



Trends in Medicaid and CHIP Telehealth, 2019-2021

Part II: Medicaid and CHIP Telehealth Utilization

Trends by Enrollee and Provider Rurality

During the pandemic period, telehealth utilization increased among both urban and rural enrollees in Medicaid, with urban enrollees sustaining greater gains in telehealth utilization at the end of 2021.

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KEY POINTS

- From 2019-2021, telehealth utilization peaked during the second quarter (April to June) of 2020 for both urban and rural Medicaid and CHIP enrollees, reaching levels of 34.7 million and 7.3 million services delivered via telehealth, respectively. This represents substantial growth in utilization from prior periods. For example, both urban and rural enrollees used under 1 million services delivered via telehealth per quarter in 2019.
- In 2020, for both urban and rural enrollees, telehealth represented 7 percent of total Medicaid and CHIP service utilization, compared to less than 0.5 percent in 2019. Telehealth utilization declined between 2020 and 2021 but remained well above 2019 levels. Between 2020 and 2021, rural enrollees decreased utilization by 9 percent, while urban enrollees increased utilization by 2 percent.
- At the end of 2021, rural enrollees were using half as many services delivered via telehealth as they had been in the second quarter of 2020. Urban enrollees reduced utilization by 41 percent. Nearly identical rates of reduction were observed for Medicaid telehealth utilization provided by rural providers compared to urban providers. Stratifying rural and urban areas by primary care Health Professional Shortage Area (HPSA) status did not yield meaningful differences.

INTRODUCTION

This Issue Brief is the second in a series examining trends in Medicaid and Children’s Health Insurance Program (CHIP) telehealth utilization before and during the COVID-19 public health emergency (PHE). In the first Issue Brief, published in August 2024, ASPE found the number of services delivered to Medicaid enrollees via telehealth increased substantially from 2019-2021, with the largest increases occurring among Asian, Black, and Hispanic Medicaid enrollees, as well as enrollees ages 0-18 years.¹

State Medicaid and CHIP programs have broad flexibility in designing the parameters of telehealth delivery, including options to determine whether or not to utilize telehealth, covered service types, where in the state telehealth can be utilized, how it is implemented, what types of providers can deliver services via telehealth, and reimbursement rates.² Prior to the COVID-19 pandemic and the PHE, many states had incorporated coverage of telehealth in their Medicaid programs.³ Medicaid enrollees in rural areas used telehealth more often than urban enrollees; a 2017 study found that rural Medicaid enrollees were estimated to be 17 times more likely to use telehealth than Medicaid enrollees living in large metropolitan areas.⁴

States generally have flexibility to cover Medicaid services delivered via telehealth and during the PHE, they were granted additional, temporary flexibilities related to telehealth, including flexibilities related to provider licensing, which expanded providers' ability to provide services via telehealth in states other than that in which they were licensed.⁵ A prior ASPE analysis of Household Pulse Survey data indicated that in 2021 and 2022 Medicaid enrollees had the highest rate of telehealth utilization out of all health insurance coverage groups and were 1.4 times more likely to use telehealth than privately insured individuals.⁶

State discretion to flexibly design Medicaid telehealth policies has led to wide geographic and temporal variation in Medicaid policies around which provider types are able to deliver services via telehealth and whether and how they will be reimbursed depending on the service type provided.⁵ The variations in states' telehealth coverage and reimbursement policies were augmented with the additional federal telehealth flexibilities made available during the COVID-19 PHE and states' subsequent rollbacks or permanent adoption of these telehealth flexibilities. It is important to examine how telehealth utilization varied before, during, and after these policy changes were implemented and the trends for both providers and enrollees as states continue to use telehealth to ensure access to care post-PHE. Importantly, differences in state policies may have disproportionately impacted individuals depending on their ability to readily access health care. Less than a fifth of Medicaid enrollees reside in rural areas,⁷ but Medicaid and CHIP cover a higher proportion of children and adults living in rural counties compared to urban counties (47 percent of children living in rural counties vs. 40 percent in urban counties and 18 percent of adults living in rural counties vs. 15 percent in urban counties).⁸ Further, previous studies have suggested that individuals living in rural areas may face unique barriers to accessing care, such as traveling further for appointments and being more likely to forgo health care because of challenges with transportation.⁹

Using 2019-2021 Medicaid and CHIP claims data, this brief describes patterns of telehealth service utilization based on where enrollees and providers live and work, highlighting trends for rural and urban enrollees and telehealth utilization in geographic HPSAs.

