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## Telemedicine Use During the COVID-19 Pandemic by Office-based Physicians and Long-term Care Providers

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### Abstract

*Objective*—This report examines telemedicine use by office-based physicians and long-term care providers in the United States, stratified by electronic health record use and by provider or practice size. Further, it examines differences in telemedicine use before and after the COVID-19 pandemic onset among office-based physicians and assesses telemedicine use during the first year of the COVID-19 pandemic for long-term care providers.

*Methods*—Nationally representative estimates in this report are derived from data collected in the 2019 and 2021 National Electronic Health Records Survey, which assesses characteristics of office-based physicians, and the 2020 National Post-acute and Long-term Care Study, which assesses characteristics of adult day services centers and residential care communities. Measures include telemedicine using audio with video or web videoconference for patient care, electronic health record use for more than accounting or billing purposes, and size of physician practices and long-term care providers.

*Results*—In 2021, 80.5% of physicians in office-based settings used telemedicine for patient care, up from 16.0% in 2019. In 2020, 20.5% of adult day services centers and 44.5% of residential care communities used telemedicine to care for users with COVID-19. Office-based physicians, adult day services centers, and residential care communities that used electronic health record systems were more likely to also use telemedicine compared with those not using electronic health records. Large practices and providers were more likely to use telemedicine compared with small practices and providers.

*Conclusion*—Findings from this report describe telemedicine use among office-based physicians and long-term care providers. Practices and providers that used electronic health records and were larger were more likely to also use telemedicine for patient care during the COVID-19 pandemic.

**Keywords:** Physician offices • electronic health records (EHRs) • telehealth • National Electronic Health Records Survey (NEHRS) • National Post-acute and Long-term Care Study (NPALS)

### Introduction

The use of telemedicine has increased in recent years, and the COVID-19 pandemic sped the adoption and use of telemedicine in the United States. Not only were concerns for patient, provider, and community safety driving the need for more virtual consults due to COVID-19 (1–3), but U.S. legislation also changed to allow expanded coverage of and reimbursement for telemedicine visits (4). Research has shown large increases in the use of telemedicine after the onset of the COVID-19 pandemic. An assessment of a large healthcare database showed that telemedicine claims as a percentage of all medical claims increased from 0.2% in 2019 to 15.4% in 2020 (5). Another study from four large telemedicine providers showed a 50% increase in telemedicine visits in the first 3 months of 2020 compared with the same period in 2019, with the largest increases occurring in March 2020 (6). Other studies have shown increases in telemedicine visits among specific patient populations (7–11) and in specific settings, including primary care settings (10), mental health and substance use disorder treatment facilities (12), and health centers (13). While rates of telemedicine use have decreased since the

early pandemic, they remain higher than prepandemic rates (14,15).

Long-term care providers also experienced changes in their provision of services to participants during the COVID-19 pandemic. In response to stay-at-home orders and social distancing requirements, the federal government and many states expanded their definitions of service provision and their funding sources to include telehealth in home- and community-based long-term services and support settings, such as adult day services centers (ADSC) and residential care communities (RCC) (4,16,17). This expansion allowed ADSCs and RCCs to continue to provide or arrange their usual services via telehealth, including socialization (for example, stretching, games, arts and crafts, and other group activities) and monitoring the health and well-being of their participants or residents (for example, assessing health needs, food and supplies, medications, and arranging in-home or in-room appointments and deliveries).

Limited descriptive estimates of telemedicine use during the COVID-19 pandemic have been published using data from physician offices and long-term care providers. Findings show that the percentage of physicians using telemedicine increased from 43% before the COVID-19 pandemic to 88% after the pandemic onset (18) and that nearly 40% of RCCs (19) and 17% of ADSCs (20) were using telemedicine for participants with COVID-19 in 2020 and 2021.

Telehealth tools are increasingly being integrated into electronic health record (EHR) systems, although this has proven challenging in some settings (21,22). Additionally, research has shown that the size of various healthcare settings is associated with the adoption of digital technologies (23), including EHR systems (24,25). Findings on the impact of setting size on telemedicine adoption have been mixed (26,27). This report provides nationally representative estimates of telemedicine use during the COVID-19 pandemic at office-based physician and long-term care settings by EHR status and by size of physician offices, ADSCs, and RCCs.

