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Who, What, When, Where, and Why: Trends in Telemedicine Usage From 2016–2020

By Jake Spiegel, Employee Benefit Research Institute

AT A GLANCE

- The pandemic as well as regulatory changes and more favorable treatment from employers created conditions in which telemedicine visits increased dramatically in March 2020.
- The Employee Benefit Research Institute (EBRI) analyzed a proprietary database containing nearly 150,000 covered lives and nearly 16 million encounters to examine trends in who uses telemedicine, which conditions patients seek to address, and whether there were factors associated with a particular visit being conducted via telemedicine.
- Telemedicine visits spiked during March 2020, when states issued stay-at-home orders and health care providers suspended nearly all in-person outpatient services. While patients' use of telemedicine for visits decreased after April 2020 from their meteoric highs, there is evidence that telemedicine visits have remained persistently higher than their prepandemic trends.
- Telemedicine users tended to be older and disproportionately female relative to patients who do not use telemedicine. The vast majority of telemedicine users had only one or two encounters with a health care provider via telemedicine, possibly indicating that telemedicine services were used to address acute needs or were used as a bridge for patients with chronic conditions.
- Telemedicine was used more frequently for respiratory symptoms and mental health issues, while face-to face was used more frequently for musculoskeletal and connective tissue problems.
- Named policyholders were more likely to seek care via telemedicine than their spouses or dependents, perhaps indicating that named policyholders were more comfortable seeking care for themselves via telemedicine, were more familiar with their employer's telemedicine offerings, or were better-informed at work about the cost benefits and availability of telemedicine services.

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Introduction

The COVID-19 pandemic radically altered the consumption of health care services. States issued stay-at-home orders, hospitals postponed elective surgeries, and doctor's offices closed. As a result, the demand for in-person health care dropped precipitously. Telemedicine visits, meanwhile, exploded in popularity, in part because it represented the only mode of care available for most non-emergency health care services.

Aside from the stay-at-home orders, there were other factors that contributed to the meteoric rise in telemedicine visits during the pandemic. Regulatory barriers were temporarily lowered as the Centers for Medicare and Medicaid Services (CMS) expanded the list of covered telemedicine services (Spiegel 2021). Many private insurers lowered or waived cost-sharing requirements for patients seeking care via telemedicine. Similarly, some employers nudged their workers to seek care via telemedicine by eliminating copays for telemedicine visits entirely.

Despite its growing popularity, there is still precious little empirical research into telemedicine. While trends in telemedicine usage have been well-documented, particularly the benefits of telemedicine as a tool to improve access to underserved populations lacking transportation to clinics and out-of-pocket costs, other relevant research questions remain unanswered (Barbosa et al. 2021). For instance, the demographics of patients who are more likely to seek care via telemedicine, and the determinants of what might increase the likelihood of a particular health care service being sought via telemedicine instead of in-person are relatively untrodden territory. This paper aims to shed some light on these relatively unknown aspects of telemedicine.

About the Data

The Employee Benefit Research Institute (EBRI) analyzed a proprietary database of claims data for nearly 150,000 employees, including their spouses and dependents, of a collection of large employers. The database contains nearly 16 million health care encounters spanning five years, accounting for over $600 million in claims cumulatively. Additionally, EBRI's Telemedicine Database contains data on nearly 6.5 million prescription drug fills. Descriptive statistics illustrating various attributes of EBRI's Telemedicine Database, including both telemedicine users and non-telemedicine users, are shown below in Table 1.[1]

Figure 1
Descriptive Statistics of Patients and Encounters in EBRI's Telemedicine Database, 2016–2020

Mean Age of Enrollee	32.9
Median Age of Enrollee	31
Share Female	47%
Share main policyholder	36%
Share spouse	24%
Share dependent	40%
Total Plan Enrollees in Database	147,631
Total Encounters	15,732,265
Average Encounters per Patient	106.5
Median Encounters per Health Care User	96
Total Health Care Spending	$ 615,019,177

Source: EBRI's Telemedicine Database.

The group of employers from which this database was populated introduced a telemedicine platform to their workers on a trial basis in 2018. After the program was well-received by workers, they rolled it out to the rest of their employees from 2019 onward. The database also differentiates between care received through a telemedicine platform and care received by a doctor remotely, such as over the phone or via videoconferencing technology, enabling us to better understand different use cases for telemedicine.

