

**Telemedicine,  
Telehealth, and Home  
Telemonitoring  
Services in Texas  
Medicaid**

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**As Required by  
Senate Bill 789, 77th  
Legislature, Regular Session,  
2001**

**Health and Human Services  
Commission**

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**TEXAS**  
Health and Human  
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## Executive Summary

Senate Bill (S.B.) 789, 77th Legislature, Regular Session, 2001, requires the Health and Human Services Commission (HHSC) to submit a report detailing the current state of telemedicine, telehealth, and home telemonitoring services in the Texas Medicaid program. HHSC must submit the report to the Speaker of the House of Representatives and to the Lieutenant Governor by December 1 of each even-numbered year.

Telemedicine medical (“telemedicine”) services first became a benefit of Texas Medicaid pursuant to House Bill (H.B.) 2389, 75th Legislature, Regular Session, 1997. Telehealth services and home telemonitoring services were later authorized for Texas Medicaid reimbursement pursuant to S.B. 293, 82nd Legislature, Regular Session, 2011. More recently, the 86th Legislature passed S.B. 670 and H.B. 1063, both of which expand coverage of telemedicine, telehealth, and home telemonitoring services, with a particular focus on reimbursement of these services through Medicaid managed care.

The number of Texas Medicaid providers and Medicaid clients utilizing telemedicine, telehealth and home telemonitoring continues to increase each year. Between fiscal year 2018 and fiscal year 2019, the number of providers rendering teleservices increased by 19 percent and the number of clients using teleservices increased by 21 percent. Telemedicine, telehealth, and home telemonitoring services accounted for \$31.7 million in Texas Medicaid spending in fiscal year 2018 and \$39.9 million in fiscal year 2019. This spending increase is attributable to greater telemedicine and telehealth service utilization among Medicaid clients.

Most telemedicine and telehealth services rendered by Texas Medicaid providers are behavioral health services. The most frequently billed telemedicine and telehealth procedure codes are psychiatric diagnostic evaluations and psychotherapy. Common diagnoses among clients receiving telemedicine and telehealth services include attention-deficit hyperactivity disorder, bipolar disorder, and schizoaffective disorder.

Despite the continuous increase in utilization of telemedicine, telehealth, and home telemonitoring, there is still opportunity to expand the services that are eligible for

remote delivery in Texas Medicaid. In response to the Novel Coronavirus 2019 (COVID-19) public health emergency, HHSC authorized the use of telemedicine and telehealth to deliver additional healthcare services for the duration of the federal public health emergency. The COVID-19 pandemic created a sharp increase in the need for and utilization of telemedicine and telehealth services. This report includes a snapshot of that utilization increase but the trends will be further examined in subsequent reports when more complete data is available.

# 1. Introduction

S.B. 789, 77th Legislature, Regular Session, 2001, requires HHSC to submit a report to the Speaker of the House of Representatives and to the Lieutenant Governor by December 1 of even-numbered years regarding the utilization of and expenditures for telemedicine, telehealth, and home telemonitoring services within the Texas Medicaid program. HHSC must report on:

- The number of physicians, health professionals, and licensed health care facilities using telemedicine, telehealth, or home telemonitoring services;
- The geographic and demographic disposition of the physicians and health professionals offering telemedicine, telehealth, or home telemonitoring services;
- The number of clients receiving telemedicine, telehealth, or home telemonitoring services;
- The types of treatment provided as telemedicine, telehealth, or home telemonitoring services; and
- The cost to Texas Medicaid to provide telemedicine, telehealth, or home telemonitoring services to clients.

H.B. 1063, 86th Legislature, Regular Session, 2019, requires HHSC to include in the report the cost to Texas Medicaid of client utilization of telemedicine, telehealth, and home telemonitoring services, as well as any savings realized by use of these services.

HHSC conducted analyses of Texas Medicaid fee-for-service (FFS) and Texas Medicaid managed care organization (MCO) telemedicine, telehealth, and home telemonitoring services claims and encounter data for fiscal years 2018 and 2019. The data are summarized in the appendices.

- Appendix A is an overview of legislative history
- Appendix B provides client service utilization and expenditure trends
- Appendix C provides aggregated location information for telemedicine, telehealth, and home telemonitoring services providers by Metropolitan Statistical Area (MSA)
- Appendix D provides commonly billed procedure codes

- Appendix E is a cost savings analysis of telemedicine, telehealth, and home telemonitoring services in the Texas Medicaid program
- Appendix F provides telemedicine and telehealth service utilization and expenditure trends during the COVID-19 pandemic

## 2. Background

### Legislation

The Texas Medicaid program began providing reimbursement to physicians offering telemedicine medical services pursuant to H.B. 2386, 75th Legislature, Regular Session, 1997. In subsequent sessions, the Legislature authorized Medicaid reimbursement for telehealth services and home telemonitoring. Two bills were enacted in 2019 to expand the delivery and reimbursement of telemedicine, telehealth, and home telemonitoring.

S.B. 670, 86th Legislature, Regular Session, 2019, repealed the requirement outlined in the Texas Government Code Section 531.0217(c-4)(4) for a patient site presenter or health professional located with a client at a telemedicine patient site to be present during a telemedicine service rendered to a client in a school-based setting. It also added provisions that:

- Prohibit MCOs from denying reimbursement for a health care service or procedure delivered as a telemedicine medical service or telehealth service solely because the service or procedure was not delivered through an in-person consultation.
- Prohibit MCOs from limiting, denying, or reducing reimbursement for a covered health care service delivered as a telemedicine or telehealth service based on the health care provider's choice of platform for providing the service.
- Ensure MCOs' utilization of telemedicine or telehealth services promotes and supports patient-centered medical homes by allowing a Medicaid recipient to receive telemedicine or telehealth services from a provider other than the recipient's primary care physician or provider in certain circumstances, only if: the telemedicine medical service or telehealth service is provided in accordance with the law and contract requirements applicable to the provision of the same service provided in-person, and the provider of telemedicine services gives notice to the patient's primary care provider of the telemedicine medical service or telehealth service.
- Authorize HHSC to reimburse Federally Qualified Health Centers (FQHCs) for the patient site facility fee and distant site practitioner fee for covered

telemedicine medical services and telehealth services delivered by a health care provider to a Medicaid recipient.

- Direct HHSC to develop, document, and implement a monitoring process to ensure that a Medicaid MCO's use of telemedicine medical services or telehealth services promotes and supports patient-centered medical homes and care coordination. The process must include monitoring of the rate at which a telemedicine medical service or telehealth service provider gives notice to the patient's primary care provider.

To implement S.B. 670, HHSC is amending its medical policies, Medicaid State Plan, and administrative rules for telemedicine and telehealth services. Implementation of the bill has occurred in phases.

- HHSC notified MCOs of the requirements of S.B. 670 on August 22, 2019, March 11, 2020, and November 5, 2020, as well as through written notices and multiple verbal presentations.
- As part of the response to COVID-19, HHSC temporarily authorized distant site telemedicine and telehealth service reimbursement for FQHCs. The temporary FQHC telemedicine and telehealth service reimbursement policy will be replaced with implementation of all medical policy amendments related to S.B. 670.
- HHSC will implement the Medicaid State Plan and rule amendments to support the FQHC telemedicine and telehealth service reimbursement in 2021.
- HHSC will implement medical policy amendments on December 1, 2020. In preparation for implementation of the medical policy amendments, HHSC published provider notifications and MCO notices to inform stakeholders of coverage requirements and expectations.

H.B. 1063, 86th Legislature, Regular Session, 2019, requires HHSC to provide Medicaid reimbursement for home telemonitoring services to children who are diagnosed with end-stage solid organ disease, have received an organ transplant, or require mechanical ventilation. HHSC implemented the benefit effective October 1, 2020. HHSC is also making amendments to its telemedicine and telehealth service administrative rules.<sup>1</sup>

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<sup>1</sup> 1 TAC Sec. §354.1430, 354.1432, and 354.1434



For a complete history of legislative action related to telemedicine, telehealth, and home telemonitoring services since 1997, see Appendix A.

## **Telemedicine Services**

Texas Medicaid telemedicine services are authorized in Chapter 531 of the Texas Government Code. Texas Medicaid telemedicine services are defined by Texas Government Code Section 531.001(8), which refers to the definition provided in Texas Occupations Code Section 111.001(4):

[A] health care service delivered by a physician licensed in this state, or a health professional acting under the delegation and supervision of a physician licensed in this state and acting within the scope of the physician's or health professional's license to a patient at a different physical location than the physician or health professional using telecommunications or information technology.

Texas Medicaid telemedicine services are delivered by a physician or a physician group, advanced practice registered nurses (APRN), and physician assistants (PA) acting under delegation and supervision of a physician. Physicians, APRNs, and PAs practicing in a County Indigent Health Program or a hospital are also authorized to deliver telemedicine services. The treating physician, APRN, or PA is referred to as the distant site provider and renders healthcare services to a patient located at a patient site. A hospital, office, or a client's home are acceptable patient sites.

Telemedicine services may be provided through the following modalities:

- Synchronous audiovisual interactions between the distant site provider and a patient at a patient site, such as live video and audio interactions;
- Asynchronous store and forward technologies, such as sending a photograph of a wound in conjunction with live audio-only interaction between the distant site provider and a patient at a patient site; and

- Other forms of audiovisual telecommunication technologies that allow the distant site provider to comply with the same standard of care as that of the same service provided in-person.<sup>2</sup>

MCOs may provide reimbursement for telemedicine services provided through only synchronous or asynchronous audio interactions, including audio-only phone calls, text-only email messages, or facsimile transmissions.<sup>3</sup>

The Texas Medical Board (TMB) has administrative rulemaking authority for the practice of medicine delivered via telemedicine.<sup>4</sup> Texas Medicaid telemedicine services adhere to TMB administrative rules and HHSC program rules and policy.<sup>5,6</sup>

Distant site providers participating in FFS Medicaid receive the same reimbursement rate for a telemedicine service as they would for a comparable in-person service.<sup>7</sup> Because rates paid by MCOs are negotiated between the MCO and the provider, distant site providers contracted with a MCO are reimbursed a negotiated and contracted rate.<sup>8</sup> MCOs are required to display payment practices for telemedicine services on their website<sup>9</sup>. Patient site providers of telemedicine services are authorized to be reimbursed a patient site facility fee for allowing a patient to receive telemedicine services from a distant site provider at their office or medical facility. For example, if a patient utilized an examination room at their primary care provider's office to receive a telemedicine service, then the office would be eligible for reimbursement for a patient site facility fee.

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<sup>2</sup> Texas Occupations Code §111.005(3)

<sup>3</sup> Texas Insurance Code §1455.004

<sup>4</sup> Texas Occupations Code §111.004

<sup>5</sup> 22 TAC Chapter 174

<sup>6</sup> 1 TAC §354.1432

<sup>7</sup> 1 TAC § 354.1432(3)(E).

<sup>8</sup> Texas Insurance Code §1455.006

<sup>9</sup> Texas Insurance Code §1455.006

## Telehealth Services

Texas Medicaid telehealth services are authorized in Chapter 531 of the Texas Government Code. Texas Medicaid telehealth service are defined in Texas Government Code Section 531.001(7), which refers to the definition provided in Texas Occupations Code Section 111.001(3):

[A] health service, other than a telemedicine medical service, delivered by a health professional licensed, certified, or otherwise entitled to practice in this state and acting within the scope of the health professional's license, certification, or entitlement to a patient at a different physical location than the health professional using telecommunications or information technology.

HHSC identifies telehealth services as services delivered by licensed professional counselors (LPCs), licensed clinical social workers (LCSWs), psychologists, registered nurses (RNs), nurse midwives, occupational therapists, home health agencies, and dieticians.

The same delivery modalities specified for Texas Medicaid telemedicine services apply to Texas Medicaid telehealth services.<sup>10,11</sup>

Distant site providers participating in FFS Medicaid receive the same reimbursement rate for a telehealth service as they would for a comparable in-person service. Distant site providers contracted with a MCO are reimbursed a negotiated and contracted rate.<sup>7</sup> A patient site facility fee is not authorized for telehealth patient site providers.

## Home Telemonitoring Services

Home telemonitoring service is defined in Texas Government Code Section 531.001(4-a) as:

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<sup>10</sup> Texas Occupations Code § 111.005(3)

<sup>11</sup> Texas Insurance Code §§ 1455.004,.006

[A] health service that requires scheduled remote monitoring of data related to a patient's health and transmission of the data to a licensed home and community support services agency (HCSSA) or a hospital.

Texas Medicaid provides reimbursement for home telemonitoring services to hospitals and HCSSAs with home health agency license types. Texas Medicaid home telemonitoring requires an RN or other qualified health care professional at a HCSSA or hospital to provide daily monitoring of a patient's clinical data transmissions. The RN or other qualified health professional monitors the client's clinical data for measurements that fall outside of the parameters specified in the client's care plan. The ordering physician, PA, or APRN reviews the client's clinical data transmissions on a weekly basis.

Home telemonitoring services are authorized by statute, which includes information on who may receive home telemonitoring services.<sup>12</sup> Texas Medicaid reimburses providers for home telemonitoring services rendered to clients with hypertension or diabetes, as well as pediatric clients with end-stage solid organ disease, those who have received an organ transplant, and those who require mechanical ventilation.

The HCSSA or hospital may be reimbursed once per day for monitoring a client's clinical data transmissions, as well as a one-time equipment and set-up fee for home telemonitoring technology. The ordering provider may be reimbursed once a week for reviewing a client's clinical data transmissions.

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<sup>12</sup> Texas Government Code §531.02164(c)

## 3. Utilization and Expenditure Trends

For fiscal years 2018 and 2019, Texas Medicaid continued to experience an increase in both client utilization and expenditures for telemedicine, telehealth, and home telemonitoring services. Telemedicine is the remote service most often used, followed by home telemonitoring and telehealth. Home telemonitoring continues to account for the majority of total expenditures for remote services. Client diagnosis data for telemedicine and telehealth services indicates that these services are primarily used for the treatment of behavioral health conditions.