## Methods

Data for this report come from two surveys administered by the National Center for Health Statistics (NCHS): the National Electronic Health Records Survey (NEHRS) and the National Post-acute and Long-term Care Study (NPALS). NEHRS is a survey of physicians practicing in non-federally employed, office-based settings in the United States, who are not in specialties of anesthesiology, pathology, or radiology. NEHRS can be used to assess EHR implementation, challenges with adoption, and capabilities of systems used in physician offices (28). In 2019 and 2021, 1,524 and 1,875 office-based physicians participated in NEHRS, representing unweighted response rates of 41% and 47%, respectively.

NPALS is a biennial survey of RCCs and ADSCs in the United States and includes an assessment of service provision and characteristics of these long-term care providers, and characteristics of RCC residents and ADSC participants (29). In 2020, 1,780 ADSCs and 4,312 RCCs responded to the NPALS survey, representing unweighted response rates of 43% and 49%, respectively.

Telemedicine use measurement differs in NEHRS and NPALS analyses. In NEHRS, telemedicine use is defined as physicians responding that their office(s) used “telemedicine technology (for example, audio with video or web videoconference) for patient visits.” This report uses data from the 2019 and 2021 NEHRS to assess COVID-19 pandemic-related changes in telemedicine use at physician offices. In 2021, NEHRS added a question about physicians’ use of audio-only technology for patient visits after Centers for Medicare & Medicaid Services guidelines were amended to allow for reimbursement of audio-only visits (4). However, to allow for comparisons in telemedicine use between the 2019 and 2021 NEHRS, physicians who reported that their office solely used audio-only telemedicine tools did not meet the definition of telemedicine use in this analysis. Descriptive national estimates of audio-only telemedicine use by office-based physicians in 2021 are available on the NCHS website (30).

In NPALS, telemedicine use was not assessed before the COVID-19 pandemic. After the onset of the pandemic, NCHS adapted the 2020 NPALS to include questions about the use of telemedicine related to COVID-19. Specifically, telemedicine use by long-term care providers is defined using the following question: “Since January 2020, did this RCC/ADSC use telemedicine or telehealth (for example, audio with video or web videoconference) to assess, diagnose, monitor, or treat residents/participants with presumptive positive or confirmed COVID-19 infection?” The 2020 NPALS asked long-term care providers about the use of audio-only calls for participant care related to COVID-19. However, to allow for more similar definitions of telemedicine between NPALS and NEHRS in this report, providers who only used audio-only calls for participant care did not meet the definition of telemedicine for these analyses. Descriptive national estimates of the use of audio-only calls by long-term care providers are available on the NCHS website (19,20).

NEHRS and NPALS both assessed EHR use. In the 2019 and 2021 NEHRS, physicians were asked if the office where they saw the most patients used an EHR system beyond a billing record system. In the 2020 NPALS, ADSCs and RCCs were asked if they used EHRs other than for accounting or billing purposes. Practice or provider size measures differed for each setting. Practice size in NEHRS is categorized as small (1–3 physicians), medium (4–10 physicians), or large (11 physicians or more). Provider size of ADSCs is categorized by the maximum allowable number of participants at the center at a given time as small (1–25 participants), medium (26–50 participants), or large (51 participants or more); provider size of RCCs is categorized by the total number of beds as small (4–25 beds), medium (26–50 beds), or large (51 beds or more).

Estimates from NEHRS are physician level, while estimates from NPALS are provider level. Both surveys include respondent weights that account for their complex sampling design, which are used to produce nationally representative estimates. For these analyses, completed

surveys in both NEHRS and NPALS with missing or unknown values for telemedicine use (1.9% of NEHRS physicians, 14.8% of NPALS ADSCs, and 13.0% of NPALS RCCs) were excluded from all analyses. Among completed surveys with complete telemedicine use values, those with missing or unknown values for EHR status (1.0% of NEHRS physicians, 0.4% of NPALS ADSCs, and 0.5% of NPALS RCCs) and healthcare setting size (0.1% of NEHRS physicians, 0.9% of NPALS ADSCs, and 0.0% of NPALS RCCs), were excluded only from relevant analyses.

Statistical significance between estimates was assessed using two-tailed *t* tests at the  $p < 0.05$  level. Unweighted sample sizes, weighted percentages, weighted 95% Korn–Graubard confidence intervals, and *p* values are shown. All estimates were assessed for reliability using NCHS data presentation standards for proportions (31). Analyses were conducted in SAS-callable SUDAAN version 11.0 (32) to account for the complex sampling designs of both NEHRS and NPALS.

