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Assessing Telemedicine Utilization by Using Medicaid Claims Data

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Abstract

Objective—This study characterized telemedicine utilization among Medicaid enrollees by patients' demographic characteristics, geographic location, enrollment type, eligibility category, and clinical conditions.

Methods—This study used 2008–2009 Medicaid claims data from 28 states and the District of Columbia to characterize telemedicine claims (indicated by GT for professional fee claims or Q3014 for facility fees) on the basis of patients' demographic characteristics, geographic location, enrollment type, eligibility category, and clinical condition as indicated by *ICD-9* codes. States lacking Medicaid telemedicine reimbursement policies were excluded. Chi-square tests were used to compare telemedicine utilization rates and one-way analysis of variance was used to estimate mean differences in number of telemedicine encounters among subgroups.

Results—A total of 45,233,602 Medicaid enrollees from the 22 states with telemedicine reimbursement policies were included in the study, and .1% were telemedicine users. Individuals ages 45 to 64 (16.4%), whites (11.3%), males (8.5%), rural residents (26.0%), those with managed care plans (7.9%), and those categorized as aged, blind, and disabled (28.1%) were more likely to receive telemedicine ($p<.001$). Nearly 95% of telemedicine claims were associated with a behavioral health diagnosis, of which over 50% were for bipolar disorder and attention-deficit disorder or attention-deficit hyperactivity disorder (29.3% and 23.4%, respectively). State-level variation was high, ranging from .0 to 59.91 claims per 10,000 enrollees (Arkansas and Arizona, respectively).

Conclusions—Despite the touted potential for telemedicine to improve health care access, actual utilization of telemedicine in Medicaid programs was low. It was predominantly used to treat behavioral health diagnoses. Reimbursement alone is insufficient to support broad utilization for Medicaid enrollees.

Telemedicine has been in use for decades, and its potential to improve health care access and to reduce costs has propelled it into the ongoing health care reform discussion (1,2). Telemedicine has the potential to improve health outcomes for vulnerable populations,

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especially those that lack access to primary care providers and mental health specialists because of geographic isolation and mobility impairments (3). Telepsychiatry is one of the most promising and best-studied applications of telemedicine and might help address behavioral health workforce shortages facing many regions (4–7). Even with rapidly growing evidence supporting telemedicine, its use in Medicare has been historically low, with only about 14,000 beneficiaries having a claim for telemedicine in 2009 (3).

Medicaid is the leading payer for mental health services in the United States, but even when there is a payment source, lack of access to mental health services due to provider shortages is a persistent problem (8). Some states leverage telepsychiatry services to ease emergency department congestion and coordinate mental health services, often preventing expensive inpatient services (9). Telepsychiatry has also been effective in reducing Medicaid costs and the need for psychotropic medication among children with high needs (10). Collaborative care that includes video access to behavioral health specialty providers has the potential to increase access, improve quality, and lower costs, but adoption of the model is limited by the lack of enabling policies, reimbursement options, clinical training and education, and technology at the point of care.

Despite telemedicine's potential to improve access to treatment and the fact that most state Medicaid programs pay for at least some forms or components of telepsychiatry, there has been limited investigation about the extent to which these health care innovations reach underserved populations. In fact, we could find no studies specifically measuring telemedicine utilization in state Medicaid programs across the United States. The purpose of this study was to describe the characteristics of Medicaid patients who had used telemedicine by analyzing Medicaid claims. Patients' demographic characteristics, geographic location, enrollment type, basis of eligibility, and clinical conditions were examined.

METHODS

Data and Study Population

This study used claims data extracted from the 2008 and 2009 Medicaid Analytic Extract files obtained from the Centers for Medicare and Medicaid Services. From the Medicaid personal summary file, we identified individuals ages 0 to 64 residing in Alabama, Arkansas, Arizona, California, Colorado, Connecticut, Florida, Georgia, Illinois, Indiana, Louisiana, Massachusetts, Maryland, Michigan, Mississippi, Missouri, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, Washington, D.C., and Washington. Patients with both Medicare and Medicaid (dual eligible) were excluded. Patients enrolled in fee-for-service or managed care Medicaid for at least one month were included. The rural-urban continuum codes from the Area Health Resources File were used to distinguish individuals residing in big metropolitan, small metropolitan, and nonmetropolitan (rural) areas.