Most telemedicine and telehealth services are billed using the same procedure codes as those used for comparable in-person services and usually, only a modifier indicates that the provider delivered a service remotely. Providers must bill a procedure code with the 95 modifier to indicate the service was remotely delivered. However, because the procedure codes can be delivered in-person or remotely, the 95 modifier is not required for a procedure code to pay, and therefore the data presented in this report may not accurately reflect the exact number of services rendered as telemedicine or telehealth services.

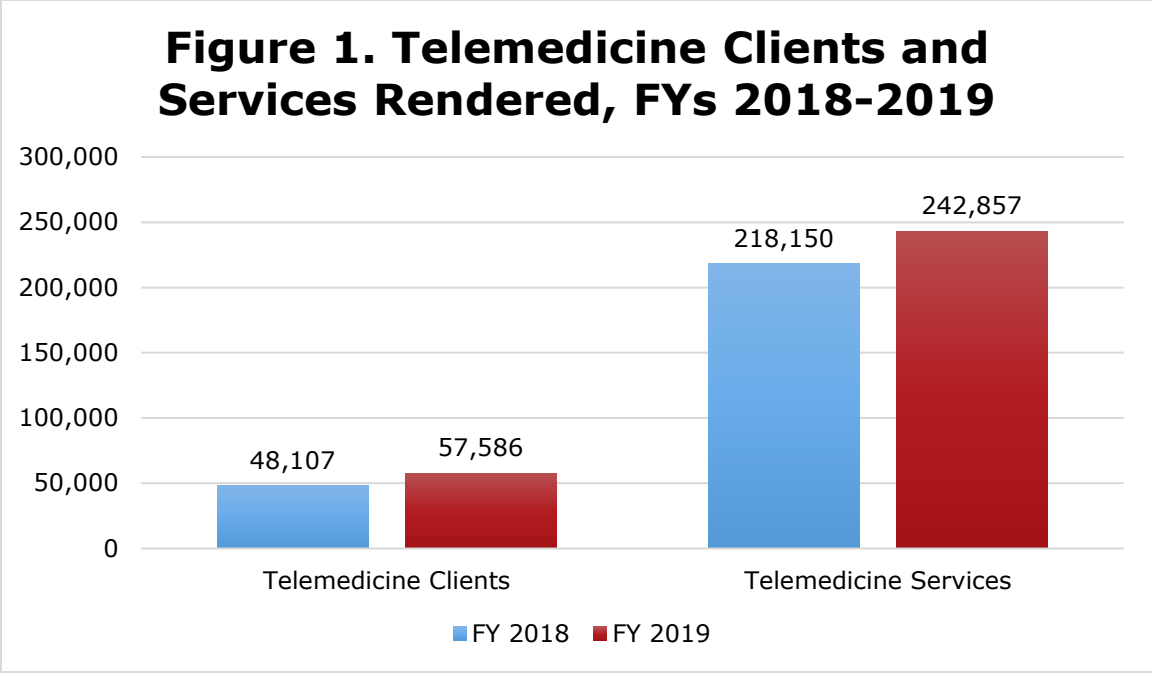
The client utilization and provider expenditure trends discussed in the following subsections are derived from data presented in Appendices B, C, D, E, and F.

### Telemedicine Services

#### Client Utilization

The number of Texas Medicaid clients utilizing telemedicine services increased 19 percent from fiscal year 2018 to fiscal year 2019. During this time, the number of services reimbursed as a telemedicine services increased 11 percent; see Figure 1.

In both fiscal year 2018 and 2019, the most common primary diagnosis for a client receiving a telemedicine service was Attention-Deficit Hyperactivity Disorder (ADHD). Other common primary diagnoses for both fiscal years included schizophrenia, schizoaffective disorder, and bipolar disorder.



**Data source:** HHSC Center for Analytics and Decision Support.

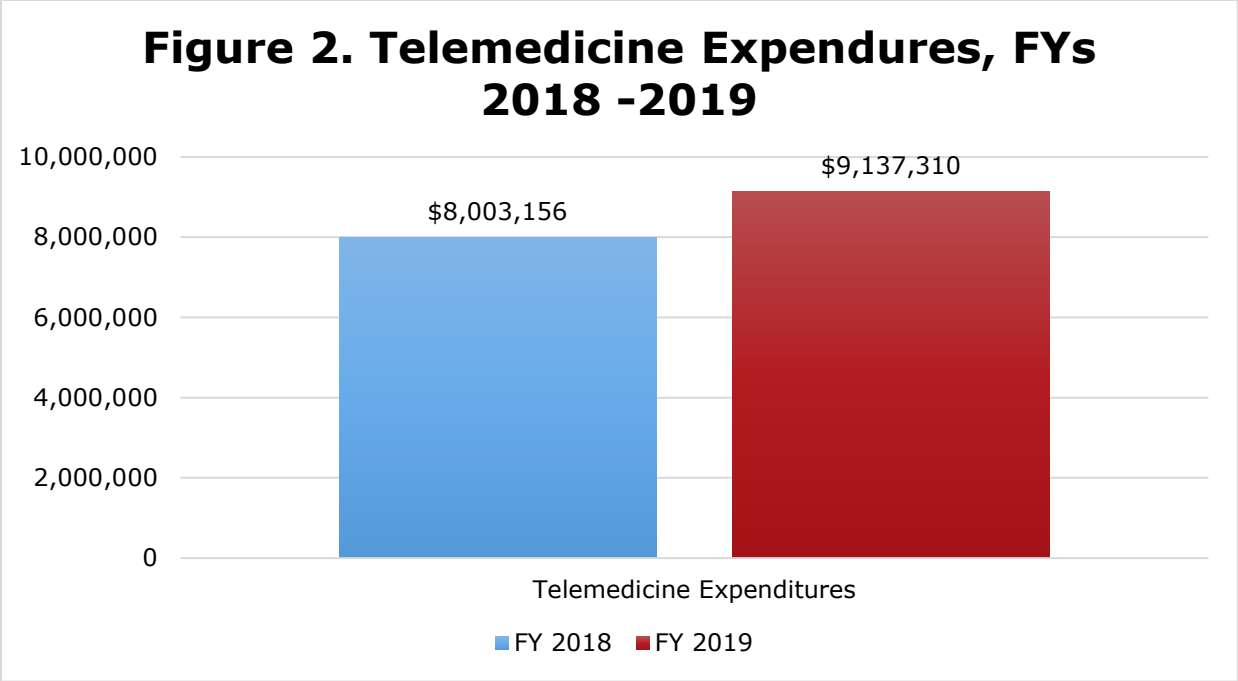
**Provider Reimbursement**

From fiscal year 2018 to fiscal year 2019, provider expenditures<sup>13</sup> increased 14 percent from \$8,003,156 to \$9,132,310 (see Figure 2).

The average amount paid to each provider for delivering telemedicine services marginally increased from \$19,908 in fiscal year 2018 to \$20,082 in fiscal year 2019. Average per client expenditures remained approximately the same from fiscal year 2018 to fiscal year 2019 (see Appendix B).

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<sup>13</sup> Throughout this report, expenditures refer to the amount reimbursed to providers for telemedicine, telehealth, and home telemonitoring services.



**Data source:** HHSC Center for Analytics and Decision Support.

Most telemedicine service providers practice in a MSA. MSAs with the most telemedicine service providers include Dallas-Fort Worth-Arlington, Houston-The Woodlands-Sugar Land, and San Antonio (see Appendix C).

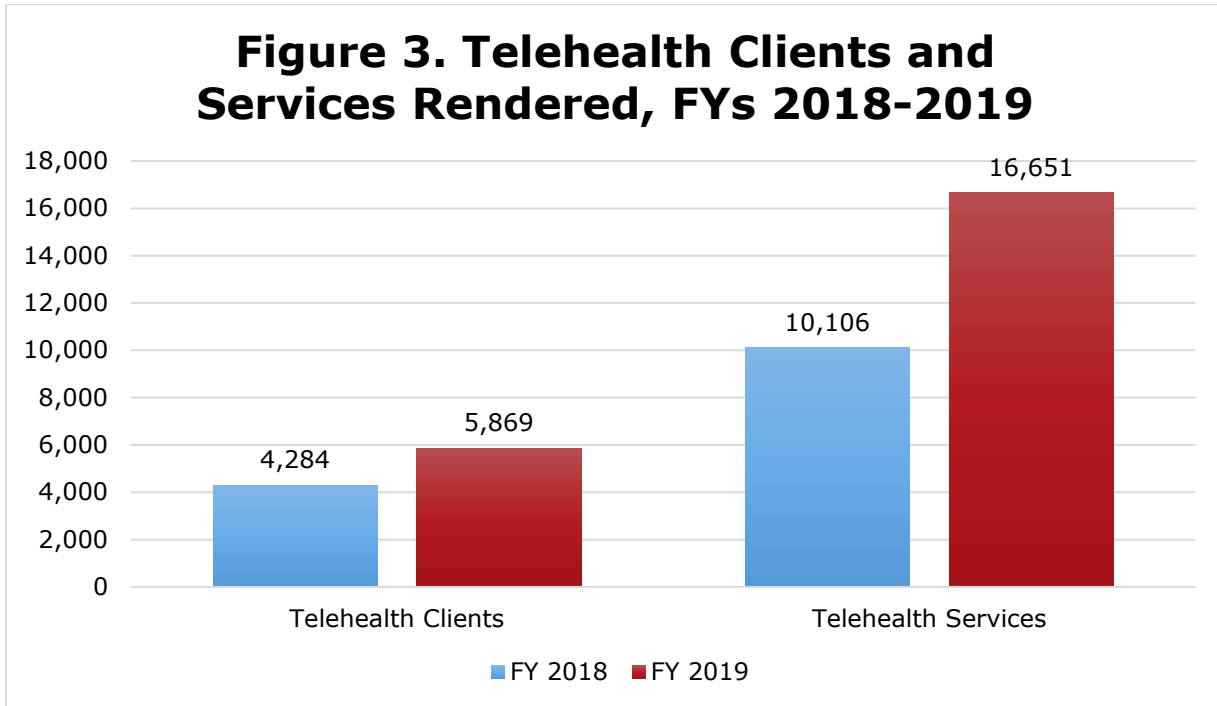
## Telehealth Services

### Client Utilization

The number of Texas Medicaid clients utilizing telehealth services increased 37 percent from fiscal year 2018 to fiscal year 2019. During this time, the number of services reimbursed as a telehealth services increased 65 percent (see Figure 3).

In both fiscal years 2018 and 2019, the most common primary diagnosis for a client receiving a telehealth services was ADHD. Other common primary diagnoses for both fiscal years included major depressive disorder, schizophrenia, and bipolar disorder.

**Figure 3. Telehealth Clients and Services Rendered, FYs 2018-2019**

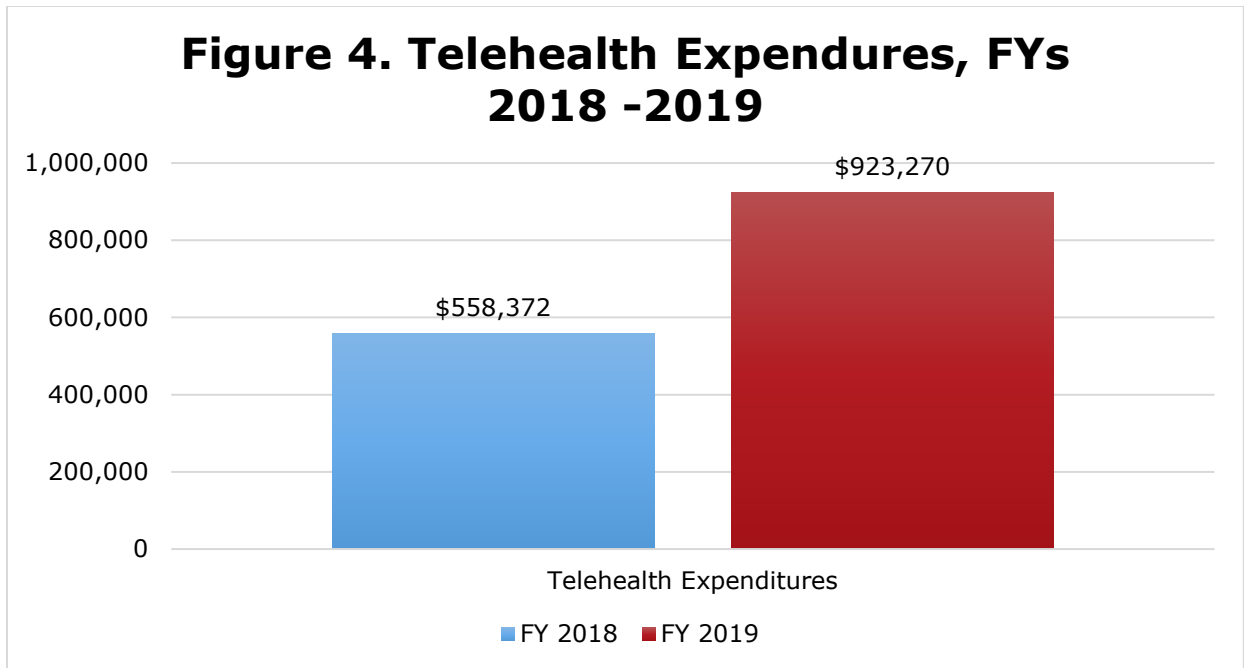


**Data source:** HHSC Center for Analytics and Decision Support.

### **Provider Reimbursement**

From fiscal year 2018 to fiscal year 2019, provider expenditures increased 65 percent from \$558,372 to \$923,270 (see Figure 4).





**Data source:** HHSC Center for Analytics and Decision Support.

The average amount paid to each provider for delivering telehealth services increased by 34 percent from \$5,940 in fiscal year 2018 to \$7,959 in fiscal year 2019. The average per client expenditures increased 20 percent from \$130 in fiscal year 2018 to \$157 in fiscal year 2019 (see Appendix B).