## Results

### Physician telemedicine use

The percentage of physicians responding that their office used telemedicine with video for patient visits increased from 16.0% in 2019 to 80.5% in 2021 (Table 1). Most physicians practiced at offices that used EHRs in 2019 (90.6%) and 2021 (89.5%). A higher percentage of physicians practiced at small offices in 2019 and 2021 (44.6% and 46.5%, respectively) compared with medium (30.4% and 28.2%, respectively) and large offices (25.0% and 25.3%, respectively).

Physicians at offices that used EHRs were more likely to use telemedicine with video for patient care in 2019 (17.3%) compared with physicians at offices that did not use EHRs (4.0%; this estimate did not meet NCHS standards for reliability of proportions) (Figure 1, Table 2). Similarly, in 2021, physicians at offices that used EHRs were more likely to use telemedicine compared with those that did not use EHRs (83.2% compared with 59.1%, respectively). In both 2019 and 2021, a higher percentage of physicians at

large offices used telemedicine (32.8% and 91.1%, respectively) compared with physicians in small offices (9.2% and 69.8%, respectively;  $p < 0.001$  for both comparisons). Despite a similar percentage of physicians using telemedicine for patient care in medium and small offices in 2019 (12.2% compared with 9.2%, respectively;  $p = 0.327$ ), a higher percentage of physicians in medium offices used telemedicine for patient care in 2021 compared with physicians in small offices (88.6% compared with 69.8%, respectively;  $p < 0.001$ ). For all subgroups of physicians assessed, the percentage using telemedicine with video for patient care increased from 2019 to 2021.

### Long-term care provider telemedicine use

In 2020, 20.5% of ADSCs and 44.5% of RCCs used telemedicine with video for COVID-19 care (Table 3). Additionally, 28.6% of ADSCs and 40.2% of RCCs reported using EHRs in 2020. A higher percentage of ADSCs were classified as medium (31.4%) and large providers (51.6%) compared with small providers (17.0%), while a higher percentage of RCCs were classified as small providers (58.9%) compared with medium (13.7%) and large providers (27.4%).

ADSCs that used EHRs were more likely to use telemedicine with video for COVID-19 care compared with ADSCs that did not use EHRs (34.8% compared with 14.6%, respectively;  $p < 0.001$ ) (Figure 2, Table 4). Similarly, RCCs that used EHRs were more likely to use telemedicine with video for COVID-19 care compared with RCCs that did not use EHRs (57.4% compared with 36.3%, respectively;  $p < 0.001$ ). A higher percentage of large ADSCs used telemedicine with video compared with small ADSCs (27.8% compared with 11.4%, respectively;  $p < 0.001$ ); the percentage of medium and small ADSCs that used telemedicine for COVID-19 care did not significantly differ (13.7% compared with 11.4%, respectively;  $p = 0.230$ ). A higher percentage of large and medium RCCs used telemedicine with video for COVID-19 care (59.5% and 51.3%, respectively) compared with small RCCs (36.0%;  $p < 0.001$  for both comparisons).

