

## ORIGINAL RESEARCH

## Disparities in Access to Teledermatology During the COVID-19 Pandemic in Detroit, Michigan

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### ABSTRACT

**Background:** Teledermatology became a necessary modality for dermatologic patient care during the COVID-19 pandemic. Due to disparities in access to technology, “The Digital Divide” refers to worsening health care disparities despite telemedicine’s best efforts to improve access.

**Methods:** Retrospective chart review was performed of all patients who were scheduled to be seen in dermatology during the first wave of pandemic (March 27, 2020 to April 27, 2020). Demographic characteristics of patients who pursued virtual visits was compared with those who did not.

**Results:** Compared to patients who canceled office visits, patients who completed virtual visit appointments were more likely to be younger (mean age 37.8 versus 45.5 years), female (68.7% versus 62.9%,  $p=0.01$ ), unmarried (68.7% versus 61.0%,  $p<0.01$ ). Of the diagnoses rendered during virtual visits, 53.3% were associated with dermatoses.

**Conclusions:** Patient populations above the age of 65 were less likely to complete a video visit, regardless of socioeconomic factors. Future policies must take marginalized populations into account to improve ease of access to technological services.

### INTRODUCTION

Teledermatology has evolved significantly since its advent in the early 1990s. While it was first used to improve access to dermatologic care in rural areas, teledermatology has also been implemented to aid primary care practices and emergency departments.<sup>1,2</sup> In the era of COVID and social distancing, teledermatology is playing a crucial role in caring for dermatology patients while also preserving the health of both patients and providers.<sup>3-5</sup> While teledermatology may in theory improve access to dermatologic care, disparities in access to virtual care may in fact be present.

For example, a recent Henry Ford Health System (HFHS) study demonstrated patients who used patient portals were more likely to be white and more frequent users of healthcare.<sup>6</sup> Other studies corroborated the possibility that Spanish-speaking patients, older patients, and lower socioeconomic groups may have decreased access to teledermatology.<sup>7,8</sup> In contrast, teledermatology significantly increased access to dermatology care for patients with Medicaid when the teledermatology consultation was initiated by their primary care physician rather than the patient themselves.<sup>9</sup> Additional literature regarding access to telehealth remains lacking.

Previous utilization of tele dermatology was limited significantly due to lack of reimbursement. However, beginning on March 17, 2020, the Centers for Medicare and Medicaid Services (CMS) and other major private payers have expanded telehealth coverage during the pandemic. The CMS policy change eliminated many barriers to implementation of telemedicine including lack of reimbursement, licensing restrictions, and Health Insurance Portability and Accountability Act (HIPAA) compliance.<sup>10</sup>

Accessibility to dermatologic care may be improved due to these policy changes for some patients; however, based on studies regarding patient portal usage, patients of lower socioeconomic status (SES) or older than 65 years of age may be marginalized.<sup>11</sup> During the COVID-19 pandemic, dermatology providers at HFHS contacted patients directly to offer virtual visits in lieu of office visits to mitigate COVID-19 exposure risk. The aim of this study is to compare the demographics of patients who elected to pursue virtual visits with those who deferred a virtual visit and while in-person appointments were canceled.

## METHODS

Using billing data, a retrospective review was performed of all patients scheduled for an office visit between March 27, 2020 and April 27, 2020. We determined whether patients who were scheduled during this time period completed a virtual visit, including telephone, video, or store-and-forward visit; or had a canceled in-person office visit.

