who tested positive for COVID-19 were all initially evaluated via telehealth; one required subsequent hospitalization. Of all patients presenting for care, 78% reported having a cough. Multivariable analysis showed no differences in number of office interactions based on visit type; older patients (95% CI=0.00-0.07) and those with subjective fevers (95% CI=1.01-3.01) or shortness of breath (95% CI=0.23-2.28) had more interactions with the office.

Conclusion: Primary care providers utilized virtual visits to care for most patients presenting with potential COVID-19 symptoms, with many patients choosing telephone over telehealth visits. Virtual visits can successfully limit patient exposure to other people, and consideration could be given to increasing its use for patients with potential symptoms of COVID-19.

Keywords: COVID-19, telemedicine, primary health care, health care utilization, signs and symptoms

Background

The Centers for Disease Control (CDC) has recommended limiting face-to-face contact with others (“social distancing”) to prevent the spread of coronavirus disease 2019 (COVID-19).¹ Outpatient virtual visits allow patients with potential infectious symptoms to remain at home, thus reducing contact with healthcare providers and other patients. Virtual visits include face-to-face telehealth (video) visits, telephone visits, and online messaging (such as through a patient portal).² Many health systems offered telehealth visits before the emergence of COVID-19,³ but the use of virtual visits by patients with COVID-19 symptoms is not represented in the literature. Knowledge on how these patients engage with healthcare practices is important for understanding the safety and feasibility of caring virtually for patients with COVID-19 symptoms. The objective of this study was to examine utilization of telehealth, telephone, and in-person encounters by primary care patients presenting with acute infectious symptoms.

Methods

Data collection and analysis

A retrospective electronic health record (EHR) review was performed to examine records of patients presenting to a community-based [*name of institution de-identified for review*] academic family medicine practice, located in [*city and state*] between March 3 and 31, 2020 with symptoms associated with COVID-19. This practice cares for a racially/ethnically diverse population of patients with insurance plans that include private indemnity insurance and government plans (i.e., Medi-caid and Medicare). Patients were identified in two ways: 1) staff kept detailed lists of patients whom they screened for fever, cough or shortness of breath; and 2) two reviewers assessed scheduling notes describing the reason for a patient’s visit to identify

those with other potential COVID-19 symptoms (i.e., sore throat, nasal congestion, headache, fatigue, myalgias, nausea, vomiting, diarrhea, loss of taste or smell). Data abstractions were performed through April 20, 2020 to assess patient follow-up encounters.

Patients were characterized by: demographics; health; type of initial visit (telehealth, telephone, in-person); subsequent in-person encounter, emergency department visit, or hospitalization; symptoms reported; and outpatient testing and treatment. The ‘initial visit’ is defined as the first encounter with a physician, whether by telehealth, telephone or in-person. The total number of patient interactions with the office regarding patient presenting symptoms was quantified. These represented the entirety of patients’ subsequent primary care interactions. Interactions included electronic messages, telephone calls, and physician telehealth, telephone or in-person encounters. Telephone calls and electronic messages included both physician and staff interactions, and included exchanges about accessing and using telehealth visits. Communication with staff before the initial visit with the physician was not used for classification of the initial visit type, but contributed to the total number of interactions with the practice. The [*name of institution de-identified for review*] Institutional Review Board deemed this study exempt from review.

Stata 16.1 (StataCorp) was used for analyses. Chi-squared statistics and ANOVA were used to assess differences (in patient characteristics, number of interactions with the office, outpatient testing, and medications prescribed) among patients receiving telehealth, telephone, and in-person visits.

Practice change during data collection period

In response to reports of local COVID-19 infections, the practice implemented a process on March 3, 2020 to convert selected scheduled office visits to either telehealth or telephone

encounters. Staff phoned patients prior to scheduled office visits, and administered a brief screening instrument to assess the presence of fever, cough or shortness of breath. Patients exhibiting one or more symptoms were encouraged to have a telehealth or telephone visit with a provider, but those who desired kept their in-person visits. From March 23–March 31, after *[name of state de-identified for review]* mandatory stay-at-home order went into effect, the office converted almost all visits to telehealth or telephone encounters. A physician had to approve in-person visits. Patients were given the choice of a telehealth versus a telephone encounter. Telehealth visits required downloading of a smartphone application to access a patient portal for the visit. If needed, staff assisted patients with these procedures. Virtual visits increased from 0.85% of total visits in February 2020 to 23.3% of visits in March 2020.