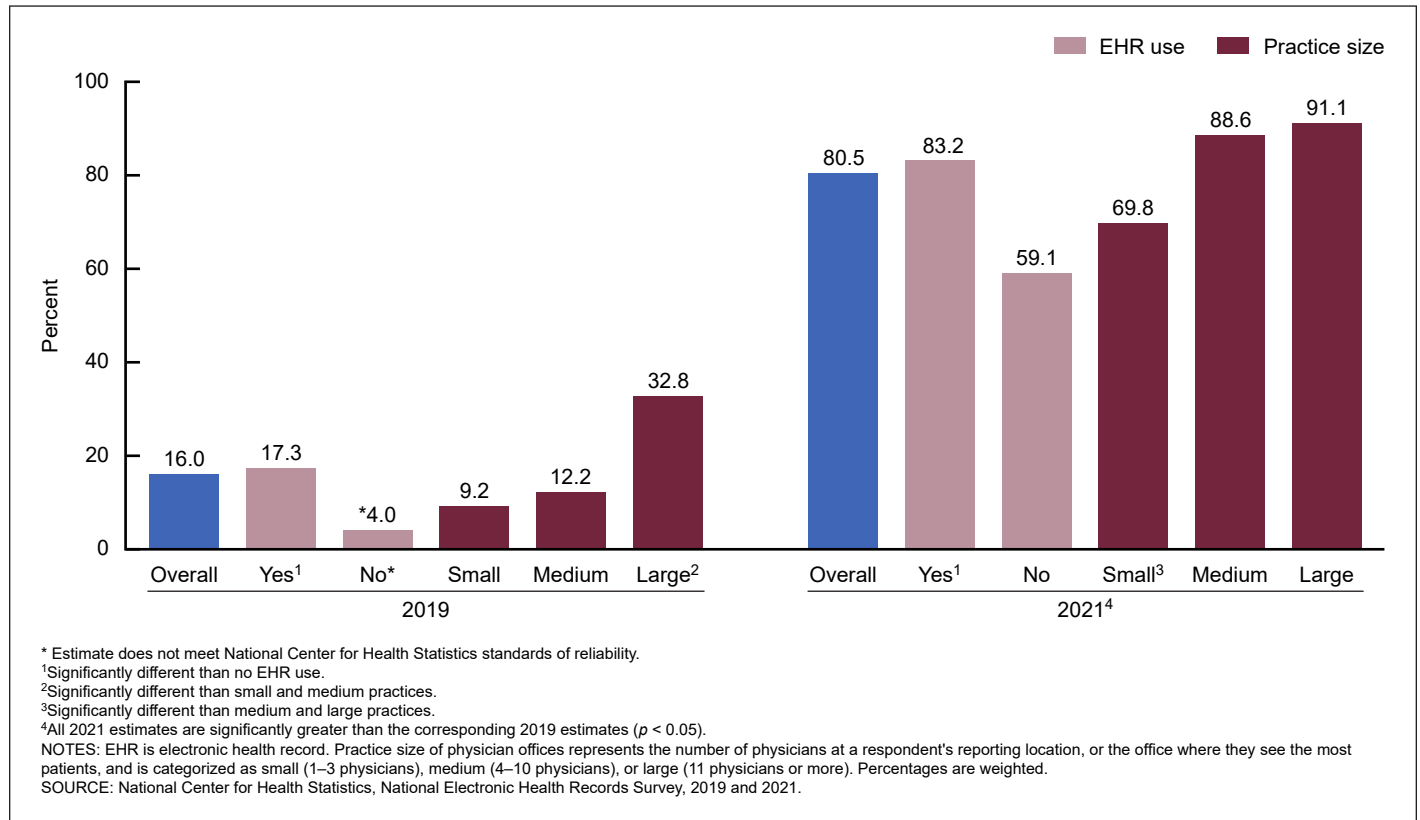
## Discussion

This report describes the use of telemedicine with video for providing care in both physician offices and long-term care settings in the United States during the COVID-19 pandemic, and it assesses changes in telemedicine use by office-based physicians before and after the pandemic onset. In 2021, four out of five physicians worked at offices that used telemedicine with video for patient care, which was a significant increase from prepandemic levels, with less than one out of five physicians using telemedicine in 2019. Other NCHS data have shown similarly high use of telemedicine for patient care in physician offices during the early COVID-19 pandemic (18,33). The increase in telemedicine use by office-based physicians from 2019 to 2021 is consistent with other reports that have shown significant increases in the use of telemedicine in various settings and among various patient populations from before compared with after the COVID-19 pandemic onset (5–13).