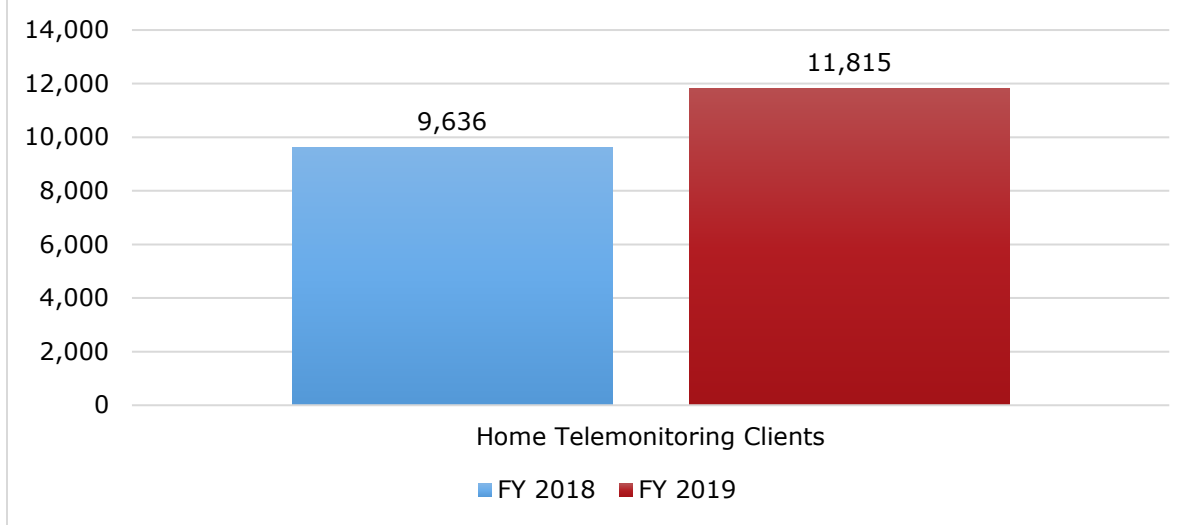
Like telemedicine service providers, telehealth service providers tend to practice in MSAs. MSAs with the most telehealth service providers include Dallas-Fort Worth Arlington, San Antonio, and Houston-The Woodlands-Sugar Land (see Appendix C).

## Home Telemonitoring Services

### Client Utilization

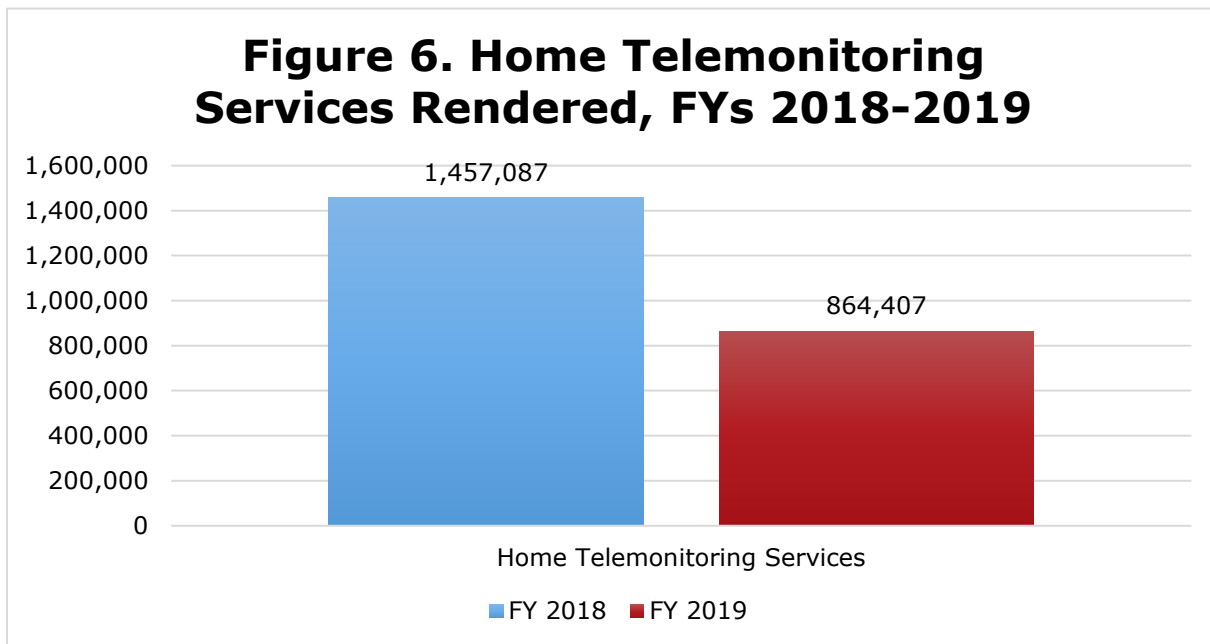
The number of Texas Medicaid clients utilizing home telemonitoring services increased by 23 percent from fiscal year 2018 to fiscal year 2019 (see Figure 5). During this time, the number of services reimbursed as home telemonitoring services decreased by approximately 69 percent (see Figure 6).

**Figure 5. Home Telemonitoring Clients, FYs 2018-2019**



**Data source:** HHSC Center for Analytics and Decision Support.

**Figure 6. Home Telemonitoring Services Rendered, FYs 2018-2019**



**Data source:** HHSC Center for Analytics and Decision Support.

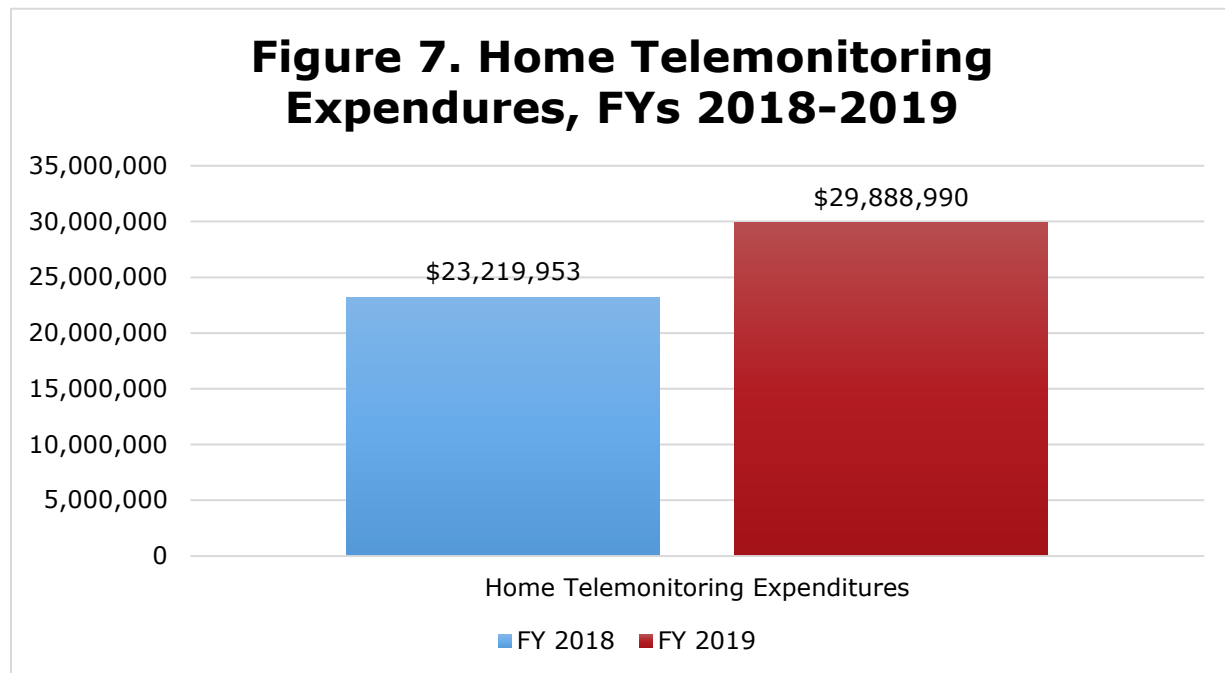
The decline in home telemonitoring services rendered in fiscal year 2019 can be explained by the discontinuation of home telemonitoring procedure code 99090.

Procedure code 99090 was replaced by procedure code S9110. Procedure code 99090 may be billed once per day, whereas procedure code S9110 may be billed once per month. Procedure code S9110 is billable with modifiers U2-U5 and U7-U9 to indicate the number of data transmission days per month.

### Provider Reimbursement

From fiscal year 2018 to fiscal year 2019, provider expenditures increased by 29 percent from \$23,219,953 to \$29,888,990 (see Figure 7). The reimbursement rates for procedure code S9110 with modifiers U2-U5 and U7-U9 were scaled to match the reimbursement rate for procedure code 99090 per number of days each month.

The average amount paid to each provider for delivering home telemonitoring services increased by 3 percent from \$71,888 in fiscal year 2018 to \$75,351 in fiscal year 2019. The average per client expenditures remained approximately the same (see Appendix B).



**Data source:** HHSC Center for Analytics and Decision Support.

Like telemedicine and telehealth providers, home telemonitoring providers tend to practice in MSAs. MSAs with the most home telemonitoring service providers

include McAllen- Edinburg-Mission, Houston-The Woodlands-Sugar Land, and Brownsville-Harlingen (see Appendix C).

## **Cost Savings of Telemedicine, Telehealth, and Home Telemonitoring**

HHSC contracted with Texas A&M University (TAMU)<sup>14</sup> to evaluate the cost savings of telemedicine medical services, telehealth services, and home telemonitoring services to Texas Medicaid. A summary of the analysis and key findings are included in this section. TAMU evaluated the effect of teleservices and home telemonitoring on Texas Medicaid costs by comparing total medical and pharmacy costs of Texas Medicaid clients who used teleservices or home telemonitoring with the total medical and pharmacy costs of similar clients who did not use teleservices or home telemonitoring between fiscal year 2012 and fiscal year 2018. For purposes of this study, TAMU used the term teleservices to refer to telemedicine and telehealth since these services are very similar in practice.

### **Methods**

TAMU took a four-step approach to constructing treatment and comparison groups for clients who did and did not receive teleservices or home telemonitoring. Clients who received both teleservices and home telemonitoring were excluded from this study because the sample size was too small, and these patients tended to have more complex conditions and comorbidities compared to those receiving either teleservices or home telemonitoring.

In Step 1, TAMU used Medicaid claims and managed care encounter data to develop a cohort of clients for each fiscal year from 2012 to 2018. A total of 2,217,456 clients were initially identified for inclusion. Clients included in each cohort had an index month in the fiscal year. An index month was defined as:

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<sup>14</sup> HHSC would like to thank Hye-Chung Kum, Mark Lawley, Sulki Park, and Ben Ukert, with the Population Informatics Lab in the Center for Remote Health Technology and Systems at Texas A&M University, for their analysis of the cost savings of telemedicine, telehealth, and home telemonitoring services to Texas Medicaid.

- A month in which the client had continuous Medicaid eligibility in the six months before (pre-period) and in the six months after (post-period);
- A month in which the client had positive pre-costs, which were total medical or pharmaceutical costs for the six-month period preceding the index month.

For clients who did not receive a teleservice or home telemonitoring, the index month was the month that met the two conditions above. For clients who received a teleservice or home telemonitoring and met the two conditions above, the index month was the month of the first teleservice or home telemonitoring encounter. Clients residing in long-term care facilities or who had no claims during the pre-period were excluded from the cohorts. Following these exclusions, the number of clients identified for inclusion was reduced to 1,988,286.

In Step 2, TAMU used the cohorts generated in Step 1 to develop more specific cohorts of clients who received a teleservice or home telemonitoring in fiscal year 2012 to 2018 (see Table 1). These clients had an index month in any fiscal year between 2012 and 2018. The cohorts generated in this step were later used to construct treatment groups.

In Step 3, TAMU used the cohorts generated in Step 1 to develop more specific cohorts of clients who did not receive a teleservice or home telemonitoring in fiscal year 2012 to 2018 (see Table 1). These clients could have multiple index months, and thus could be included in multiple fiscal year cohorts. The cohorts generated in this step were later used to construct comparison groups.

**Table 1. Cohort Sizes by Fiscal Year**

<b>FY</b>	<b>Teleservice or Telemonitoring Clients</b>	<b>Non-Teleservice or Telemonitoring Clients</b>	<b>Total</b>
2012	10,329	75,448	85,777
2013	8,855	84,218	93,073
2014	10,018	110,529	120,547
2015	13,624	160,358	173,982

<b>FY</b>	<b>Teleservice or Telemonitoring Clients</b>	<b>Non-Teleservice or Telemonitoring Clients</b>	<b>Total</b>
2016	14,919	216,983	231,902
2017	19,323	282,458	301,781
2018	22,781	357,564	380,345
Total	99,849	1,287,558	1,387,407

**Data source:** HHSC Center for Analytics and Decision Support. Data prepared by Texas A&M University under contract to HHSC.

Finally, in Step 4, TAMU developed multiple treatment and comparison groups. A treatment group included clients who received a teleservice or home telemonitoring and were in a fiscal year cohort with other clients who had received a teleservice or home telemonitoring. A comparison group contained clients who had not received a teleservice or home telemonitoring and were in a fiscal year cohort with other clients who had not received a teleservice or home telemonitoring. Multiple treatment and comparison groups were generated to ensure that clients in each group were similar. Similarities between clients who received teleservices or home telemonitoring and clients who received in-person services were determined based on Medicaid relevant risk groups (people who are elderly, pregnant, children, people who are blind or have disabilities, and parents), specified disease(s), comorbidity index, dual eligibility (those receiving both Medicaid and Medicare), and demographics. To account for variation in care and costs over time, the total costs of clients who received teleservices were compared to the total costs of clients who received in-person care from the same health care providers and during the same fiscal year(s). Additional modifications were made to some treatment and comparison groups based upon demographic and disease-related factors. A total of 42 treatment groups and 42 comparison groups were developed for the 7 state fiscal years and 6 risk groups, including the telemonitoring and non-telemonitoring groups (see Tables 2 and 3).