BACKGROUND

Barriers to Access in Rural and Provider Shortage Areas

People living in rural communities in the United States may face multiple barriers to accessing health care. Rural areas, which contain 17 percent of Medicaid enrollees, are more likely to experience health care provider shortages and hospital closures and experience infrastructure limitations and higher poverty rates, the combination of which can significantly increase travel distances and decrease transit options to care.^{5,6,10,11} HPSAs, which are geographic areas, population groups, or health care facilities that are designated by the Health Resources and Services Administration (HRSA) as having a shortage of health professionals,¹² are more common in rural areas. As of September 2024, 66 percent of all primary care medical HPSAs and 62 percent of all mental health HPSAs were located in rural areas.¹³ In this paper, we will focus on primary care geographic HPSAs, not facility-based HPSAs or mental health geographic HPSAs.

Before the COVID-19 pandemic, telehealth was introduced in some state Medicaid programs with the intent to better reach rural enrollees, as the use of technology to deliver certain health care services was thought to overcome some physical and structural barriers like specialist shortages or limited transit options. However, restrictions or ambiguity around who could provide services via telehealth, which service types could be provided via telehealth, and how these services could be delivered electronically, may have limited telehealth uptake in practice. In addition, access to services delivered via telehealth in rural areas may be hindered by limited broadband internet service and limited use of digital technology such as smartphones and tablets.^{14,15} A Federal Communications Commission report from 2021 found that approximately 17 percent of rural residents in the U.S. do not have the benchmark level of broadband coverage, compared to just one percent of urban residents.¹⁶ Recent federal initiatives have sought to improve access to affordable and adequate broadband, but the impacts of these initiatives on improving access to telehealth are yet to be studied.^{17,18,19}

Medicaid Developments in Telehealth Policy During the PHE

During the COVID-19 PHE, federal Medicaid flexibilities for telehealth coverage policies were adopted by many states. Some of these policies were adopted by states temporarily while others were made permanent.²⁰ These telehealth policy changes would have been particularly beneficial in rural communities, given the relatively higher rates of Medicaid coverage in those areas.²¹

In establishing their state Medicaid telehealth policies, states must continue to meet federal requirements related to coverage of a benefit and other applicable federal laws, including federal regulations, as well as the parameters of a state's Medicaid state plan and/or demonstration projects and waivers.²²

Since 2020, states have implemented new or updated existing telehealth policies including, but not limited to, changes to where enrollees and providers can be located for reimbursable telehealth visits (originating sites and distant sites, respectively), reimbursement for audio-only telehealth, and relaxing out-of-state provider restrictions:

- Prior to the COVID-19 pandemic, 21 states allowed patients to access services delivered via telehealth from their homes. By mid-2020, 26 additional states had changed their policy to allow a **patient's home as an originating site** for Medicaid reimbursement for one or more services or providers.²³ By the end of 2021, all 50 states and the District of Columbia had included patient home on the list of originating sites.⁵ However, following the end of the federal PHE, 47 states and the District of Columbia have explicitly included patient home on the list of originating sites, as of fall 2024.²⁴
- As of 2023, 36 states and the District of Columbia explicitly allow **Federally Qualified Health Centers (FQHCs)**, which provide primary care and other health services to underserved areas and populations, to serve as originating sites for telehealth visits, while 37 states and the District of Columbia allow FQHCs to be **distant site** providers (i.e., providers at the FQHC are reimbursed for delivering services via telehealth to Medicaid enrollees located elsewhere).²⁵ Some of these states also added **rural health clinics (RHCs)**, which must be located in a rural area that is also medically underserved or a HPSA, to the list of distant site providers that are allowed to provide telehealth. As of fall 2024, 39 states and the District of Columbia allow FQHCs, RHCs, or both to serve as distant site providers.²⁴
- State coverage of Medicaid services delivered using **audio-only telehealth** has the potential to improve access to those services in areas with low internet connectivity or digital literacy. While audio-only telehealth could be appropriate for some service types, such as behavioral health-related services or prescription refill visits, other services may not be suitable to deliver through this modality (i.e., services that require visual clues and examination).²⁶ Prior to 2020, only nine states had allowed audio-only telehealth;²³ by the end of 2021, 46 states and the District of Columbia were allowing

audio-only telehealth for at least one service or provider type, although some states have since ended this flexibility when their state PHEs ended.⁵

- During the COVID-19 PHE, many states used a Section 1135 waiver to temporarily allow providers to deliver **out-of-state Medicaid services via telehealth**. States also have the option to permanently allow providers to deliver out-of-state Medicaid services via telehealth, for example, through licensure exceptions in certain situations or through the use of interstate compacts (provider licensing agreements across states).^{27,28,29,30}

Despite the emergence of telehealth options during the PHE, access to telehealth in rural communities may not be as prevalent compared to urban areas. Rural and urban differences in access are seen for services delivered via telehealth overall as well as for specific services such as behavioral health visits. A 2021 report from the U.S. Department of Health and Human Services Office of the Inspector General (OIG) summarized two state Medicaid studies that examined associations between access and increased telehealth use for behavioral health visits. These two states reportedly found a positive relationship between telehealth usage and access to behavioral health in rural areas; however, the details of these methods and findings were not made available in the OIG report.³¹

