DEPARTMENT OF HEALTH

Mathematica®
Progress Together

Minnesota Study of Telehealth Expansion and Payment Parity

Final Report

November 29, 2023

Arka Ghosh, Elizabeth Greener, Ethan Jacobs, and Alyssa Evans

This page has been left blank for double-sided copying.

Contents

Tables

Figures

Executive Summary

The Health Economics Program at the Minnesota Department of Health (MDH) contracted with Mathematica to evaluate the impact of telehealth expansion and payment parity through the 2021 Minnesota Telehealth Act on the use of health care services covered by private sector health insurance in Minnesota. The Minnesota Telehealth Act codified the expansion of telehealth that began in response to the COVID-19 pandemic and expanded the state's telehealth payment parity requirements to include audio-only visits, with a sunset for the latter provision. This report presents the results of Mathematica's study and implications for telehealth policy.

Research questions

This study answers a series of research questions included in the Minnesota Telehealth Act about the impact of telehealth expansion and payment parity, namely:

- What is the impact of telehealth expansion and payment parity on:
  - access to care, quality of care, and health outcomes?
  - health care disparities and equitable access to care?
- Does audio-only telehealth support equitable access and eliminate barriers to care without worsening outcomes?
- Does increased access to telehealth affect outcomes (for example, inpatient hospitalizations or emergency department [ED] visits) for specific services and populations?
- To what extent are telehealth services:
  - substitutes for an in-person visit?
  - services that were previously not billed or reimbursed?
  - services that are in addition to or duplicative of in-person services?

Data and methods

The primary data source for this study is the Minnesota All Payer Claims Database (MN APCD). In all the analyses, we consider patients with commercial insurance separately from those with Medicare Advantage. The study includes Medicare Advantage patients to address the Minnesota Legislature's directive to assess the impact of telehealth expansion and payment parity on elderly patients. In addition, the MN APCD includes up-to-date Medicare Advantage claims, and Medicare Advantage plans are administered by commercial insurers. For this study, we compared telehealth users to nonusers across two time periods: we compared changes in outcomes between 2019 (before implementation of the Minnesota Telehealth Act) and 2021 (after implementation of the Minnesota Telehealth Act and the onset of the COVID-19 pandemic); and we assess differences in outcomes in 2022 (the most recent year available in the MN APCD).

Key findings

Characteristics of Minnesotans using telehealth services

Patients who used telehealth services following implementation of the Minnesota Telehealth Act differed substantially from those who did not use telehealth in 2021 and 2022, with respect to both their individual characteristics and the characteristics of where they reside—whether commercially insured or insured through Medicare Advantage. Patients who used telehealth were more likely to be at high risk of experiencing adverse outcomes and to have selected comorbidities that included depression, diabetes, hypertension, hypothyroidism, ischemic heart disease, low back pain, and persistent asthma.

With respect to the patients' locales, telehealth use was more common in metropolitan areas, in areas with high broadband access, and in areas with high percentages of Black, Indigenous, People of Color (BIPOC) residents. These findings suggest that telehealth can be used to bypass access issues related to in-person visits and emphasize the importance of supporting the infrastructure of video visits.

Audio-only telehealth

Patients were much less likely to use audio-only telehealth, compared with audio-visual telehealth. However, Medicare Advantage patients used audio-only telehealth at higher rates (measured as the percent of patients with one or more visits per year) than commercially insured patients. About 5 percent of Medicare Advantage patients, compared with less than 2 percent of commercially insured patients, used audio-only visits in 2021 and 2022.

Among both commercially insured and Medicare Advantage patients, use of audio-only telehealth was more common among high-risk patients and among patients with a broad range of comorbidities, as well as among those living in nonmetropolitan and high-poverty areas. Among commercially insured patients, use of audio-only telehealth was also more common if living in an area with low broadband access.

Access to care

Telehealth use was associated with relatively large increases in use of primary care, specialty care, and behavioral health services between 2019 and 2021, among both commercially insured and Medicare Advantage patients. The increase in use of behavioral health visits associated with telehealth was especially marked. Commercially insured patients who used telehealth increased their use of behavioral health services by about 2.5 additional visits per year compared with telehealth nonusers; Medicare Advantage telehealth users increased their use of behavioral health services by nearly 2 visits per year compared with telehealth nonusers.

These increases in service use persisted into the subsequent year. Among both commercially insured and Medicare Advantage patients who used telehealth in 2021, use of ambulatory services was relatively high in 2022.

Telehealth use in 2021 was associated with greater increases in the use of ambulatory visits in both 2021 and 2022 for high-risk patients, those with diabetes, hypertension, and depression, patients in metropolitan areas, and those in areas with high percentages of BIPOC residents.

Use of in-person services

Among commercially insured patients, telehealth in 2021 was associated with a statistically significant relative decrease from 2019 to 2021 in in-person visits for primary care, specialty care, and behavioral health. This pattern suggests that patients were substituting telehealth for at least some in-person visits. Among Medicare Advantage patients, the general decrease in the use of in-person services from 2019 to 2021 was not significantly associated with telehealth use.