**Table 2. Size of Treatment Groups**

<b>FY</b>	<b>Aged</b>	<b>Pregnant</b>	<b>Child</b>	<b>Blind/ Disabled</b>	<b>Parents</b>	<b>Total Tele- service</b>	<b>Tele- monitoring</b>	<b>Total Clients</b>
<b>2012</b>	119	21	3,057	6,941	165	10,303	26	10,329
<b>2013</b>	64	14	3,525	4,287	195	8,085	770	8,855
<b>2014</b>	93	29	4,444	4,736	241	9,543	475	10,018
<b>2015</b>	215	48	5,534	6,110	496	12,403	1,221	13,624
<b>2016</b>	366	52	5,431	6,773	549	13,171	1,748	14,919
<b>2017</b>	342	73	7,493	7,133	663	15,704	3,619	19,323
<b>2018</b>	470	71	8,920	7,792	737	17,990	4,791	22,781
<b>Total</b>	1,669	308	38,404	43,772	3,046	87,199	12,650	99,849

**Data source:** HHSC Center for Analysis and Decision Support. Data prepared by Texas A&M University under contract to HHSC.

**Table 3. Size of Comparison Groups**

<b>FY</b>	<b>Aged</b>	<b>Pregnant</b>	<b>Child</b>	<b>Blind/ Disabled</b>	<b>Parents</b>	<b>Total Tele- service</b>	<b>Tele- monitoring</b>	<b>Total Clients</b>
<b>2012</b>	2,423	1,683	36,040	30,842	2,860	73,848	1,600	75,448
<b>2013</b>	4,284	1,254	34,542	34,542	3,226	82,219	1,999	84,218
<b>2014</b>	5,013	1,565	53,168	43,136	3,702	106,584	3,945	110,529
<b>2015</b>	11,972	3,172	74,215	52,611	7,440	149,410	10,948	160,358

<b>FY</b>	<b>Aged</b>	<b>Pregnant</b>	<b>Child</b>	<b>Blind/ Disabled</b>	<b>Parents</b>	<b>Total Tele- service</b>	<b>Tele- monitoring</b>	<b>Total Clients</b>
<b>2016</b>	13,303	5,572	118,742	60,757	9,122	207,496	9,487	216,983
<b>2017</b>	15,224	4,873	157,810	73,783	9,514	261,204	21,254	282,458
<b>2018</b>	17,482	9,202	198,450	91,921	13,119	330,174	27,390	357,564
<b>Total</b>	69,701	27,321	677,338	387,592	48,983	1,210,935	76,623	1,287,558

**Data source:** HHSC Center for Analytics and Decision Support. Data prepared by Texas A&M University under contract to HHSC.

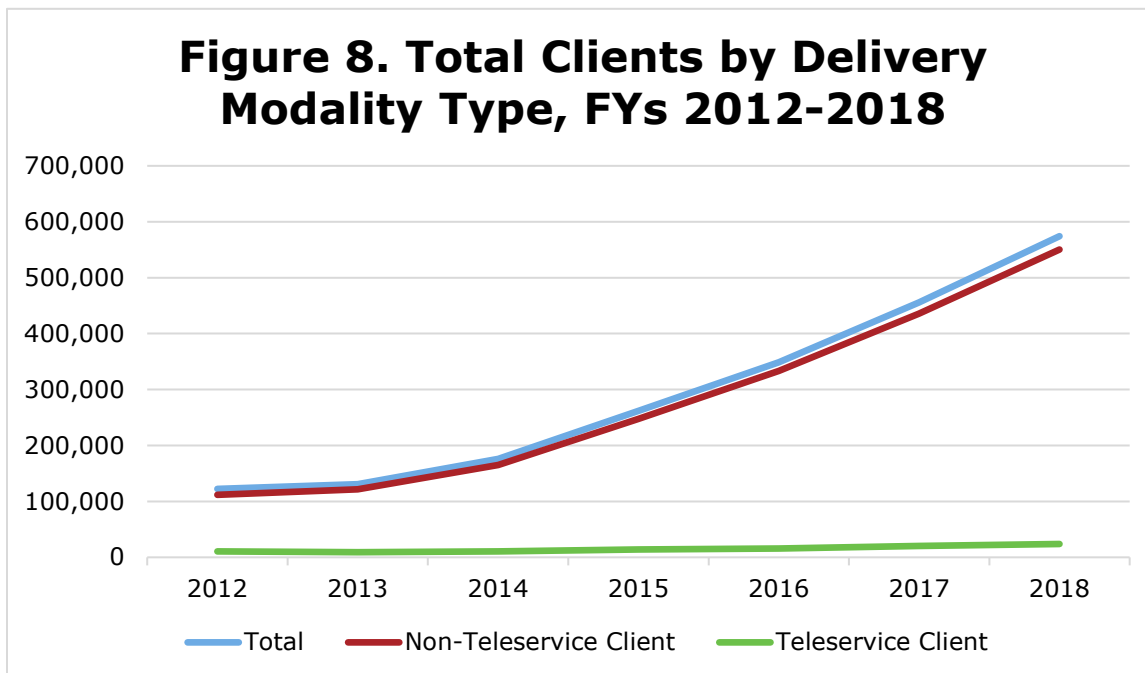


TAMU used two statistical techniques to analyze the impact of teleservice and home telemonitoring utilization on subsequent medical and pharmaceutical costs between the treatment and comparison groups. The first technique used a regression model, with regression equations for each paired treatment and comparison group, to assess post-cost differences between the groups. Multiple independent variables were included in the model to help account for demographic or health status variations among clients, as well as random variation in any of the data. The dependent variable was client post-cost, which was defined as the total medical or pharmaceutical costs for the six-month period following an index month. TAMU generated baseline medical and pharmaceutical post-cost analyses (see Tables 1-5 in Appendix E). TAMU also generated regression analyses using combined fiscal year data for children, people who are blind or have disabilities, or who were in the telemonitoring/non-telemonitoring groups (see Table 8 of Appendix E). Key findings from the regression analyses using combined fiscal year data are also presented in the next section.

The second technique used a difference in differences model. The model compared differences between pre- and post-costs for treatment and comparison groups. Pre-costs were total medical and pharmacy costs across the six months preceding an index month. Post-costs were defined the same as for the regression model. Medical costs were broken out into three encounter types, including inpatient, emergency department, and outpatient. TAMU generated medical and pharmaceutical difference in differences analyses (see Tables 6 and 7 in Appendix E). TAMU also generated difference in differences analyses using combined fiscal year data for children, people who are blind or have disabilities, or who were in the telemonitoring/non-telemonitoring (see Table 9 of Appendix E). Key findings from the difference in differences analyses using combined fiscal year data are also presented in the next section.

## Key Findings<sup>15</sup>

Results from this analysis suggest client utilization of teleservice and home telemonitoring continues to remain low, even among providers offering remote service options. From fiscal year 2012 to 2018, the total number of clients receiving services from providers offering remote services increased from 138,615 in 2012 to 606,548 in 2018. Of those clients, those using teleservices increased from 11,135 in 2012 to 24,400 in 2018 (see Figure 8).



**Data source:** HHSC Center for Analytics and Decision Support.

The analyses provided information about the size, direction, and significance of teleservice and home telemonitoring utilization on medical and pharmaceutical costs for the client populations. The analyses also provided insights into costs for specific client populations. Of those receiving remote services, children (51.6 percent), individuals who are blind or have a disability (31.1 percent), and those

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<sup>15</sup> The key findings in this section were derived from teleservice, home telemonitoring, medical, and pharmaceutical utilization that occurred prior to the COVID-19 public health emergency, which was initially declared by the United States Health and Human Services Secretary on January 31, 2020.

receiving home telemonitoring services (6.4 percent) account for 90 percent of the teleservice users. Results of this analysis suggest children who participate in teleservices have greater use of inpatient services and pharmacy services, but less use of emergency department services, compared to similar clients receiving in-person services from the same provider. Overall, there is a positive correlation between children receiving teleservices and medication use and hospital care and a negative correlation between children receiving teleservices and emergency department care. The net effect of teleservices delivered to children is \$53 per client per month in greater medical spending and \$42 per client per month in greater pharmacy spending (see Appendix E).

Individuals who are blind or have a disability and participate in teleservices use less inpatient services, emergency department services, and outpatient services. The net effect of teleservices delivered to these clients is \$502 per client per month less in medical spending compared to similar clients receiving solely in-person services. At the same time, growth in total medical spending for individuals who are blind or have a disability and receiving teleservices exceeds that of similar clients receiving services in-person by \$274 per month (see Table 12 in Appendix E). These findings suggest that teleservices are meeting a previously unmet need of this Medicaid population. A supplemental analysis suggests that are primarily used to deliver behavioral health care for this population.

Clients who participate in home telemonitoring services use more outpatient services and less inpatient services. The net effect of home telemonitoring is \$345 per client per month more in total medical spending and \$61 per client per month more in pharmacy spending (see Table 12 in Appendix E). These findings suggest that home telemonitoring increases interactions between the client and the provider, leading to a quicker response to therapy needs and fewer inpatient admissions.

Complete findings from this analysis can be found in Appendix E.

## **COVID-19 Telemedicine and Telehealth Flexibilities**

To ensure safety and continuity of care during the COVID-19 public health emergency, HHSC authorized Texas Medicaid providers to submit claims for reimbursement of the following services, so long as the services were provided appropriately and in accordance with the health care provider's licensure:

- Audio-only behavioral health services;
- Audio-only medical (physician delivered) evaluation and management services;
- Audio-only Early Childhood Intervention (ECI) specialized skills training;
- Audio-only nutritional counseling services;
- Telemedicine and telehealth School Health and Related Services (SHARS);
- Telehealth occupational therapy, physical therapy, and speech therapy;
- Telemedicine delivery of certain components of Texas Health Steps checkups;
- Rural Health Center reimbursement for telemedicine and telehealth services; and
- FQHC reimbursement for telemedicine and telehealth services.

The COVID-19 telemedicine and telehealth policy flexibilities were implemented throughout March and April 2020. HHSC conducted analyses of Medicaid FFS and MCO telemedicine, telehealth, and home telemonitoring services claims data for January 2020 through May 2020 to assess the client service utilization and expenditure trends resulting from the COVID-19 pandemic, as well as the most commonly billed procedure codes (see Appendix F). This data may be incomplete and will be updated in future versions of this report.

## **Client Utilization**

Between January 2020 and May 2020, 110,063 Texas Medicaid clients utilized telehealth services, 479,731 utilized telemedicine services, 21,739 utilized telephonic (audio-only) services, and 13,941 utilized home telemonitoring services. During this time, 689,241 services were reimbursed as a telehealth services, 1,015,145 services were reimbursed as telemedicine services, 28,018 services were reimbursed as telephonic (audio-only) services, and 173,675 services were reimbursed as home telemonitoring services. Although this data only represents a portion of fiscal year 2020, it indicates that utilization of telemedicine and telehealth services will have increased significantly over fiscal year 2019 (see Table 4). Because specific procedure codes for telephonic (audio-only) services were enabled for reimbursement effective March 1, 2020, these services cannot be compared to those in fiscal year 2019. Additional research and monitoring of claims and encounter data will be required to determine why utilization of home telemonitoring services did not experience growth comparable to telemedicine and telehealth services between January 2020 and May 2020.

**Table 4: Telemedicine, Telehealth, and Home Telemonitoring Services Utilization, FY 2019 and January to May 2020**

<b>Time</b>	<b>Service</b>	<b>Clients</b>	<b>Services</b>
<b>FY 2019</b>	Telehealth	5,869	16,651
<b>January to May 2020</b>	Telehealth	110,063	689,241
<b>FY 2019</b>	Telemedicine	57,586	242,857
<b>January to May 2020</b>	Telemedicine	479,731	1,015,145
<b>FY 2019</b>	Telemonitoring	11,815	1,123,915
<b>January to May 2020</b>	Telemonitoring	13,941	173,675

**Data source:** HHSC Center for Analytics and Decision Support.

Between January 2020 and May 2020, the most common primary diagnosis for a client receiving a telemedicine service was hypertension. Other common primary diagnoses included allergic rhinitis, major depressive disorder, acute upper respiratory infection, and generalized anxiety disorder. During the same time, the most common primary diagnosis for a client receiving a telehealth service was mixed receptive-expressive language disorder. Other common primary diagnoses included delayed milestone in childhood, ADHD, encounter for other specified aftercare, and unspecified lack of expected normal physiological development in childhood. Of those receiving telephonic services, the most common primary diagnosis was hypertension. Other common primary diagnoses included type 2 diabetes, Chronic Obstructive Pulmonary Disease (COPD), hypertensive chronic kidney disease, and chronic gastritis.

### **Provider Reimbursement**

Between January 2020 and May 2020, the total amount paid to providers for telemedicine services was \$49,916,702; the total amount paid to providers for

telehealth services was \$58,627,718; the total amount paid to providers for telephonic (audio-only) services was \$306,269; and the total amount paid to providers for home telemonitoring services was \$13,910,443. The average amount paid per provider for telemedicine services was \$7,032; \$18,174 for telehealth services; \$277 for telephonic (audio-only) services; and \$21,975 for home telemonitoring services. This data represents only a portion of fiscal year 2020. As noted above, specific procedure codes for telephonic (audio-only) services were enabled for reimbursement effective March 1, 2020, so these services cannot be compared to those in state fiscal year 2019. It indicates that the expenditures for telemedicine and telehealth services will be substantially higher in fiscal year 2020 than they were in fiscal year 2019; see Table 5. Additional research and monitoring of claims and encounter data will be required to determine why the average amount per provider for telemedicine and home telemonitoring services decreased from January through May 2020, as compared to state fiscal year 2019.