### Patient Characteristics

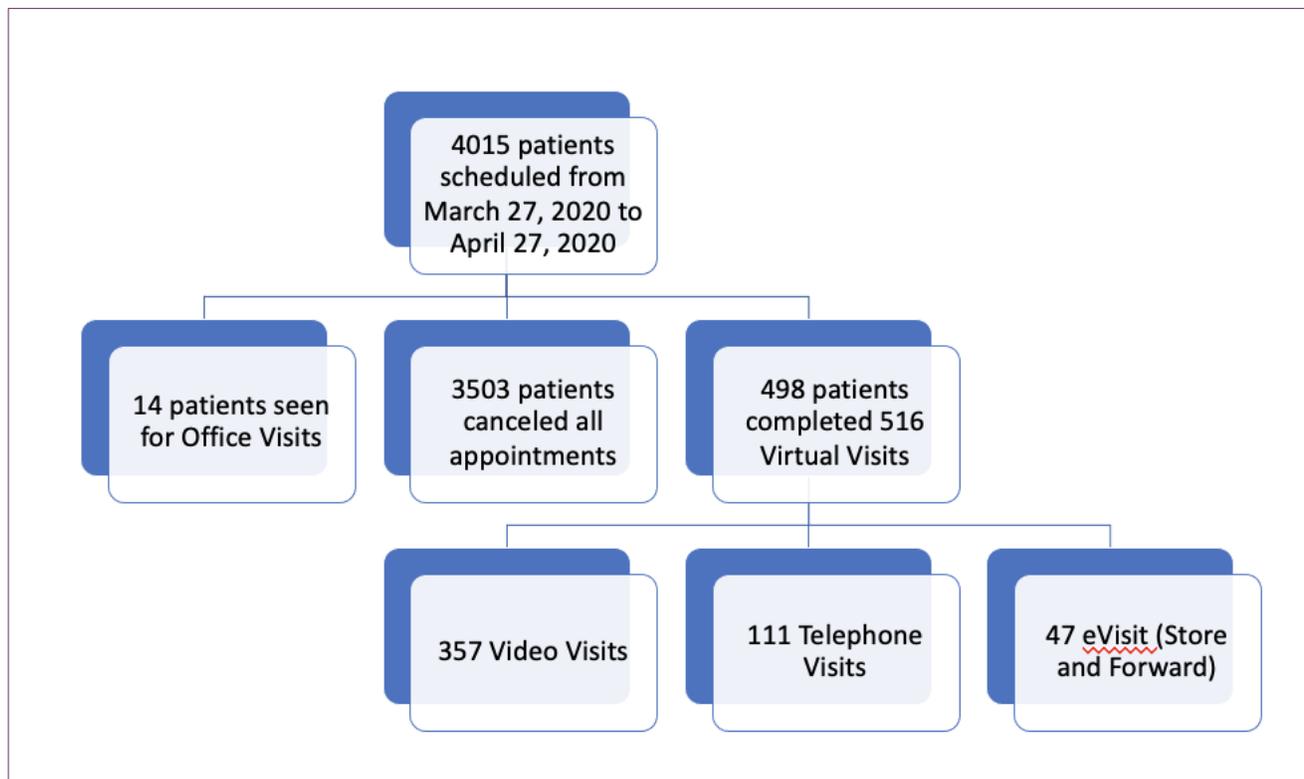
Patient characteristics were obtained through chart review including age, gender, race, ethnicity, marital status, insurance type, and zip code. Patient age was categorized into two groups: younger and older than 18 years. Patients over the age of 65 were investigated separately as well. Race was categorized as white, black, or other. A Social Deprivation Index (SDI) was linked to patient zip code.<sup>12</sup> SDI is used to quantify the socioeconomic variation in health outcomes, and is a function of demographic characteristics collected by the American Community Survey.<sup>12,13</sup> Insurance was categorized into four groups: commercial, Medicaid, Medicare, and unknown.

### Statistical Analyses

Differences in characteristics of patients who rescheduled to virtual visits and those who canceled office visits were compared by use of chi-square and t-tests. Multivariate logistic regression was used to model these associations and generate odds ratios adjusted for the other variables included in the model. Statistical significance was set at  $p < 0.05$ . This project was reviewed by Henry Ford Health System's Institutional Review Board, and informed consent was waived.

