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Provider Experiences with Telehealth During the COVID-19 Pandemic

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IRVINE

Provider Experiences with Telehealth During the COVID-19 Pandemic

THESIS

submitted in partial satisfaction of the requirements for the degree of

MASTER OF SCIENCE  
in Biomedical and Translational Sciences

by  
Nairi Asadoorian Berner

Thesis Committee  
Professor Sherrie H. Kaplan, Chair  
Distinguished Professor Sheldon Greenfield  
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## **ABSTRACT OF THESIS**

Provider Experiences with Telehealth During the COVID-19 Pandemic

by

Nairi Asadoorian Berner

University of California, Irvine, 2021

Master of Science Biomedical and Translational Science

Professor Sherrie H. Kaplan, Chair

This paper presents responses to a survey developed to gauge providers' perceptions of telehealth during the COVID-19 pandemic. The survey was developed by faculty at the University of California, Irvine's Health Policy and Research Institute following semi-structured discussions with focus group participants. A final draft survey was distributed to mostly primary care clinicians. Responses indicated overall favorable perceptions of telehealth. Notable perceived challenges including care by telehealth of medically complex patients, patients with language barriers, and patients with poor access or understanding of technology. Continued evaluation and revision of the survey measure will be needed to improve its generalizability and appropriateness for distribution to a larger participant group.



## **Chapter 1**

### **Introduction**

Telehealth is the “provision of health care remotely by means of a variety of telecommunication tools, including telephones, smartphones, and mobile wireless devices, with or without a video connection” (1). It has emerged over the last decade as an alternative and supplement to traditional office visits and has been proven effective in delivering mainly outpatient clinical care (2,3). Though its use has been particularly useful in rural settings where access to local subspecialty care is limited, virtual care has been used in varying degrees across the United States and around the world (4,5). There has been considerable interest in the quality and cost-effectiveness of telehealth and much research has been done assessing these facets of telehealth (2,6). However, concerns regarding safety and limitations of telehealth had likely contributed to its relatively slow adoption despite its potential for convenience and improved healthcare access (7). Additionally, lack of compensation for virtual visits previously constituted a major hurdle in its expansion to mainstream use in healthcare delivery (1,8).

The onset of the COVID-19 pandemic necessitated a rapid increase in telehealth use among many healthcare institutions nationwide in efforts to keep patients and healthcare providers safe from spread of the virus. The expansion was facilitated in large part by the Center for Medicare and Medicaid Services’ decision to reimburse for telehealth services to Medicare recipients (9). Restrictions on various platform use including mobile applications were loosened as part of declaration of a state of emergency, allowing for greater access at a time when patient care was widely regarded as paramount (9). The University of California Irvine’s (UCI) healthcare system adapted similarly to add telehealth services to replace and

augment many outpatient office visits starting March 2020 and continuing to present day. In many cases, providers who had no prior experience with telehealth were required to adjust quickly to the changing medium.

While the implementation of telehealth at UCI was rushed in a heroic effort to meet an overwhelming and unexpected need for safe and effective healthcare during the pandemic, there is much to be learned from the successes and limitations of its use. And though the pandemic will eventually reach its end, telehealth will likely remain an integral part of healthcare delivery.

This study aimed to answer 3 questions pertaining to the use of telehealth in the outpatient setting:

1. Which patient clinical and demographic characteristics do providers identify as favorable for telehealth visits as opposed to face-to-face visits?
2. What characteristics of the provider and visit type are well-suited for implementation of successful telehealth visits?
3. What are the components of clinical work-flow necessary to conduct successful telehealth visits?

Discussions with providers prior to survey development directed the following working hypotheses:

1. Healthier, younger patients as well as patients previously known to providers are better suited for care via telehealth services as opposed to patients who have more overall disease burden.

2. Patients with English proficiency and access and ability to use technology benefited more from telehealth.
3. Various aspects of clinical work flow would benefit from adjustment and addition of resources to optimize care via telehealth.

## **Chapter 2**

### **Background**

Telehealth has existed since the turn of the 20<sup>th</sup> century with reports of doctors providing services by telephone since Alexander Graham Bell's invention in the 1870's (10) and continues to present day with slow, but steady advances since the turn of the 20<sup>th</sup> century (10, 11,12) as depicted in Figure 1. Currently, telehealth exists in many contexts and includes both synchronous care which involves real-time audio and/or video interaction with a clinician as well as asynchronous care which includes messaging as well as data storage and forwarding (2). The main goal of telehealth has been improvement in healthcare access (1). However, with the rise in healthcare costs over the last several decades, there has been considerable interest in its potential for cost savings (13). In fact, self-financed healthcare organizations such as the Department of Defense and Kaiser Permanente have encouraged the use of telehealth services, both synchronous and asynchronous, for improved care and cost effectiveness purposes (1, 14). The total impact of these services remains unclear, but in 2016, Kaiser Permanente reported more virtual interactions with patients including e-mail, telephone and video than in-person visits (15).

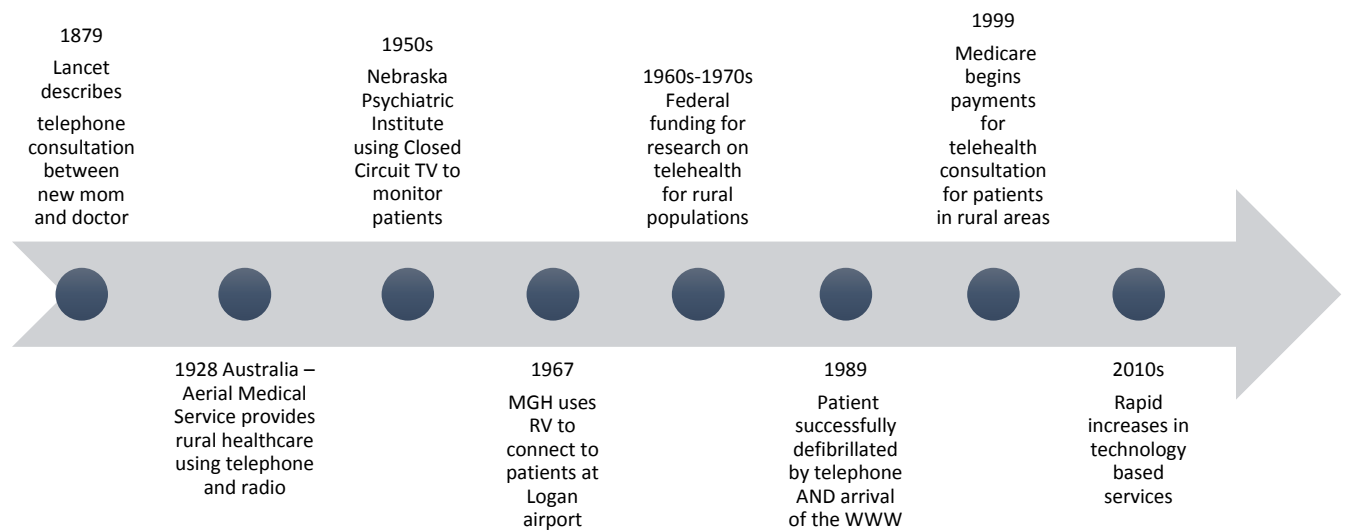


Figure 1: Timeline of important advances in telehealth

The application of telehealth has expanded, albeit slowly, to encompass a wide range of healthcare services. Asynchronous communication with providers, most notably in the form of “patient portal” type communication has obviated the need for clinic visits in many cases (16) and likely reduced costs. Teleradiology, teledermatology, and telepsychiatry have expanded over the last few decades offering access to specialists where none were previously available (17,18,19). These care models are now increasingly used for patients with acute conditions such as viral infections and sinusitis, but also in the care of chronic disease such as heart failure and diabetes, which require multidisciplinary, longitudinal approaches to care (6).

The size and heterogeneity of the literature evaluating the effectiveness of telehealth has made its interpretation challenging. In 2016, the Agency for Healthcare Research and Quality published “Telehealth: Mapping the Evidence for Outcomes from Systematic Reviews” in response to a request from United States Senators Bill Nelson and Jim Thune to determine the potential for reducing costs and improving access to quality care (20). The authors of the

technical brief describe the vast heterogeneity, both in clinical focus and scope, of the systematic reviews included in their evaluation. Mapping the data demonstrated positive clinical outcomes when telehealth was used in remote patient monitoring, whereby digital devices record and transmit data to providers, used mainly in chronic disease management. Psychotherapy was another clinical field where evidence supported the use of telehealth for improvement in clinical outcomes. The impact on cost and health services utilization was also reviewed. Of the 58 systematic reviews included, 32 included data on cost. In general, the impact on cost was found to be more muted than the impact on health outcomes with 4 studies showing benefit and 11 studies showing potential benefit. All the studies demonstrating definite cost savings and/or less healthcare utilization were studies examining the impact of remote patient monitoring (20).

Reimbursement for telehealth services had been slowly increasing prior to the pandemic, though had remained somewhat limited (1). Previously, Medicare payments for telehealth were restricted to largely rural settings where local access to providers was unavailable (21). Medicare reimbursement for telehealth services expanded dramatically in 2020 to improve access to safe and effective care during the COVID-19 public health emergency. Payment for telehealth services among private insurers had been increasing over the past decade. As of 2016, 29 states had laws requiring private insurers to cover telehealth services (1). As of January 2021, 43 states have laws requiring such coverage from private insurers and all 50 states require Medicaid coverage for live video services (22). In addition to issues of reimbursement, factors related to medical licensure and liability when practicing

across state lines as is often the case in rendering of telehealth services as well as privacy and cybersecurity concerns continue to be key aspects requiring adjustment and improvement (21).

Finally, patient and provider engagement are important for the widespread use of telehealth. Surveys of physicians providing telehealth services in the past have yielded mostly favorable results with providers reporting no major differences in the quality of care. One such example comes a cross-sectional survey conducted with providers and patients participating in the Massachusetts General Hospital Telehealth Program (23). Providers in the fields of psychiatry, neurology, primary care, oncology, and cardiology were asked to participate in the program and were given education and provided technology support. Patient participants were identified by the providers as suitable for virtual visits and all patients had previous relationships with their providers. Participants (426 patients, 76 attending physicians) who engaged in both virtual video visits and in-person visits were surveyed regarding their experiences with both modalities (23). Patient participants were primarily white, non-Hispanic and diverse in age. Participants were asked about the quality of the visits, their comfort levels with the visit types, time spent, feeling of connection with the provider or patient, and capabilities for physical exam components. Fifty-nine percent of clinicians and 62.6 percent of patients reported no difference in the quality of care. Seventy-nine percent of patient participants reported increased convenience of virtual visits when compared to traditional in-office visits. More than 50% of patients reported a willingness to pay up to a \$50 copay for virtual visits in the future (23). There are several notable elements to this study. First, the patient participants were chosen by the providers, which very likely improved the levels of reported provider and patient satisfaction. Secondly, each patient was seen both via telehealth

and in-person during the study period and as such, the limitations of telehealth, such as potential for fragmented patient-physician relationships and inadequate physical exams were lessened. These types of pre-pandemic studies will offer important insights into what the post-pandemic experience with telehealth may resemble.