Considering subsequent-year effects, telehealth use was significantly associated with higher use of in-person services in 2022 among both Medicare Advantage and commercially insured patients. Despite this association between telehealth and use of in-person services, commercially insured patients as a whole—both telehealth users and non-users—did not increase their use of in-person services over 2022. However, Medicare Advantage patients used slightly more in-person services on average in 2022 than in 2021—suggesting their return to seeking in-person care as the COVID-19 pandemic waned.

Continuity of care

Telehealth use was associated with greater fragmentation of care—alternatively measured by an index (the rBBI) or simply as visits with a usual provider of care—for Medicare Advantage patients, although the magnitude of this change in fragmentation of care is small. In 2022, among Medicare Advantage patients, telehealth use was associated with slightly fewer visits with the patient's usual provider of care as well as slightly greater fragmentation as measured by the rBBI. These same metrics provided inconclusive results for commercially insured patients. In 2022, patients with commercial insurance who had used telehealth in 2021 had fewer visits with their usual provider of care, but fragmentation of care as measured by the rBBI was also lower; these metrics would generally be expected to move in opposite directions.

Telehealth was not associated with substantial differences in continuity of care between 2019 and 2021.

Hospitalizations and emergency department visits for ambulatory care sensitive conditions

Among Medicare Advantage patients, telehealth use in 2021 was associated with increases in hospitalizations and ED visits for ambulatory care sensitive conditions (ACSCs) from 2019 to 2021, and with higher levels of hospitalizations and ED visits for ACSCs in 2022. Hospitalizations and ED visits for ACSCs should be avoidable when patients are receiving high-quality and well-coordinated care. The increases and higher levels of hospitalizations were more pronounced for older patients (75 years and older), high-risk patients, and patients with diabetes and hypertension. The higher level of hospital admissions for ACSCs in 2022 among telehealth users in 2021 was also significantly higher for patients residing in metropolitan areas.

The association between telehealth use and hospitalizations and ED visits for ACSCs among commercially insured patients was smaller in magnitude than for Medicare Advantage patients and not always statistically significant. Telehealth use in 2021 was associated with a relatively small increase in hospitalizations for ACSCs from 2019 to 2021, but not with any changes in ED visits over that same period. Telehealth use in 2021 was associated with higher levels of hospitalizations and ED visits for ACSCs in 2022, although again the difference between telehealth users and nonusers was smaller than among Medicare Advantage patients. The increase in hospitalizations for ACSCs from 2019 to 2021 among

telehealth users in 2021 was significantly higher for patients with diabetes, and the higher level of hospitalizations in 2022 among telehealth users in 2021 was significantly higher for older patients (65 and older), men, and patients with diabetes and hypertension.

These findings should be interpreted with caution, as the statistically significant findings may be driven by confounding factors not captured in the MN APCD claims data, such as patient-level sociodemographic characteristics like race, income, and dual eligibility status. Additional research would be needed to determine whether telehealth use or other unobserved factors are driving the observed positive association between telehealth use and hospital admissions and ED visits for ACSCs.

Follow-up visits after hospitalization or emergency department visits for mental illness

From 2019 to 2021, telehealth use in 2021 was associated with a small but statistically significant increase in follow-up visits after an ED visit for mental illness among commercially insured patients. Over this same period telehealth was not associated with significant differences in follow-up visits after a hospitalization for mental illness among commercially insured patients, nor was telehealth associated with changes in follow-up visits after either a hospitalization or ED visits for mental illness among Medicare Advantage patients.

In 2022, telehealth use in 2021 was associated with a higher likelihood of receiving a follow-up visit after either an inpatient hospitalization or ED visit for mental illness among both commercially insured and Medicare Advantage patients.

Policy implications

Policymakers considering whether to continue supporting the expansion of telehealth and payment parity might consider several findings from this study, if consistent with their broader goals for health care access in Minnesota. In particular:

- Telehealth use appeared to promote greater access to care by potentially underserved populations. Specifically, telehealth use was associated with overall increases and higher rates of use of ambulatory visits (especially behavioral health visits) among high-risk patients, patients with comorbidities, and patients in areas with high concentrations of BIPOC residents. In addition to potentially underserved populations, telehealth use was also associated with overall increases and higher rates of use of ambulatory visits for patients in metropolitan areas. These benefits were more limited among patients in areas with low broadband access, especially among patients in Medicare Advantage.
- Telehealth visits appeared to have substituted in part for in-patient visits, specifically among commercially insured patients. As a result, among these patients, telehealth expansion did not necessarily result in duplicative services or greater care fragmentation. However, Medicare Advantage patients did not appear to use telehealth as a substitute for in-person visits.
- Telehealth use was associated with slightly greater fragmentation of care, specifically among Medicare Advantage patients. However, it is unclear whether this fragmentation was due to duplication of services or whether telehealth users were able to access referrals to primary care physicians (PCPs), specialists, and behavioral health providers that they would not otherwise access.