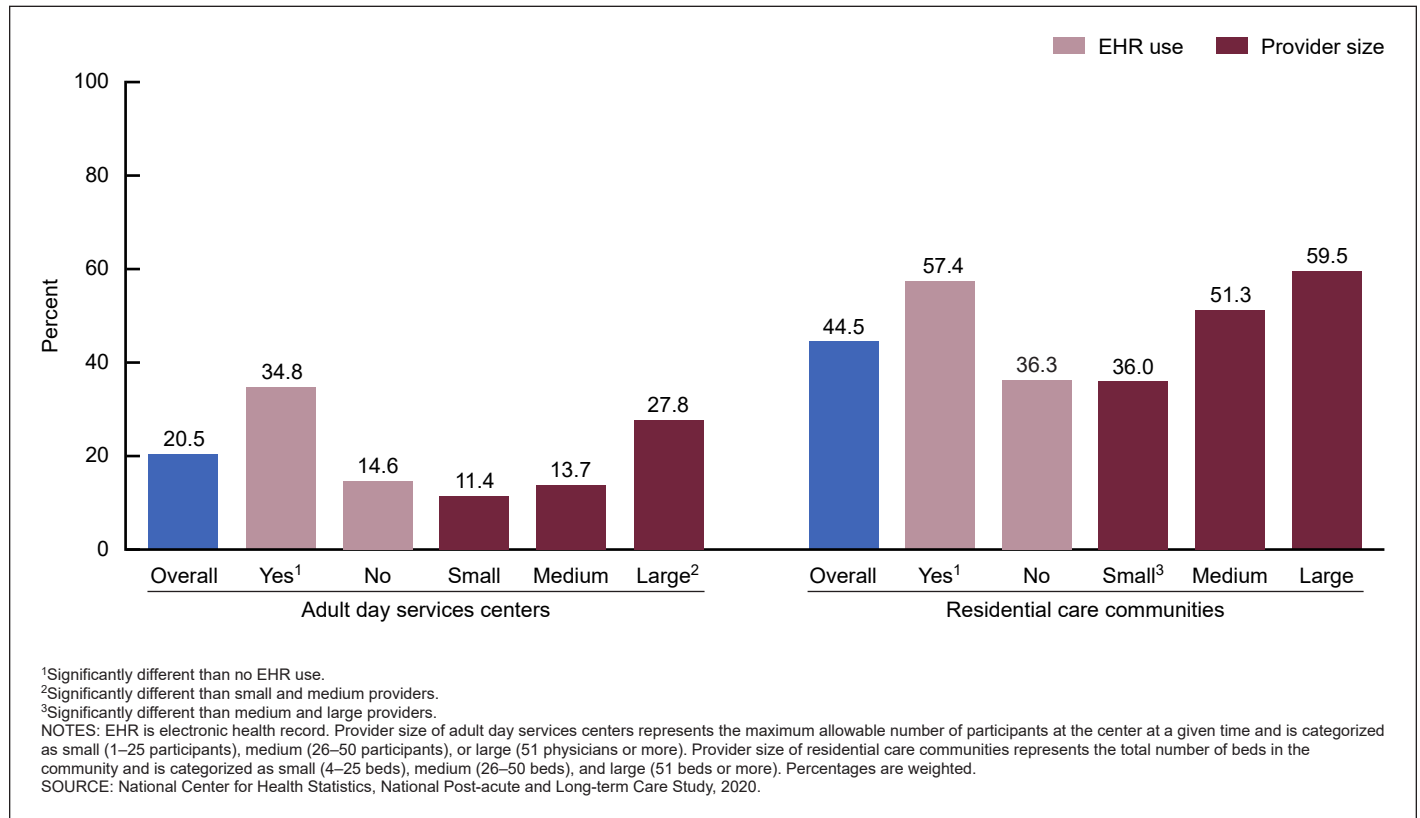
In 2020, about one in five ADSCs and two in five RCCs used telemedicine with video to provide COVID-19-related care. Many ADSCs temporarily closed or served participants virtually or offsite during the COVID-19 pandemic (20), while RCCs may have restricted visitors and provider visits (19), so that use of telemedicine may have been necessary for continuity of services. However, long-term care providers may have been less likely to use telemedicine for COVID-19 care because their users may have had underlying challenges, such as hearing or visual impairments or lack of technological knowledge that prevented them from effectively using telemedicine technology (34). Other work has summarized barriers at the institutional level and provided recommendations for increasing telemedicine use in long-term care settings (35).

This research also found that EHR use was associated with telemedicine use; office-based physicians and long-term care providers that used EHRs were more likely to also use telemedicine. This finding could be expected given the increased integration of telemedicine into EHR systems

**Figure 1. Percentage of physicians in office-based settings that used telemedicine with video for patient care, overall and by selected characteristics: United States, 2019 and 2021**



**Figure 2. Percentage of long-term care providers that used telemedicine with video to care for users with COVID-19, overall and by selected characteristics: United States, 2020**





(21,22). Healthcare setting size was also associated with telemedicine use for providing care, as larger physician offices and long-term care providers were more likely to use telemedicine compared with smaller settings. Research has identified many barriers to the adoption of telemedicine, including cost, resistance to change, challenges in introducing new technology, and characteristics of the patient population (36,37).