The current study at UCI was aimed at understanding providers' experiences with telehealth as part of a larger study evaluating its potential benefits and risk, and with a goal of ultimately improving the experience for patients and providers as well as improving healthcare outcomes. Special attention was also given to the perceptions of providers regarding the impact of telehealth services in the treatment of patients with diabetes, as the development of technology in this field has expanded and potentially augmented telehealth care for some patients. Previous studies have shown statistically significant improvements in clinical outcomes as well as lower no-show rates when patients were randomized to diabetic care via telehealth and compared with controls receiving traditional office visits (24) highlighting the potential long-term impact of telehealth on diabetes. The increased use of continuous glucose monitors and insulin pumps as well as downloadable blood glucose meters which offer information to clinicians remotely will further entice patients to seek care via telehealth, obviating the need to take time off work or find transportation for routine clinical care (27). These advancements have the potential to impact not only clinical care outcomes, but also the overall economic impact related to healthcare.

The widespread availability of smartphones and personal computers has improved access to telehealth services (25); however, many patients at UCI, particularly the elderly, have limited understanding and/or access to digital technology. Additionally, patients with language



barriers may have a more difficult time accessing such services (26). These observations raise significant concern about the impact telehealth has had and will have on disparities in healthcare. Telehealth is often touted as a tool to improve such disparities, allowing clinical reach to rural communities where local resources are slim, particularly in realms of very specialized medicine (28). On the other hand, if the very people who need these services most are unable to access them, disparities will widen. The intent of this study was to gauge providers' impressions of feasibility of caring for patients with different characteristics and of different abilities and resources via telehealth vs face-to-face visits.

The circumstances of the pandemic and the additional emotional and physical strain it placed upon providers and patients may very well have had an effect on providers' impressions of telehealth visits in this study. To better understand participants' morale and job satisfaction, items pertaining to these topics were included in the survey with expectation that their responses to such items would contextualize responses for the current environment.

## Chapter 3

### Methods

The survey was designed to study the effects of the sudden, compulsory change to telehealth during the COVID-19 pandemic and to determine what modifications are needed to maximize satisfaction and health outcomes.

*Measures development.* The provider survey was developed by faculty at the University of Irvine's Health Policy and Research Institute including a psychometrician and clinical colleagues. Drs. Kaplan and Greenfield conducted a number of small focus groups and individual interviews with Primary Care Physicians and Endocrinologists actively providing both telehealth and in-person office visits. Using semi-structured interview questions (see Appendix A), focus group participants were asked about their experiences with telehealth during the COVID-19 pandemic. Their responses were collated by category using content analysis. Specific constructs were identified (including difficulties with telehealth for specific patient populations, difficulties with technology and clinic flow issues).

*Communication:* Concerns regarding communication were raised mostly in the context of language barriers with non-English speaking patients and the effectiveness of interpreter services, limitations of non-verbal cues, and potential disruptions of provider-patient trust and relationships.

*Clinic Work Flow:* Factors relating to clinic work flow were raised as they pertained to “checking-in” of patients and time spent attempting to reach patients by phone in addition to post-visit procedures such as coordination of referrals, future blood work and follow up appointments.

*EMR/Technology:* There was substantial concern with regards to reliability and ease of usability of technology as well as such heavy reliance upon it without an alternative (paper option). Furthermore, device availability for patients was discussed. This was felt to be an area which had the potential to further increase inequities in healthcare for patients who did not have the means to access telehealth services or enough technological literacy to use the necessary devices.

*Patient Characteristics:* As expected, providers believed patient characteristics, both demographic and clinical, play a significant role in appropriateness for telehealth. Demographic characteristics identified included age, primary spoken language, need for 3<sup>rd</sup> party presence during the visit (family/friend), accessibility to technology, and health literacy. Clinical characteristics impacting fitness for telehealth services included number of comorbid conditions and medications as well as potential need for detailed physical exam unable to be performed during a telehealth visit.

Content was then organized to guide construct development. These constructs were used to formulate specific survey item content to determine to what degree the problems

affected the clinicians' impressions of telehealth (Table 1). Items were also generated to assess physicians' attitudes about the benefits of telehealth and the circumstances for which telehealth has had positive or negative effects on patient care. The study was designed to determine the effects of different healthcare delivery systems and patient outcomes, including differences in patient and provider satisfaction with care.

Construct	# of Items
Clinic Flow	8
Communication with Patients	11
Quality of Patient Care	28
Complicated Patients	27
EMR/Technology	6

**Table 1: Constructs and associated number of items represented in initial survey**

The final draft survey was circulated among physicians participating in the focus groups for comments, revisions and recommendations. The survey was then revised based on these comments and the final edited version was distributed via RedCap to the 63 Primary Care Providers, Geriatricians and Endocrinologists seeing patients at the 5 UCI outpatient clinics in February 2021. The final survey is provided in the Appendix of this document. In addition to the revised survey questionnaires, a section with items related to provider job satisfaction was morale was added. These items were derived from a survey previously validated in a group of physicians' surveyed for the Medical Outcomes Study (29) which was designed to determine relationships between patient outcomes and the treating physicians and health care systems.

**The survey measures were organized in 4 sections.**

**Section 1** included 6 items pertaining to the provider morale and 6 items assessing job satisfaction constructs, using previously developed measures (29).

**Section 2** included constructs specifically related to the respondents' experiences with telehealth. It included 18 items related patient care, 12 items related to clinic flow, 7 items related to EMR/technology, 14 items related to caring for different types of patients, and 4 items related to communication.

**Section 3** included item content specifically focused on diabetes care. Providers who did not care for diabetic patients were instructed to skip these questions. Providers were asked 10 questions about the ease or difficulty of assessing complications related to diabetes and 16 questions regarding the adequacy of telemedicine when caring for patients with diabetes with varying clinical characteristics.

**Section 4** included questions about specific demographic and background characteristics of the respondents.

A total of 50 surveys were completed and analyzed. Descriptive statistics were reported. Cronbach's coefficient alpha, a measure of reliability, was performed to assess the consistency with which respondents answered the questions in each of the content areas. Item to total correlations were also reported to determine if any single item correlated poorly with the remainder of the items in the composite. Reliability analyses and item to total correlations were performed for theoretical composites in the following categories: Clinic Flow, Communication, Patient Care, Complicated Patients, EMR/Technology. The analyses and results are described in the following section.

## Chapter 4

### Results and Analysis

#### ***Participant Demographic Characteristics***

As depicted in Table 2, 80% of our 50 respondents were physicians and 8% were nurses. The providers mainly comprised of Primary Care Providers, with 28 percent of them self-identifying as General Internists and 50 percent of them as Family Medicine providers. Nine percent of them were Endocrinologists and percent 11 percent were Geriatricians. Sixty-nine percent of our respondents were women. The mean time in practice was 14 years.

<b>Characteristics</b>	<b>n</b>	<b>Years</b>	<b>%</b>
Total #	50		
Mean Age		47	
Mean Number of Years Practiced		16	
Gender			
Male			24%
Female			69%
Other			7%
Type of Healthcare Provider			
Physician			80%
Nurse			9%
Other			11%
Specialty			
General Internal Medicine			28%
Family Medicine			50%
Geriatric Medicine			11%
Same Day Walk-In			2%
Endocrinology			9%

**Table 2: Participant Demographic Data**

### ***Morale/Job Satisfaction***

Responses to questions pertaining to morale and job satisfaction indicated varying levels of stress and well-being among providers. When asked on a 5-point scale (very serious problem, serious problem, somewhat of a problem, not a very serious problem, not a problem at all) regarding their stress level, 74% of respondents indicated trying to see more patients per session while maintaining high quality of care presented at least somewhat of a problem while 64% reported at least some isolation from colleagues. Additionally, 84% of respondents indicated having to work harder to meet practice standards and 26% indicated that they often consider leaving clinical practice.

Responses were converted to a 5-point numerical Likert scale with the number five (5) representing the most favorable response and the number one (1) representing the most unfavorable, with responses in-between given values between 1 and 5 at equal intervals.

***Reliability Analysis.*** Cronbach's alpha was determined to be 0.636 for items pertaining to job satisfaction (1a-e and g) and 0.816 items pertaining to morale (1f, 2-4) as seen in Table 3. Item-to-total statistics are depicted in Tables 4 and 5 for morale and job satisfaction respectively.