Telemedicine utilization was established by using GT, the Current Procedural Terminology (CPT) modifier indicating a claim for professional services, and Q3014, the Healthcare Common Procedure Coding System (HCPCS) code indicating a claim for the facility fee

(11). Both types of claims could be submitted for the same encounter, and state Medicaid plans varied in their reimbursement rates for both types of claims. Telemedicine utilization rates and encounter rates were calculated on the basis of total number of Medicaid enrollees. An initial frequency analysis showed that a number of states in the 2008 data set had zero claims for telemedicine, an indication that the state did not reimburse for this service. To make sure that we excluded states lacking reimbursement policies for telemedicine, we supplemented the 2008 claims data with the findings of a 2006 study of Medicaid reimbursement policies by Brown (12). States that had no Medicaid policies for telemedicine reimbursement according to the Brown study and no Medicaid claims for telemedicine in the 2008 data were assumed not to have a Medicaid reimbursement policy for telemedicine in 2008 and were excluded from the analysis. States that did not have Medicaid reimbursement policies according to the 2006 study but that had Medicaid telemedicine claims in 2008 were assumed to have adopted a policy between 2006 and 2008 and therefore were included in the study. On the basis of these criteria, 22 states were included in the descriptive analysis: Alabama, Arkansas, Arizona, California, Colorado, Florida, Georgia, Illinois, Indiana, Louisiana, Michigan, Missouri, North Carolina, New Mexico, New York, Oklahoma, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, and Washington.

Statistical Analysis

We collected descriptive statistics to characterize the sample by telemedicine records, demographic covariates, *ICD-9* codes, and state-level variation in telemedicine encounters. Chi-square tests were used to compare telemedicine utilization rates and one-way analysis of variance was utilized to estimate differences in mean number of telemedicine encounters among subgroups of Medicaid enrollees. All analyses were performed by using SAS, version 9.3.

RESULTS

Demographic Characteristics and Telemedicine Utilization

Table 1 describes the demographic characteristics of the study population. Table 2 shows differences in both telemedicine utilization rates and average number of telemedicine encounters across subgroups. Five times as many enrollees lived in metropolitan areas compared with rural areas, but individuals living in the rural areas were 17 times more likely to receive telemedicine services compared with individuals in the big metropolitan areas. Similarly, although a small proportion of enrollees qualified for Medicaid on the basis of the aged, blind, and disabled eligibility category, they were four and six times more likely than enrollees in the adult and child categories, respectively, to receive health care services via telemedicine. The results showed significant racial and ethnic disparities, with white enrollees two times as likely as African-American and Hispanic enrollees and 16 times as likely as Asian patients to receive services via telemedicine.

Common Diagnoses

Table 3 lists the top 20 *ICD-9* codes for which telemedicine was used. The top 20 diagnosis codes accounted for 95% of all telemedicine claims. Nearly 93% of telemedicine encounters were for treatment of behavioral health diagnoses. The two diagnosis codes used most

frequently in telemedicine claims, bipolar disorder and attention-deficit disorder (ADD) or attention-deficit hyperactivity disorder (ADHD), accounted for just over 50% of all telemedicine claims (29.3% and 23.4%, respectively).

State-Level Variation

Table 4 shows the number of Medicaid enrollees who received telemedicine services by state. These claims showed high levels of variation of telemedicine utilization. In seven states (Arizona, Missouri, New Mexico, North Carolina, Oklahoma, Tennessee, and Texas), more than ten per 10,000 enrollees had a telemedicine encounter. In the remaining 15 states, fewer than ten per 10,000 enrollees received telemedicine services.

DISCUSSION

The results of this descriptive analysis raise a number of important issues warranting further discussion and research. Most significant, the current findings show that in 2008–2009, telemedicine was predominantly used in the Medicaid population to treat mental health conditions, specifically bipolar disorder and ADD or ADHD. According to the media, professional organizations, and the scientific literature, telemedicine is used for a number of primary care, emergency, and specialty conditions, yet these findings show otherwise (13–15). Neufeld and Doarn's (16) analysis of 2012 Medicare claims found a similar—yet less extreme—proportion, with mental health professional fees accounting for 70% of total expenditures for telemedicine.