METHODS

The study methodology is the same as in ASPE's prior analysis: *Trends in Medicaid and CHIP Telehealth, 2019-2021 – Part I: Medicaid and CHIP Telehealth Trends by Enrollee Characteristics*.¹ We analyzed data from the Transformed Medicaid Statistical Information System (T-MSIS), which collects Medicaid and CHIP data from U.S. states, territories, and the District of Columbia into the largest national resource of enrollee information. The study period for the series of Medicaid Telehealth Issue Briefs was from calendar years (CYs) 2019 through 2021; this allowed us to look at changes in telehealth utilization for Medicaid enrollees before and during the COVID-19 PHE, stratified by key enrollee- and provider-level characteristics. In this analysis, utilization captures unique services via claims, not unique visits or episodes of care. Therefore, our data tables may capture multiple services that took place during the same visit. Services were categorized as being delivered via telehealth if the claim had at least one telehealth code, details of which can be found in Appendix B of the previous Issue Brief. Otherwise, the service was flagged as being provided in person. Utilization was measured for all child and adult Medicaid and CHIP enrollees living in the 50 states, the District of Columbia, and the two U.S. territories that submitted data to T-MSIS during the study period: Puerto Rico and the Virgin Islands. See the Methodology section and Appendix B of the previous Issue Brief for further details.

To identify an enrollee's or provider's location of residence or work, we used a combination of zip codes and Federal Information Processing Standard (FIPS) county codes as reported in T-MSIS. To delineate urban/rural status, we combined the Office of Management and Budget (OMB) definition of rurality* and HRSA's approach.^{† 32,33} The detailed methodology for assigning urban/rural status can be found in Appendix A.

To identify primary care geographic HPSAs, we use the 2021 Primary Care HPSA Crosswalk from the Centers for Medicare and Medicaid Services (CMS), which is at the zip code level.³⁴

This Issue Brief uses these geographic definitions, geospatial files from the U.S. Census Bureau and HRSA,^{35,36,37} and statistical software (Stata, version 17.0) to create a county map that overlays primary care HPSAs and rural areas in the 50 states, the District of Columbia, Puerto Rico, and the Virgin Islands.

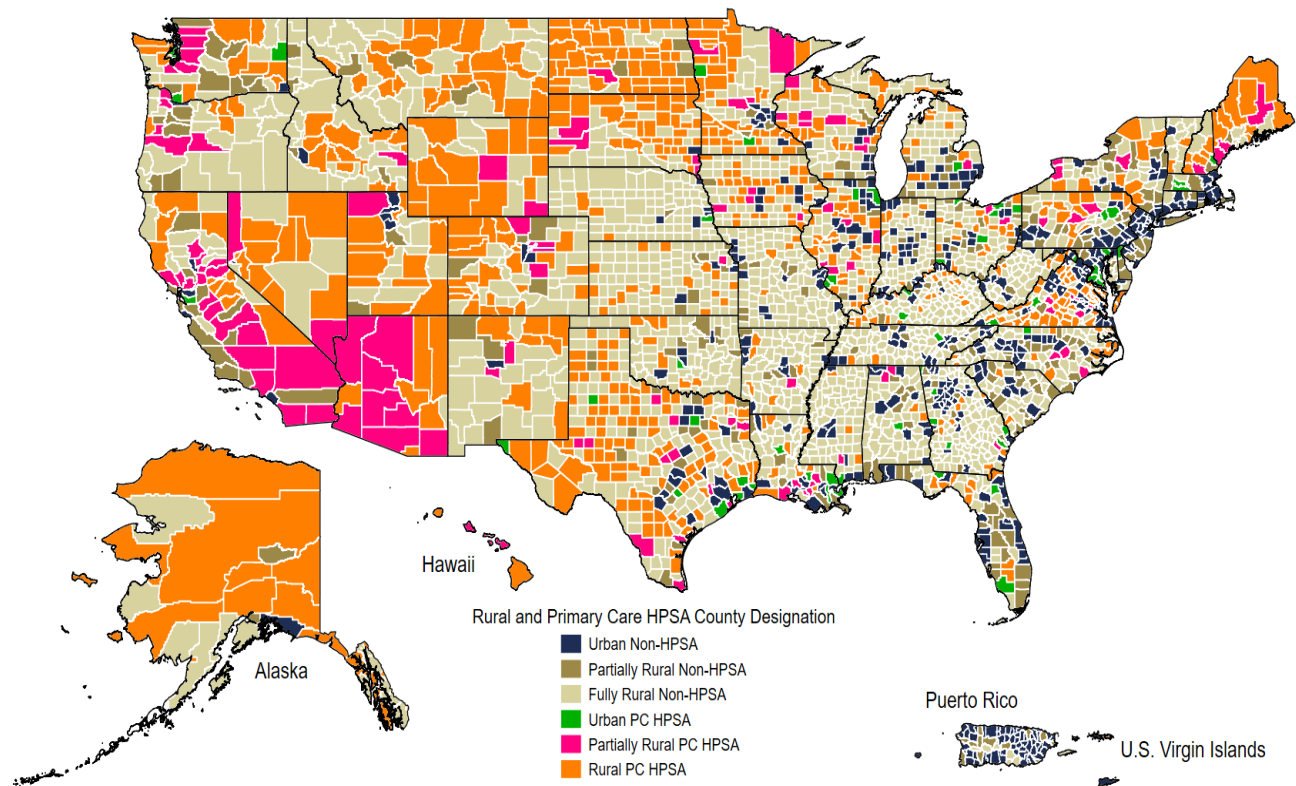
* The OMB definition of rurality uses the Census Bureau's Core-Based Statistical Area (CBSA) values to first classify FIPS counties as metropolitan, micropolitan, or an outlying county; then designates all *non*-metropolitan counties as rural.