A primary strength of this research is its use of multiple surveys to produce nationally representative estimates of telemedicine use at different healthcare settings during the early COVID-19 pandemic. However, findings from this research should be considered within the context of the limitations from each survey and setting. First, the NEHRS findings are limited to non-federally employed, office-based physicians in the United States who are not in the specialties of anesthesiology, pathology, or radiology. Second, although changes in telemedicine use could be assessed among office-based physicians, previous years of NPALS did not collect information on the use of telemedicine before the COVID-19 pandemic, so an assessment of change in telemedicine use over time could not be measured. Additionally, assessments of telemedicine in long-term care settings were limited to telemedicine use for COVID-19 care and do not represent providers' broader use of telemedicine. Lastly, estimates in this analysis for both physician offices and long-term care settings only assessed telemedicine use that involved video technology and did not capture facilities that solely used audio-only technology.

## Summary

This report used two surveys from the National Center for Health Statistics, NEHRS and NPALS, to describe telemedicine use among office-based physicians and long-term care providers before and during the early COVID-19 pandemic. A higher percentage of office-based physicians used telemedicine in 2021 than in 2019. Additionally, office-based physicians and long-term care providers who used EHRs were more likely to use telemedicine for care during

the COVID-19 pandemic compared with those who did not use EHRs.

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**Table 1. Characteristics of physicians in office-based settings, overall: United States, 2019 and 2021**

Characteristic	2019			2021		
	Unweighted number of physicians	Weighted percent (95% confidence interval)	<i>p</i> value	Unweighted number of physicians	Weighted percent (95% confidence interval)	<i>p</i> value
Overall	1,469	100.0 (...)	...	1,866	100.0 (...)	...
Use of telemedicine with video						
Yes <sup>1</sup>	264	16.0 (13.2–19.1)	Reference	1,492	80.5 (77.4–83.4)	Reference
No <sup>2</sup>	1,205	84.0 (80.9–86.8)	Less than 0.001	374	19.5 (16.6–22.6)	Less than 0.001
Electronic health record use						
Yes	1,321	90.6 (88.0–92.7)	Reference	1,688	89.5 (86.8–91.8)	Reference
No	140	9.4 (7.3–12.0)	Less than 0.001	151	10.5 (8.2–13.2)	Less than 0.001
Practice size						
Small	624	44.6 (40.4–48.9)	Reference	795	46.5 (42.9–50.2)	Reference
Medium	449	30.4 (26.7–34.4)	Less than 0.001	557	28.2 (24.9–31.6)	Less than 0.001
Large	394	25.0 (21.6–28.6)	Less than 0.001	514	25.3 (22.2–28.5)	Less than 0.001

... Category not applicable.

<sup>1</sup>The 2021 estimate is significantly greater than the 2019 estimate ( $p < 0.05$ ).

<sup>2</sup>The 2019 estimate is significantly greater than the 2021 estimate ( $p < 0.05$ ).

NOTES: The Korn–Graubard method was used to calculate 95% confidence intervals. Reference is the category to which all other categories in the characteristic are compared. Practice size of physician offices represents the number of physicians at a respondent's reporting location, or the office where they see the most patients, and is categorized as small (1–3 physicians), medium (4–10 physicians), and large (11 physicians or more).

SOURCE: National Center for Health Statistics, National Electronic Health Records Survey, 2019 and 2021.

**Table 2. Percentage of physicians in office-based settings that used telemedicine with video for patient care, overall and by selected characteristics: United States, 2019 and 2021**

Characteristic	Used telemedicine in 2019		Used telemedicine in 2021 <sup>1</sup>	
	Percent (95% confidence interval)	<i>p</i> value	Percent (95% confidence interval)	<i>p</i> value
Overall	16.0 (13.2–19.1)	...	80.5 (77.4–83.4)	...
Electronic health record use				
Yes	17.3 (14.2–20.8)	Reference	83.2 (80.1–86.0)	Reference
No	*4.0 (1.1–9.9)	Less than 0.001	59.1 (45.6–71.6)	Less than 0.001
Practice size				
Small	9.2 (5.9–13.6)	Reference	69.8 (64.3–74.9)	Reference
Medium	12.2 (7.9–17.8)	0.327	88.6 (84.2–92.1)	Less than 0.001
Large	32.8 (25.7–40.6)	Less than 0.001	91.1 (85.7–95.0)	Less than 0.001

... Category not applicable.