Questions	N items	Item Means*	Cronbach's Alpha
Job Satisfaction	6	2.987	0.636
Morale	6	3.012	0.816

**Table 3: Item means and Cronbach's alpha for job satisfaction and morale** *\*Items were all converted to 1-5 scale with a value of 5 being assigned to the response most favorable to telehealth and 1 being assigned to the response least favorable to telehealth. The item means are captured from this scale.*

### Provider Job satisfaction Items:

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
seemorepatients	15.1600	8.831	.484	.415	.541
isolation	14.7600	11.737	.201	.078	.646
beingpressured	14.1200	10.598	.300	.132	.618
stress	15.2600	9.666	.511	.307	.539
workingharder	15.6200	9.220	.567	.451	.514
EMRchange	14.6800	11.406	.170	.073	.665

**Table 4: Item-total statistics for items related to provider morale.**

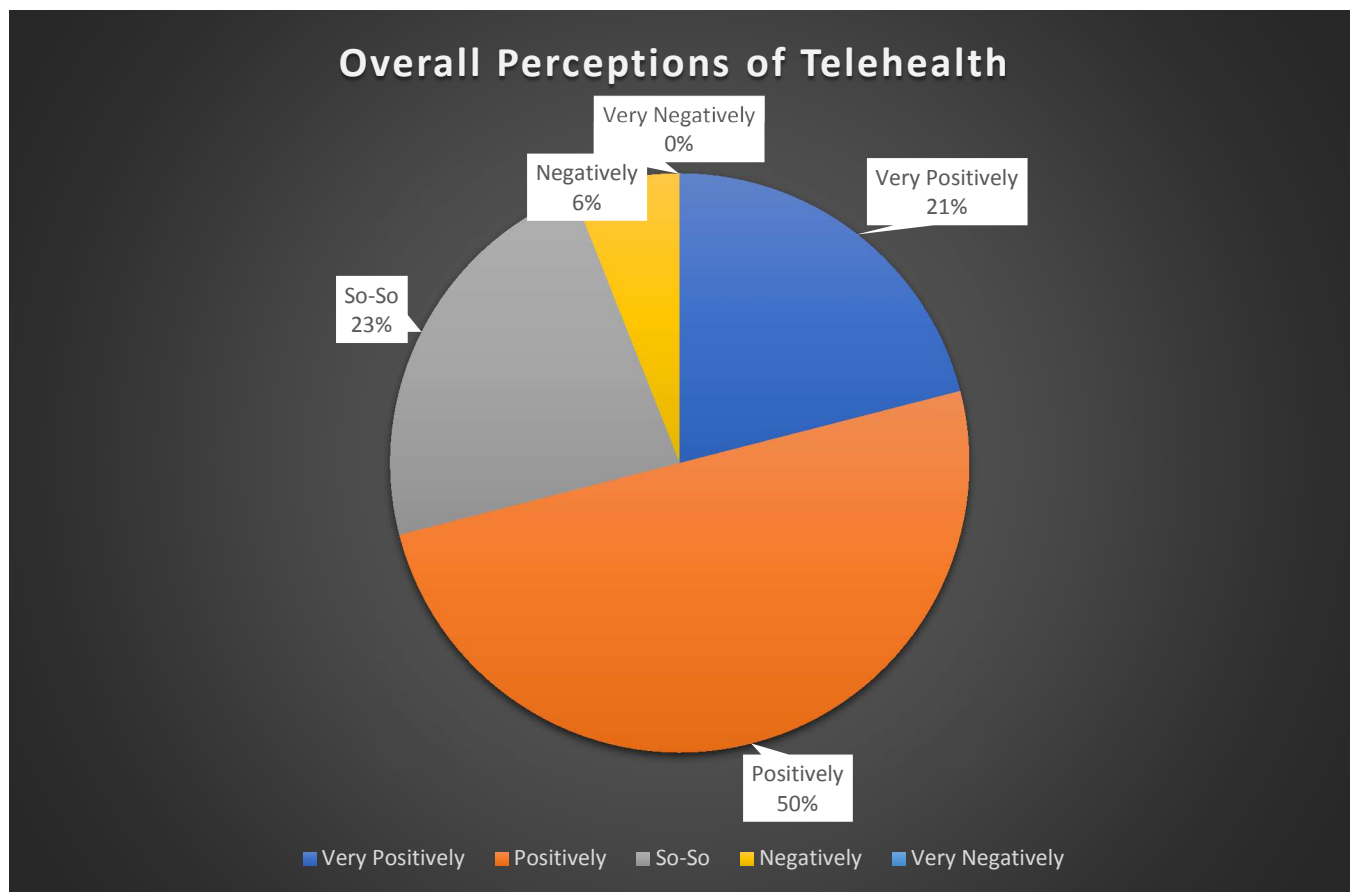
Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
morale	14.9969	14.020	.568	.498	.794
demoralized	15.1769	10.729	.733	.616	.749
moralechange	15.4045	14.572	.440	.409	.814
practicefeelsgood	14.4422	13.554	.490	.319	.805
demandsworththetoll	15.6055	12.887	.505	.411	.804
thinkaboutleavingpractice	14.7484	10.445	.779	.686	.736

**Table 5: Item-total statistics for items related to provider job satisfaction**

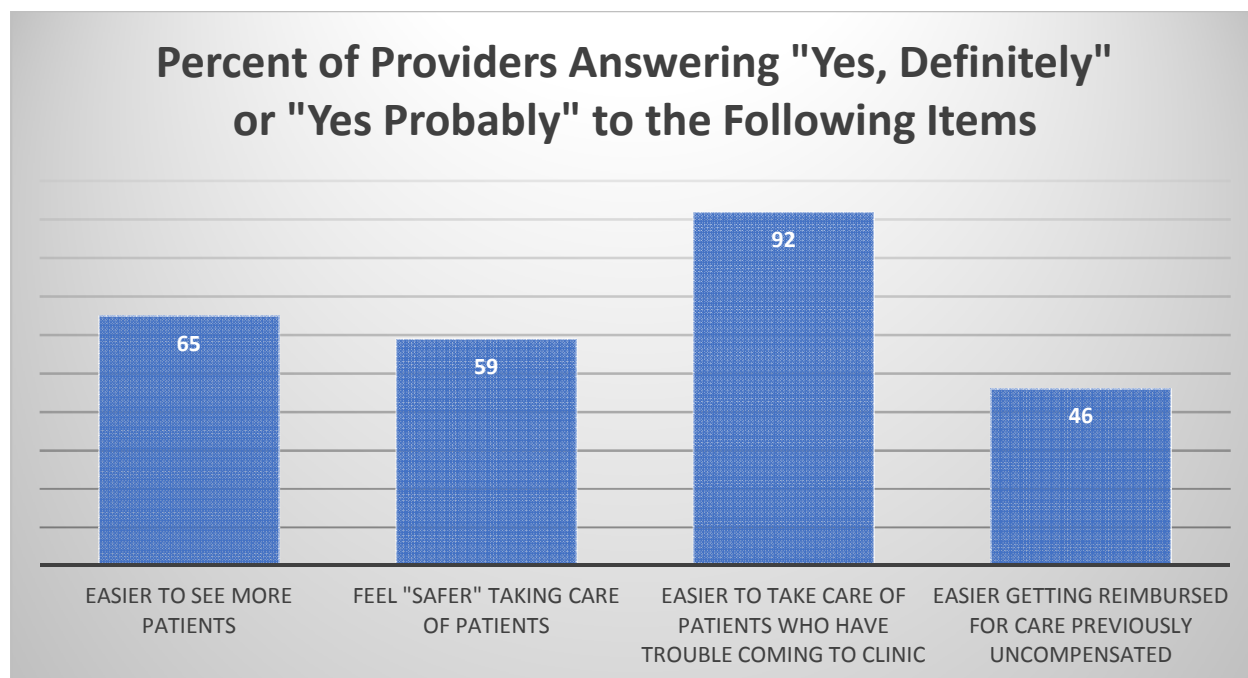
Of the study's respondents, 96% reported caring for patients via telehealth. Of those, 71% rated their experience with telehealth as positive or very positive (Figure 2) and 65% responded that telehealth had improved their ability to see more patients during a clinic session. Some areas of concern which emerged were in taking care of patients with language barriers which were exacerbated according to 42% of respondents and patients with limited



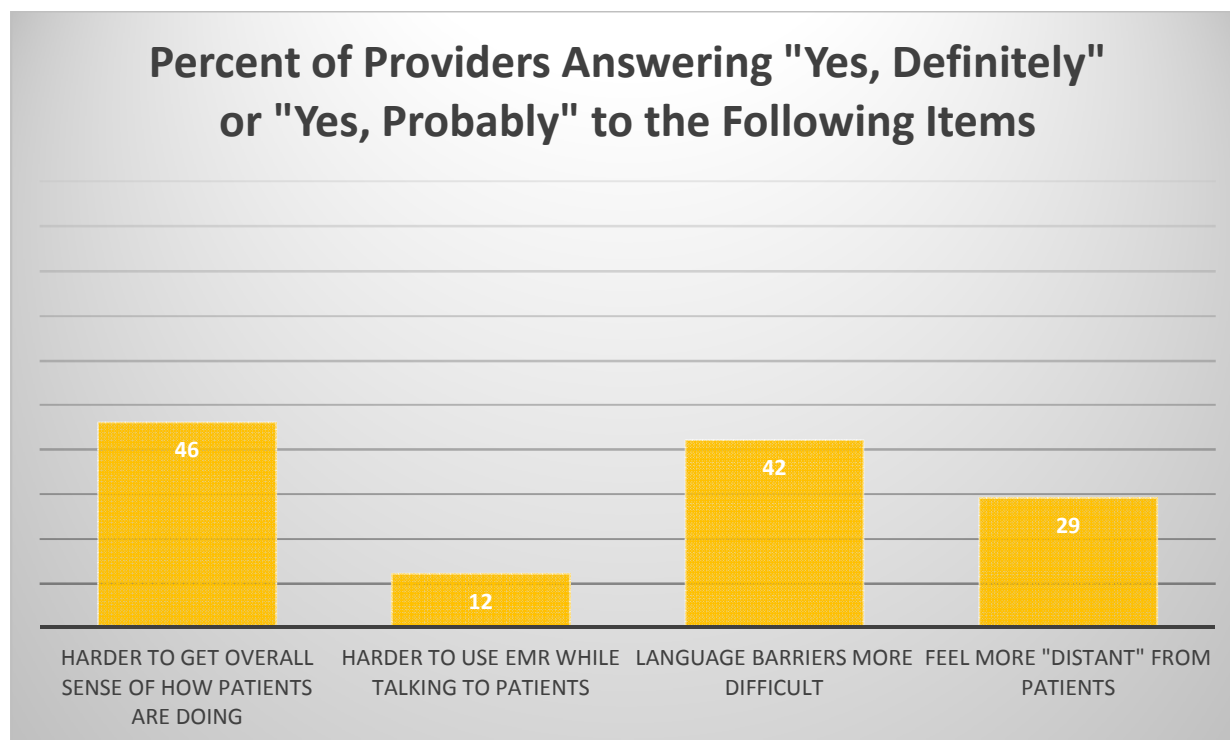
understanding or access to digital technology for whom 72% responded telehealth to be ineffective or very ineffective. Overall, providers' responses indicated telehealth had a positive effect on their ability to talk to patients (60%), their ability to schedule timely/needed visits (79%), and on convenience (75%). Problems with connectivity and other technologic issues as well as patient's lack of familiarity with telehealth were believed to have had a negative impact on telehealth visits. Figures 3 and 4 depict participant responses to items regarding specific components of care via telehealth.