## RESULTS

4015 patients were scheduled for in-person office visits during the study period (Figure 1). Of those, 14 patients kept in-person for office visits in lieu of virtual visits and were excluded from the analysis. Of the remaining 4001 patients, 498 (12.4%) patients successfully completed a virtual visit appointment and 3503 (87.6%) had elected to cancel their appointments. Five hundred



**Figure 1.** Number of Patients Scheduled for Office Visits During the First Wave of the COVID-19 Pandemic

and sixteen virtual visits were completed by the 498 patients during this time period. Compared to patients who canceled office visits, patients who completed virtual visit appointments were more likely to be younger patients (mean age 37.8 versus 45.5 years), female (68.7% versus 62.9%,  $p=0.01$ ), unmarried (68.7% versus 61.0%,  $p<0.01$ ), and had commercial insurance (56.4% versus 51.5%) or Medicaid (23.3% versus 19.6%,  $p<0.01$ ) (Table 1). Between groups, there was no difference based on race ( $p=0.51$ ) or SDI score (0.74). On multivariate analysis, patients with virtual visits were more likely to be younger than 18 (aOR 1.44, 95% CI 1.12-1.85,  $p<0.005$ ), and female (aOR 1.30, 95% CI 1.06-1.60,  $p=0.01$ ). Patients with Medicare insurance were less likely to have completed a virtual visit (aOR 0.73, 95% CI 0.57-0.95,  $p=0.017$ ).

## Diagnoses

Of the 498 virtual visits, 820 separate ICD diagnostic codes were used (Table 2). Of the diagnoses rendered during virtual visits, 12.4% were related to neoplasms, 53.3% were associated with dermatoses, and 6.5% were related to medication monitoring. Of the various dermatoses, 20.9% of virtual visits were related to acne or rosacea, 7.4% atopic dermatitis, and 5.1% psoriasis.

## Age

In the pediatric population, patients with Medicaid insurance were less likely to schedule a virtual visit compared with patients with commercial insurance (53.1% versus 62.0%); however, this did not reach statistical significance ( $p=0.095$ ) (Table 3). Compared to white patients, Blacks were less likely to have a completed virtual visit appointment (41.0% versus 51.9%,  $p=0.068$ ). Moreover, pediatric patients with

**Table 1.** Characteristics of All Patients Associated With Completed Virtual Visit During the COVID-19 Pandemic

Characteristic	All	Virtual Visits	Canceled Visits	p-value	aOR* (95% CI)	p-value
Age						
<b>&lt;18</b>	751 (18.8%)	129 (25.9%)	622 (17.8%)	<0.001	1.44 (1.12 – 1.85)	0.004
<b>≥18</b>	3250 (81.2%)	369 (74.1%)	2881 (82.2%)			
Gender						
<b>Female</b>	2547 (63.7%)	342 (68.7%)	2205 (62.9%)	0.01	1.30 (1.06 – 1.60)	0.011
<b>Male</b>	1454 (36.3%)	156 (31.3%)	1298 (37.1%)			
Race						
<b>White</b>	2086 (52.1%)	248 (49.8%)	1838 (52.5%)		Reference	
<b>Black</b>	1204 (30.1%)	155 (31.1%)	1049 (29.9%)	0.51	0.99 (0.79 – 1.24)	0.947
<b>Other</b>	711 (17.8%)	95 (19.1%)	616 (17.6%)		1.00 (0.76 – 1.30)	0.999
Marital Status						
<b>Not married</b>	2480 (62.0%)	342 (68.7%)	2138 (61.0%)	0.001		
<b>Married</b>	1521 (38.0%)	156 (31.3%)	1365 (39.0%)		0.85 (0.68 – 1.07)	0.17
Insurance						
<b>Commercial</b>	2085 (52.1%)	281 (56.4%)	1804 (51.5%)	<0.001	Reference	
<b>Medicaid</b>	804 (20.1%)	116 (23.3%)	688 (19.6%)		0.97 (0.76 – 1.23)	0.782
<b>Medicare</b>	1006 (25.1%)	92 (18.5%)	914 (26.1%)		0.73 (0.57 – 0.95)	0.017
<b>Unknown</b>	106 (2.6%)	9 (1.8%)	97 (2.8%)		0.57 (0.29 – 1.15)	0.118
SDI score (mean +/- SD)	49.1 ± 34.7 (N=3975)	49.6 ± 33.5 (N=495)	49.1 ± 34.9 (N=3480)	0.74		