One Mode of Delivery, Two Different Flavors

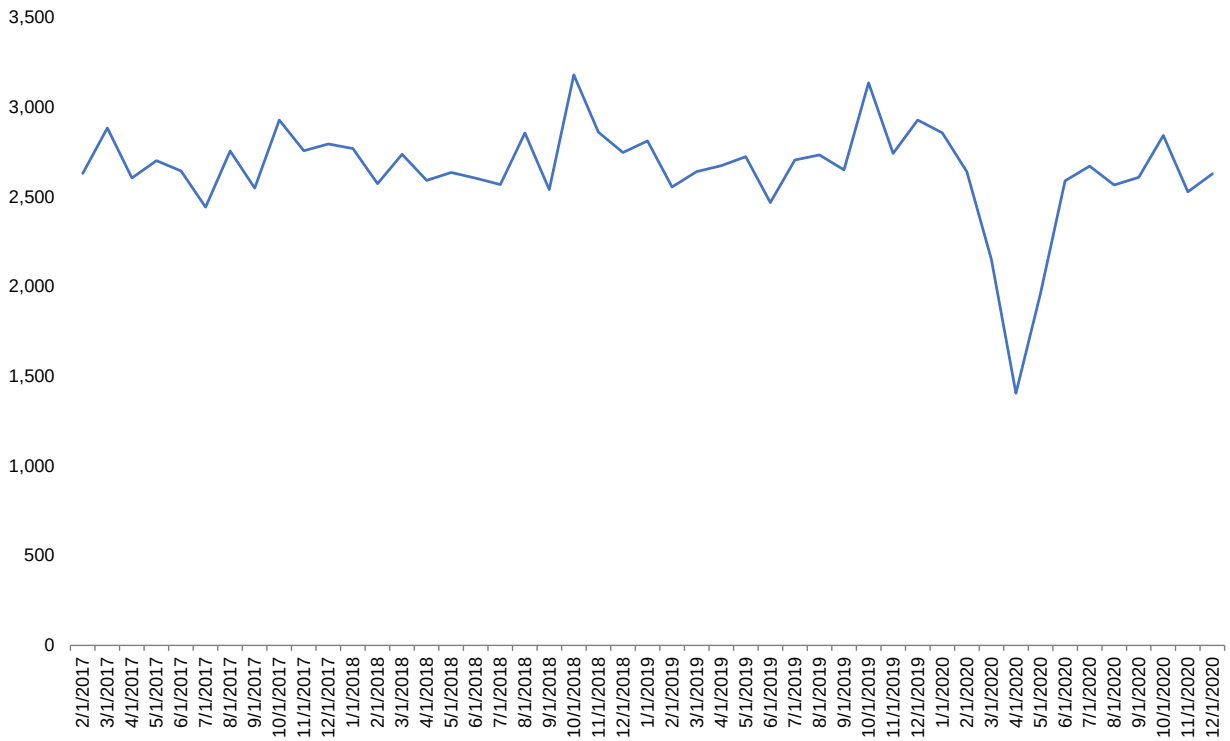
Before exploring the demographics of telemedicine users and the types of care they sought, it is useful to draw a distinction between two different implementations of telemedicine, which represent distinct use cases.[2] If these two types of telemedicine services are lumped together, analyses run the risk of confounding underlying trends. The first flavor of telemedicine, which we call telemedicine-as-a-service (TaaS), is where services are delivered via a third-party platform and in which the patient has no pre-existing relationship with health care providers. Teladoc, Doctor on Demand, and MDlive are several such providers that have grown rapidly in recent years. For example, a patient seeking medical care would log in to an application to receive on-demand care, or schedule an appointment to receive care at their convenience, from a remote health care provider they have not met before. The second flavor, which we call telemedicine as a medium (TAM), is exemplified by a patient utilizing videoconferencing or remote monitoring technologies, such as blood pressure and respiratory flow rate monitoring, to engage with a doctor with whom the patient already has a relationship, such as their primary care physician or psychologist, or a health care provider who is already in the patient's network. This flavor of telemedicine proliferated during the COVID-19 pandemic, when health care providers quickly pivoted to deliver care to patients who could not — or preferred not to —receive it in person (Weiner, et al. 2021). These flavors of telemedicine stand in contrast to in-person visits, which we term face-to-face (F2F).

While the difference between telemedicine as a service vs. a medium may seem subtle at first glance, differentiating between the two enables us to conduct richer analyses. There is likely a different composition of services sought by patients via TaaS than by TAM. Telemedicine as a service, on account of the physician lacking a formal pre-existing relationship with the patient, may be better suited to address a relatively simple acute condition, typically not emergent, such as an upper respiratory tract infection. Indeed, the convenience of receiving on-demand care via synchronous videoconferencing may encourage patients to seek care for issues that they may not have sought in person. Previous research suggests that telemedicine may act as a compliment rather than a direct substitute for in-person health care visits, with one paper finding that only about 12 percent of telemedicine visits substituted for in-person care (Ashwood et al. 2017). On the other hand, with telemedicine as a medium, patients have a pre-existing relationship with their health care provider, and it therefore may be better suited for patients seeking help in addressing chronic care. These two flavors of telemedicine may therefore attract systematically different patients seeking systematically different health care services.

Significant Modality Shifts

The data in EBRI's Telemedicine Database comport with findings from previous work that examined the impact of the COVID-19 pandemic on patient care. In-person services in EBRI's database fell precipitously in April of 2020, after many states issued stay-at-home orders and health care providers postponed most non-essential care, as shown below in Figure 2. In-person visits in EBRI's Telemedicine Database dropped precipitously from over 264,000 visits in February 2020 to 217,000 in March 2020, before bottoming out at fewer than 149,000 visits in April 2020. Other researchers, analyzing other proprietary databases, have found a similar trend (Jeffrey et al. 2020). The Commonwealth Fund found, for instance, that in-person care dropped nearly 60 percent from its typical yearly trend beginning in late March (Mehrota et al. 2021).