**Figure 2: Overall Perceptions of Telehealth**

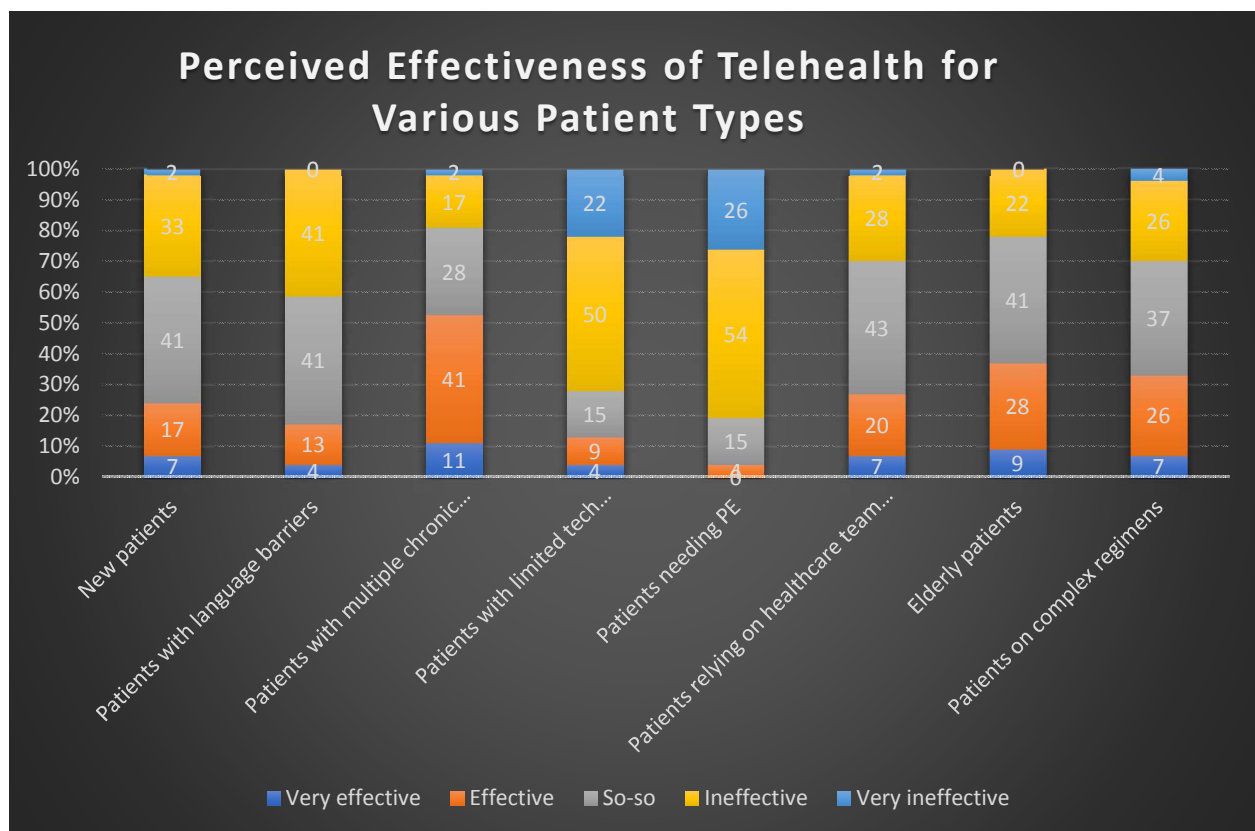


**Figure 3: Percent of providers responding "yes" to questions regarding ease of telehealth**



**Figure 4: Percent of providers responding "yes" to questions regarding challenges of telehealth**

Providers were also asked about their perceptions of effectiveness of telehealth in the care of various patient types and with differing needs (Figure 5). Item responses were again converted to a 1-5 scale with a value of 5 being assigned to the response most favorable to telehealth and 1 being assigned to the response least favorable to telehealth. The item mean for this set of responses was 2.832 and the Cronbach's alpha for the set of items was 0.831 indicating an acceptable level of reliability.



**Figure 5: Preferred visit methods for various patient types**

### ***Correlation Analysis:***

Correlation analyses were conducted to determine if significant relationships exist between providers' responses to job satisfaction and morale items and their perceptions of telehealth. Mean composite scores were calculated for each provider's answers to the job satisfaction items and morale items and Spearman's correlation analysis was conducted for these means and their relationship to the item asking "Overall, how would you rate your experience with telehealth (phone or video)?" depicted in Figure 2 above.

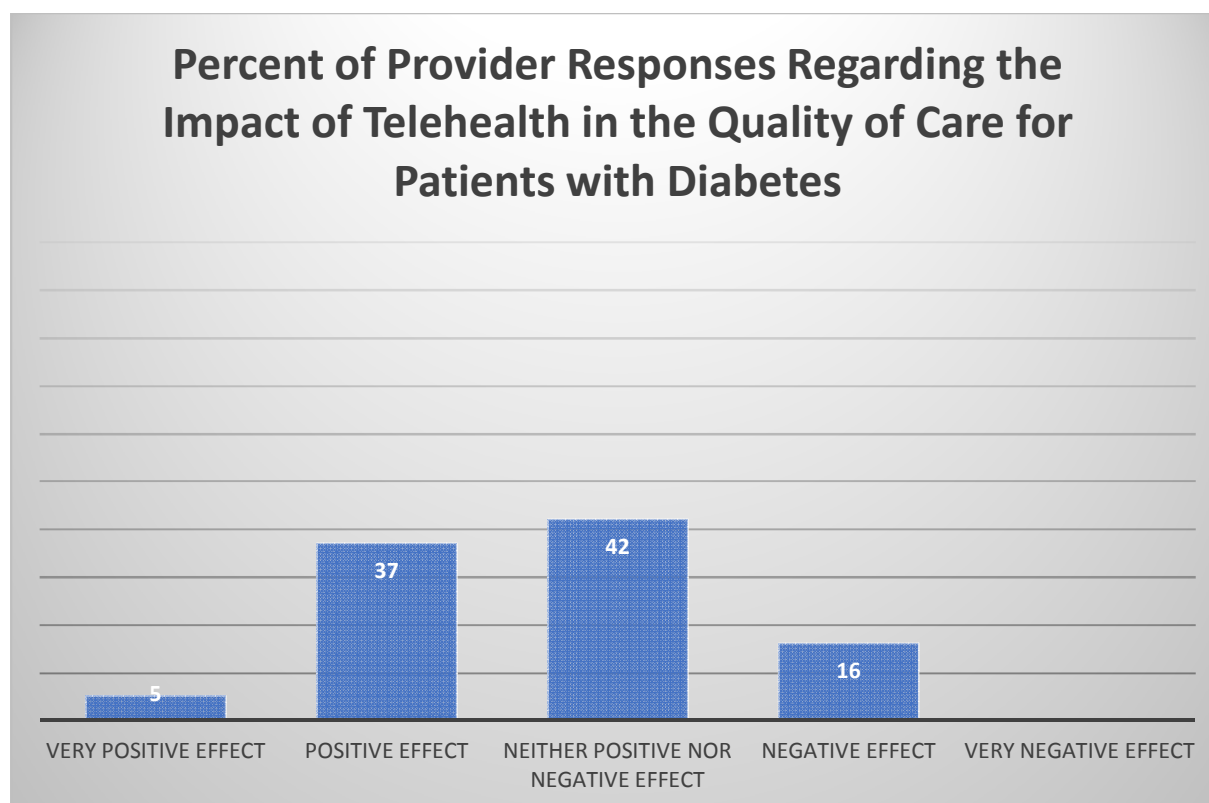
**Spearman correlation** coefficient for job satisfaction and telehealth experience was **-0.064** with p-value of .664, indicating no statistically significant correlation.

**Spearman correlation** coefficient for morale and telehealth experience was **-0.033** with a p-value of .822, similarly indicating no statistically significant correlation.

### ***Care of Patients with Diabetes***

Thirty-eight of our total 50 respondents answered affirmatively when asked whether they care for patients with diabetes and those providers were instructed to answer items related to that care.

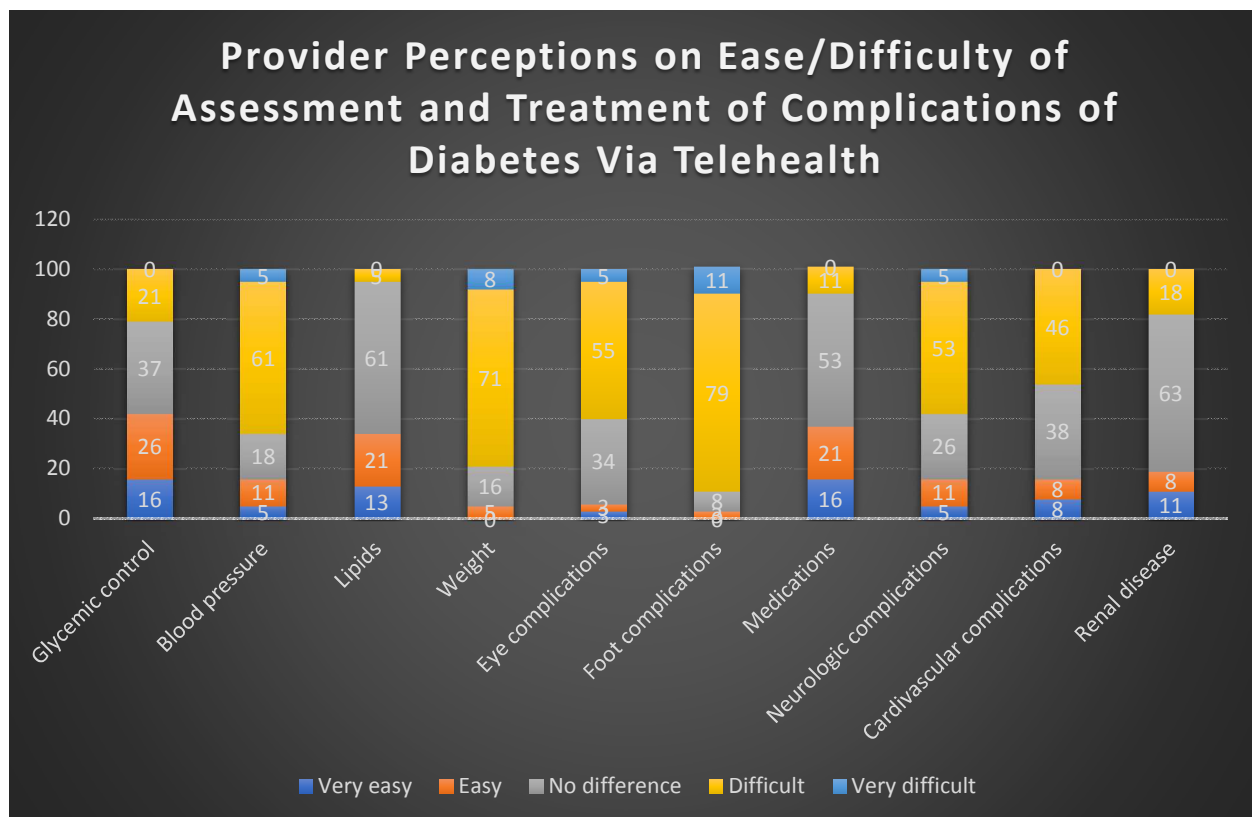
Overall, providers' impressions of the impact of telehealth on the care provided to patients with diabetes was mixed, but skewed towards positive. While providers most frequently answered there was no difference at a response rate of 42% when compared to face-to-face visits, only 16% felt telehealth was worse (Figure 6).