**Table 5: Telemedicine, Telehealth, and Home Telemonitoring Services Expenditures, FY 2019 and January to May 2020**

<b>Time</b>	<b>Service</b>	<b>Total Amount</b>	<b>Average Amount Per Provider</b>
<b>FY 2019</b>	Telehealth	\$923,270	\$7,959
<b>January to May 2020</b>	Telehealth	\$58,627,718	\$18,174
<b>FY 2019</b>	Telemedicine	\$9,137,310	\$20,082
<b>January to May 2020</b>	Telemedicine	\$49,916,702	\$7,032
<b>FY 2019</b>	Telemonitoring	\$29,888,990	\$74,351
<b>January to May 2020</b>	Telemonitoring	\$13,910,443	\$21,975

**Data source:** HHSC Center for Analytics and Decision Support.

## 4. Conclusion

In the 2018-19 biennium, utilization and expenditures for telemedicine and telehealth increased. While home telemonitoring utilization decreased, expenditures increased. The decrease in home telemonitoring services is likely due to the code update that changed the frequency with which providers billed for home telemonitoring services from a daily basis to a monthly basis. HHSC expects an increase in utilization and expenditures for telemedicine and telehealth in fiscal year 2020 due to the COVID-19 pandemic.

Telemedicine, telehealth, and home telemonitoring providers continue to be located in large MSAs, such as Dallas-Fort Worth-Arlington, San Antonio, and Houston-The Woodlands-Sugar Land.

Procedure code data and client diagnoses for fiscal years 2018 and 2019 suggest telemedicine and telehealth services have been primarily used to treat behavioral health conditions, including ADHD, bipolar disorder, major depressive disorder, and schizoaffective disorder. Procedure code data and client diagnoses between January 2020 and May 2020 deviated from recent trends due to the nature of teleservice utilization in response to COVID-19.

External stakeholders have expressed interest in expanding telemedicine and telehealth to a range of behavioral health services. Stakeholders have also expressed interest in making COVID-19 telemedicine, telehealth, and telephonic flexibilities permanent benefits of Texas Medicaid. HHSC will continue to work with MCOs to communicate telemedicine and telehealth service coverage changes to MCO providers and members per S.B. 670. HHSC is also continuing to review changes to the telemedicine and telehealth service benefits for FFS Medicaid clients.

## List of Acronyms

<b>Acronym</b>	<b>Full Name</b>
APRN	Advanced Practice Registered Nurse
CIHCP	County Indigent Health Care Program
DSHS	Texas Department of State Health Services
ECI	Early Childhood Intervention
FFS	Fee-for-Service
HCSSA	Home and Community Support Services Agency
LCSW	Licensed Clinical Social Worker
LMFT	Licensed Marriage and Family Therapist
LPC	Licensed Professional Counselor
MCO	Managed Care Organization
MSA	Metropolitan Statistical Area
OT	Occupational Therapist
PA	Physician Assistant
RN	Registered Nurse
SHARS	School Health and Related Services



<b>Acronym</b>	<b>Full Name</b>
SLP	Speech-Language Pathologist
TAC	Texas Administrative Code
TMB	Texas Medical Board

## **Appendix A. Legislative History**

Since 1997, the Legislature has passed numerous bills to define the telemedicine, telehealth, and home telemonitoring services benefits in Texas Medicaid. Major pieces of legislation that impact Texas Medicaid are listed below.

- H.B. 2386, 75th Legislature, Regular Session, 1997, required HHSC to provide reimbursement to physicians providing telemedicine services to Texas Medicaid clients. The telemedicine services benefit implemented in October 1997.
- H.B. 2017, 75th Legislature, Regular Session, 1997, required HHSC to establish reimbursement mechanisms for physicians providing telemedicine services to Texas Medicaid clients. The bill also required HHSC to encourage teaching hospitals, small rural hospitals, and Federally Qualified Health Centers to provide telemedicine services.
- S.B. 789, 77th Legislature, Regular Session, 2001, authorized HHSC to establish procedures to determine which telemedicine services should be reimbursed, to reimburse services at the same rate as in-person medical services, and to submit a report on the effects of telemedicine services on the Texas Medicaid program to the Legislature by December 1<sup>st</sup> of each even-numbered year.
- H.B. 2700, 77th Legislature, Regular Session, 2001, authorized HHSC to create a Texas-Mexico border region telemedicine services pilot program, as well to establish a Telemedicine Advisory Committee.
- S.B. 691, 78th Legislature, Regular Session, 2003, required HHSC to periodically review policies regarding the reimbursement of telemedicine services through the Texas Medicaid program. Specifically, HHSC was directed to identify variations between Texas Medicaid and Medicare reimbursement for telemedicine services, and was also authorized to modify rules and procedures as appropriate.
- S.B. 1340, 79th Legislature, Regular Session, 2005, authorized HHSC to develop, and the Texas Department of State Health Services (DSHS) to implement, a pilot program enabling Texas Medicaid clients in need of mental health care to receive these services via remote delivery.
- S.B. 24, 80th Legislature, Regular Session, 2007, directed HHSC to add office visits as telemedicine medical services and to develop a reimbursement process for telemedicine service patient sites.
- S.B. 293, 82nd Legislature, Regular Session, 2011, directed HHSC to provide reimbursement for new telehealth and home telemonitoring services benefits.

The telehealth services benefit was implemented May 1, 2013, and the home telemonitoring services benefit was implemented October 1, 2013.

- H.B. 1878, 84th Legislature, Regular Session, 2015, required MCOs to provide reimbursement to a physician who renders telemedicine services to children in primary or secondary school-based settings, even when the physician is not a child's primary care provider.
- H.B. 3519, 84th Legislature, Regular Session, 2015, moved the sunset date for the Texas Medicaid home telemonitoring services benefit from September 1, 2015 to September 1, 2019.
- S.B. 1107, 85th Legislature, Regular Session, 2017, established state scope-of-practice requirements and delivery modalities for telemedicine services and telehealth services.
- S.B. 922, 85th Legislature, Regular Session 2017, required that HHSC provide Texas Medicaid reimbursement to LCSWs, OTs, SLPs, LPCs, LMFTs, and psychologists for telehealth services rendered to children in school-based settings.
- S.B. 1697, 85th Legislature, Regular Session, 2017, established a new pediatric teleconnectivity resource program to help nonurban health care facilities obtain telemedicine services from pediatric specialist physicians.
- S.B. 670, 86th Legislature, Regular Session, 2019, prohibits Texas Medicaid MCOs from denying reimbursement for a health care service or procedure delivered as a telemedicine medical service or telehealth service solely because the service or procedure was not delivered through an in-person consultation; prohibits Texas Medicaid MCOs from limiting, denying, or reducing reimbursement for a covered health care service delivered as a telemedicine or telehealth service based on the health care provider's choice of platform for providing the service; ensures Texas Medicaid MCOs utilization of telemedicine or telehealth services promotes and supports patient-centered medical homes by allowing a Medicaid recipient to receive telemedicine or telehealth services from a provider other than the recipient's primary care physician or provider in certain circumstances, only if: the telemedicine medical service or telehealth service is provided in accordance with the law and contract requirements applicable to the provision of the same service provided in-person, the provider of telemedicine services gives notice to the patient's primary care provider of the telemedicine medical service or telehealth service; and authorizes HHSC to reimburse Federally Qualified Health Centers for the patient site facility fee and distant site practitioner fee for covered telemedicine medical services and telehealth services delivered by a health care provider to a Medicaid recipient

- H.B. 1063, 86th Legislature, Regular Session, 2019, requires HHSC to provide Texas Medicaid reimbursement to Texas Medicaid providers for rendering home telemonitoring services to pediatrics who are diagnosed with end-stage solid organ disease; have received an organ transplant; or require mechanical ventilation.

## Appendix B. Telemedicine, Telehealth, and Home Telemonitoring Services Client Utilization and Expenditures

**Table 1. Client Utilization and Expenditures, FY 2018**

<b>Service</b>	<b>Clients</b>	<b>Providers</b>	<b>Services Delivered</b>	<b>Average Expenditure Per Client</b>	<b>Average Expenditure Per Provider</b>
<b>Telemedicine</b>	48,107	402	218,150	\$166	\$19,908
<b>Telehealth</b>	4,284	94	10,106	\$130	\$5,940
<b>Home Telemonitoring</b>	9,636	323	1,457,087	\$2,410	\$71,888
<b>Total</b>	<b>59,853</b>	<b>778</b>	<b>1,685,34</b>		

**Table 2. Client Utilization and Expenditures, FY 2019**

<b>Service</b>	<b>Clients</b>	<b>Providers</b>	<b>Services Delivered</b>	<b>Average Expenditure Per Client</b>	<b>Average Expenditure Per Provider</b>
<b>Telemedicine</b>	57,490	455	242,857	\$159	\$20,082
<b>Telehealth</b>	5,869	116	16,651	\$157	\$7,959

<b>Service</b>	<b>Clients</b>	<b>Providers</b>	<b>Services Delivered</b>	<b>Average Expenditure Per Client</b>	<b>Average Expenditure Per Provider</b>
<b>Home Telemonitoring</b>	11,815	402	864,407	\$2,530	\$74,351
<b>Total</b>	<b>72,490</b>	<b>928</b>	<b>1,123,91</b>		

**Note:** Provider counts are based upon Base Texas Provider Identifier (TPI) number. Client counts are based upon Patient Control Number (PCN), also known as the client's Medicaid ID number. The provider and client counts are unduplicated within the telemedicine, telehealth, and home telemonitoring benefit areas, as well as in the totals reflected at the end of each table. However, the same provider might offer both telemedicine and home telemonitoring services. Similarly, the same client may be included in more than one of the three benefit areas. Thus, the provider and client counts are not additive across the three benefit areas.

For telemedicine services, the total services delivered is inclusive of distant and patient site procedure codes billed when both sites are eligible for reimbursement. The definition of a service is different for home telemonitoring. Home telemonitoring services represent individual reimbursements to providers for equipment installation and set-up, daily monitoring of a client's clinical data transmissions, or weekly monitoring of a client's clinical data transmissions.

**Data source:** Claims and encounter data provided by HHSC Center for Analytics and Decision Support.

## **Appendix C. Telemedicine, Telehealth, and Home Telemonitoring Service Providers by Metropolitan Statistical Area (MSA)**

**Table 1. Telemedicine, Telehealth, and Home Telemonitoring Providers by MSA, FYs 2016-2017**

<b>MSA</b>	<b>Telemedicine FY 2018</b>	<b>Telemedicine FY 2019</b>	<b>Telehealth FY 2018</b>	<b>Telehealth FY 2019</b>	<b>Home telemonitoring FY 2018</b>	<b>Home telemonitoring FY 2019</b>
<b>Abilene</b>	3	3	1	2	0	0
<b>Amarillo</b>	6	4	0	0	1	3
<b>Austin-</b>	40	44	6	10	1	3
<b>Beaumont-</b>	6	9	2	4	2	2
<b>Brownsville-</b>	3	5	0	0	38	52
<b>College</b>	1	3	1	1	1	1
<b>Dallas-Fort Worth- Arlington</b>	60	77	21	28	29	44
<b>El Paso</b>	22	14	0	1	1	7
<b>Houston- Sugar Land-</b>	72	92	9	14	43	54

<b>MSA</b>	<b>Telemedicine FY 2018</b>	<b>Telemedicine FY 2019</b>	<b>Telehealth FY 2018</b>	<b>Telehealth FY 2019</b>	<b>Home telemonitoring FY 2018</b>	<b>Home telemonitoring FY 2019</b>
<b>Killeen-</b>	6	8	3	5	0	1
<b>Laredo</b>	2	3	1	1	27	33
<b>Longview</b>	12	8	1	1	2	2
<b>Lubbock</b>	8	9	5	2	1	1
<b>McAllen-</b>	11	7	4	2	114	124
<b>Midland</b>	2	3	0	3	0	0
<b>Odessa</b>	3	3	0	0	1	1
<b>San Angelo</b>	6	5	1	0	0	0
<b>San Antonio</b>	29	47	15	21	18	22
<b>Sherman- Denison</b>	0	2	0	0	0	3
<b>Texarkana</b>	0	1	0	1	0	0
<b>Tyler</b>	3	3	3	0	0	0



<b>MSA</b>	<b>Telemedicine FY 2018</b>	<b>Telemedicine FY 2019</b>	<b>Telehealth FY 2018</b>	<b>Telehealth FY 2019</b>	<b>Home telemonitoring FY 2018</b>	<b>Home telemonitoring FY 2019</b>
<b>Victoria</b>	2	2	1	4	1	1
<b>Waco</b>	11	6	4	4	0	0
<b>Wichita</b>	5	3	4	1	0	0
<b>Non-MSA</b>	84	48	11	10	33	41
<b>Total</b>	<b>402</b>	<b>455</b>	<b>94</b>	<b>116</b>	<b>323</b>	<b>402</b>

**Note:** Provider counts are based upon Base Texas Provider Identifier (TPI) number. The same provider may offer services in multiple counties. The total provider amounts in Appendix C were obtained by summing all providers participating in each county. Thus, the total number of providers reflected in each MSA and for each benefit per fiscal year are not unduplicated and may not match the data in Appendix A. Counties included in each MSA were obtained from the Texas Comptroller and the U.S. Census Bureau.