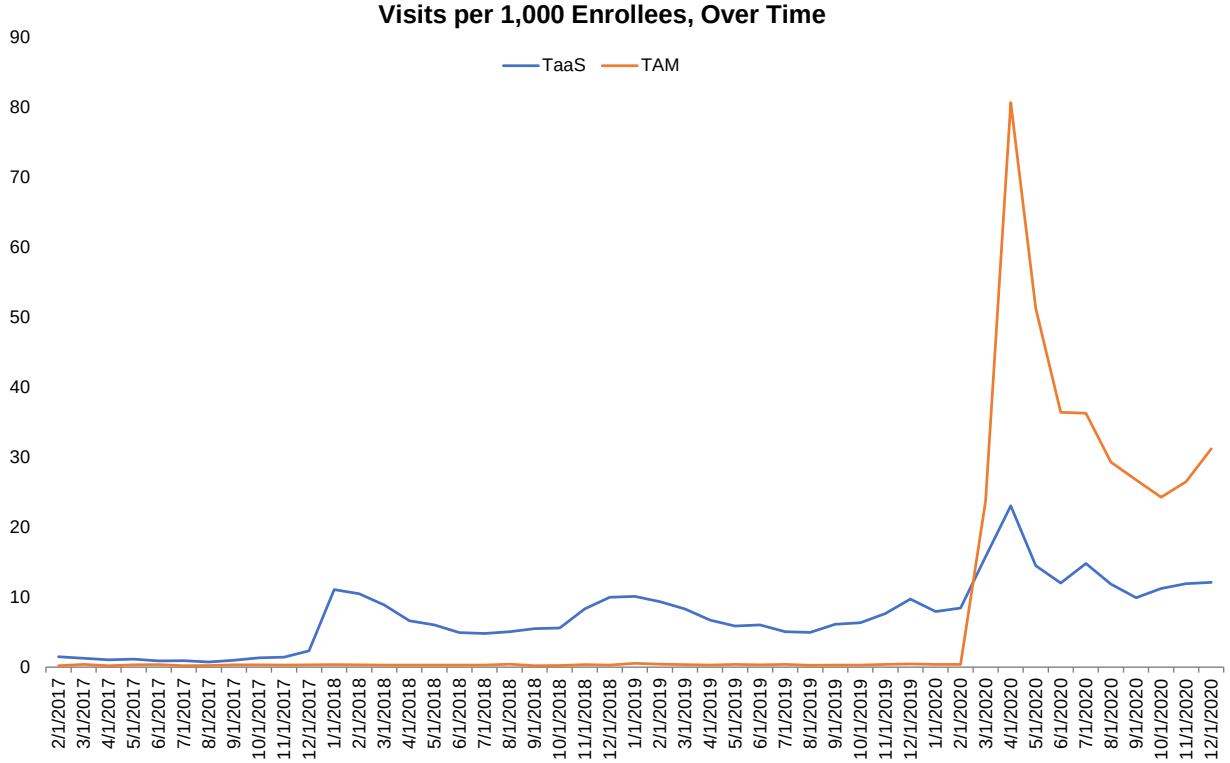
Figure 2
Face-to-Face (In-Person) Visits per 1,000 Enrollees, Over Time



Source: EBRI's Telemedicine Database

Telemedicine visits, meanwhile, spiked in April 2020, indicating a shift in the modality of care that patients sought. In addition to using telemedicine-as-a-service providers like Teladoc, doctor's offices adapted to the COVID-19 pandemic by offering their services remotely, such as over the phone or through synchronous videoconferencing technology, enabling patients to seek out health care services from providers with whom they had a preexisting relationship. Additionally, regulatory barriers were lowered, making it easier for doctors to provide services via telemedicine, and some employers waived cost-sharing arrangements for care sought via telemedicine (Spiegel 2021). As a result of the confluence of these factors, health care visits via TaaS increased 87 percent relative to February 2020, as shown in Figure 3. Telemedicine-as-a-medium, visits, however, were 50 times higher than in February 2020 as providers quickly pivoted to offering their services via videoconferencing technology and patients relied more heavily on remote-monitoring technology such as pulse oximetry, also shown in Figure 3.

Figure 3
Telemedicine-as-a-Service (TaaS) and Telemedicine-as-a-Medium (TAM) Visits per 1,000 Enrollees, Over Time