**Figure 6: Perceptions of telehealth visits in care of patients with diabetes**

As compared to in-person visits, respondents reported more difficulty in assessing for several parameters and complications of diabetes (Figure 7). When asked about accurately assessing for weight, blood pressure, eye complications and foot complications, 79% of respondents stated assessing weight was difficult or very difficult, while 66% responded similarly for blood pressure, 60% for eye complications, and 90% for foot complications. On the other hand, respondents felt monitoring for glycemic control was relatively easy with only 21% describing it as difficult or very difficult. Similarly, only 11% of respondents believed medication management to be difficult or very difficult. As would be expected, elements related to physical exam findings posed the greatest challenges in the care of patients via telehealth.

Total item means for the set of items related to assessing complications to diabetes was 2.789 (Items responses were converted to 1-5 scale with a value of 5 being assigned to the response most favorable to telehealth and 1 being assigned to the response least favorable to telehealth) and Cronbach's alpha for this set of items was 0.856 indicating reasonable internal reliability.

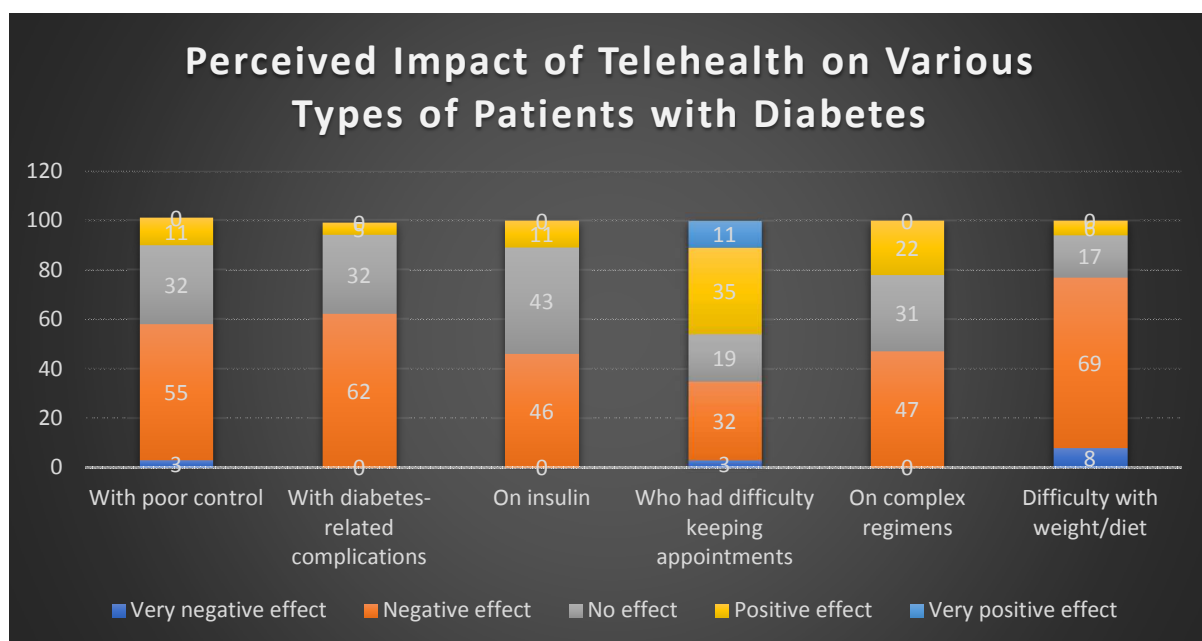


**Figure 7: Perceptions regarding ease/difficulty in use of telehealth for assessment and treatment of complications of diabetes**

Providers also felt more comfortable treating patients with whom they had already established care with 61% of them responding that telehealth was adequate in the care of follow-up patients, while 74% felt in-person visits were better for patients new to the practice.

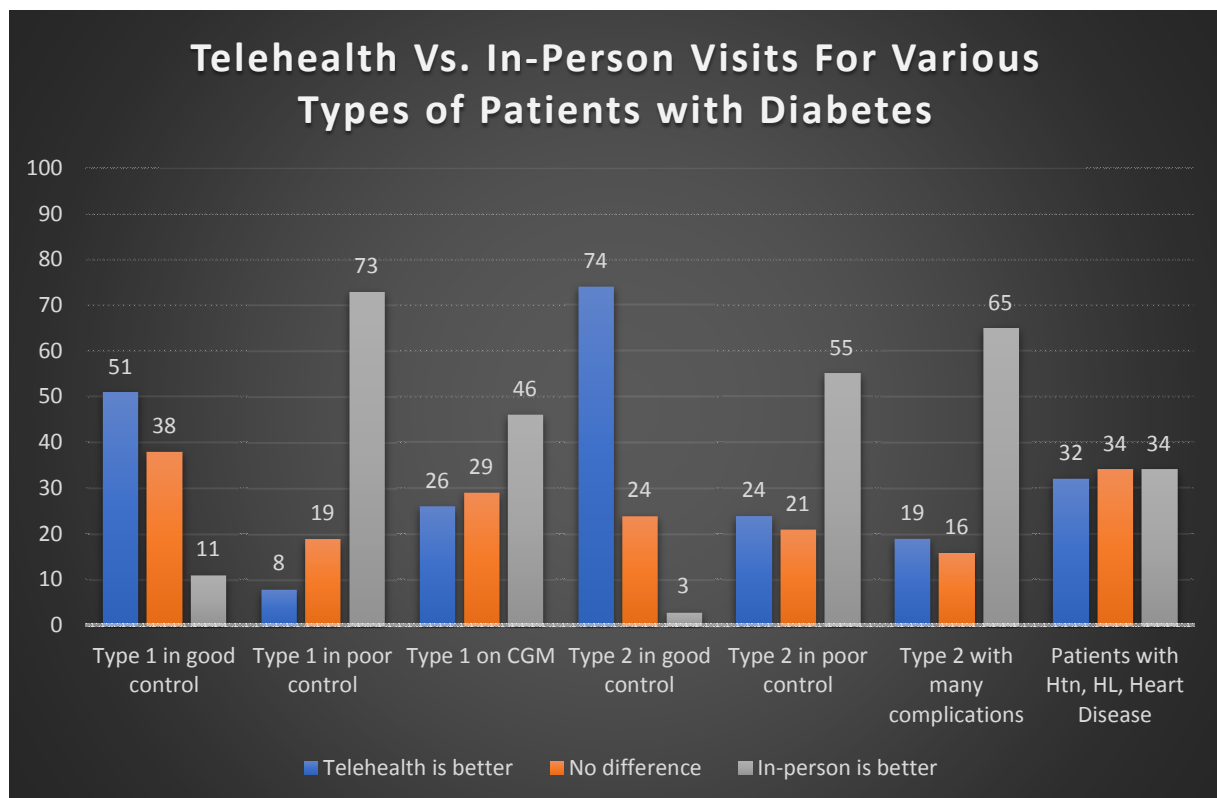
This likely reflects the need for establishing rapport and trust with patients during initial visits as well as the increased importance of physical exam during those visits.

Providers were asked a series of questions related to the impact of telehealth on patients with diabetes with more complex clinical characteristics (Figure 8). As expected based on initial focus group discussions, providers felt telehealth had a more negative impact on the care of such patients particularly those with poor control (58% negative) with diabetes related complications (62% negative) and patients with difficulty with weight/diet (77% negative). Total item means for the set of items related to different patient types was 2.614 and Cronbach's alpha was 0.831.



**Figure 8: Perceived impact of telehealth on patients with diabetes with varying clinical characteristics**

Providers were then asked which type of visit would serve various types of patients with diabetes (Figure 9). Patients in poor control or with many complications were the ones deemed most likely to benefit from in-person visits (73% of responses for Type 1 DM in poor control, 65% responses for Type 2 in poor control). Presence or absence of poor control was more highly correlated with perceived need for in-person visits than was type of diabetes.



**Figure 9: Telehealth vs. in-person visits for patient with diabetes**

#### *Construct related item reliability analysis*

Items were sorted to represent our empirical constructs and tested for internal reliability with determination of Cronbach's alpha. Cronbach's alpha for each of the constructs (clinic flow, communication with patients, quality of patient care, the care of complicated patients, and EMR/technology) were  $>0.7$  (Table 6).



Topic	N items	Item Means*	Included Questionnaire Items	Cronbach's Alpha
Clinic Flow	11	3.445	Section 1 Q1a, Section 2 Q5a, Q6b, Q6d, Q9e, Q9g, Q9h, Q9j, Q9k, Q9l, Q10d	0.772
Communication with Patients	10	2.924	Section 2 Q5b, Q5d, Q6a, Q6f, Q6g, Q9b, Q9c, Q9m, Q10e	0.825
Quality of Patient Care	18	2.898	Section 2 Q6j-l, Q9i, Q9n, Section 3 Q2, Q3a-j, Q5a	0.902
Complicated Patients	10	2.749	Section 2 Q7c, Q7f-h, Section 3 Q5b-e, Q5f	0.844
EMR/Technology	9	2.601	Section 1 Q1g, Section 2 Q5c, Q6e, Q7d, Q10a-b, Q10e-g	0.708

**Table 6: Item means and Cronbach's alphas of construct specific items**

*\*Items were all converted to 1-5 scale with a value of 5 being assigned to the response most favorable to telehealth and 1 being assigned to the response least favorable to telehealth. The item means are captured from this scale.*

The item-total tables for the construct items are depicted in the tables below. As can be seen, there are items which do not share substantial variance with the other items included in the construct. In the clinic flow construct, item “see more patients” and “home office distraction” have negative item-to-total correlations and removal of these items may improve the reliability of the construct (Table 7). In the communication with patients construct (Table 8), “techproblemsforsmootherconvo” has a low item-total correlation as does “EMRchange” in the EMR/Technology construct. Again, removal of these items may improve reliability coefficients of the relevant constructs.