\*Adjusted Odds Ratio (aOR) obtained from multivariate analysis

**Table 2.** Frequency of Diagnoses Among Patients with Completed Virtual Visits

Diagnosis	Frequency
Neoplasms	102 (12.4%)
Acne/rosacea	171 (20.9%)
Atopic dermatitis	61 (7.4%)
Psoriasis	42 (5.1%)
Dermatitis, unspecified	163 (19.9%)
Medication monitoring	53 (6.5%)
Other	228 (27.8%)

**Table 3.** Characteristics Among Patients with Completed Virtual Visits, Stratified By Age of Patient

Characteristic	All	Virtual Visits	Canceled Visits	p-value	aOR (95% CI)*	p-value
<b>Pediatric Patients</b>						
Gender						
<b>Female</b>	420 (55.9%)	75 (58.1%)	345 (55.5%)	0.58	1.15 (0.78 – 1.70)	0.47
<b>Male</b>	331 (44.1%)	54 (41.9%)	277 (44.5%)			
Race						
<b>White</b>	322 (42.9%)	67 (51.9%)	255 (41.0%)		Reference	
<b>Black</b>	204 (27.2%)	28 (21.7%)	176 (28.3%)	0.068	0.68 (0.39 – 1.19)	0.18
<b>Other</b>	225 (30.0%)	34 (26.4%)	191 (30.7%)		0.73 (0.46 – 1.18)	0.20
Insurance						
<b>Commercial</b>	410 (54.6%)	80 (62.0%)	330 (53.1%)	0.095	Reference	
<b>Medicaid</b>	312 (41.5%)	47 (36.4%)	265 (42.6%)		0.87 (0.55 – 1.36)	0.53
<b>Unknown</b>	29 (3.9%)	2 (1.6%)	27 (4.3%)		0.32 (0.07 – 1.39)	0.13
SDI score (mean ± SD)	49.4 ± 35.7 (N=750)	43.6 ± 33.3 (N=129)	50.6 ± 36.1 (N=621)	0.041	0.98 (0.91 – 1.05)	0.51
<b>Adult Patients</b>						
Age (mean ± SD)	52.6 ± 18.8 (N=3250)	47.4 ± 19.1 (N=369)	53.3 ± 18.6 (N=2881)	<0.0001	0.83 (0.76 – 0.89)	<0.0001
Gender						
<b>Female</b>	2127 (65.4%)	267 (72.4%)	1860 (64.6%)	0.003	1.33 (1.04 – 1.70)	0.023
<b>Male</b>	1123 (34.6%)	102 (27.6%)	1021 (35.4%)			
Race						
<b>White</b>	1764 (54.3%)	181 (49.1%)	1583 (54.9%)		Reference	
<b>Black</b>	1000 (30.8%)	127 (34.4%)	873 (30.3%)	0.10	1.080 (0.81 – 1.45)	0.61
<b>Other</b>	486 (15.0%)	61 (16.5%)	425 (14.8%)		1.03 (0.74 – 1.43)	0.87
Insurance						
<b>Commercial</b>	1675 (51.5%)	201 (54.5%)	1474 (51.2%)	0.024	Reference	
<b>Medicaid</b>	492 (15.1%)	69 (18.7%)	423 (14.7%)		1.03 (0.75 – 1.41)	0.85
<b>Medicare</b>	1006 (31.0%)	92 (24.9%)	914 (31.7%)		1.24 (0.89 – 1.74)	0.21
<b>Unknown</b>	77 (2.4%)	7 (1.9%)	70 (2.4%)		0.72 (0.32 – 1.59)	0.21
SDI score (mean ± SD)	49.1 ± 34.5 (N=3225)	51.8 ± 33.5 (N=366)	48.7 ± 34.6 (N=2859)	0.11	1.00 (0.96 – 1.04)	1.00

\*Adjusted Odds Ratio (aOR) obtained from multivariate analysis

lower SDI scores (i.e. less deprivation) were more likely to have a completed virtual visit appointment (score of 43.6 versus a score of 50.6 in patients with canceled appointments,  $p=0.041$ ). Statistical significance of lower SDI scores was not maintained on multivariate analysis, potentially due to interactions between SDI and race as well as a relatively low sample size of virtual visits (N-129).