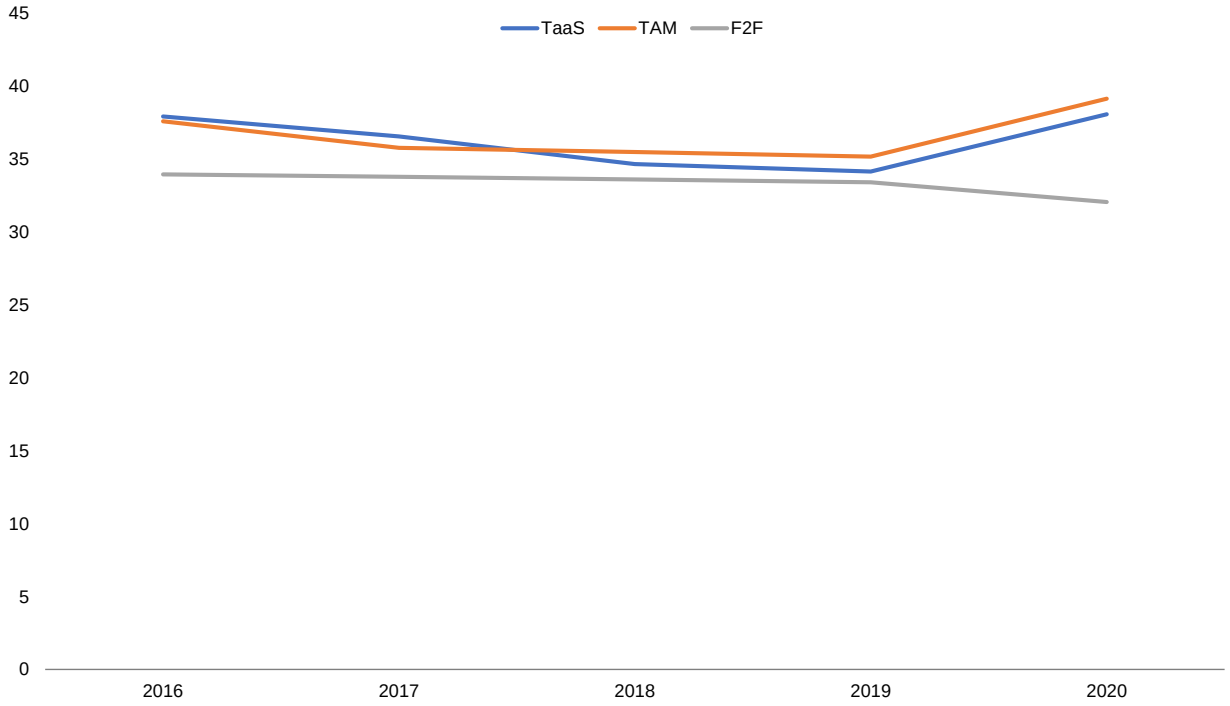
Source: EBRI's Telemedicine Database

Telemedicine encounters of both varieties decreased after the April 2020 peak, reflecting the rebound of in-person care after stay-at-home orders were lifted and doctor's offices began reopening. In June 2020, in-person visits in the database recovered to the levels seen in February 2020, although in-person health care visits in subsequent months remained lower than in 2019. Still, telemedicine encounters remained persistently higher than pre-pandemic levels.[3] This could reflect a hesitancy on the part of patients to seek in-person care while the pandemic continued to rage across the country; indeed, as COVID-19 cases spiked after Thanksgiving, patients sought more care via TaaS in December than in October or November. Alternatively, this could indicate some amount of behavioral stickiness: once accustomed to receiving care via telemedicine when it was nearly the only option, some users may have found that they enjoyed telemedicine's superior convenience, or they may have grown accustomed to the cost advantages that some employers instituted.

Who Uses Telemedicine?

About 20 percent of the population in EBRI's Telemedicine Database used either variation of telemedicine at some point between 2016 and 2020. Decomposing this into TaaS and TAM visits, we find that similar proportions of patients used either service; roughly 11 percent used either TaaS or TAM at some point between 2016 and 2020, and nearly 3 percent used *both* TAM and TaaS for health care visits. Digging into demographics, patients using telemedicine were slightly different than F2F users. Telemedicine-as-a-medium users were modestly older than TaaS users (37 years old and 36 years old on average, respectively). Both were older than F2F users, who were 33 years old on average. The age gap is roughly persistent between 2016 and 2019, shown in Figure 4, before widening slightly in 2020, perhaps as a result of older patients seeking elective health care services that were not available to be administered in person.

Figure 4
Average Age of Telemedicine-as-a-Service (TaaS), Telemedicine-as-a-Medium (TAM), and Face-to-Face (F2F) Users, by Year