**Data source:** Claims and encounter data provided by HHSC Center for Analytics and Decision Support.

## Appendix D. Telemedicine, Telehealth, and Home Telemonitoring Services Procedure Codes

**Table 1. Telemedicine Services, FY 2018**

Procedure Code	Description	Instances Billed
<b>Q3014</b>	Patient Site Facility Fee	87,938
<b>99214</b>	Office/Outpatient Visit - Established Client	51,530
<b>99213</b>	Office/Outpatient Visit - Established Client	33,554
<b>90792</b>	Psychiatric Diagnostic Evaluation with Medical services	17,155
<b>90791</b>	Psychiatric Diagnostic Evaluation	3,866
<b>All Other</b>	Office/Outpatient Visit - New or Established Client; Psychotherapy	24,107
<b>Total</b>		<b>218,150</b>

**Table 2. Telemedicine Services, FY 2019**

Procedure Code	Description	Instances Billed
<b>Q3014</b>	Patient Site Facility Fee	89,732
<b>99214</b>	Office/Outpatient Visit - Established Client	60,261

<b>Procedure Code</b>	<b>Description</b>	<b>Instances Billed</b>
<b>99213</b>	Office/Outpatient Visit - Established Client	41,401
<b>90792</b>	Psychiatric Diagnostic Evaluation with Medical Services	17,217
<b>90791</b>	Psychiatric Diagnostic Evaluation	4,134
<b>All Other</b>	Office/Outpatient Visit - New or Established Client; Psychotherapy	30,112
<b>Total</b>		<b>242,857</b>

**Table 3. Telehealth Services, FY 2018**

<b>Procedure Code</b>	<b>Description</b>	<b>Instances Billed</b>
<b>99214</b>	Office/Outpatient Visit - Established Client	3,623
<b>90791</b>	Psychiatric Diagnostic Evaluation	1,346
<b>99213</b>	Office/Outpatient Visit - Established Client	2,672
<b>90792</b>	Psychiatric Diagnostic Evaluation with Medical Services	669
<b>99212</b>	Office/Outpatient Visit - Established Client	645

<b>Procedure Code</b>	<b>Description</b>	<b>Instances Billed</b>
<b>All Other</b>	Office/Outpatient Visit - New or Established Client; Psychotherapy	1,151
<b>Total</b>		<b>10,106</b>

**Table 4. Telehealth Services, FY 2019**

<b>Procedure Code</b>	<b>Description</b>	<b>Instances Billed</b>
<b>99214</b>	Office/Outpatient Visit - Established Client	7,944
<b>99213</b>	Office/Outpatient Visit - Established Client	3,070
<b>90791</b>	Psychotherapy, 60 minutes with Patient and/or Family Member	2,214
<b>90791</b>	Psychiatric Diagnostic Evaluation	1,229
<b>90792</b>	Psychiatric Diagnostic Evaluation with Medical Services	783
<b>All Other</b>	Office/Outpatient Visit - New or Established Client; Psychotherapy	1,411
<b>Total</b>		<b>16,651</b>

**Table 5. Home Telemonitoring Services, FY 2018**

<b>Procedure Code</b>	<b>Description</b>	<b>Instances Billed</b>
<b>99090-GQ</b>	Daily Data Monitoring	1,249,019
<b>99444</b>	Weekly Review of Patient Data	194,961
<b>99090</b>	Daily Data Monitoring	1,682
<b>Total</b>		<b>1,457,087</b>

**Table 6. Home Telemonitoring Services, FY 2019**

<b>Procedure Code</b>	<b>Description</b>	<b>Instances Billed</b>
<b>99090-GQ</b>	Daily Data Monitoring	533,489
<b>99444</b>	Weekly Review of Patient Data	247,901
<b>S9110<sup>16</sup></b>	Telemonitoring of Patient in Their Home, Including Equipment	49,327
<b>Total</b>		<b>864,407</b>

**Note:** Full procedure code descriptions are withheld due to American Medical Association (AMA) copyright.

**Data source:** Claims and encounter data provided by HHSC Center for Analytics and Decision Support.

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<sup>16</sup> S9110 replaced procedure code 99090. Procedure code 99090 may be billed once per day, whereas procedure code S9110 may be billed once per month.

## Appendix E. Cost Savings of Telemedicine, Telehealth, and Home Telemonitoring

**Table 1. Baseline Regression Teleservice and Home Telemonitoring Effect on Medical Post-Cost per Client Per Month, FY 2012 – FY 2018**

<b>FY</b>	<b>Statistic</b>	<b>Aged</b>	<b>Pregnant</b>	<b>Child</b>	<b>Blind/ Disabled</b>	<b>Parents</b>	<b>Tele- monitoring &amp; Non-tele- monitoring</b>
<b>2012</b>	Treatment Effect	5.7	709.4	-31	-324.2***	2.2	555.9
<b>2012</b>	Standard Error	(62.6)	(437.9)	(38.2)	(63.2)	(156.3)	(542.2)
<b>2012</b>	Sample (N)	2,542	1,704	39,097	37,781	3,025	1,626
<b>2013</b>	Treatment Effect	-24.6	-324.9	132.5***	-458.9***	83.8	-325.5*
<b>2013</b>	Standard Error	(89)	(378.5)	(37.3)	(73)	(100.9)	(189.4)
<b>2013</b>	Sample (N)	4,348	1,268	42,437	38,828	3,420	2,769
<b>2014</b>	Treatment Effect	-37.9	305*	158.7***	-353.8***	-71.1	339.2**
<b>2014</b>	Standard Error	(61.6)	(123.8)	(40.9)	(82.3)	(80.6)	(112.5)

<b>FY</b>	<b>Statistic</b>	<b>Aged</b>	<b>Pregnant</b>	<b>Child</b>	<b>Blind/ Disabled</b>	<b>Parents</b>	<b>Tele- monitoring &amp; Non-tele- monitoring</b>
<b>2014</b>	Sample (N)	5,106	1,594	57,610	47,868	3,943	4,420
<b>2015</b>	Treatment Effect	104.3* *	-199.7	50.8	-484.7***	79.3	343.8***
<b>2015</b>	Standard Error	(52.3)	(145)	(37.9)	(69.1)	(52.9)	(57.2)
<b>2015</b>	Sample (N)	12,186	3,220	79,738	58,717	7,935	12,167
<b>2016</b>	Treatment Effect	109.3* *	-356.8**	43	-505.6***	-104.8	354.6***
<b>2016</b>	Standard Error	(48)	(134.9)	(32.9)	(77.6)	(82.7)	(65.7)
<b>2016</b>	Sample (N)	13,667	5,624	124,162	67,526	9,668	11,235
<b>2017</b>	Treatment Effect	67.6	-275.9**	70.6**	-364.1***	-63.5	365.1***
<b>2017</b>	Standard Error	(51.5)	(136.7)	(26.3)	(71.2)	(162.5)	(34.6)
<b>2017</b>	Sample (N)	15,563	4,946	165,291	80,914	10,176	24,871
<b>2018</b>	Treatment Effect	54.8	-84	32.7	-564.1***	-65.7	337***

FY	Statistic	Aged	Pregnant	Child	Blind/ Disabled	Parents	Tele- monitoring & Non-tele- monitoring
2018	Standard Error	(46)	(176.8)	(27.5)	(79.1)	(62.4)	(32.5)
2018	Sample (N)	17,951	9,273	207,347	99,712	13,856	32,178

**Note:** The total number of teleservice and non-teleservice clients was 1,298,043. The total number of telemonitoring and non-telemonitoring service clients was 89,266.

The treatment effect is the estimated cost difference between clients who received a teleservice or a home telemonitoring service as compared to clients who did not receive these services. A negative treatment effect indicates a cost decrease among clients who received a teleservice or a home telemonitoring service as compared to clients who did not receive these services. A positive treatment effect indicates a cost increase among clients who received a teleservice or a home telemonitoring service as compared to clients who did not receive these services.

The standard error of the effect represents the average distance of observed values from estimated values (regression line). The standard error is typically reported in parentheses. If the treatment effect and standard error values are similar in magnitude or if the standard error is greater than the treatment effect, random error cannot be excluded as a cause of the observed differences in cost. If the treatment effect is considerably larger than the standard error, there is likely a non-random difference between observed costs for clients who received a teleservice or a home telemonitoring service, as compared to clients who did not receive these services.

The p-value is a measure of probability that can be used to assess the statistical significance of the treatment effect. A smaller p-value indicates a stronger certainty of the estimated cost difference between the treatment



and comparison groups. The p-values are noted in the table with asterisks as follows: \*\*\*  $p < 0.001$ , \*\*  $p < 0.05$ , and \*  $p < 0.1$ .

**Data source:** Analysis and interpretation of results provided by Texas A&M University under contract to HHSC.

**Table 2. Baseline Regression Teleservice and Home Telemonitoring Effect on Inpatient Post-Cost per Client Per Month, FY 2012 – FY 2018**

<b>FY</b>	<b>Statistic</b>	<b>Aged</b>	<b>Pregnant</b>	<b>Child</b>	<b>Blind/ Disabled</b>	<b>Parents</b>	<b>Tele-monitoring &amp; Non-tele- monitoring</b>
<b>2012</b>	Treatment Effect	-52.8**	747.2*	-88**	-293.4***	-67.4	-201.6
<b>2012</b>	Standard Error	(22.2)	(411.1)	(33.3)	(53)	(133)	(495)
<b>2012</b>	Sample (N)	2,542	1,704	39,097	37,781	3,025	1,626
<b>2013</b>	Treatment Effect	-31.5	-264.5	53.4*	-422.3***	-63.6	-297.7**
<b>2013</b>	Standard Error	(23.4)	(330.7)	(32.2)	(57)	(74.9)	(143.5)
<b>2013</b>	Sample (N)	4,348	1,268	42,437	38,828	3,420	2,769
<b>2014</b>	Treatment Effect	-50.1***	10	64.1*	-433.9***	-133.6*	-177.1**
<b>2014</b>	Standard Error	(12.6)	(134.1)	(33.9)	(64.8)	(70.1)	(76.3)
<b>2014</b>	Sample (N)	5,106	1,594	57,610	47,868	3,943	4,420
<b>2015</b>	Treatment Effect	2.7	-231.3*	27.9	-238.9***	45.2	-63.4*

<b>FY</b>	<b>Statistic</b>	<b>Aged</b>	<b>Pregnant</b>	<b>Child</b>	<b>Blind/ Disabled</b>	<b>Parents</b>	<b>Tele-monitoring &amp; Non-tele- monitoring</b>
<b>2015</b>	Standard Error	(12)	(121.2)	(32.4)	(53.3)	(39.3)	(35.1)
<b>2015</b>	Sample (N)	12,186	3,220	79,738	58,717	7,935	12,167
<b>2016</b>	Treatment Effect	-11.7	-252.2**	34.8	-282.5***	-74.3	-19.2
<b>2016</b>	Standard Error	(14.8)	(104.8)	(26.8)	(61.7)	(73)	(43.1)
<b>2016</b>	Sample (N)	13,667	5,624	124,162	67,526	9,668	11,235
<b>2017</b>	Treatment Effect	-3.2	-217.6**	50.3**	-172.2**	-97.6	-16.2
<b>2017</b>	Standard Error	(21.4)	(114.1)	(21.9)	(52.6)	(157.3)	(20.6)
<b>2017</b>	Sample (N)	15,563	4,946	165,291	80,914	10,176	24,871
<b>2018</b>	Treatment Effect	5	13.6	47.6**	-67	17.1	-35.9**
<b>2018</b>	Standard Error	(16.1)	(129.8)	(16.8)	(47.7)	(43.3)	(15.6)
<b>2018</b>	Sample (N)	17,951	9,273	207,347	99,712	13,856	32,178

**Note:** The total number of teleservice and non-teleservice clients was 1,298,043. The total number of telemonitoring and non-telemonitoring service clients was 89,266.

The treatment effect is the estimated cost difference between clients who received a teleservice or a home telemonitoring service as compared to clients who did not receive these services. A negative treatment effect indicates a cost decrease among clients who received a teleservice or a home telemonitoring service as compared to clients who did not receive these services. A positive treatment effect indicates a cost increase among clients who received a teleservice or a home telemonitoring service as compared to clients who did not receive these services.

The standard error of the effect represents the average distance of observed values from estimated values (regression line). The standard error is typically reported in parentheses. If the treatment effect and standard error values are similar in magnitude or if the standard error is greater than the treatment effect, random error cannot be excluded as a cause of the observed differences in cost. If the treatment effect is considerably larger than the standard error, there is likely a non-random difference between observed costs for clients who received a teleservice or a home telemonitoring service, as compared to clients who did not receive these services.

The p-value is a measure of probability that can be used to assess the statistical significance of the treatment effect. A smaller p-value indicates a stronger certainty of the estimated cost difference between the treatment and comparison groups. The p-values are noted in the table with asterisks as follows: \*\*\*  $p < 0.001$ , \*\*  $p < 0.05$ , and \*  $p < 0.1$ .