In adult patients, younger patients were more likely to complete a virtual visit with average age  $47.4 \pm 19.1$  years versus  $53.3 \pm 18.6$  years in patients who canceled ( $p<0.0001$ ) (Table 3). Female patients (72.5% versus 64.6%,  $p=0.003$ ) and commercial insurance (54.5% versus 51.2%,  $p=0.024$ ) were significantly more likely to have a virtual visit. When adjusted for all variables, the associations between younger age, female gender and successful virtual visits remained statistically significant. Interestingly, Black patients (34.4% versus 30.3%,  $p=0.10$ ) and higher SDI scores ( $51.8 \pm 33.5$  versus  $48.7 \pm 34.6$ ,  $p=0.11$ ) were associated with successful virtual visits, though these did not meet statistical significance.

When patients  $>65$  years of age were analyzed as a separate cohort, age, gender, race, and SDI were not shown to be significantly associated with virtual visit completion (Table 4).

## DISCUSSION

With the burgeoning need for telemedicine and tele dermatology, recent research has raised concerns for demographic differences in access to virtual visits in medicine, now called “The Digital Divide.”<sup>14–16</sup> Beginning in March 2020, many dermatology practices implemented tele dermatology rapidly as a response to the spread of COVID-19 and

the necessity for social distancing. Recent studies have shown that dermatology patients over the age of 65 and those with Medicare insurance were less likely to pursue tele dermatology visits.<sup>17,18</sup> Strikingly, patients with Medicaid were more likely to pursue a tele visit in lieu of an office visit in a similar study.<sup>19</sup> Studies in other specialties have found similar trends with fewer virtual visits completed by patients who are older, poorer, non-English-speaking, and female.<sup>20</sup> Some hypotheses propose that younger patients with Medicaid insurance may prefer virtual visits due to lack of private transportation or access to childcare. Women, however, may have a disproportionate distribution of childcare duties with children staying home, which may limit access to telehealth.<sup>21,22</sup> Most articles posit that older patients pursue fewer dermatology virtual visits due to lower technical literacy as well more common complaints related to keratinocyte carcinomas.<sup>18,19</sup>

In this study, the pediatric patient population who completed virtual visits appeared to mirror health disparities previously reported in pediatric dermatology patients, with improved access in patients with commercial insurance, lower SDI scores, and white race.<sup>23,24</sup> In the adult patient population, younger, female patients with commercial insurance were more likely to complete virtual visits. This observation with younger and female patients remained statistically significant after adjustment for all other variables in the adult population. Notably, black patients and patients with higher SDI scores were more likely to have virtual visits; however, this did not meet statistical significance. In this study, our data overall suggests that virtual visits were more accessible to patients who were younger with commercial insurance.

Our findings in older patients are similar to previously reported findings with patients

over 65 less likely to pursue virtual visits. Lower deprivation indices and race in