**Item-Total Tables for the Topics are Provided Below:**

<b>Item-Total Statistics</b>					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
seemorepatients	35.0870	35.503	-.084	.145	.823
easiermorepatients	34.1739	30.769	.296	.626	.773
schedul timelyvisit	33.8261	30.547	.596	.494	.742
moreptsperclinic	34.1957	31.628	.378	.686	.760
keepontime	34.1739	32.725	.256	.366	.772
orderlabs	34.1304	27.671	.720	.712	.720
delegatetasks	34.5870	26.026	.730	.718	.712
referrals	34.3696	28.060	.609	.692	.731
medrefills	34.1957	27.183	.783	.853	.712
reconcilemeds	34.8043	26.028	.656	.670	.721
homeofficedistractio	35.3696	36.194	-.112	.205	.799

**Table 7: Item-total statistics for items in clinic flow construct**

<b>Item-Total Statistics</b>					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
hardtoknowhowptsdoing	26.5556	32.162	.341	.272	.825
languagebarriersharder	26.3556	27.780	.510	.527	.814
more distantfrompts	25.9333	27.655	.677	.487	.790
talktopts	25.4889	30.028	.571	.418	.803
talktopts withlangbarriers	26.6667	31.727	.523	.614	.809
settingrighttone	26.2000	31.164	.581	.497	.805
taketurnstalking	26.0889	28.037	.654	.696	.793
takecareofanxieties	25.9778	28.749	.663	.672	.793
badnews	26.7778	31.131	.432	.378	.817
techproblemsforsmoothc onvo	27.1556	34.907	.175	.098	.834

**Table 8: Item-total statistics for items in communication with patients construct**

### Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
ptsafety	48.3514	84.068	.304	.386	.907
wholeptpicture	49.7027	82.492	.626	.682	.895
managediseaserelateddistress	49.3514	82.790	.566	.653	.896
assesspthomelife	48.5405	80.255	.672	.687	.893
getsenseofhealth	49.1622	80.029	.583	.667	.896
major treatment decisions	49.5405	79.644	.662	.737	.893
qualitydiabetescare	48.8108	82.713	.590	.699	.896
monitorglycontrol	48.7568	77.467	.771	.841	.889
monitorbp	49.6486	84.068	.387	.678	.902
assesslipids	48.7297	82.480	.597	.754	.895
assessweight	49.9730	87.249	.334	.424	.902
monitoreyes	49.7568	85.578	.400	.446	.901
monitorfeet	50.1351	87.065	.431	.663	.900
managemeds	48.7297	78.258	.801	.878	.889
assessneuro	49.5676	79.863	.645	.817	.894
assesscvsympt	49.3784	80.353	.646	.840	.894
monitorrenal	49.0541	81.553	.627	.752	.894
effectglyingeneral	49.5676	86.586	.348	.501	.902

**Table 9: Item-total statistics in quality of patient care construct**

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
multiplechronicdisease	23.9429	21.467	.758	.676	.806
needPE	25.5429	24.903	.444	.433	.838
healthcaresocialnet	24.4857	24.669	.385	.393	.846
elderly	24.1143	22.810	.653	.792	.818
complextreatmentreg	24.3714	22.240	.602	.833	.824
priorpoorcontrol	25.0000	24.294	.611	.704	.824
diabcomplication	25.0571	25.291	.598	.778	.828
insulinpts	24.8286	25.793	.440	.764	.838
difficultyweight	25.2857	26.857	.285	.464	.849
complexregimens	24.7429	23.255	.685	.638	.816

**Table 10: Item-total statistics for complicated patients construct**

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
EMRchange	20.2273	15.342	.180	.150	.731
harderuseEMR	19.3864	13.731	.392	.459	.684
documentEMR	19.8409	14.369	.472	.458	.667
networkproblems	21.3182	15.292	.344	.604	.690
troubleshoottechyourself	21.3182	14.455	.558	.588	.656
techproblemsforsmoothconvo	21.3409	14.695	.560	.560	.659
ptlackfamiliaritytelehealth	21.3636	14.237	.534	.548	.657
ptcomfortmychart	21.3182	15.478	.383	.217	.685
limitedtech	21.1591	14.835	.247	.222	.717

**Table 11: Item-total statistics for EMR/Technology construct**

## **Chapter 5**

### **Discussion**

Based on the survey responses, the experience with telehealth at UCI has been mixed. Providers felt safer taking care of patients via telehealth during the pandemic and believed telehealth made it easier to take care of patients who generally have difficulty coming to clinic. Additionally, providers felt more comfortable with taking care of patients well-known to them and those whose diabetes was in good control. As expected, providers responded that new patients, patients with language barriers, patients with difficulty accessing technology and patients whose diabetes was in poor control may be more challenging to take care via telehealth.

The limitations of the study included small sample size and potential for poor generalizability related to the timing of the survey. It is difficult to know whether provider impressions of telehealth will be different post pandemic. Additionally, the study was conducted with participants who mostly practiced primary care and their perceptions may be different than those of subspecialty providers.

The long-term success of telehealth will depend upon many factors, including patient perspectives and health outcomes, but will require buy-in from all stakeholders, including providers. If it is deemed too cumbersome, its widespread success will be limited. There is an opportunity in telehealth to better health care delivery in a manner which serves providers, patients, and health care systems. Multiple studies have shown, echoed in this evaluation, the challenges faced by healthcare providers resulting in significant levels of job dissatisfaction.

It is difficult to know what portion of the difficulties with morale and wellness experienced by this study's respondents can be attributed to the COVID-19 pandemic and the changes that have come with it. Physician burnout has been recognized as a significant problem over the last 2 decades and previously conducted surveys have indicated similar dissatisfaction. One such example is a survey conducted by the Stanford Physician Wellness Committee in 2016 which reported a 39% self-reported burnout among Stanford physicians up from 26% from 2013. When asked about professional fulfillment in the Stanford study only 14% reported high fulfillment down from 24% in 2013 (30). While this survey does not specifically ask about "burnout," it does pose questions related to that subject with items related to job satisfaction and morale. It is reasonable to assume providers who question whether the demands from their practice are worth the toll they take or consider leaving clinical practice are suffering from some form of burnout.

The effects of stress, low morale, and burnout on the healthcare provider workforce cannot be underestimated. There is a current shortage of physicians in the United States and the Association of American Medical Colleges projects the shortage will grow to between 54,100 and 139,000 providers by 2033 (31). Physician burnout could easily add to this ongoing problem and have a direct effect on the both the availability and quality of healthcare in the United States.

To improve healthcare in the country, the collective experience of healthcare workers will need to be improved. New, innovative delivery systems which offer more flexibility and convenience and allow for more frequent monitoring of health parameters may contribute to

improvement in job satisfaction. This will likely be true for new generations of providers more adept with technology.

As we move forward with telehealth services in the coming months and years, it is important to determine which of the factors negatively affecting telehealth are modifiable. Connectivity problems as well as familiarity with telehealth will likely improve quite quickly as providers and patients become more comfortable with its use. Language barriers may be more difficult to overcome, even with better interpreter services. Reaching the most vulnerable populations, such as the elderly and the socioeconomically disadvantaged, may continue to be difficult, though it is precisely in reaching these populations where the influence of telehealth may have the greatest impact.

The responses to this survey reinforced the notion that it is easier to take care of patients with fewer health conditions and with better resources than those without. This statement is true of traditional office visits as well. And while telehealth will be an important resource for healthier patients and those more capable with technology, it is important to ensure that the advancement of telehealth does not leave behind sicker, socioeconomically disadvantaged patients further enhancing inequity in healthcare. Reaching the most vulnerable patient populations will require careful consideration and outreach to determine factors which interfere with patients' ability to use telehealth and produce solutions which improve outcomes in a cost-efficient manner. In previous studies, disinterest, lack of perceived benefit and inconvenience have been identified as potential barriers to the use of telehealth in minority populations (18). Appropriate outreach is needed to demonstrate the potential advantages of telehealth to patients who are apprehensive. Potential solutions include in-home training with

health aides, phone calls from office staff in advance of visits to help patients prepare, as well as highlighting of advantages such as time and effort saved having to arrive for in-person visits. Additional resources such as help with technology, after hours visit availability, and improved language interpreter services would help with patient confidence and willingness to participate and to succeed. Though our survey was directed at providers, their job satisfaction and morale are inextricably linked to patient satisfaction and health outcomes. When patients are happy and healthy, their doctors are more likely to be as well. In this vein, it is vitally important to consider the above factors as direct means of improving provider perceptions of telehealth.

Naturally, telehealth will not be suited for all types of care. It may be more appropriate for follow up care rather than for initial visits with new providers. Visits which require an extensive exam cannot not be performed by telehealth. In the case of diabetes, telehealth has been tested prior to the pandemic and has been shown to be effective.

Telehealth is well suited for the treatment of diabetes as much of diabetic care involves the interpretation of data which is collected prior to the visit with home monitoring devices. With recent technologic advances in the collection of this data and the ability to share it remotely with physicians, there has been more interest in using telehealth for routine care of patients with diabetes. It is likely that many office visits can successfully be converted to telemedicine visits without compromising clinical outcomes and with the potential to improve access to health care.

Where feasible, the application of telehealth to routine diabetes care will provide an effective and efficient tool in treatment of patients who would otherwise need to physically



present for multiple office visits per year. With the advent of new technologies including downloadable blood glucose monitors and continuous glucose monitoring devices, physicians will be able to access much of what is needed to treat patients remotely.

The key to telehealth success will lie in improvement in accessibility and flexibility without compromising quality of care or sacrificing the important trust-based relationships between providers and patients. It is easy to assume that all that is needed for telehealth to function is a provider, a patient, and a device. But in fact, supporting personnel including nursing staff, information technology staff, and scheduling assistants are vital to smooth and comprehensive visits. The presence of such personnel will ensure providers are able to focus on patient care and medical decision making, rather than on technology issues, scheduling problems, and arranging referrals. Additionally, if staff are able to “check-in” patients by phone or video a prespecified number of minutes prior to their visit time as they normally would during an in-person visit, time and resources will be saved in trying to establish connectivity and may result in a greater number of patients being able to be “seen” on any given day, further decreasing inefficiencies and missed visits. Additionally, flexibility to “convert” to in-person visits within a reasonable amount of time, such as 1 week of the telehealth visits, will add a level of assurance for patients apprehensive of the new system.

