Nationwide Use of Telehealth Among Commercially Insured Individuals 2007–2017

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INTRODUCTION

While the potential benefits of telehealth have been long recognized,^{1,2} uptake had been gradual over time until COVID-19^{3,4}. Given current provider and payer commitments, expanded telehealth is likely to persist beyond the pandemic.^{5,6} However, despite some evidence about aggregate trends in telehealth visits,^{3,4} little is known about the characteristics of patients who have historically received telehealth services. Given that certain drivers of post-pandemic telehealth use will be similar to those that existed prior to the pandemic, insight about pre-pandemic trends can provide important context and reference points for telehealth use after the pandemic.

METHODS

We analyzed 2007–2017 data from Truven® MarketScan, a national database of over 40 million individuals with commercial employer-sponsored insurance through approximately 100 insurers.

We assessed telehealth services using the GT modifier (indicating use of an interactive audio and video telecommunication system) to Current Procedural Terminology codes 99201–99205 (new patient visits), 99211–99215 (return patient visits), and 99241–99245 (consultant visits). We evaluated demographic data, urban (metropolitan service area) vs. non-urban setting, site of service, insurance type, and the number of telehealth visits in each year. Site of service was categorized as (1) outpatient, (2) community mental health centers, (3) urgent care, and (4) other. Consistent with prior work evaluating insurance type by deductible amount and managed care status, we categorized insurance type as (1) consumer driven health plans (CDHP) and high deductible health plans (HDHP); (2) health maintenance organization (HMO), point of service (POS), and POS with capitation plans; and (3) preferred provider organization (PPO), exclusive provider organization (EPO), and comprehensive plans.

We used Kruskal-Wallis tests to compare continuous variables. Statistical tests were two-tailed and considered significant at $\alpha=0.05$. Analyses were performed in SAS, Version 9.4. Institutional review board approval was not obtained given the completely de-identified nature of study data.

RESULTS

Our sample consisted of 47,911 patients receiving 80,360 telehealth visits between 2007 and 2017 (averaging 1.7 visits per patient). The mean age was 37.6 years and 57% of patients were female. Forty-two percent of patients lived in the South, with fewer in the Midwest (25%), West (22%), and Northeast (6%). Most visits occurred in the outpatient setting (86%). The majority of patients were covered by PPO, EPO, or comprehensive plans (66%).

Telehealth use increased from 321 patients and 859 total telehealth visits in 2007 to 14,031 patients and 22,927 visits in 2017 (Table 1). The average number of visits per patient decreased from 2.7 in 2007 to 1.6 in 2017 ($p=0.29$). Utilization varied by gender, with differences more pronounced in the latter half of the study period. The age of patients receiving telehealth services decreased over the study period from 39.5 years to 34.7 years ($p<0.001$).

Patients living in urban settings received the minority of telehealth services early in the study period, but this trend reversed from 2014 to 2017. Telehealth visits occurred predominantly in the outpatient setting, though the total percentage of visits in that setting decreased over time. Telehealth use increased across all insurance types (Table 2). This trend was most pronounced among individuals covered under CDHP or HDHP plans, with an increase from 7 to 3455 patients receiving telehealth services from 2007 to 2017.

DISCUSSION

To our knowledge, this is the first long-term description of patients receiving telehealth visits through commercial insurance. It demonstrated that telehealth visits were relatively uncommon and occurred most commonly in the outpatient setting, with increases over time and a trend toward urban settings, younger individuals and those insured through CDHP and HDHP plans. Insight about use by geographic region can help identify areas for greater telehealth investment, while information about insurance type is particularly salient given

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Table 1 Telehealth Services and Patient Demographics

Year	Patients receiving telehealth services	Number visits per patient	Mean age	Geography				Urban ¹ N (%)		Outpatient ²	Community mental health center	Urgent care	Other ³
				Midwest	North-east	South	West	Urban ¹ N (%)					
2007	321	2.7	39.5	171	10	134	4	129 (40.2)	858	0	0	1	
2008	458	1.6	37.6	243	8	120	55	104 (22.7)	733	0	0	1	
2009	707	1.5	38.9	325	13	248	76	188 (26.6)	1083	2	0	5	
2010	1590	1.9	41.4	220	46	1154	164	1094 (68.8)	2996	1	0	20	
2011	2187	1.8	39	433	46	515	309	547 (25.0)	3859	1	0	13	
2012	1585	1.5	38.2	495	50	658	323	554 (34.9)	2351	1	0	9	
2013	3638	1.8	35.2	1045	126	1381	918	1756 (48.3)	6076	312	4	292	
2014	6382	1.9	35.3	1563	198	2379	1974	3445 (54.0)	10,602	746	0	0	
2015	7655	1.5	35.2	1575	349	2868	2850	5613 (73.3)	8521	609	1	2630	
2016	9357	1.6	34.9	2404	741	4583	1615	6732 (71.9)	13,285	738	89	1117	
2017	14031	1.6	34.7	3447	1070	5975	2359	9438 (67.3)	18,677	538	536	3176	
Total	47,911	1.7	37.6	11,921	2657	20,015	14,031	29,600 (61.8)	69,041	2948	630	7741	

¹Urban geography defined by Metropolitan Service Area (MSA) which are regions containing at least one urban area with > 50,000 residents²Outpatient settings include office and hospital-based outpatient, federally qualified health centers, rural health clinics³The “other” category included all other sites of services, the most common of which were inpatient psychiatric facility (797 total services), school (540 total services), and patient home (454 total services). The category also included 3417 services coded in underlying data as “other/unknown” and 1793 services coded as “telehealth” with unclear site of service

Table 2 Coverage Types of Patients Receiving Telehealth Services

Plan*	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
CDHP, HDHP	7	21	24	40	51	99	362	1013	1884	2907	3455	9863
PPO, comprehensive, EPO	282	406	604	1430	1941	1333	2841	4822	3901	5399	8528	31,487
HMOs, POS, POS with cap	28	19	41	107	150	126	354	447	1698	961	1954	5885

*Coverage data missing for 1% (n=676) of patients during the study period

the disruption the pandemic has caused to employer-sponsored insurance and policymaker plans to reform national insurance coverage. Study limitations included descriptive design and focus on commercially insured individuals. We lacked important patient-level data including race/ethnicity and provider-level data (e.g., primary vs. specialty care) that are potentially associated with telehealth utilization. Telehealth utilization was also low early in the study period, and both absolute and relative growth in use should be assessed contextually in future work using other sources (e.g., clinical data). Nonetheless, our findings suggest areas for additional work and provide important insight that policy and practice leaders can use to implement telehealth amid and after the pandemic.

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Declarations:

Conflict of Interest: Dr. Liao reports receiving personal fees from Kaiser Permanente Washington Health Research Institute; textbook royalties from Wolters Kluwer; and honoraria from Wolters Kluwer, the American College of Physicians, and the Journal of Clinical Pathways, all outside the submitted work. Dr. Marcotte, Dr. Reddy, and Ms. Zhou report no disclosures.

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