**Table 4.** Characteristics Among >65-Year-Old Patients with Completed Virtual Visits

Characteristic	All	Virtual Visits	Canceled Visits	p-value
Age (mean ± SD)	74.0 ± 7.4 (N=995)	74.1 ± 7.7 (N=82)	74.0 ± 7.3 (N=913)	0.96
Gender				
<b>Female</b>	559 (56.2%)	43 (52.4%)	516 (56.5%)	0.48
<b>Male</b>	436 (43.8%)	39 (47.6%)	397 (43.5%)	
Race				
<b>White</b>	712 (71.6%)	53 (64.6%)	659 (72.2%)	0.35
<b>Black</b>	197 (19.8%)	20 (24.4%)	177 (19.4%)	
<b>Other</b>	86 (8.6%)	9 (11.0%)	77 (8.4%)	
Insurance				
<b>Commercial</b>	132 (13.3%)	7 (8.5%)	125 (13.7%)	0.38
<b>Medicaid</b>	7 (0.7%)	0	7 (0.8%)	
<b>Medicare</b>	850 (85.4%)	75 (91.5%)	775 (84.9%)	
<b>Unknown</b>	6 (0.6%)	0	6 (0.7%)	
SDI score (mean ± SD)	39.7 ± 32.3 (N=988)	43.4 ± 31.5 (N=81)	39.4 ± 32.3 (N=907)	0.28

elderly patients were not associated with increased likelihood of successful virtual visits. While socioeconomic factors appear to play a role in disparities in access to teledermatology for patients below the age of 65, it appears that age is the pivotal factor in determining access to teledermatology care during the COVID-19 pandemic. One confounding issue, however, is that most older patients are often seen in dermatology for full skin examinations which may have been deferred during the pandemic due to overall lack of urgency. While skin examinations were deferred during the COVID pandemic, early studies posit that skin cancer diagnoses may have been delayed during the pandemic.<sup>25</sup> As previous studies have reported, older patients may defer virtual visits due to the desire for in-person evaluations of possible skin neoplasms.<sup>18</sup> Moreover, elderly patients have low self-perceived ability to perform many functions on a patient portal that would allow them to access a physician, even with additional aid.<sup>26</sup> 41% of Medicare beneficiaries lack access to either a

computer with high-speed internet connection at home or smartphone with a wireless data plan, with 26% lacking access to both.<sup>27</sup> Future technology employed in patient care should consider ease of use for the elderly as well as optimization of evaluation of neoplasms to help improve access for the elderly patient population. Government legislation should also consider the digital inequities that exist throughout the nation as well.<sup>16</sup>

With regards to the utility of teledermatology, virtual visits appear to be most often utilized for dermatoses, which made up 53.3% of ICD codes used. Another potential use for telehealth is for patients who were scheduled to follow up for medication monitoring purposes, such as for isotretinoin. As previously mentioned, the evaluation of neoplasms remains limited in telemedicine. As our experience with telemedicine continues to grow, it is possible that teledermatology may be optimized to allow for patients with known common dermatoses and medication monitoring to be

seen via virtual visits and allow for easier in-person access for patients with neoplasms and unknown dermatoses.

## LIMITATIONS

Limitations of this study include a single institution experience with overall low adoption of virtual visits amongst canceled appointments. Though virtual visits were offered to all patients by physicians, inter-provider variability in offering virtual visits may be present. Moreover, patients who did not have an office visit scheduled prior to the COVID-19 pandemic but scheduled a subsequent virtual visit were not included. In this study, initial chief complaints were unable to be recorded. There was a lower sample size for adults over the age of 65, with only 82 patients completing a virtual visit. Lastly, our study had few non-English-speaking patients, who have been shown to be disadvantaged in access to telemedicine during the COVID-19 pandemic.<sup>19,28</sup>

However, this study demonstrates preliminary evidence of the persistence of disparities in teledermatology during the COVID-19 pandemic. Additional investigation into factors affecting patients' decision to pursue virtual visits as well as further demographic information of patients completing virtual visits with the increasing implementation of teledermatology should be considered.

## CONCLUSION

During the COVID-19 pandemic, telemedicine has become essential. Health care providers must remain mindful of patients who may not have easy access to technology, who may not have the technological literacy to pursue virtual visits,

or even may not have complaints easily evaluated by teledermatology.

Though federal policy has improved reimbursement to allow for remote delivery of care,<sup>29</sup> additional policies are needed to improve ease of access to phone and internet services and technological advances.<sup>27</sup> Electronic medical records should be modified to improve ease of access for all patients. Though limitations in teledermatology are present, teledermatology will remain a presence in caring for our patients, and providers and EMRs must continue to collaborate to optimize use for both providers and patients.

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