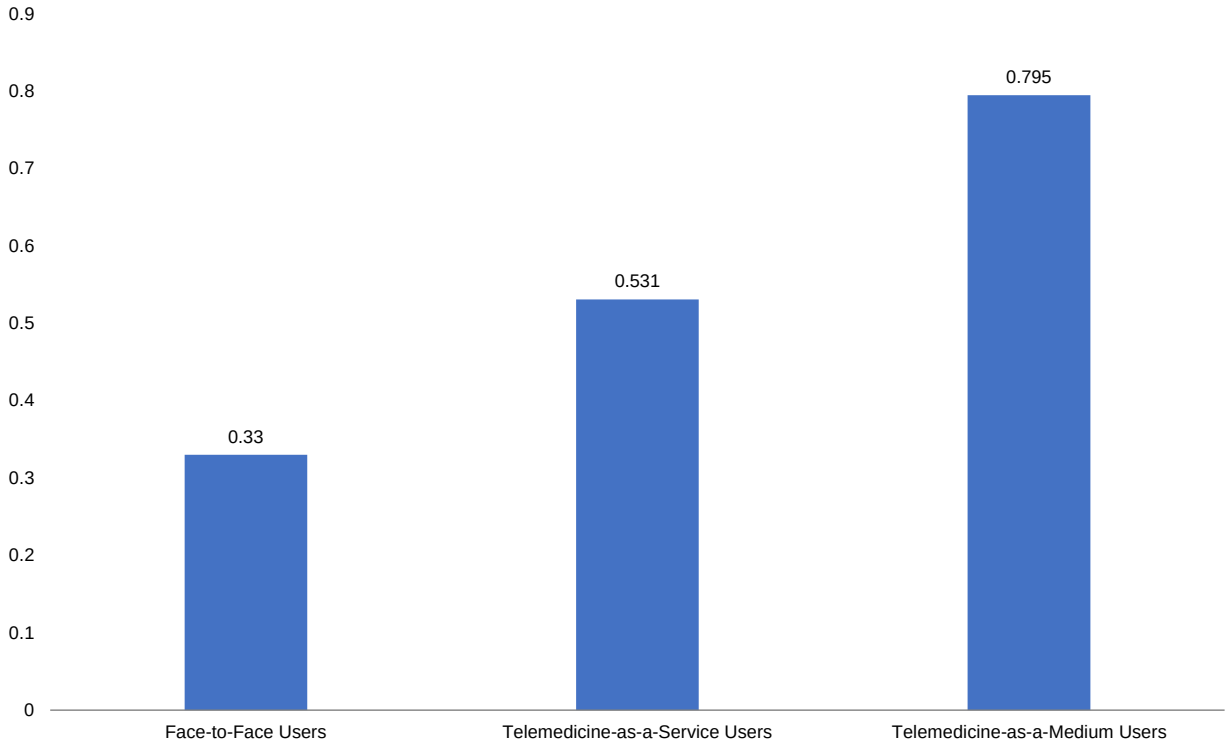


Source: EBRI's Telemedicine Database

We also observe differences in gender among TaaS, TAM, and F2F users. Both TaaS and TAM users were more likely to be female (56 percent and 55 percent, respectively) than patients who never used telemedicine (52 percent). This gap persisted from 2018, when the group of employers rolled out their telemedicine benefit offering, until the pandemic in 2020.

On the whole, telemedicine users were slightly unhealthier than F2F users, as measured by the Charlson Comorbidity Index (CCI). The CCI is a commonly used predictor of one-year mortality rates and is often used by researchers as a proxy for health. Patients seeking care via telemedicine of any variety had an average CCI of 0.62, compared with F2F users who had an average of 0.33, perhaps reflecting a hesitancy on the part of sicker patients to seek F2F care. Disaggregating between TaaS and TAM patients, we find that TaaS patients had a lower CCI on average than TAM patients, at 0.531 and 0.795, respectively, perhaps a reflection of patients seeking care via TaaS for low-intensity chronic conditions and via TAM for chronic conditions and preventive care.

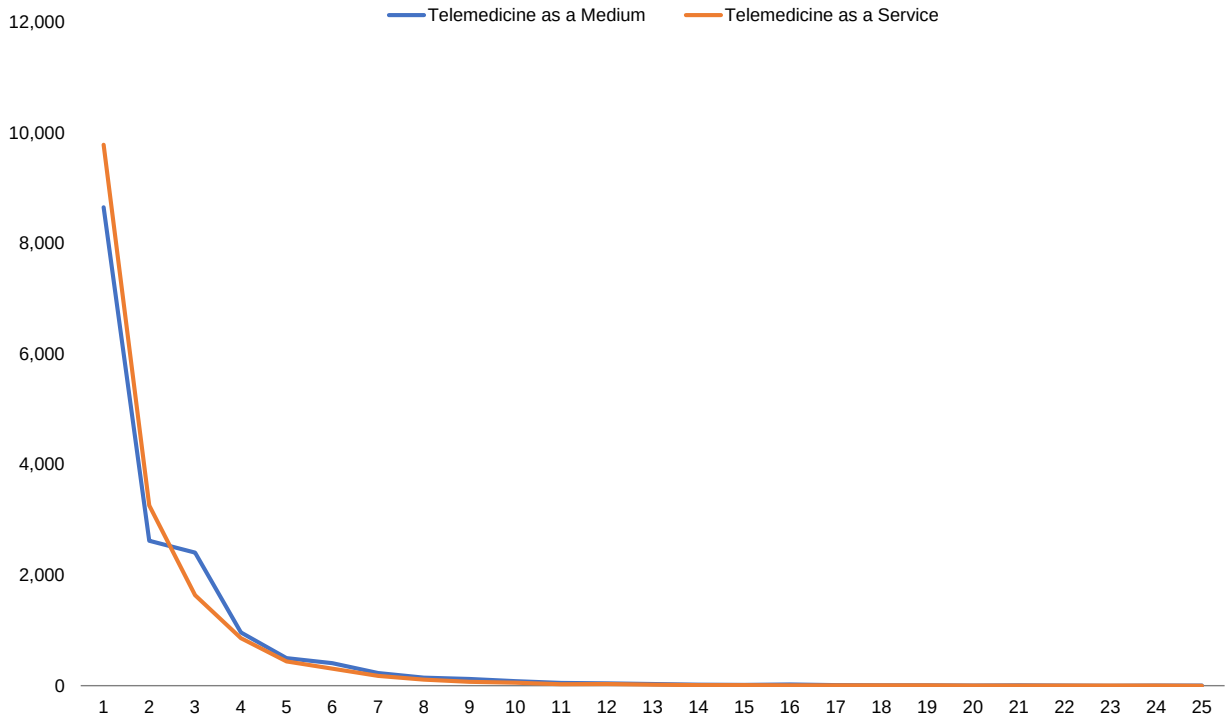
Figure 5
Average Charlson Comorbidity Index of Patients, by Mode of Delivery



Source: EBRI's Telemedicine Database

The majority of patients who used any type of telemedicine had only one encounter with a telemedicine provider. Differences in the frequency of visits by telemedicine modes were roughly the same. Eighty-seven percent of TaaS users had three or fewer encounters with TaaS providers, compared to 84 percent of TAM users. A very small number of patients enthusiastically embraced telemedicine services; fewer than 1 percent of TaaS patients used TaaS services more than 10 times, and fewer than 1 percent of TAM patients used TAM services more than 12 times. There were several notable outliers: One outlier used TaaS to address health care needs 69 times over the course of the four-year study period, far more than any other patient in EBRI's database, and a different outlier used TAM for health care services 70 times. However, such enthusiastic and frequent usage is rare, and the vast majority of patients use either flavor of telemedicine fewer than five times, as shown below in Figure 6.