The disproportionate use of telemedicine for behavioral health services in the Medicaid program may have a number of explanations. First, the overall prevalence of mental health conditions is considerably higher in the Medicaid population than in the general population, in large part because of the social determinants of mental health and also because prior to enactment of the Affordable Care Act, most adult Medicaid enrollees were required to meet categorical eligibility criteria based on a disability (17). Second, the level of sophistication of the technology needed to provide mental health treatment via telemedicine is minimal compared with other telemedicine applications. In many cases, a mental health encounter can be conducted with a Webcam and a secure Internet connection, whereas treatment of general medical ailments, such as otitis media or heart disease, requires specialized equipment that is more costly and less widely available. Third, reimbursement policies in some states may incentivize the use of telemedicine for mental health services. For example, telemedicine mental health services are almost universally covered by Medicaid programs, whereas many other services are explicitly excluded for delivery via telemedicine (18). Conversely, some state-level policies disincentivize the use of telemedicine for mental health. In some states, only psychiatrists and psychologists are eligible for reimbursement, whereas licensed therapists, social workers, and counselors, who are often reimbursed for providing these services in person, are not paid for services delivered via telemedicine (18).

A striking profile emerged of the patient who was most likely to receive telemedicine services: a white male, age 45 to 64, who lives in a rural area with a managed care plan and who is eligible for Medicaid in the category of aged, blind, and disabled. This profile warrants further research because of some of the limitations of this study, including the

overrepresentation of claims from a small number of states and the likely impact of confounding variables. The rural-urban disparity was likely due to a characterization of telemedicine as a solution to rural provider shortages, even though Medicaid enrollees living in urban areas face similar access issues, especially those in need of mental health providers.

Underutilization in urban areas may also align with Medicare reimbursement policies—whereas Medicare restricts reimbursement for telemedicine to nonmetropolitan statistical areas and health professional shortage areas, most state Medicaid policies do not make this distinction and reimburse for services provided in both urban and rural areas (18). A recent study by Neufeld and colleagues (19) found a substantial increase in Medicare utilization of telemedicine in Illinois following the expansion of the state's Medicaid telemedicine reimbursement policy. Thus this relationship may go both ways—Medicare policies may also drive Medicaid utilization patterns. Further research is needed to test this hypothesis.

As was observed in this study, racial and ethnic disparities have been found in the use of new lifesaving innovations (20). However, the racial and ethnic variation found here was likely confounded by the urban-rural disparity. In contrast, telemedicine utilization was high for people with disabilities compared with the overall study population, which may indicate benefits of this technology for people with mobility impairments. Further research is needed to better understand the diffusion of telemedicine across diverse racial and ethnic populations and people with disabilities.

The results of this study highlight the chasm between the robust public discourse surrounding telemedicine policies and actual utilization of the services. When Medicare reimbursement of telemedicine became effective in 1999, expectations were high. Congress expected expenditures for telemedicine to reach at least $60 million in the first year, but only 301 encounters occurred and actual expenditures reached only $20,000 (16). Since then, Medicare reimbursement policies for telemedicine have been in flux, with some loosening of the geographic, provider, and CPT code limitations. Despite nearly 15 years of reimbursement, the low utilization rates for telemedicine persist even in the Medicare population. Neufeld and Doarn's (16) analysis found only $5 million in total Medicare telemedicine expenditures in 2012, and the authors characterized the current state of nationwide utilization as merely "a pilot study." Furthermore, as demonstrated by the lack of telemedicine claims in Arkansas despite a Medicaid reimbursement policy, state reimbursement practices may lag behind policy adoption for a number of reasons, including the possibility that no claims for telemedicine were submitted, claims were submitted but issues with third-party payers prevented payment, or the billing codes were not open or active despite the state policy. It is also possible that the state developed unique telemedicine modifier codes that were not picked up in this analysis, which only flagged the GT modifier and the Q3014 HCPCS code. On a more promising note, Adler-Milstein and colleagues (21) found that 42% of U.S. hospitals surveyed in 2012 by the American Hospital Association reported telehealth adoption. However, self-reported adoption may not directly correlate with utilization.