**Data source:** Analysis and interpretation of results provided by Texas A&M University under contract to HHSC.

**Table 3. Baseline Regression Teleservice and Home Telemonitoring Effect on Emergency Department Post-Cost per Client Per Month, FY 2012 – FY 2018**

<b>FY</b>	<b>Statistic</b>	<b>Aged</b>	<b>Pregnant</b>	<b>Child</b>	<b>Blind/ Disabled</b>	<b>Parents</b>	<b>Tele-monitoring &amp; Non-tele- monitoring</b>
<b>2012</b>	Treatment Effect	-2.6	11.7	3.3	11.7**	7.7	34.8
<b>2012</b>	Standard Error	(4.2)	(41.9)	(3.2)	(4.2)	(22.7)	(75.8)
<b>2012</b>	Sample (N)	2,542	1,704	39,097	37,781	3,025	1,626
<b>2013</b>	Treatment Effect	-6.8	60.7	10.3*	19.9***	113.8***	-129.7**
<b>2013</b>	Standard Error	(4.4)	(55.4)	(3.9)	(4.9)	(23.5)	(47.5)
<b>2013</b>	Sample (N)	4,348	1,268	42,437	38,828	3,420	2,769
<b>2014</b>	Treatment Effect	5.3*	148.8***	8.8**	23.8***	37.1**	39.7
<b>2014</b>	Standard Error	(2.8)	(36.1)	(3.6)	(4.6)	(15.8)	(31.3)
<b>2014</b>	Sample (N)	5,106	1,594	57,610	47,868	3,943	4,420
<b>2015</b>	Treatment Effect	-12.2*	5.3	-8.4**	-8.1*	9.6	40.2**

<b>FY</b>	<b>Statistic</b>	<b>Aged</b>	<b>Pregnant</b>	<b>Child</b>	<b>Blind/ Disabled</b>	<b>Parents</b>	<b>Tele-monitoring &amp; Non-tele- monitoring</b>
<b>2015</b>	Standard Error	(5.9)	(32.3)	(3.1)	(4.7)	(13.3)	(13)
<b>2015</b>	Sample (N)	12,186	3,220	79,738	58,717	7,935	12,167
<b>2016</b>	Treatment Effect	-0.9	-63.1**	-8***	-7.2	1.6	-11.6
<b>2016</b>	Standard Error	(4.4)	(31.9)	(3)	(7.5)	(16.1)	(8)
<b>2016</b>	Sample (N)	13,667	5,624	124,162	67,526	9,668	11,235
<b>2017</b>	Treatment Effect	5.1	-39.7	-5.6**	-9.5	0.6	-8.9**
<b>2017</b>	Standard Error	(4.8)	(27.4)	(2.5)	(8.6)	(14.5)	(4.2)
<b>2017</b>	Sample (N)	15,563	4,946	165,291	80,914	10,176	24,871
<b>2018</b>	Treatment Effect	-1.8	-77.8**	-20.5**	-49.7***	-25.1	-10.8*
<b>2018</b>	Standard Error	(4.6)	(34.5)	(9.2)	(11.8)	(23)	(6)
<b>2018</b>	Sample (N)	17,951	9,273	207,347	99,712	13,856	32,178

**Note:** The total number of teleservice and non-teleservice clients was 1,298,043. The total number of telemonitoring and non-telemonitoring service clients was 89,266.

The treatment effect is the estimated cost difference between clients who received a teleservice or a home telemonitoring service as compared to clients who did not receive these services. A negative treatment effect indicates a cost decrease among clients who received a teleservice or a home telemonitoring service as compared to clients who did not receive these services. A positive treatment effect indicates a cost increase among clients who received a teleservice or a home telemonitoring service as compared to clients who did not receive these services.

The standard error of the effect represents the average distance of observed values from estimated values (regression line). The standard error is typically reported in parentheses. If the treatment effect and standard error values are similar in magnitude or if the standard error is greater than the treatment effect, random error cannot be excluded as a cause of the observed differences in cost. If the treatment effect is considerably larger than the standard error, there is likely a non-random difference between observed costs for clients who received a teleservice or a home telemonitoring service, as compared to clients who did not receive these services.

The p-value is a measure of probability that can be used to assess the statistical significance of the treatment effect. A smaller p-value indicates a stronger certainty of the estimated cost difference between the treatment and comparison groups. The p-values are noted in the table with asterisks as follows: \*\*\*  $p < 0.001$ , \*\*  $p < 0.05$ , and \*  $p < 0.1$ .

**Data source:** Analysis and interpretation of results provided by Texas A&M University under contract to HHSC.

**Table 4. Baseline Regression Teleservice and Home Telemonitoring Effect on Outpatient Post-Cost per Client Per Month, FY 2012 – FY 2018**

<b>FY</b>	<b>Statistic</b>	<b>Aged</b>	<b>Pregnant</b>	<b>Child</b>	<b>Blind/ Disabled</b>	<b>Parents</b>	<b>Tele-monitoring &amp; Non-tele- monitoring</b>
<b>2012</b>	Treatment Effect	58.1	-23.5	57.4***	-29.9	72.3	757.1***
<b>2012</b>	Standard Error	(57.9)	(100.6)	(15)	(28.3)	(70.2)	(161.2)
<b>2012</b>	Sample (N)	2,542	1,704	39,097	37,781	3,025	1,626
<b>2013</b>	Treatment Effect	6.9	-60.4	80.7***	-35.6	148.2**	-29
<b>2013</b>	Standard Error	(84.8)	(123.1)	(15.5)	(36.7)	(48.5)	(109.5)
<b>2013</b>	Sample (N)	4,348	1,268	42,437	38,828	3,420	2,769
<b>2014</b>	Treatment Effect	12.3	295.1***	98.2***	80.6*	62.3**	515.3***
<b>2014</b>	Standard Error	(59.4)	(67.1)	(16.4)	(42)	(31.3)	(74.5)
<b>2014</b>	Sample (N)	5,106	1,594	57,610	47,868	3,943	4,420
<b>2015</b>	Treatment Effect	101.6*	31.3	24	-245.6***	34.6	407.4***



<b>FY</b>	<b>Statistic</b>	<b>Aged</b>	<b>Pregnant</b>	<b>Child</b>	<b>Blind/ Disabled</b>	<b>Parents</b>	<b>Tele-monitoring &amp; Non-tele- monitoring</b>
<b>2015</b>	Standard Error	(49.6)	(60.9)	(16.4)	(38.4)	(29.1)	(40.8)
<b>2015</b>	Sample (N)	12,186	3,220	79,738	58,717	7,935	12,167
<b>2016</b>	Treatment Effect	121.3**	-104.5*	9.1	-223.4	-30.8	373.9***
<b>2016</b>	Standard Error	(44.4)	(61.8)	(15.6)	(40.8)	(32.3)	(44.8)
<b>2016</b>	Sample (N)	13,667	5,624	124,162	67,526	9,668	11,235
<b>2017</b>	Treatment Effect	70.8	-58.5	21*	-191.8	34.1	381.2**
<b>2017</b>	Standard Error	(45.9)	(59.6)	(11.4)	(40.8)	(34.6)	(26)
<b>2017</b>	Sample (N)	15,563	4,946	165,291	80,914	10,176	24,871
<b>2018</b>	Treatment Effect	49.8	-97.9	-14.5	-496.8***	-83.1**	373***
<b>2018</b>	Standard Error	(42.3)	(82.5)	(19.7)	(56.4)	(40.4)	(26.7)
<b>2018</b>	Sample (N)	17,951	9,273	207,347	99,712	13,856	32,178

**Note:** The total number of teleservice and non-teleservice clients was 1,298,043. The total number of telemonitoring and non-telemonitoring service clients was 89,266.

The treatment effect is the estimated cost difference between clients who received a teleservice or a home telemonitoring service as compared to clients who did not receive these services. A negative treatment effect indicates a cost decrease among clients who received a teleservice or a home telemonitoring service as compared to clients who did not receive these services. A positive treatment effect indicates a cost increase among clients who received a teleservice or a home telemonitoring service as compared to clients who did not receive these services.

The standard error of the effect represents the average distance of observed values from estimated values (regression line). The standard error is typically reported in parentheses. If the treatment effect and standard error values are similar in magnitude or if the standard error is greater than the treatment effect, random error cannot be excluded as a cause of the observed differences in cost. If the treatment effect is considerably larger than the standard error, there is likely a non-random difference between observed costs for clients who received a teleservice or a home telemonitoring service, as compared to clients who did not receive these services.

The p-value is a measure of probability that can be used to assess the statistical significance of the treatment effect. A smaller p-value indicates a stronger certainty of the estimated cost difference between the treatment and comparison groups. The p-values are noted in the table with asterisks as follows: \*\*\*  $p < 0.001$ , \*\*  $p < 0.05$ , and \*  $p < 0.1$ .

**Data source:** Analysis and interpretation of results provided by Texas A&M University under contract to HHSC.

**Table 5. Baseline Regression Teleservice and Home Telemonitoring Effect on Pharmacy Post-Cost per Client Per Month, FY 2012 – FY 2018**

<b>FY</b>	<b>Statistic</b>	<b>Aged</b>	<b>Pregnant</b>	<b>Child</b>	<b>Blind/ Disabled</b>	<b>Parents</b>	<b>Tele-monitoring &amp; Non-tele- monitoring</b>
<b>2012</b>	Treatment Effect	-4.7	46.2	73***	50.4**	56.6	N/A
<b>2012</b>	Standard Error	(7.7)	(33.9)	(8.4)	(24.5)	(61.8)	N/A
<b>2012</b>	Sample (N)	2,542	1,704	39,097	37,781	3,025	N/A
<b>2013</b>	Treatment Effect	-7.1	-101.7	62.3***	44.7*	91.2**	N/A
<b>2013</b>	Standard Error	(7.6)	(52.6)	(12.3)	(25.4)	(33.5)	N/A
<b>2013</b>	Sample (N)	4,348	1,268	42,437	38,828	3,420	N/A
<b>2014</b>	Treatment Effect	13.2**	38.6	58.3***	-6	14.3	N/A
<b>2014</b>	Standard Error	(6)	(27.4)	(12.5)	(42.4)	(38.7)	N/A
<b>2014</b>	Sample (N)	5,106	1,594	57,610	47,868	3,943	N/A
<b>2015</b>	Treatment Effect	7.2	-6.6	88.8***	8.1	48.2	90.9***

<b>FY</b>	<b>Statistic</b>	<b>Aged</b>	<b>Pregnant</b>	<b>Child</b>	<b>Blind/ Disabled</b>	<b>Parents</b>	<b>Tele-monitoring &amp; Non-tele- monitoring</b>
<b>2015</b>	Standard Error	(6.6)	(22.9)	(9.2)	(25.1)	(33.3)	(24.5)
<b>2015</b>	Sample (N)	12,186	3,220	79,738	58,717	7,935	12,167
<b>2016</b>	Treatment Effect	-35.9	11.5	47.6***	7.9	73.5	93**
<b>2016</b>	Standard Error	(41.1)	(30.4)	(11.7)	(41.3)	(41)	(34.8)
<b>2016</b>	Sample (N)	13,667	5,624	124,162	67,526	9,668	11,235
<b>2017</b>	Treatment Effect	3	16.5	32.7**	10.5	102.6**	47.8**
<b>2017</b>	Standard Error	(5.2)	(40.7)	(13.4)	(35.2)	(39.7)	(21.6)
<b>2017</b>	Sample (N)	15,563	4,946	165,291	80,914	10,176	24,871
<b>2018</b>	Treatment Effect	6.2	81**	14.6	-32.6	66.1*	57.2**
<b>2018</b>	Standard Error	(8.1)	(30.6)	(10.8)	(41)	(36.7)	(26.7)
<b>2018</b>	Sample (N)	17,951	9,273	207,347	99,712	13,856	32,178

**Note:** The total number of teleservice and non-teleservice clients was 1,298,043. The total number of telemonitoring and non-telemonitoring service clients was 89,266.

The treatment effect is the estimated cost difference between clients who received a teleservice or a home telemonitoring service as compared to clients who did not receive these services. A negative treatment effect indicates a cost decrease among clients who received a teleservice or a home telemonitoring service as compared to clients who did not receive these services. A positive treatment effect indicates a cost increase among clients who received a teleservice or a home telemonitoring service as compared to clients who did not receive these services.

The standard error of the effect represents the average distance of observed values from estimated values (regression line). The standard error is typically reported in parentheses. If the treatment effect and standard error values are similar in magnitude or if the standard error is greater than the treatment effect, random error cannot be excluded as a cause of the observed differences in cost. If the treatment effect is considerably larger than the standard error, there is likely a non-random difference between observed costs for clients who received a teleservice or a home telemonitoring service, as compared to clients who did not receive these services.

The p-value is a measure of probability that can be used to assess the statistical significance of the treatment effect. A smaller p-value indicates a stronger certainty of the estimated cost difference between the treatment and comparison groups. The p-values are noted in the table with asterisks as follows: \*\*\*  $p < 0.001$ , \*\*  $p < 0.05$ , and \*  $p < 0.1$ .

**Data source:** Analysis and interpretation of results provided by Texas A&M University under contract to HHSC.

**Table 6. Difference-in-Differences Analysis of Medical Costs per Client per Month, FY 2012 – FY 2018**

<b>FY</b>	<b>Statistic</b>	<b>Aged</b>	<b>Pregnant</b>	<b>Child</b>	<b>Blind/ Disabled</b>	<b>Parents</b>	<b>Tele- monitoring &amp; Non-tele- monitoring</b>
<b>2012</b>	Diff-in-Diff Coefficient	44.8	-259.7	-103***	232.8**	34	69.2
<b>2012</b>	Standard Error	(68.1)	(325.5)	(836.7)	(274.5)	(153.8)	(500.5)
<b>2012</b>	Sample (N)	2,542	1,704	39,097	37,781	3,025	1,626
<b>2013</b>	Diff-in-Diff Coefficient	-34.8	-539	47.5	242.8**	32.5	-270.5**
<b>2013</b>	Standard Error	(100.5)	(328.5)	(80.7)	(88.3)	(130.7)	(105.7)
<b>2013</b>	Sample (N)	4,348	1,268	42,437	38,828	3,420	2,769
<b>2014</b>	Diff-in-Diff Coefficient	2	-7.9	165.1**	467.7**	-141.2	-154.2*
<b>2014</b>	Standard Error	(82.3)	(188.2)	(67.5)	(114.9)	(103.5)	(82.2)
<b>2014</b>	Sample (N)	5,106	1,594	57,610	47,868	3,943	4,420
<b>2015</b>	Diff-in-Diff Coefficient	45.2	-220	72.8**	227**	84.7	114.8**
<b>2015</b>	Standard Error	(59.2)	(156.4)	(37)	(82.5)	(61.6)	(48.7)
<b>2015</b>	Sample (N)	12,186	3,220	79,738	58,717	7,935	12,167
<b>2016</b>	Diff-in-Diff Coefficient	99.1*	-385**	44.7	234.8**	-26.2	191.3***

<b>FY</b>	<b>Statistic</b>	<b>Aged</b>	<b>Pregnant</b>	<b>Child</b>	<b>Blind/ Disabled</b>	<b>Parents</b>	<b>Tele- monitoring &amp; Non-tele- monitoring</b>
<b>2016</b>	Standard Error	(55)	(160.1)	(34.2)	(87.9)	(83.6)	(46.3)
<b>2016</b>	Sample (N)	13,667	5,624	124,162	67,526	9,668	11,235
<b>2017</b>	Diff-in-Diff Coefficient	46.7	-501.7**	81.4**	346.2***	45.7	252.3***
<b>2017</b>	Standard Error	(57.6)	(153.5)	(28)	(88.5)	(151.4)	(28.2)
<b>2017</b>	Sample (N)	15,563	4,946	165,291	80,914	10,176	24,871
<b>2018</b>	Diff-in-Diff Coefficient	47	-335.5*	-3.2	283**	-7.4	321.5***
<b>2018</b>	Standard Error	(50.4)	(190.3)	(29.4)	(93.8)	(70.5)	(26.5)
<b>2018</b>	Sample (N)	17,951	9,273	207,347	99,712	13,856	32,178

**Note:** The total number of teleservice and non-teleservice clients was 1,298,043. The total number of telemonitoring and non-telemonitoring service clients was 89,266.