† The HRSA approach additionally considers census tracts *within* metropolitan counties with Rural-Urban Commuting Area Codes (RUCA) values of 4-10 as rural. RUCA codes are created by the U.S. Department of Agriculture's Economic Research Service, which creates these codes using U.S. Census data.

FINDINGS

In 2021, 2,267 counties were classified as rural, 413 counties were classified as partially rural, and 554 counties were classified as urban. Among the 2,267 rural counties, 701 (31 percent) were classified as at least partially primary care HPSAs. Among the 413 partially rural counties, 121 (29 percent) were classified as at least partially primary care HPSAs. Among the 554 urban counties, 61 (11 percent) were classified as a primary care HPSA. This count excludes counties or county-equivalents in U.S. territories that did not report data to CMS. As seen in Figure 1, there is a large amount of overlap between rural and primary care HPSA designated areas in the U.S. The following two sections will use these two geographic designations to examine trends in telehealth utilization by where enrollees live and by where providers work, respectively.

Figure 1. Rural and Primary Care Geographic HPSA Designations by County, 2021



Source: Rural county data available from <https://www.hrsa.gov/rural-health/about-us/what-is-rural/data-files>. Primary Care geographic HPSA designations are based on 2021 HRSA data files, available from <https://data.hrsa.gov/data/download>.

Notes: HPSA = Health professional shortage area. Counties designated on the map as Primary Care geographic HPSAs may be either partially or fully designated.

Geographic Trends in Medicaid Telehealth Utilization (2019-2021)

Telehealth Use by Urban vs. Rural Enrollees

Nationally, overall Medicaid telehealth utilization sharply increased between 2019 and 2020 (+2302 percent), with urban enrollees experiencing a larger relative increase (+2719 percent) than rural enrollees (+1278 percent), as shown in Table 1. Between 2020 and 2021, however, these trends diverge for urban and rural Medicaid enrollees. Urban telehealth utilization continued to increase in 2021 by 2 percent, while rural enrollees decreased telehealth utilization by 9 percent.

*Between 2020 and 2021 rural enrollees **decreased** telehealth utilization by **9 percent** while urban enrollees **increased** telehealth utilization by **2 percent**.*

Table 1. Changes in Telehealth Utilization, Overall and by Urban/Rural Enrollee Residence, 2019-2021

	All Enrollees		Rural Enrollees		Urban Enrollees	
Year	Telehealth Share of Total Utilization	Telehealth Share of Total Rural Utilization	Year-to-Year Difference in Rural Telehealth	Telehealth Share of Total Urban Utilization	Year-to-Year Difference in Urban Telehealth	
2019	0.3% (4,893,349)	0.4% (1,417,764)	N/A	0.2% (3,473,989)	N/A	
2020	7.1% (117,530,369)	6.7% (19,540,452)	+1278%	7.2% (97,943,226)	+2719%	
2021	6.3% (117,636,014)	5.5% (17,785,168)	-9%	6.4% (99,812,266)	+2%	