Figure 6
Frequency of Telemedicine Visits by Patients, by Type of Visit



Source: EBRI's Telemedicine Database

Unsurprisingly, patients sought different types of care via in-person, TaaS, and TAM visits. Most commonly, patients sought care for acute respiratory conditions via TaaS, representing nearly 38 percent of TaaS visits. This comports with previous research indicating that telemedicine is an effective and increasingly common way to treat acute, generally low-risk, and highly infectious respiratory issues (Portnoy et al. 2016). Other types of care commonly sought included "ill-defined symptoms," care for the nervous system and sense organs, and care for the genitourinary system, shown below in Figure 7. While TAM visits were similarly most commonly sought for respiratory care (23 percent), care for mental disorders was much more commonly sought via TAM than via TaaS or in-person modes. Patients seeking care in person, on the other hand, most commonly sought care for musculoskeletal and connective tissue issues (22 percent).

Figure 7
Most Common Diagnosis Group Codes, by Mode of Delivery

Face-to-Face (F2F) Users	% of F2F Visits	Telemedicine-as-a-Service (TaaS) Users	% of TaaS Visits	Telemedicine-as-a-Medium (TAM) Users	% of TAM Visits
Musculoskeletal, Connective Tissue	21.7%	Respiratory System	37.7%	Respiratory System	23.2%
Symptoms, Ill-Defined Conditions	13.4%	Symptoms, Ill-Defined Conditions	11.9%	Mental Disorders	12.9%
Respiratory System	7.9%	Nervous System, Sense Organs	9.7%	Symptoms, Ill-Defined Conditions	12.1%
Nervous System, Sense Organs	7.7%	Genitourinary System	7.8%	Nervous System, Sense Organs	8.8%
Endocrine, Nutrition, Metabolic	7.5%	Infectious and Parasitic	5.9%	Musculoskeletal, Connective Tissue	5.8%
Genitourinary System	6.3%	Mental Disorders	5.4%	Endocrine, Nutrition, Metabolic	5.8%
Circulatory System	6.0%	Skin, Subcutaneous Tissue	5.0%	Factors Influencing Health Status	5.7%
Neoplasms	5.5%	Factors Influencing Health Status	3.5%	Genitourinary System	5.4%
Injury and Poisoning	5.5%	Musculoskeletal, Connective Tissue	3.2%	Circulatory System	5.0%
Digestive System	5.2%	Circulatory System	2.5%	Skin, Subcutaneous Tissue	4.7%

Source: EBRI's Telemedicine Database.

We find that the composition of telemedicine visits changed somewhat as the pandemic progressed. In particular, visits for mental disorders via TAM increased in relative popularity beginning in April, at the outset of the pandemic, and remained the most popular diagnosis for TAM visits until November, when respiratory issues once again became the predominant reason for utilizing TAM, perhaps the reflection result of seasonal colds, as shown below in Figure 8. Meanwhile, for TAM visits, respiratory issues were the most common diagnoses for most of the pandemic, as shown below in Figure 9. Several diagnoses, such as genitourinary issues and infectious and parasitic issues, remained persistently more popular for patients seeking care during the pandemic via TaaS than TAM, confirming the findings shown in Figure 7 above.

Figure 8

Most Common Diagnosis Group Codes for Telemedicine-as-a-Medium Visits Over Time

March	April	May	June	July	August	September	October	November	December
Respiratory System	Symptoms, Ill-Defined Conditions	Mental Disorders	Mental Disorders	Mental Disorders	Mental Disorders	Mental Disorders	Mental Disorders	Respiratory System	Respiratory System
Symptoms, Ill-Defined Conditions	Mental Disorders	Symptoms, Ill-Defined Conditions	Symptoms, Ill-Defined Conditions	Symptoms, Ill-Defined Conditions	Symptoms, Ill-Defined Conditions	Symptoms, Ill-Defined Conditions	Respiratory System	Mental Disorders	Mental Disorders
Mental Disorders	Respiratory System	Musculoskeletal, Connective Tissue	Nervous System, Sense Organs	Respiratory System	Respiratory System	Respiratory System	Symptoms, Ill-Defined Conditions	Symptoms, Ill-Defined Conditions	Symptoms, Ill-Defined Conditions
Nervous System, Sense Organs	Musculoskeletal, Connective Tissue	Endocrine, Nutrition, Metabolic	Endocrine, Nutrition, Metabolic	Nervous System, Sense Organs	Circulatory System	Circulatory System	Circulatory System	Circulatory System	Circulatory System
Endocrine, Nutrition, Metabolic	Circulatory System	Nervous System, Sense Organs	Respiratory System	Circulatory System	Nervous System, Sense Organs	Nervous System, Sense Organs	Nervous System, Sense Organs	Nervous System, Sense Organs	Nervous System, Sense Organs

Source: EBRI's Telemedicine Database.