Results

Healthcare system interactions by type of initial physician visit. Of 202 patients presenting with at least one potential COVID-19 symptom assessed for study inclusion, 89 (44%) initially saw a physician by telehealth, 55 (27%) by telephone, and 52 (25%) in-person. Six patients with scheduled appointments were lost to follow-up. Of patients whose first physician encounter was by telehealth, telephone, or in-person, 9%, 12.7% and 19.2%, respectively ($p=0.22$), had subsequent in-person or emergency department visits. All 5 patients in the study who tested positive for COVID-19 were initially seen via telehealth. Only one required a subsequent in-person visit and hospitalization (**Figure 1**).

Patient characteristics by type of initial physician visit. **Table 1** depicts differences in characteristics of patients who were initially evaluated by their physician via telehealth, telephone, or in-person. Patients with initial in-person visits tended to be younger than those with

telephone and telehealth encounters (38.5% of those initially seen in-person were aged 18 and younger, compared to 18.2% and 6.7% of those with initial telephone or telehealth encounters). Of patients aged 18 and younger, 14 (70%) of those with initial in-person visits and 29 of 38 (76.3%) overall had Medicaid insurance.

Patient-reported symptoms. Patients most commonly presented with cough (78%), fever (39%), and shortness of breath (38%). Those reporting shortness of breath were more likely to have virtual visits than in-person visits (48.3% telehealth and 36.4% telephone versus 21.2% in-person encounters; $p < 0.01$).).

Discussion

Primary care physicians in this study successfully cared for the majority of patients seen virtually for potential COVID-19 symptoms. Most patients who were initially cared for through a virtual visit did not require subsequent in-person office visits or emergency department visits to address their symptoms, even though they were more likely to experience concerning symptoms such as shortness of breath. On average, these patients utilized more office staff and physician resources compared to in-person visits, though they were more likely to report shortness of breath than those initially seen in person. Therefore, physicians could have asked patients to follow-up more closely, as their inability to perform a physical examination may have led to more uncertainty about their assessment. Alternatively, patients could have scheduled follow-up appointments on their own if they developed shortness of breath after initial evaluation. Correspondence with office staff regarding the access and use of telehealth also likely comprised many of the virtual interactions.

Given the choice, most patients in this study chose to have telephone over telehealth encounters. Future studies are needed to investigate reasons underlying this preference, which we hypothesize may include difficulty with or lack of the technology required for telehealth visits, or health insurance policies requiring patient cost-sharing for telehealth but not for telephone visits.

Younger patients, driven largely by those aged 18 and younger, were more likely to have in-person office visits than older patients. This finding may reflect greater parental desire to have their children examined in-person, since children may be unable to provide an adequate history of their symptoms. However, since the majority of our practice's children have Medicaid insurance, these findings may reflect barriers related to socioeconomic status or social determinants of health, and require future investigation.

Study limitations include underestimation of the total number of telephone calls and messages exchanged with patients, since each telephone and message encounter in our EHR system may represent multiple back-and-forth exchanges. We did not assess whether telephone calls and messages after the first visit were with physicians or office staff. Though we collected data for at least 20 days after initial patient presentations, some patients may have had ongoing illness when data collection ceased. Limited COVID-19 testing capacity existed for the majority of the data collection period.

COVID-19 has rapidly transformed physician healthcare delivery by increasing the use of virtual medicine in an attempt to limit patient and healthcare provider exposure to COVID-19 and decrease the burden on emergency departments. This increased utilization of virtual visits may persist beyond the current pandemic period as patients embrace the safety and flexibility that this mode of medicine offers compared to in-person office visits. However, as these visits

require greater coordination and utilization of practice resources than traditional in-person office visits, future work is needed to examine the costs and financial repercussions for medical practices that incorporate virtual visits. Primary care practices implementing virtual visits to care for patients with COVID-19 symptoms should be prepared for increased patient interactions with the practice, many of which may be unreimbursed.