Source: ASPE analysis of T-MSIS claims, 2019-2021

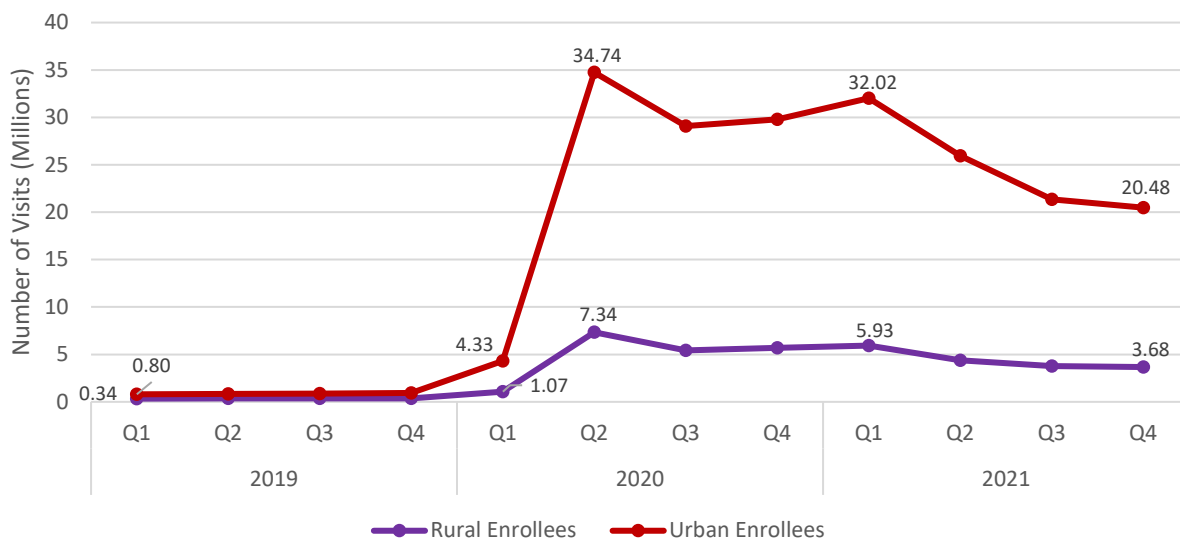
Notes: Table 1 reports utilization for all 50 states and DC, PR, and VI. The denominator used to calculate the share of telehealth is the total number of services delivered via telehealth and in-person provided in that year to that enrollee group (total vs. urban vs. rural).

Despite differences in year-to-year changes, the telehealth share of each group’s total utilization was approximately the same across years for both urban and rural enrollees. In 2020, telehealth represented 7 percent of urban and rural enrollees’ total utilization. Both shares fell by about 1 percentage point in 2021, although the reduction was slightly larger for rural enrollees between 2020 and 2021 than for urban enrollees.

Figure 2 presents quarterly trends in telehealth utilization by urban and rural status. This analysis indicates there was a sharp rise in telehealth utilization between quarter one (Q1) and quarter two (Q2) of 2020, among both urban (+703 percent) and rural (+586 percent) enrollees. Of note, there was a smaller but still sizeable spike in telehealth utilization between quarter four (Q4) 2019 and Q1 2020, which predates when the Medicaid telehealth flexibilities were put in place on March 13, 2020. Over these two quarters, urban enrollees experienced a 356 percent increase, while rural enrollees experienced a 186 percent increase.

By the end of the study period (Q4 2021), urban enrollees had experienced a 41 percent reduction in services delivered via telehealth, compared to Q2 2020 levels (34.7 million to 20.5 million), coinciding with when most states implemented stay at home policies at the beginning of the pandemic. On the other hand, rural enrollees were using *half* (3.7 million) as many of the services delivered via telehealth as they had been using in Q2 2020 (7.3 million).

Figure 2. Quarterly Telehealth Utilization by Enrollee Residence, 2019-2021



Source: ASPE analysis of T-MSIS claims, 2019-2021

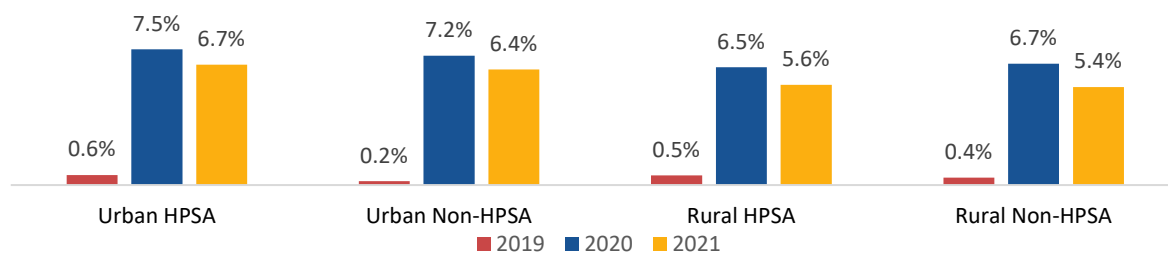
Notes: Figure 2 reports utilization for all 50 states and DC, PR, and VI.