The recent pandemic has accelerated the use of telehealth and has perhaps forced a new realm in healthcare delivery. We will need to continue study its effects, identify problems associated with its use, and work to mitigate those problems with are modifiable in efforts to improve health outcomes, lessen inequities, and promote the well-being of providers and their patients.

## References

1. Dorsey ER, Topol EJ. State of Telehealth. *N Engl J Med*. 2016 Jul 14;375(2):154-61.
2. McLean S, Sheikh A, Cresswell K, et al. The impact of telehealthcare on the quality and safety of care: a systematic overview. *PLoS One*. 2013;8(8):e71238. 2013 Aug 19.
3. Tchero H, Kangambega P, Briatte C, Brunet-Houdard S, Retali GR, Rusch E. Clinical Effectiveness of Telemedicine in Diabetes Mellitus: A Meta-Analysis of 42 Randomized Controlled Trials. *Telemed J E Health*. 2019 Jul;25(7):569-583
4. Driessen J, Bonhomme A, Chang W, Nace DA, Kavalieratos D, Perera S, Handler SM. Nursing Home Provider Perceptions of Telemedicine for Reducing Potentially Avoidable Hospitalizations. *J Am Med Dir Assoc*. 2016 Jun 1;17(6):519-24.
5. de Souza CHA, Morbeck RA, Steinman M, Hors CP, Bracco MM, Kozasa EH, Leão ER. Barriers and Benefits in Telemedicine Arising Between a High-Technology Hospital Service Provider and Remote Public Healthcare Units: A Qualitative Study in Brazil. *Telemed J E Health*. 2017 Jun;23(6):527-532.
6. Ekeland AG, Bowes A, Flottorp S. Effectiveness of telemedicine: a systematic review of reviews. *Int J Med Inform*. 2010 Nov;79(11):736-71.
7. Scott Kruse C, Karem P, Shifflett K, Vegi L, Ravi K, Brooks M. Evaluating barriers to adopting telemedicine worldwide: A systematic review. *J Telemed Telecare*. 2018 Jan;24(1):4-12.
8. Contreras CM, Metzger GA, Beane JD, Dedhia PH, Ejaz A, Pawlik TM. Telemedicine: Patient-Provider Clinical Engagement During the COVID-19 Pandemic and Beyond. *J Gastrointest Surg*. 2020;24(7):1692-1697.
9. Billing for telehealth during COVID-19 | Telehealth.HHS.gov  
<https://telehealth.hhs.gov/providers/billing-and-reimbursement/>
10. Board on Health Care Services; Institute of Medicine. The Role of Telehealth in an Evolving Health Care Environment: Workshop Summary. Washington (DC): National Academies Press (US); 2012 Nov 20.
11. <https://www.sigmundsoftware.com/blog/history-of-telehealth/>
12. Liebson, E. Telepsychiatry: Thirty-Five Years' Experience. *Medscape*. Jul 08, 1997.
13. History of Health Spending in the United States, 1960-2013  
<https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/Downloads/HistoricalNHEPaper.pdf>
14. Pearl R. Kaiser Permanente Northern California: current experiences with internet, mobile, and video technologies. *Health Aff (Millwood)*. 2014 Feb;33(2):251-7.
15. A milestone: Kaiser now interacts more with patients virtually than in-person (advisory.com)  
<https://www.advisory.com/daily-briefing/2016/10/13/kaiser-telehealth>
16. Kruse CS, Bolton K, Freriks G. The effect of patient portals on quality outcomes and its implications to meaningful use: a systematic review. *J Med Internet Res*. 2015 Feb 10;17(2):e44.
17. Hanna TN, Steenburg SD, Rosenkrantz AB, Pyatt RS Jr, Duszak R Jr, Friedberg EB. Emerging Challenges and Opportunities in the Evolution of Teleradiology. *AJR Am J Roentgenol*. 2020 Dec;215(6):1411-1416.
18. Lee JJ, English JC 3rd. Teledermatology: A Review and Update. *Am J Clin Dermatol*. 2018 Apr;19(2):253-260.

19. Fortney JC, Pyne JM, Turner EE, Farris KM, Normoyle TM, Avery MD, Hilty DM, Unützer J. Telepsychiatry integration of mental health services into rural primary care settings. *Int Rev Psychiatry*. 2015;27(6):525-39.
20. Telehealth: Mapping the Evidence for Patient Outcomes From Systematic Reviews (ahrq.gov) [https://effectivehealthcare.ahrq.gov/sites/default/files/pdf/telehealth\\_technical-brief.pdf](https://effectivehealthcare.ahrq.gov/sites/default/files/pdf/telehealth_technical-brief.pdf)
21. Tuckson RV, Edmunds M, Hodgkins ML. Telehealth. *N Engl J Med*. 2017 Oct 19;377(16):1585-1592.
22. State Telehealth Policies (ncsl.org) <https://www.ncsl.org/research/health/state-coverage-for-telehealth-services.aspx>
23. Donelan K, Barreto EA, Sossong S, Michael C, Estrada JJ, Cohen AB, Wozniak J, Schwamm LH. Patient and clinician experiences with telehealth for patient follow-up care. *Am J Manag Care*. 2019 Jan;25(1):40-44.
24. Rasmussen OW, Lauszus FF, Loekke M. Telemedicine compared with standard care in type 2 diabetes mellitus: A randomized trial in an outpatient clinic. *J Telemed Telecare*. 2016 Sep;22(6):363-8.
25. Perrin A, Duggan M. Americans' internet access: 2000-2015. Pew Research Center website. [pewinternet.org/2015/06/26/americans-internet-access-2000-2015](http://pewinternet.org/2015/06/26/americans-internet-access-2000-2015). 2015 June 26.
26. Eberly LA, Kallan MJ, Julien HM, Haynes N, Khatana SAM, Nathan AS, Snider C, Chokshi NP, Eneanya ND, Takvorian SU, Anastos-Wallen R, Chaiyachati K, Ambrose M, O'Quinn R, Seigerman M, Goldberg LR, Leri D, Choi K, Gitelman Y, Kolansky DM, Cappola TP, Ferrari VA, Hanson CW, Deleener ME, Adusumalli S. Patient Characteristics Associated With Telemedicine Access for Primary and Specialty Ambulatory Care During the COVID-19 Pandemic. *JAMA Netw Open*. 2020 Dec 1;3(12).
27. Sim I. Mobile Devices and Health. *N Engl J Med*. 2019 Sep 5;381(10):956-968.
28. Marcin JP, Shaikh U, Steinhorn RH. Addressing health disparities in rural communities using telehealth. *Pediatr Res*. 2016 Jan;79(1-2):169-76.
29. DiMatteo MR, Sherbourne CD, Hays RD, Ordway L, Kravitz RL, McGlynn EA, Kaplan S, Rogers WH. Physicians' characteristics influence patients' adherence to medical treatment: results from the Medical Outcomes Study. *Health Psychol*. 1993 Mar;12(2):93-102.
30. 2016-Stanford-Physician-Wellness-Survey-Report.pdf (centerformsc.org)
31. <https://www.aamc.org/news-insights/us-physician-shortage-growing>

## Appendix

### SECTION 1. YOUR CURRENT MORALE AND WELL-BEING (N = 50)

The following are general questions about your current morale and well-being, especially since COVID-19.

1. The following issues are currently of concern to some providers. For each item, please indicate how much of A problem each is for you in your own practice.

	A VERY SERIOUS PROBLEM	A SERIOUS PROBLEM	SOMEWHAT OF A PROBLEM	NOT A VERY SERIOUS PROBLEM	NOT A PROBLEM AT ALL
a. Trying to see more patients per session while maintaining high quality of care?	16%	28%	30%	16%	10%
b. Isolation from colleagues?	4%	16%	44%	32%	4%
c. Being pressured to withhold specific patient services that could improve care?	2%	8%	30%	28%	32%
d. Personal or professional stress?	16%	18%	54%	8%	4%
e. Having to work harder (longer hours, evenings and weekends) to meet practice standards?	24%	38%	22%	16%	0
f. Feeling demoralized about the state of medical practice in general?	10%	32%	22%	28%	8%
g. Having to manage frequent changes to the electronic medical record?	6%	16%	38%	28%	12%

2. Thinking about all aspects of your professional life, how would you rate your current morale?

Extremely High, couldn't be better	Very high	On the high side	Neither high nor low	On the low side	Very low	Extremely low, couldn't be worse
0	6%	38%	28%	22%	4%	2%

3. Over the past year, has your morale gotten better or worse?

It's gotten a whole lot better	It's gotten a lot better	It's gotten somewhat better	It hasn't changed	It's gotten somewhat worse	It's gotten a lot worse	It's gotten a whole lot worse
0	6%	10%	32%	36%	14%	2%

4. The following statements are about personal values with respect to your medical practice. There are no right or wrong answers.

	STRONGLY AGREE	AGREE	NEITHER AGREE NOR DISAGREE	DISAGREE	STRONGLY DISAGREE
a. My practice makes me feel good about myself	16%	43%	29%	12%	0
b. I often find myself questioning whether the demands from my practice are worth the toll they take on me	18%	34%	30%	16%	2%
c. These days, I often think about leaving clinical practice	6%	20%	24%	32%	18%

## SECTION 2. YOUR EXPERIENCES WITH TELEHEALTH

- 1a. On average, about how many clinic sessions (half-day) do you see patient's each week? **AVERAGE: 6**  
 1b. On average, about how many patients do you see per clinic session each week? **AVERAGE: 9**

- 2a. Since COVID-19, have you seen any patients using telehealth?