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Table 1. Patient Characteristics, overall and by visit type

Characteristic	All Patients n=202	Telehealth n=89	Telephone, n=55	In-Person, n=52	p-value
Female, n (%)	120 (59.4)	57 (64)	39 (70.9)	22 (42.3)	0.006
Age, mean (SD; range)	36.8 (19.5; 1-89)	40.3 (14.7; 4-73)	40.7 (22; 1-89)	26.4 (20; 1-72)	<0.001
Race / Ethnicity, n (%) *					0.3
Asian	19 (9.4)	10 (11.2)	5 (9.1)	4 (7.7)	
Black	15 (7.4)	6 (6.7)	5 (9.1)	4 (7.7)	
Hispanic	28 (13.9)	15 (16.9)	11 (20)	2 (3.8)	
Other	23 (11.4)	8 (9)	4 (7.3)	9 (17.3)	
White	93 (46)	37 (41.6)	23 (41.8)	29 (55.8)	
Unknown	24 (11.9)	13 (14.6)	7 (12.7)	4 (7.7)	
Married, n (%)	60 (29.7)	32 (36)	18 (32.7)	8 (15.4)	0.03
Insurance, n (%)					0.001
PPO	74 (36.6)	35 (39.3)	19 (34.5)	18 (34.6)	
HMO	66 (32.7)	38 (42.7)	16 (29.1)	10 (19.2)	
Medicaid	42 (20.8)	10 (11.2)	10 (18.2)	20 (38.5)	
Medicare	12 (5.9)	2 (2.3)	7 (12.7)	3 (5.8)	
Other	8 (4.0)	4 (4.5)	3 (5.5)	1 (1.9)	
Preferred language-English, n (%)	192 (95.1)	86 (96.6)	51 (92.7)	49 (94.3)	0.57
Comorbidity score, mean (SD) *	0.22 (0.6)	0.19 (0.5)	0.4 (0.89)	0.08 (0.33)	0.02
Asthma, n (%)	23 (11.4)	14 (15.7)	5 (9.1)	4 (7.7)	0.28
Hypertension, n (%)	25 (12.4)	10 (11.2)	11 (20)	2 (3.9)	0.03
Anxiety disorder, n (%)	57 (28.2)	29 (32.6)	16 (29.1)	10 (19.2)	0.23
Body mass index, mean (SD)†	26.6 (5.9)	26.4 (5.5)	27.4 (6.3)	25.5 (6.8)	0.40
Current or previous smoking, n (%)	20 (9.9)	10 (11.2)	10 (18.2)	0	0.10
# total interactions with office, mean (SD; range)	5.34 (3.5; 2-20)	6.07 (3.7; 2-20)	5.16 (3.6; 2-18)	4.52 (3.0; 2-17)	0.03
Telephone calls	4.39 (2.6; 1-12)	4.39 (2.5; 1-12)	5.29 (2.6; 2-12)	3.56 (2.46; 1-12)	0.002
E-mail messages	1.70 (1.2; 1-8)	1.97 (1.3; 1-6)	1.58 (1.29; 1-8)	1.40 (0.96; 1-7)	0.02
Telemedicine	1.64 (0.80; 1-6)	2.30 (0.70; 1-6)	1.16 (0.46; 1-3)	1.10 (0.30; 1-2)	<0.001
In-Person	1.36 (0.64; 1-4)	1.06 (0.23; 1-2)	1.04 (0.19; 1-2)	2.25 (0.62; 1-4)	<0.001
Outpatient testing, n (%)					
COVID-19	40 (19.8)	22 (24.7)	13 (23.6)	5 (9.6)	0.16
Influenza	17 (8.4)	6 (6.7)	1 (1.8)	10 (19.2)	0.004
Streptococcus	2 (1.0)	1 (1.1)	0	1 (1.9)	0.61
Chest x-ray	15 (7.4)	5 (5.6)	4 (7.3)	6 (11.5)	0.44
Antibiotics prescribed, n (%)	35 (17.3)	11 (12.4)	6 (10.9)	18 (34.6)	0.001
Bronchodilator prescribed, n (%)	32 (15.8)	15 (16.9)	7 (12.7)	10 (19.2)	0.65
Patient-reported symptoms, n (%)					
Fever	79 (39.1)	33 (37.1)	20 (36.4)	25 (48.1)	0.36
Cough	158 (78.2)	75 (84.3)	38 (69.1)	41 (78.9)	0.10
Shortness of breath	77 (38.1)	43 (48.3)	20 (36.4)	11 (21.2)	0.01

* Charlson comorbidity index⁴; scores range from 0-13 with higher numbers indicating greater comorbidity

† among adults only; n=162