The low utilization of telemedicine by Medicaid providers and high level of variability among states in use of telemedicine demonstrate that reimbursement alone is insufficient to

advance clinical practice. There are many obstacles (for example, legal, financial, cultural, and professional obstacles) to implementation of telemedicine services. Payment for services is a major step, but governments cannot simply reimburse their way to clinical practice changes. Best practices, clinical guidelines, education and training, and established practice networks may help bridge the gap between policy and practice. Ultimately, expansion of telemedicine requires further research into the impact of state-specific reimbursement and licensure policies on telemedicine utilization (22,23). Examination of how financial incentives affect the development of telemedicine services is needed, particularly the use of different fee structures for aspects of telemedicine. For example, the facility fees paid to presenting sites where the patient is located are typically much lower than the professional or service fees paid to distant sites where the provider is located. Nominal facility fees fail to cover the costs incurred by presenting sites, such as appointment scheduling and providing staff to serve as “presenters” of the patient to the distant provider during the telemedicine encounter. Without appropriate payment, potential presenting sites may decline to enter the telemedicine market, resulting in a limited patient supply. In addition, further research is needed to evaluate return on investment and to distinguish between short-term policy impacts versus long-term cost savings and improved health outcomes.

This study had all of the known limitations of claims-based health services research. There was also the potential that use of telemedicine was underestimated because of the use of the GT and Q3014 modifier codes to identify telemedicine services. Some states may have established state-specific procedure codes or modifiers that were not picked up in our analysis. In addition, issues with third-party intermediaries may require providers to submit claims without the telemedicine-specific modifiers in order to receive reimbursement, which may also have resulted in underestimation. The high level of state variation potentially skewed the results by overrepresentation of states with more telemedicine claims. For example, nearly one-third of the cases analyzed were accounted for by Arizona alone, and nearly two-thirds were accounted for by the addition of North Carolina, Texas, and Tennessee. Therefore, the patient profile that emerged from the data may have been confounded by geographic and state-level characteristics associated with this imbalance of claims. Finally, there is some indication that providers may be utilizing telemedicine without reimbursement, especially for facility fees and for patients in HMOs or other capitated-payment plans (24).

CONCLUSIONS

Telemedicine has tremendous potential to decrease access barriers for underserved communities and is the subject of much policy and practice debate, yet actual utilization of telemedicine in Medicaid programs in this study was low. The overwhelming majority of Medicaid telemedicine claims were for behavioral health treatments, a pattern similar to one seen in the Medicare program. Public policies that support the expansion of telemedicine services are needed, and further research is needed to determine how specific policies affect utilization. However, public policies alone are insufficient to maximize the potential of telemedicine. Best practices, clinical guidelines, education and training, and established practice networks will all be needed to support the clinical implementation of telemedicine services.

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TABLE 1

Characteristics of 45,233,602 Medicaid enrollees from 22 states with Medicaid reimbursement policies for telemedicine, 2008–2009

Characteristic	N	%
Age group		
0–17	26,468,457	58.5
18–29	9,481,838	21.0
30–44	5,744,289	12.7
45–64	3,539,018	7.8
Race-ethnicity		
White	15,865,496	35.1
African American	10,326,600	22.8
Hispanic	12,126,252	26.8
Asian	1,262,520	2.8
Other	5,652,734	12.5
Sex		
Female	26,546,428	58.7
Male	18,687,174	41.3
Metropolitan area		
Big	25,327,087	56.0
Small	13,139,042	29.0
Rural	6,767,473	15.0
Plan type		
Fee for service	24,598,506	54.4
Managed care	20,635,096	45.6
Basis of eligibility		
Aged, blind, and disabled	4,399,586	9.7
Child	26,474,807	58.5
Adult	14,154,536	31.3
Unknown	74,201	.2
Not eligible	130,472	.3
Telemedicine utilization		
Yes	33,329	.1
No	45,200,273	99.9