Figure 9

Most Common Diagnosis Group Codes for Telemedicine-as-a-Service Visits Over Time

March	April	May	June	July	August	September	October	November	December
Respiratory System	Respiratory System	Symptoms, Ill-Defined Conditions	Symptoms, Ill-Defined Conditions	Respiratory System	Respiratory System	Respiratory System	Respiratory System	Respiratory System	Respiratory System
Symptoms, Ill-Defined Conditions	Symptoms, Ill-Defined Conditions	Musculoskeletal, Connective Tissue	Respiratory System	Symptoms, Ill-Defined Conditions	Symptoms, Ill-Defined Conditions	Symptoms, Ill-Defined Conditions	Symptoms, Ill-Defined Conditions	Symptoms, Ill-Defined Conditions	Symptoms, Ill-Defined Conditions
Nervous System, Sense Organs	Musculoskeletal, Connective Tissue	Respiratory System	Musculoskeletal, Connective Tissue	Nervous System, Sense Organs	Genitourinary System	Nervous System, Sense Organs	Genitourinary System	Nervous System, Sense Organs	Genitourinary System
Genitourinary System	Circulatory System	Infectious and Parasitic	Infectious and Parasitic	Genitourinary System	Skin, Subcutaneous Tissue	Genitourinary System	Nervous System, Sense Organs	Genitourinary System	Nervous System, Sense Organs
Infectious and Parasitic	Neoplasms	Circulatory System	Neoplasms	Infectious and Parasitic	Nervous System, Sense Organs	Mental Disorders	Infectious and Parasitic	Mental Disorders	Mental Disorders

Source: EBRI's Telemedicine Database.

What Makes a Visit a Telemedicine Visit?

Given that we have observed systematic differences between patients who use either flavor of telemedicine and patients who do not, there may exist factors that are strongly correlated with a specific health care visit being conducted over telemedicine. We do not make a causal argument but instead aim to examine the factors — and their relative strength — that may influence the modality of care sought. We model the likelihood of a given health care visit being conducted via telemedicine as a function of the patient's age, gender, status as named policyholder, and type of care sought, and we include a dummy variable indicating the presence of the COVID-19 pandemic to capture the significant change in modalities brought about by the pandemic.[4] To explore whether there were factors more or less strongly associated with a visit being conducted via TAM or TaaS, we estimate two logistic regression models, the coefficients of which are shown below in Figure 10.

We find several factors associated with an increased likelihood of a particular health care visit being conducted via telemedicine. In particular, holding other variables constant, we find that a patient being female increased the likelihood of a visit being conducted via both flavors of telemedicine. For TaaS visits, a given visit being conducted over telemedicine was 47.5 percent more likely if the patient was female relative to a male, and it was 33.5 percent more likely for TAM visits. An additional year of age, meanwhile, had a relatively smaller impact on a visit being conducted via telemedicine. While the coefficient was statistically significant, the odds ratio indicates only a *de minimis* decrease in the likelihood of a visit being conducted via telemedicine for each one-year increase in a patient's age.

The type of care sought by patients had statistically significant impacts on the likelihood of a visit being conducted via telemedicine as well. Reflecting telemedicine's apparent appeal to patients seeking to address acute health issues, all else equal, a patient seeking care for respiratory issues significantly increased the likelihood of the visit being conducted via TaaS as well as TAM by 803 percent and 517 percent, respectively.[5] Care sought for mental health also increased the likelihood of a visit being conducted via telemedicine; all else equal, a patient seeking care for mental health increased the likelihood of the visit being conducted via TaaS by 121 percent and via TAM by a whopping 433 percent. Visits for circulatory and digestive issues, meanwhile, were not statistically different for telemedicine visits relative to in-person visits.

Figure 10

Logistic Regression Output From Modeling the Likelihood of a Health Care Visit Being Conducted via Telemedicine, by Mode of Care

	Telemedicine as a Service		Telemedicine as a Medium	
Independent Variable	**Odds Ratio**	**P>z**	**Odds Ratio**	**P>z**
Age	0.9899	< 0.01*	0.9954	< 0.01*
Gender (Female = 1)	1.4749	< 0.01*	1.3356	< 0.01*
Named Policyholder	2.5044	< 0.01*	1.6388	< 0.01*
Charlson Comorbidity Index	0.817	< 0.01*	0.8996	< 0.01*
Respiratory Issue	9.0364	< 0.01*	6.1685	< 0.01*
Circulatory	0.879	0.21	1.7166	0.19
Musculoskeletal	0.2504	<0.01*	0.4793	< 0.01*
Mental Illness	2.2125	< 0.01*	5.3342	< 0.01*
Digestive	0.813	0.32	1.1608	< 0.01*
Ill-Defined Symptoms	1.6265	< 0.01*	1.7059	0.08
Pandemic Dummy	3.7862	< 0.01*	13.0338	< 0.01*
Constant	0.001	< 0.01*	0.001	< 0.01*

*Indicates the coefficient is statistically significant from zero at a 1 percent level.
Source: EBRI's Telemedicine Database.