Telehealth Use by Enrollees Living in Primary Care Geographic HPSAs

The majority of primary care geographic HPSA-designated counties (both full and partial) are located in rural areas. This analysis looks at telehealth utilization by primary care geographic HPSA status and by urban or rural status, when relevant. Similar to the year-to-year differences observed for urban vs. rural enrollees in the previous section, all subgroups experienced a sharp increase in relative telehealth utilization between 2019 and 2020, then diverged in 2021. Enrollees that do not reside in geographic HPSAs maintained their telehealth utilization levels in 2021, while enrollees who live in geographic HPSAs reduced utilization by 4 percent between 2020 and 2021. Of note, the 7 percent reduction in telehealth utilization in rural HPSAs is lower than the 9 percent reduction experienced by all rural enrollees over the same time period (see Table 1).

Figure 3 shows the telehealth share of total Medicaid utilization for four groups of enrollees defined by rurality and geographic HPSA status. Just as Figure 2 indicated similar trends for enrollees living in urban and rural areas, the results in Figure 3 indicate that within urban and rural areas, there were similar trends for HPSAs and non-HPSAs. Prior to the pandemic, telehealth accounted for less than 1 percent of utilization for all four categories and was slightly higher in HPSAs compared to non-HPSAs. Within urban and rural areas, HPSAs and non-HPSAs saw similar increases in telehealth use between 2019 and 2020. In urban areas, telehealth utilization as a percentage of all utilization increased by roughly 7 percentage points in both HPSA and non-HPSA areas. In rural areas, the percentage increased by 6 percentage points in HPSAs and by 6.3 percentage points in non-HPSAs. Between 2020 and 2021, the telehealth share of total utilization fell by between 0.8 and 1.3 percentage points for all designations.

Figure 3. Percent of Total Services via Telehealth by Urban/Rural and Primary Care Geographic HPSA Enrollee Residence, 2019-2021



Source: ASPE analysis of T-MSIS claims, 2019-2021

Notes: Figure 3 reports utilization for all 50 states and DC, PR, and VI. The denominator used to calculate each bar percentage is the total number of services delivered via telehealth and in-person provided in that year to that enrollee group (urban vs. rural, HPSA vs. non-HPSA).

Geographic Trends in Telehealth Provision (2019-2021)

Providers in Urban vs. Rural Areas

In 2020, urban providers experienced a larger relative increase (+2492 percent) in service provision via telehealth than rural providers (+1410 percent), as shown in Table 2. However, rural providers offered 7 percent fewer services via telehealth in 2021 compared to 2020 levels, in contrast to urban providers, who offered 2 percent more. This divergence in trends matches the findings on overall telehealth utilization by urban and rural enrollee residence. However, as a proportion of total utilization in each year, telehealth shares remained similar between rural and urban providers, though again, rural providers experienced a slightly larger reduction than urban providers.

Table 2. Changes in Telehealth Provision, Overall and by Urban/Rural Providers, 2019-2021

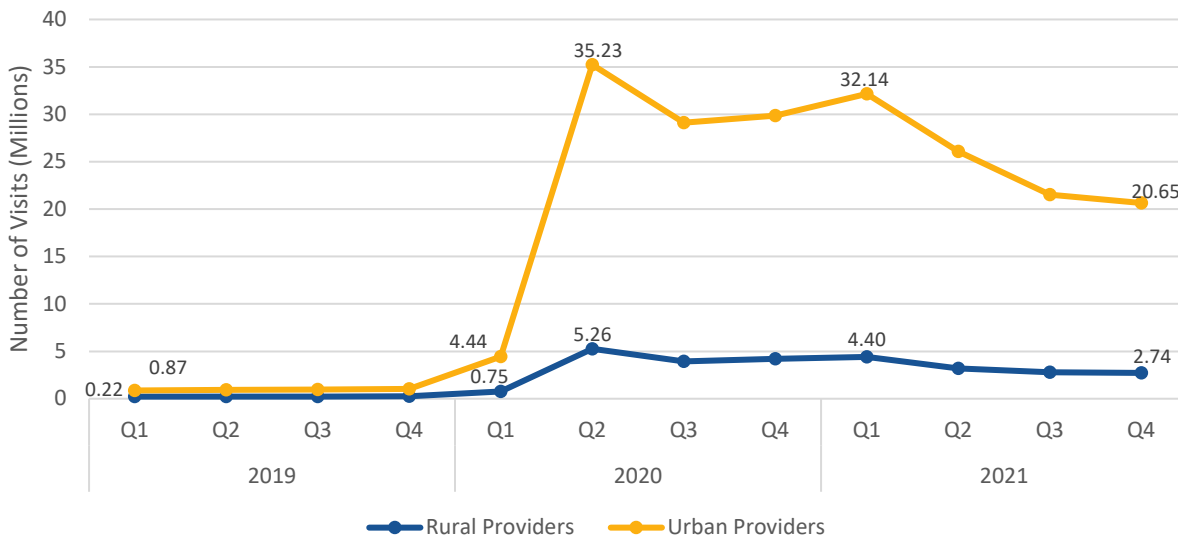
Year	All Providers		Rural Providers	Urban Providers	
	Telehealth Share of Total Utilization	Telehealth Share of Total Services from Rural Providers	Year-to-Year Difference in Telehealth with Rural Providers	Telehealth Share of Total Services from Urban Providers	Year-to-Year Difference in Telehealth with Urban Providers
2019	0.3% (4,893,349)	0.4% (937,833)	N/A	0.3% (3,805,044)	N/A
2020	7.1% (117,530,369)	7.2% (14,164,790)	+1410%	7.6% (98,641,848)	+2492%
2021	6.3% (117,636,014)	5.9% (13,137,531)	-7%	6.7% (100,377,192)	+2%