**YES** 48  
**NO** 2

3. Since COVID-19, on average, what proportion of patients do you see each week:

**By telephone?** 28%  
**By video?** 17%  
**In-person?** 53%

4. Overall, how would you rate your experience with telehealth (phone or video)?

Very positively	Positively	So-so	Negatively	Very negatively
21%	50%	23%	6%	0

5. Compared to face-to-face visits, do you think that telehealth has generally:

	YES, DEFINITELY	YES, PROBABLY	MAYBE	NO, PROBABLY NOT	NO, DEFINITELY NOT
a. Made it easier to see more patients during clinic sessions?	27%	38%	15%	19%	2%
b. Made it harder to get an overall sense of how patients are doing?	8%	38%	31%	23%	0
c. Made it harder to use the EMR while talking with patients?	4%	8%	13%	38%	38%
d. Made language barriers with patients more difficult?	21%	21%	21%	27%	10%
e. Made your patients less comfortable talking to you?	0	6%	25%	54%	15%
f. Made you feel more "distant" from your patients than you feel is best?	6%	23%	23%	38%	10%
g. Made you feel 'safer' taking care of patients?	38%	21%	21%	17%	2%
h. Made it easier for you to take care of patients who have difficulty coming to clinic (e.g. those with mobility problems, transportation problems, etc.)?	48%	44%	6%	2%	0
i. Made it easier to get reimbursed for care that would otherwise been uncompensated?	27%	19%	33%	19%	2%

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**SECTION 2 CONTINUED**

6. How much of an effect has telehealth (phone or video) had on:

	<b>A VERY POSITIVE EFFECT</b>	<b>A POSITIVE EFFECT</b>	<b>NO DIFFERENCE</b>	<b>A NEGATIVE EFFECT</b>	<b>A VERY NEGATIVE EFFECT</b>
a. Your ability to talk to patients?	25%	35%	31%	8%	0
b. Your ability to schedule timely or needed patient visits?	27%	52%	21%	0	0
c. Convenience seeing patients (from your home or other venues)?	35%	40%	23%	2%	0
d. Your ability to see more patients per clinic session?	19%	31%	48%	2%	0
e. Documenting care in the EMR?	13%	38%	44%	6%	0
f. Talking to patients with language barriers?	4%	0	44%	50%	2%
g. Setting the right “tone” for visits?	8%	4%	67%	21%	0
h. Preserving patient safety?	33%	23%	27%	17%	0
i. Preserving your own safety?	42%	38%	19%	2%	0
j. Your ability to get a comprehensive picture of the “whole patient” (e.g. mood, demeanor, degree of pain)?	2%	6%	23%	66%	2%
k. Your ability to manage any disease-related distress your patients may have?	4%	13%	44%	40%	0
l. Your ability to assess the patient’s home life/environment?	17%	31%	46%	6%	0

7. How effective or ineffective is telehealth for the following kinds of patients:

	<b>VERY EFFECTIVE</b>	<b>EFFECTIVE</b>	<b>SO-SO</b>	<b>INEFFECTIVE</b>	<b>VERY INEFFECTIVE</b>
a. New (or new to you) patients?	7%	17%	41%	33%	2%
b. Patients with language barriers?	4%	13%	41%	41%	0
c. Patients with multiple chronic diseases or conditions?	11%	41%	28%	17%	2%
d. Patients with limited access to or understanding of digital technology?	4%	9%	15%	50%	22%
e. Patients needing [at least some parts of] physical exams?	0	4%	15%	54%	26%
f. Patients who rely on the healthcare team as part of their social network?	7%	20%	43%	28%	2%
g. Elderly patients?	9%	28%	41%	22%	0
h. Patients with complex treatment regimens?	7%	26%	37%	26%	4%

8. Are telephone, video or in-person visits the best for treating or managing the following:

	<b>TELEPHONE VISITS</b>	<b>VIDEO VISITS</b>	<b>IN-PERSON VISITS</b>	<b>ANY ARE OKAY</b>
a. Patients facing major decisions (surgeries, high risk procedures)?	4%	7%	63%	26%
b. Giving patients bad news?	0	4%	74%	21%
c. Pain assessment?	2%	9%	72%	17%
d. Depressed patients?	6%	26%	34%	34%
e. Patients with major concerns about getting COVID-19?	15%	66%	0	19%
f. Patients you haven’t seen for a long time or don’t know very well?	2%	17%	62%	19%
g. Patients who don’t have much privacy at home?	4%	0	85%	11%



9. Compared to in-person visits, how easy or difficult is each of the following for telehealth visits?

	<b>VERY EASY</b>	<b>SOMEWHAT EASY</b>	<b>ABOUT THE SAME</b>	<b>SOMEWHAT DIFFICULT</b>	<b>VERY DIFFICULT</b>
a. Change from a telehealth to an in-person visit?	13%	17%	36%	32%	2%
b. Take turns talking or having smooth conversations?	18%	13%	36%	33%	0
c. Take care of patients' anxieties, worries or concerns?	15%	17%	46%	22%	0
d. Protect patients' privacy?	13%	17%	54%	15%	0
e. Keep visits on time (the right length)?	15%	48%	30%	7%	0
f. Build rapport with new patients?	4%	28%	33%	33%	2%
g. Order lab tests?	33%	13%	52%	2%	0
h. Delegate tasks to staff?	24%	9%	43%	22%	2%
i. Get an overall sense of the patient's general health (mood, demeanor)?	11%	11%	43%	35%	0
j. Arrange referrals?	26%	11%	54%	7%	2%
k. Requesting medication refills?	28%	17%	50%	4%	0
l. Reconcile patients' medications?	20%	11%	37%	24%	9%
m. Break bad news?	7%	2%	35%	46%	11%
n. Make major treatment decisions?	4%	7%	37%	46%	7%

10. How much of an impact does each of the following have on your ability to deliver optimal patient care via telehealth?

	<b>A VERY NEGATIVE IMPACT</b>	<b>A NEGATIVE IMPACT</b>	<b>NEITHER NEGATIVE NOR POSITIVE IMPACT</b>	<b>A POSITIVE IMPACT</b>	<b>A VERY POSITIVE IMPACT</b>
a. Network or internet problems?	19%	55%	21%	4%	0
b. The need to troubleshoot technology problems yourself?	17%	57%	23%	2%	0
c. Distractions in the patient's home?	6%	40%	49%	4%	0
d. Distractions from your home or clinic office?	11%	28%	62%	0	0
e. Technology problems that make smooth conversation difficult (e.g. freezing, transmission delays, muting)?	15%	64%	19%	2%	0
f. Patients' lack of familiarity or comfort with telehealth?	21%	55%	19%	4%	0
g. Patients' comfort or lack of use of MyChart patient portal?	15%	63%	20%	2%	0

### SECTION 3. DIABETES CARE

The following questions ask specifically about the use of telehealth vs. in-person visits for taking care of patients with diabetes.

Are you primarily responsible for the management of patients with diabetes?

**YES** 76%  
**NO** 16% → SKIP TO SECTION 4  
**No Answer** 8%

1. About what proportion of your current patients have diabetes?

**MEAN** 39%

2. Overall, how much of an effect has telehealth had on the quality of care you are able to provide for patients with diabetes?

A very positive effect	A positive effect	Neither positive nor negative effect	A negative effect	A very negative effect
5%	37%	42%	16%	0

3. By telephone or video how easy or difficult is it to do each of the following for patients with diabetes compared to in-person visits?

	VERY EASY	EASY	NO DIFFERENCE	DIFFICULT	VERY DIFFICULT
a. Monitor patients' glycemic control?	16%	26%	37%	21%	0
b. Monitor patients' blood pressure control?	5%	11%	18%	61%	5%
c. Assess lipid levels?	13%	21%	61%	5%	0
d. Get an accurate sense of patients' weight?	0	5%	16%	71%	8%
e. Monitor for eye complications?	3%	3%	34%	55%	5%
f. Monitor for foot complications?	0	3%	8%	79%	11%
g. Manage patients' medications?	16%	21%	53%	11%	0
h. Assess neurologic symptoms?	5%	11%	26%	53%	5%
i. Assess cardiovascular symptoms?	8%	8%	38%	46%	0
j. Monitor renal disease?	11%	8%	63%	18%	0

4. What is the better way to see the following types of patients with diabetes?

	TELEHEALTH IS ADEQUATE	IN-PERSON VISITS ARE BETTER	IT DOESN'T MATTER
a. Patients you have known for a long time who are well controlled?	61%	5%	34%
b. Patients new to you?	8%	74%	18%
c. Type 1 patients on insulin who are in good control?	51%	11%	38%
d. Type 1 patients on insulin in poor control?	8%	73%	19%
e. Type 2 patients with many complications?	19%	65%	16%
f. Type 2 patients in good control?	74%	3%	24%
g. Type 2 patients in poor control?	24%	55%	21%
h. Type 1 patients on CGMs?	26%	46%	29%
i. Patients with hypertension, hyperlipidemia and/or heart disease?	32%	34%	34%



5. Since the COVID-19 pandemic began, what has been the effect on glycemic control for your patients with diabetes:

	<b>A VERY NEGATIVE EFFECT</b>	<b>A NEGATIVE EFFECT</b>	<b>NO EFFECT</b>	<b>A POSITIVE EFFECT</b>	<b>A VERY POSITIVE EFFECT</b>
a. In general?	0	55%	32%	13%	0
b. Who had a prior history of poor control?	3%	55%	32%	11%	0
c. Who have diabetes-related complications?	0	62%	32%	5%	0
d. On insulin?	0	46%	43%	11%	0
e. Who have difficulty with diet or weight control?	8%	69%	17%	6%	0
f. Who had difficulty keeping appointments?	3%	32%	19%	35%	11%
g. On complex regimens?	0	47%	31%	22%	0

6. Since COVID-19, has the frequency of visits (telehealth or in-person) for your patients with diabetes:

	<b>INCREASED A LOT</b>	<b>INCREASED SOME</b>	<b>STAYED ABOUT THE SAME</b>	<b>DECREASED SOME</b>	<b>DECREASED A LOT</b>
a. Telephone visits	32%	53%	16%	0	0
b. Video visits?	13%	53%	32%	0	3%
c. In-person visits?	0	0	25%	53%	2%

#### SECTION 4. ABOUT YOU

The following questions ask specifically about the use of telehealth vs. in-person visits for taking care of patients with diabetes.

1. What is your age?

**MEAN** 47

2. With what gender do you identify?

**MALE** 24%  
**FEMALE** 69%  
**OTHER** 7%

3. What type of healthcare provider are you?

**PHYSICIAN** 80%  
**NURSE** 9%  
**OTHER** 11%

4. What is your clinical specialty?

**General internal medicine** 28%  
**Family medicine** 50%  
**Endocrinology (adult)** 9%  
**Endocrinology (pediatric)** 0  
**Nephrology** 0  
**Cardiology** 0  
**Other**  
    **Geriatrics** 11%  
    **Family same day walk-in clinic** 2%

5. For how many years have you practiced medicine?

**MEAN** 16