The difference-in-differences coefficient estimates the difference in cost trends for clients in the treatment and comparison groups from the pre-period to the post-period. A negative coefficient indicates a lower change in cost among clients who received a teleservice or a home telemonitoring service as compared to clients who did not receive these services. A positive coefficient indicates an increased change in cost among clients who received a teleservice or a home telemonitoring service as compared to clients who did not receive these services.

The p-value is a measure of probability that can be used to assess the statistical significance of the treatment effect. A smaller p-value indicates a stronger certainty of the estimated cost difference between the treatment

and comparison groups. The p-values are noted in the table with asterisks as follows: \*\*\*  $p < 0.001$ , \*\*  $p < 0.05$ , and \*  $p < 0.1$ .

**Data source:** Analysis and interpretation of results provided by Texas A&M University under contract to HHSC.



**Table 7. Difference-in-Differences Analysis of Pharmacy Costs per Client per Month, FY 2012 – FY 2018**

<b>FY</b>	<b>Statistic</b>	<b>Aged</b>	<b>Pregnant</b>	<b>Child</b>	<b>Blind/Disabled</b>	<b>Parents</b>	<b>Tele-monitoring &amp; Non-tele-monitoring</b>
<b>2012</b>	Diff-in-Diff Coefficient	-8.8	26.7	19.7**	-38.8	21.3	44.9
<b>2012</b>	Standard Error	(10.4)	(35.1)	(8.4)	(25.9)	(49.6)	(75.6)
<b>2012</b>	Sample (N)	2,542	1,704	39,097	37,781	3,025	1,626
<b>2013</b>	Diff-in-Diff Coefficient	0.9	-6.4	29.7**	6	26	36.5
<b>2013</b>	Standard Error	(11.7)	(43.1)	(11.1)	(37.2)	(39)	(30.1)
<b>2013</b>	Sample (N)	4,348	1,268	42,437	38,828	3,420	2,769
<b>2014</b>	Diff-in-Diff Coefficient	-25***	78.2**	38.9***	-2	7.8	18.2
<b>2014</b>	Standard Error	(9)	(34.9)	(12.5)	(41)	(39.6)	(25.4)
<b>2014</b>	Sample (N)	5,106	1,594	57,610	47,868	3,943	4,420
<b>2015</b>	Diff-in-Diff Coefficient	-6.6	-10.9	31.8***	-16.4	0.7	15.9

<b>FY</b>	<b>Statistic</b>	<b>Aged</b>	<b>Pregnan t</b>	<b>Child</b>	<b>Blind/ Disabled</b>	<b>Parents</b>	<b>Tele-monitoring &amp; Non-tele- monitoring</b>
<b>2015</b>	Standard Error	(10.3)	(25.9)	(9.4)	(26.1)	(32.9)	(19.5)
<b>2015</b>	Sample (N)	12,186	3,220	79,738	58,717	7,935	12,167
<b>2016</b>	Diff-in-Diff Coefficient	-65.3	50.7	31.8***	-49.6	35.7	-18.7
<b>2016</b>	Standard Error	(40.3)	(37.9)	(11.8)	(36.9)	(40.3)	(23.4)
<b>2016</b>	Sample (N)	13,667	5,624	124,162	67,526	9,668	11,235
<b>2017</b>	Diff-in-Diff Coefficient	-6.2	8.3	27.7***	19.8	42.3	-10.8
<b>2017</b>	Standard Error	(10.8)	(48.4)	(13.5)	(34.2)	(41.6)	(16.2)
<b>2017</b>	Sample (N)	15,563	4,946	165,291	80,914	10,176	24,871
<b>2018</b>	Diff-in-Diff Coefficient	-1.2	12.9	13.6	-6.6	46.7	-22.6
<b>2018</b>	Standard Error	(11.8)	(46.6)	(14.3)	(39.7)	(44.4)	(16.2)
<b>2018</b>	Sample (N)	17,951	9,273	207,347	99,712	13,856	32,178

**Note:** The total number of teleservice and non-teleservice clients was 1,298,043. The total number of telemonitoring and non-telemonitoring service clients was 89,266.

The difference-in-differences coefficient estimates the difference in cost trends for clients in the treatment and comparison groups from the pre-period to the post-period. A negative coefficient indicates a lower change in cost among clients who received a teleservice or a home telemonitoring service as compared to clients who did not receive these services. A positive coefficient indicates an increased change in cost among clients who received a teleservice or a home telemonitoring service as compared to clients who did not receive these services.

The p-value is a measure of probability that can be used to assess the statistical significance of the treatment effect. A smaller p-value indicates a stronger certainty of the estimated cost difference between the treatment and comparison groups. The p-values are noted in the table with asterisks as follows: \*\*\*  $p < 0.001$ , \*\*  $p < 0.05$ , and \*  $p < 0.1$ .

**Data source:** Analysis and interpretation of results provided by Texas A&M University under contract to HHSC.

**Table 8. Medical and Pharmacy Post-Cost Regression Using Combined Data from 2015-2018**

<b>Statistic</b>	<b>Child</b>	<b>Blind/Disabled</b>	<b>Telemonitoring &amp; Non-telemonitoring</b>
Total Medical Cost Treatment Effect	53***	-502.5***	345.1***
Total Medical Cost Standard Error	(15.1)	(37.7)	(20.7)
Total Medical Cost Sample (N)	578,538	306,869	80,451
Inpatient Cost Treatment Effect	46.1***	-177.3***	-28.8**
Inpatient Cost Standard Error	(11.3)	(26.5)	(11.8)
Inpatient Cost Treatment Sample (N)	578,538	306,869	80,451
ED Cost Treatment Effect	-11.4***	-21.9***	-2.9
ED Cost Standard Error	(3.4)	(4.7)	(3.5)
ED Cost Sample (N)	578,538	306,869	80,451
Outpatient Cost Treatment Effect	7.6	-325***	373.9***
Outpatient Cost Standard Error	(8.6)	(23.6)	(15.8)

<b>Statistic</b>	<b>Child</b>	<b>Blind/Disabled</b>	<b>Telemonitoring &amp; Non-telemonitoring</b>
Outpatient Cost Sample (N)	578,538	306,869	80,451
Pharmacy Cost Treatment Effect	41.6***	1.9	60.7***
Pharmacy Cost Standard Error	(6)	(18.7)	(11.8)
Pharmacy Cost Sample (N)	578,538	306,869	80,451

**Note:** The total number of teleservice and non-teleservice clients was 883,407. The total number of telemonitoring and non-telemonitoring service clients was 80,451.

The treatment effect is the estimated cost difference between clients who received a teleservice or a home telemonitoring service as compared to clients who did not receive these services. A negative treatment effect indicates a cost decrease among clients who received a teleservice or a home telemonitoring service as compared to clients who did not receive these services. A positive treatment effect indicates a cost increase among clients who received a teleservice or a home telemonitoring service as compared to clients who did not receive these services.

The standard error of the effect represents the average distance of observed values from estimated values (regression line). The standard error is typically reported in parentheses. If the treatment effect and standard error values are similar in magnitude or if the standard error is greater than the treatment effect, random error cannot be excluded as a cause of the observed differences in cost. If the treatment effect is considerably larger than the standard error, there is likely a non-random difference between observed costs for clients who received a teleservice or a home telemonitoring service, as compared to clients who did not receive these services.

The p-value is a measure of probability that can be used to assess the statistical significance of the treatment effect. A smaller p-value indicates a stronger certainty of the estimated cost difference between the treatment and comparison groups. The p-values are noted in the table with asterisks as follows: \*\*\*  $p < 0.001$ , \*\*  $p < 0.05$ , and \*  $p < 0.1$ .

**Data source:** Analysis and interpretation of results provided by Texas A&M University under contract to HHSC.

**Table 9. Medical and Pharmacy Difference-in-Differences Analysis Using Combined Data from 2015-2018**

<b>Statistic</b>	<b>Child</b>	<b>Blind/Disabled</b>	<b>Telemonitoring &amp; Non-telemonitoring</b>
Total Medical Cost Diff-in-Diff Coefficient	43.9**	274.2***	256.7***
Total Medical Cost Standard Error	(15.9)	(45.2)	(16.8)
Total Medical Cost Sample (N)	578,538	306,869	80,451
Inpatient Cost Diff-in-Diff Coefficient	17.1	276.5***	-4.8
Inpatient Cost Standard Error	(12.5)	(35.9)	(9.7)
Inpatient Cost Treatment Sample (N)	578,538	306,869	80,451
ED Cost Diff-in-Diff Coefficient	19***	-12.6**	-0.9
ED Cost Standard Error	(2.9)	(4.8)	(2.9)
ED Cost Sample (N)	578,538	306,869	80,451
Outpatient Cost Diff-in-Diff Coefficient	27**	-2.4	261.5***
Outpatient Cost Standard Error	(8.7)	(24.8)	(13)

Statistic	Child	Blind/Disabled	Telemonitoring & Non-telemonitoring
Outpatient Cost Sample (N)	578,538	306,869	80,451
Pharmacy Cost Diff-in-Diff Coefficient	25.3***	-11.9	-14.4
Pharmacy Cost Standard Error	(6.9)	(18.1)	(9.5)
Pharmacy Cost Sample (N)	578,538	306,869	80,451

**Note:** The total number of teleservice and non-teleservice clients was 883,407. The total number of telemonitoring and non-telemonitoring service clients was 80,451.

The difference-in-differences coefficient estimates the difference in cost trends for clients in the treatment and comparison groups from the pre-period to the post-period. A negative coefficient indicates a lower change in cost among clients who received a teleservice or a home telemonitoring service as compared to clients who did not receive these services. A positive coefficient indicates an increased change in cost among clients who received a teleservice or a home telemonitoring service as compared to clients who did not receive these services.

The p-value is a measure of probability that can be used to assess the statistical significance of the treatment effect. A smaller p-value indicates a stronger certainty of the estimated cost difference between the treatment and comparison groups. The p-values are noted in the table with asterisks as follows: \*\*\*  $p < 0.001$ , \*\*  $p < 0.05$ , and \*  $p < 0.1$ .

**Data source:** Analysis and interpretation of results provided by Texas A&M University under contract to HHSC.



## **Appendix F. COVID-19 Telemedicine and Telehealth Utilization and Expenditure Trends**

**Table 1. Client utilization trends, January 2020 - May 2020**

<b>Service</b>	<b>Clients</b>	<b>Providers</b>	<b>Services Delivered</b>
<b>Telemedicine</b>	479,731	7,099	1,015,145
<b>Telehealth</b>	110,063	3,226	689,241
<b>Telephonic</b>	21,739	1,105	28,018
<b>Total</b>	<b>553,174</b>	<b>9,825</b>	<b>1,732,404</b>

**Table 2. Expenditure trends, January 2020 – May 2020**

<b>Service</b>	<b>Amount Paid</b>	<b>Average Expenditure per Client</b>	<b>Average Expenditure per Provider</b>
<b>Telemedicine</b>	\$49,916,702	\$104	\$7,032
<b>Telehealth</b>	\$58,627,718	\$533	\$18,174
<b>Telephonic</b>	\$306,269	\$14	\$277
<b>Total</b>	<b>\$108,850,689</b>	<b>\$651</b>	<b>\$25,483</b>

**Table 3. Telemedicine Services, January 2020 – May 2020**

<b>Procedure Code</b>	<b>Description</b>	<b>Instances Billed</b>
<b>99213</b>	Office/Outpatient Visit - Established Client	325,613
<b>99214</b>	Office/Outpatient Visit - Established Client	185,608
<b>Q3014</b>	Patient Site Facility Fee	69,012
<b>99212</b>	Office/Outpatient Visit - Established Client	55,948
<b>T1015</b>	Encounter Visit	49,146
	<b>Total</b>	<b>616,315</b>

**Table 4. Telehealth Services, January 2020 – May 2020**

<b>Procedure Code</b>	<b>Description</b>	<b>Instances Billed</b>
<b>92507</b>	Speech-Language Pathology Services	223,394
<b>97530</b>	Therapeutic Activities, 15 Minutes	82,880
<b>T1017</b>	Targeted Case Management	65,002

Procedure Code	Description	Instances Billed
<b>H2014</b>	Skills Training, 15 Minutes	49,733
<b>90837</b>	Psychotherapy	46,601
<b>T1027</b>	Specialized Skills Training	40,796
<b>Total</b>		<b>508,406</b>

**Table 5. Telephonic Services, January 2020 – May 2020**

Procedure Code	Description	Instances Billed
<b>99441</b>	Telephonic Evaluation and Management Service with an Established Patient; 5-10 minutes	5,924
<b>99442</b>	Telephonic Evaluation and Management Service with an Established Patient; 11-20 minutes	12,679
<b>99443</b>	Telephonic Evaluation and Management Service with an Established Patient; 21-30 minutes	9,415
<b>Total</b>		<b>28,018</b>

**Note:** Full procedure code descriptions are withheld due to American Medical Association (AMA) copyright.

**Data source:** Claims and encounter data provided by HHSC Center for Analytics and Decision Support.