Source: ASPE analysis of T-MSIS claims, 2019-2021

Notes: Table 2 reports utilization for all 50 states and DC, PR, and VI. The denominator used to calculate the share of telehealth is the total number of services delivered via telehealth and in-person provided in that year by that provider group (total vs. urban vs. rural).

Examining quarterly trends in telehealth provision shows that there was a sharp increase between Q1 and Q2 of 2020 for both urban providers (+694 percent) and rural providers (+597 percent) (Figure 4). By the end of the study period (Q4 2021), urban providers’ provision of telehealth decreased by 41 percent from Q2 2020 levels. Meanwhile, rural providers’ provision of telehealth was only half (-48 percent) of Q2 2020 levels. These decreases roughly mirror the reductions observed in telehealth utilization by rural *enrollees* during this time (as shown in Figure 2).

Figure 4. Quarterly Telehealth Provision by Urban/Rural Providers, 2019-2021



Source: ASPE analysis of T-MSIS claims, 2019-2021

Notes: Figure 4 reports provision for all 50 states and DC, PR, and VI.

DISCUSSION

Telehealth utilization by Medicaid enrollees peaked for those living in rural areas, urban areas, geographic HPSAs, and outside of geographic HPSAs in the second quarter of 2020, shortly after or when many state stay-at-home orders were put into place. However, differences in the utilization patterns between urban and rural enrollees toward the end of our study period—a year and a half later—call for continued monitoring of telehealth use after the pandemic period. It will be important to assess whether telehealth is used less often by enrollees living in rural areas (shortage area or not) than it was over the pandemic

years (2020-2021), while also monitoring use by urban enrollees (living in shortage areas or not) to see if their use is similar to or different after the pandemic period. Living in primary care geographic shortage areas did not seem to be associated with increased telehealth utilization patterns, although this could be an understated finding as enrollees categorized as not living in a primary care geographic HPSA may live in other types of HPSAs (such as a mental health geographic HPSA), and thus could be experiencing another type of provider shortage.

A lack of availability and affordability of broadband internet services in rural areas, may have contributed to the lower increases seen among rural enrollees compared to urban enrollees during the pandemic period and could inhibit further uptake of telehealth after the pandemic period.^{6,38} As broadband is generally required to utilize *and* provide the audio-video modality of telehealth, this barrier could affect both rural enrollees as well as rural providers. For example, a New York State Department of Health provider survey conducted during the pandemic found that 40 percent of the state’s providers reported a lack of internet connectivity.³⁹ However, more recent federal policy initiatives to help improve access to affordable and adequate broadband, coupled with continued flexibility in how and where telehealth may be provided, may enable rural areas to access telehealth at similar rates to urban areas in 2022 and beyond.^{17,18,19} Monitoring the impact of these policy initiatives to expand broadband access will also be important going forward.

Promoting state coverage and reimbursement of services delivered via audio-only telehealth, when medically appropriate, may also especially benefit rural enrollees. While many states temporarily covered and reimbursed for Medicaid services provided under audio-only telehealth during the PHE, as of September 2023, 43 states and the District of Columbia continue to offer this flexibility for at least some services, and some states have recently passed new audio-only legislation to make this flexibility permanent.⁴⁰ For example, Florida expanded the legal definition of “telehealth” to include audio-only services and Utah required its state Medicaid program to reimburse for audio-only services.⁴¹

Additionally, people who have low digital or technology literacy levels may need additional supports to take full advantage of services delivered via telehealth, especially as broadband internet connectivity improves over time.⁴²

CONCLUSION

State Medicaid programs used telehealth prior to the COVID-19 pandemic to increase access to services. During the COVID-19 PHE, Medicaid and CHIP enrollees and providers substantially increased their use of telehealth, regardless of whether they lived in urban or rural areas; however, urban enrollees and providers sustained greater gains in telehealth utilization toward the end of the study period. However, the federal PHE ended in May 2023, bringing an end to some Medicaid telehealth flexibilities. As a result, the availability of telehealth decreased post-PHE in states that did not make their Medicaid telehealth policies permanent. The use of telehealth in the Medicaid and CHIP programs warrants continued examination into how this flexibility is used by providers and enrollees, in both urban and rural areas, beyond the study period which ended in 2021.