Status as a named policyholder was also associated with a higher likelihood of a particular visit being conducted over telemedicine. In particular, controlling for other variables, the likelihood of a particular visit being conducted via TaaS for a named policyholder was 150 percent higher than for a spouse or dependent. The likelihood of a particular visit being conducted via TAM, meanwhile, was 64 percent higher than if the patient was a spouse or dependent. This could be a reflection that named policyholders may be more comfortable seeking care via telemedicine for their own needs, or it could reflect the fact that named policyholders tended to be older on average, since dependents lowered the average age of non-policyholders. Alternatively, this may be a reflection that the named policyholder is more intimately familiar with the full range of services covered by their health care plan and therefore may be more likely to understand that telemedicine services are covered by their policy.

Interestingly, a one-unit increase in a patient's CCI had the opposite effect that might be expected given the earlier finding that both TaaS and TAM users had higher CCIs than F2F users. Holding all else equal, a one-unit increase in CCI (i.e., going from a CCI of 2 to a CCI of 3) was associated with an 18.3 percent *decrease* in the likelihood of a given visit being conducted via TaaS and a 10 percent decrease in the likelihood of a given visit being conducted via TAM. This could be a reflection of the fact that very ill patients prefer to — or perhaps *need* to, given that telemedicine is not feasible for all types of care — access health care services in person.

Finally, we find that the pandemic dummy variable significantly increased the likelihood of a health care visit being conducted over telemedicine. This comports with expectations, given the meteoric rise in both types of telemedicine visits observed as the COVID-19 pandemic hit the United States. For TaaS visits, a health care encounter occurring during or after March 2020 increased the likelihood of a given visit being conducted via TaaS by 279 percent. For TAM visits, the increase in likelihood was even larger at 1,203 percent.

Conclusion

Telemedicine has long been touted as a convenient and cost-effective means for health care providers to deliver services to patients. The pandemic thrust telemedicine into the spotlight when many providers ceased most elective in-person services on account of the COVID-19 pandemic. Many patients and providers who previously had not used telemedicine before the pandemic experienced it for the first time. Our analysis indicates that even after stay-at-home orders were lifted and health care providers resumed conducting in-person visits, telemedicine engagements remained above their pre-pandemic trend. This could be evidence of a transformational effect of the COVID pandemic regarding how Americans seek out and receive care.

Care from a health care provider with whom a patient has no preexisting relationship attracts different patients seeking to address different needs than care from a health care provider with whom the patient *does* have a preexisting relationship. Patients seeking care via TaaS were disproportionately female and older than F2F users, and they most frequently sought care for minor respiratory symptoms. Patients seeking care via TAM were similarly older and more frequently female than F2F users, and while they also often sought respiratory care, TAM patients also disproportionately sought care for mental health issues.

These results have important implications for employers. Employers who have implemented or are considering implementing telemedicine platforms for their employees should be aware that telemedicine tended to attract patients seeking care for acute, low-intensity, and often self-limited needs, as evidenced by the majority of patients seeking care via either flavor of telemedicine only once. The growth of services sought via TAM suggests employees are willing to seek care for chronic conditions via telemedicine. Also, this study shows that employees are willing to access mental health services through telemedicine, via both TaaS and TAM.

Even though this level of utilization is still relatively low, this could still be a boon for employers, as telemedicine visits may shift patients away from potentially costly urgent care and emergency department visits. Indeed, in interviews of benefits executives conducted by EBRI, several interviewees noted that they believed telemedicine could potentially lower their firm's total health care expenditures (Spiegel and Fronstin 2020). Additionally, we find evidence that the named policyholder is more likely to seek care via telemedicine for themselves than for a spouse or dependent. This

could indicate a knowledge gap, where people covered by the main policyholder's plan are unaware that they too are able to take advantage of telemedicine services.

While telemedicine visits have remained persistently higher after the onset of the COVID-19 pandemic, it remains to be seen the extent to which the virtual-health-care-seeking behavior formed during the COVID-19 will persist in a post-pandemic world. Similarly, the impact of telemedicine on patients' health status, the downstream impact on in-person health care sought, and the spending and price differences on telemedicine services relative to in-person services are unknown. EBRI plans to leverage this claims database to answer those questions in the future.

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[1] We should note that since the database was populated by a group of employers in a particular industry, our analyses may not necessarily be generalizable to the telemedicine-seeking population as a whole.

[2] The list of approved telemedicine codes as well as billing modifiers is referenced by Gross (2020) and Yeramosu et al. (2019).

[3] Indeed, a Wald test for a structural break confirms that the trend of persistently higher telemedicine visits — both TaaS and TAM — remains in place after April 2020. The p-value for a Wald test for structural break in March 2020 with TaaS visits was < 0.01, and it was < 0.01 for TAM visits. Following March 2020, the p-value of the Wald test for each month was greater than 0.05.

[4] For TaaS visits, the model is specified as: $\Pr(Visit_i = TAS|y_i, X_i) = X_{it}'\beta + \epsilon_i$, where X_i is a vector of demographic and treatment variables and ϵ_i contains the error terms. Similarly, for TAM visits: $\Pr(Visit_i = TAM|y_i, X_i) = X_{it}'\beta + \epsilon_i$, where X_i is a vector of demographic and treatment variables and ϵ_i contains the error terms. Both models are estimated using clustered standard errors.

[5] It should be noted that diagnoses for respiratory issues decreased from 2019 to 2020, from 208,624 to 179,309. However, COVID-19 diagnoses accounted for 16 percent of all respiratory issue diagnoses in 2020, indicating that these results do not seem to be driven by COVID-19 concerns.

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