TABLE 2

Utilization of telemedicine among 45,233,602 Medicaid enrollees from 22 states with Medicaid reimbursement policies for telemedicine, 2008–2009, by enrollee characteristic

Characteristic	N	Telemedicine utilization rate[a]	p	Telemedicine encounter rate[b]	p
Total	45,233,602	7.4		28.7	
Age group			<.001		<.001
0–17	26,468,457	5.9		22.7	
18–29	9,481,838	5.8		22.7	
30–44	5,744,289	11.1		44.8	
45–64	3,539,018	16.4		63.6	
Race-ethnicity			<.001		<.001
White	15,865,496	11.3		45.8	
African American	10,326,600	4.8		17.7	
Hispanic	12,126,252	5.8		19.9	
Asian	1,262,520	.7		2.5	
Other	5,652,734	5.9		25.4	
Sex			<.001		<.001
Female	26,546,428	6.6		24.9	
Male	18,687,174	8.5		34.1	
Metropolitan area			<.001		<.001
Big	25,327,087	1.5		7.9	
Small	13,139,042	9.0		29.1	
Rural	6,767,473	26.0		105.9	
Plan type			<.001		<.001
Fee for service	24,598,506	6.9		27.7	
Managed care	20,635,096	7.9		29.9	
Enrollment type			<.001		<.001
Aged, blind, and disabled	4,399,586	28.1		108.0	
Child	26,474,807	4.6		16.8	
Adult	14,106,159	6.2		26.5	
Unknown	74,201	2.4		7.3	

Characteristic	N	Telemedicine utilization rate[a]	p	Telemedicine encounter rate[b]	p
Not eligible	130,472	3.8		29.5	

[a] Rate of utilization per 10,000 enrollees

[b] Mean encounters per 10,000 enrollees per year

TABLE 3

Diagnosis codes for 101,769 claims for telemedicine among Medicaid enrollees from 22 states with Medicaid reimbursement policies for telemedicine, 2008–2009

Rank	*ICD*–9 code	Diagnosis	N	%
1	296	Bipolar disorder	29,821	29.3
2	314	ADD or ADHD[a]	23,801	23.4
3	295	Schizophrenia	7,319	7.2
4	309	Adjustment disorder	6,258	6.1
5	304	Opioid dependence	5,262	5.2
6	300	Anxiety	4,774	4.7
7	313	Overanxious disorder	4,719	4.6
8	311	Depressive disorder	4,515	4.4
9	312	Undersocialized conduct disorder	3,462	3.4
10	299	Autistic disorder	2,145	2.1
11	298	Depressive-type psychosis	1,269	1.2
12–20	305, 303, 293, 250, 995, V61, 692, 706, and 307	Nondependent alcohol abuse, acute alcohol intoxication, delirium, diabetes mellitus, other anaphylactic reaction, family disruption, contact dermatitis, acne varioliformis, and adult onset fluency disorder	4,204	<1%

[a]Attention-deficit disorder or attention-deficit hyperactivity disorder

TABLE 4

Telemedicine encounters among 45,233,602 Medicaid enrollees in 22 states with Medicaid reimbursement policies for telemedicine, 2008–2009

State	Enrollees with telemedicine	Total enrollees	Rate per 10,000 enrollees
AL	16	807,169	.20
AR	0	702,405	.00
AZ	10,186	1,700,127	59.91
CA	1,546	10,281,450	1.50
CO	__[a]	640,333	.02
FL	131	3,006,115	.44
GA	930	1,772,430	5.25
IL	145	2,505,678	.58
IN	196	1,115,029	1.76
LA	17	1,147,169	.15
MI	407	1,988,566	2.05
MO	2,021	1,014,956	19.91
NC	5,484	1,711,760	32.04
NM	1,933	578,972	33.39
NY	98	4,465,999	.22
OK	1,292	814,332	15.87
PA	17	2,094,261	.08
SC	263	880,921	2.99
TN	3,193	1,415,199	22.56
TX	4,507	4,502,026	10.01
VA	830	900,531	9.22
WA	116	1,188,174	.98
Total	33,329	45,233,602	7.37

[a]Actual number was not reported to preserve patient privacy.