\* Estimate does not meet National Center for Health Statistics standards of reliability.

<sup>1</sup>All 2021 estimates are significantly greater than 2019 estimates within a given row ( $p < 0.05$ ).

NOTES: The Korn–Graubard method was used to calculate 95% confidence intervals. Reference is the category to which all other categories in the characteristic are compared. Practice size of physician offices represents the number of physicians at a respondent's reporting location, or the office where they see the most patients, and is categorized as small (1–3 physicians), medium (4–10 physicians), and large (11 or more physicians). Percentages are weighted.

SOURCE: National Center for Health Statistics, National Electronic Health Records Survey, 2019 and 2021.

**Table 3. Characteristics of long-term care providers, overall: United States, 2020**

Characteristic	Adult day services centers			Residential care communities		
	Unweighted number of providers	Weighted percent (95% confidence interval)	<i>p</i> value	Unweighted number of providers	Weighted percent (95% confidence interval)	<i>p</i> value
Overall	1,516	100.0 ...	...	3,750	100.0 ...	...
Use of telemedicine with video for COVID-19 care						
Yes	303	20.5 (18.5–22.6)	Reference	1,770	44.5 (42.2–46.9)	Reference
No	1,213	79.5 (77.4–81.5)	Less than 0.001	1,980	55.5 (53.1–57.9)	Less than 0.001
Electronic health record use						
Yes	441	28.6 (26.9–30.4)	Reference	1,925	40.2 (38.3–42.1)	Reference
No	1,069	71.4 (69.6–73.1)	Less than 0.001	1,808	59.9 (58.0–61.7)	Less than 0.001
Provider size						
Small	278	17.0 (15.2–19.0)	Reference	1,712	58.9 (57.3–60.5)	Reference
Medium	483	31.4 (29.0–33.8)	Less than 0.001	625	13.7 (12.5–14.9)	Less than 0.001
Large	741	51.6 (49.0–54.1)	Less than 0.001	1,413	27.4 (26.0–28.9)	Less than 0.001

... Category not applicable.

NOTES: The Korn–Graubard method was used to calculate 95% confidence intervals. Reference is the category to which all other categories in the characteristic are compared. Provider size of adult day services centers represents the maximum allowable number of participants at the center at a given time and is categorized as small (1–25 participants), medium (26–50 participants), and large (51 participants or more). Provider size of residential care communities represents the total number of beds in the community and is categorized as small (4–25 beds), medium (26–50 beds), and large (51 beds or more).

SOURCE: National Center for Health Statistics, National Post-acute and Long-term Care Study, 2020.

**Table 4. Percentage of long-term care providers that used telemedicine with video to care for users with COVID-19, overall and by selected characteristics: United States, 2020**

Characteristic	Adult day services centers using telemedicine		Residential care communities using telemedicine	
	Percent (95% confidence interval)	<i>p</i> value	Percent (95% confidence interval)	<i>p</i> value
Overall	20.5 (18.5–22.6)	...	44.5 (42.2–46.9)	...
Electronic health record use				
Yes	34.8 (30.3–39.4)	Reference	57.4 (54.2–60.6)	Reference
No	14.6 (12.5–16.9)	Less than 0.001	36.3 (32.9–39.8)	Less than 0.001
Provider size				
Small	11.4 (7.9–15.7)	Reference	36.0 (32.5–39.6)	Reference
Medium	13.7 (10.8–17.1)	0.230	51.3 (45.8–56.7)	Less than 0.001
Large	27.8 (24.6–31.2)	Less than 0.001	59.5 (56.0–62.9)	Less than 0.001

... Category not applicable.

NOTES: The Korn–Graubard method was used to calculate 95% confidence intervals. Reference is the category to which all other categories in the characteristic are compared. Provider size of adult day services centers represents the maximum allowable number of participants at the center at a given time and is categorized as small (1–25 participants), medium (26–50 participants), and large (51 participants or more). Provider size of residential care communities represents the total number of beds in the community and is categorized as small (4–25 beds), medium (26–50 beds), and large (51 beds or more). Percentages are weighted.

SOURCE: National Center for Health Statistics, National Post-acute and Long-term Care Study, 2020.



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