The next brief in the series will look at telehealth utilization for pediatric enrollees in Medicaid and CHIP.

APPENDIX A: Rural/Urban Designation

- First, we identify an enrollee’s FIPS code using the county code variable in T-MSIS. We crosswalk FIPS code to a single CBSA value (Metropolitan Statistical Area, Micropolitan Statistical Area, or outlying county) using the Census Bureau Delineation Files from March 2020 (“List 1, Core based statistical areas (CBSAs), metropolitan divisions, and combined statistical areas (CSAs)”).
 - For enrollees with missing FIPS codes, we use a ZIP-FIPS crosswalk to map ZIP codes to FIPS codes, then identify the corresponding CBSA value.
- Second, we identify an enrollee’s rural-urban commuting area (RUCA) code using the 2010 ZIP-RUCA crosswalk from the USDA’s Economic Research Service (updated on August 17, 2020).
- Third, we *separately* determine urban/rural status using FIPS-CBSA values and ZIP-RUCA codes.
 - We used the OMB definition to classify CBSA:

Area or County	Rural or Not Rural
Metropolitan area (urban core of 50,000 or more people)	Not rural
Micropolitan area (urban core of 10,000-49,999 people)	Rural
Counties outside of Metro or Micro areas	Rural

Notes: OMB definition found at <https://www.hrsa.gov/rural-health/about-us/what-is-rural>.

- RUCA codes allow us to identify rural census tracts in metropolitan counties and are based on population density, urbanization, and daily commuting patterns. Codes 4-10 are typically considered rural, with some exceptions. These codes are also used by the Federal Office of Rural Health Policy at the Health Resources and Services Administration (HRSA).

RUCA Code	Rural or Not Rural
1 Metropolitan area core: primary flow within an urbanized area (UA)	Not rural
2 Metropolitan area high commuting: primary flow 30% or more to a UA	Not rural
3 Metropolitan area low commuting: primary flow 10% to 30% to a UA	Not rural
4 Micropolitan area core: primary flow within an Urban Cluster of 10,000 to 49,999 (large UC)	Rural
5 Micropolitan high commuting: primary flow 30% or more to a large UC	Rural
6 Micropolitan low commuting: primary flow 10% to 30% to a large UC	Rural
7 Small town core: primary flow within an Urban Cluster of 2,500 to 9,999 (small UC)	Rural
8 Small town high commuting: primary flow 30% or more to a small UC	Rural
9 Small town low commuting: primary flow 10% to 30% to a small UC	Rural
10 Rural areas: primary flow to a tract outside a UA or UC	Rural
99 Not coded: Census tract has zero population and no rural-urban identifier information	Unknown

Notes: RUCA codes found at <https://www.ers.usda.gov/data-products/rural-urban-commuting-area-codes/>.

- Finally, we consolidate the urban/rural definitions from FIPS and RUCA.
 - To consolidate, we assign final status as **Rural** if *either* FIPS or RUCA indicate that.
 - Otherwise, we assign final status as **Urban** if *either* FIPS or RUCA indicate that.
 - All other cases would be flagged as **Unknown**.

Value	CBSA Value	RUCA Value
U	Metropolitan Statistical Area	1, 2, 3
U	Metropolitan Statistical Area	99/Missing
U	Missing	1, 2, 3
R	Metropolitan Statistical Area	4, 5, 6, 7, 8, 9, 10
R	Micropolitan Statistical Area	1, 2, 3
R	Micropolitan Statistical Area	4, 5, 6, 7, 8, 9, 10
R	Micropolitan Statistical Area	99/Missing
R	Missing	4, 5, 6, 7, 8, 9, 10
9	Missing	99/Missing

Notes: CBSA = Core-Based Statistical Area. RUCA = Rural-Urban Commuting Area.

APPENDIX B: STATE DATA QUALITY

Table 1: For analyses related to Enrollee Residence (Urban/Rural):

- The share of telehealth claims with Unknown enrollee location is particularly high in MS and OK, which is consistent with these states' lack of completeness of Type of Bill and Place of Service.

Table 2: For analyses related to Provider Location (Urban/Rural), In-State/Out-of-State, Provider Type:

- The proportion of services delivered via telehealth in 2020 from unknown provider location is particularly high in DE, NE, and TX.

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