- Telehealth use was associated with increases and higher levels of hospitalizations and ED visits for ACSCs—hospitalizations and ED visits that should be avoidable when patients are receiving high-quality and well-coordinated care. The unexpected nature of these findings point towards the need for further research with more detailed patient-level data and a more rigorous study design. While the analysis controls for several factors captured in the MN APCD, such as age, sex, comorbidities, and area-level characteristics of the patient's residence, there may be other factors not captured in the claims data but associated with both telehealth use and higher patient need that are driving the increases in hospitalizations and ED visits for ACSCs. For example, claims data do not contain data on patient-level social risk factors that may affect these outcome measures. At the same time, it is possible that telehealth use does not provide the appropriate level of care or adversely affects care coordination among more clinically and socially vulnerable patients, resulting in worse outcomes. However, the analysis in this report is insufficient to disentangle the contribution of telehealth use versus unobserved factors in driving this finding. Additional research—for example, a randomized study—would be needed to determine whether telehealth use, another factor, or a combination of factors is driving the increases in potentially avoidable hospitalizations and ED visits.
- Telehealth use was associated with slightly but significantly higher rates of follow-up visits following a hospitalization or ED visit for mental illness in 2022, both among commercially insured and Medicare Advantage patients, suggesting that telehealth users were more likely to receive follow-up care than patients not using telehealth.
- While overall use of audio-only services was low, audio-only telehealth may be an important resource for potentially vulnerable populations. Specifically, use was highest among patients who were older, higher-risk, or lived in areas with low broadband connectivity. Such patients might otherwise find it challenging to access in-person care due to age, illnesses, and mobility challenges, and might be unable to use audio-visual telehealth due to low broadband access or low levels of digital literacy.

This page has been left blank for double-sided copying.

I. Introduction

The Health Economics Program at the Minnesota Department of Health (MDH) contracted with Mathematica to assess the impact of telehealth expansion and payment parity under the 2021 Minnesota Telehealth Act on the use of health care services covered by private health insurance in Minnesota. To address the Minnesota Legislature's directive to assess the impact of telehealth expansion and payment parity on elderly patients, the study defines private insurance to include Medicare Advantage plans, which are offered by commercial insurers, but the study excludes Medicare Fee-for-Service patients.

The 2021 Minnesota Telehealth Act codified the expansion of telehealth that began in response to the COVID-19 pandemic. It also expanded the state's telehealth payment parity requirements to include telephone-only visits, with a sunset on this provision on June 30, 2025.

The study addresses a series of research questions included in the Minnesota Telehealth Act about the impact of telehealth expansion and payment parity, namely:

- What is the impact of telehealth expansion and payment parity on:
  - access to care, quality of care, and health outcomes?
  - health care disparities and equitable access to care?
- Does audio-only telehealth support equitable access and eliminate barriers to care without worsening outcomes?
- Does increased access to telehealth affect outcomes (for example, inpatient hospitalizations or emergency department [ED] visits) for specific services and populations?
- To what extent are telehealth services:
  - substitutes for an in-person visit?
  - services that were previously not billed or reimbursed?
  - services that are in addition to or duplicative of in-person services?

The analyses focus on the following topics:

- **Access to care.** Did telehealth expansion result in increased access to services (as measured by utilization of services), specifically for primary care, specialist, and behavioral health visits?
- **Use of in-person care.** Compared with telehealth nonusers, did telehealth users change their use of in-person services after the telehealth expansion?
- **Continuity of care.** Compared with the care telehealth nonusers received, was telehealth use associated with obtaining care from a stable and consistent group of providers over time?
- **Quality of care.** Compared with telehealth nonusers, did telehealth users have higher or lower rates of hospitalizations or ED visits for ambulatory care sensitive conditions (ACSCs)? Did they have higher or lower rates of follow-up visits following a hospitalization or ED visit for mental illness?
- **Use of audio-only telehealth.** Was audio-only telehealth associated with increased access to care, use of in-person care, continuity of care, and/or quality of care?

For each analysis, we present the results based on patients' insurance coverage (commercial or Medicare Advantage) and other patient and area characteristics. The results include regression-adjusted estimates to control for patient and area-level characteristics that might correlate with telehealth use and outcomes.

II. Data and Methods

A. Methodological approach

To examine the impact of telehealth use on outcomes of interest, we conducted two types of analyses: (1) a regression-adjusted difference-in-differences (DD) analysis examining changes in outcomes from 2019 to 2021 between cohorts of 2021 telehealth users and nonusers, respectively; and (2) a cross-sectional analysis examining differences in outcomes in 2022 among telehealth users versus nonusers in 2021. We conducted all analyses separately for commercially insured and Medicare Advantage patients.

1. Difference-in-differences analysis: 2019 and 2021

We used regression-adjusted DD analysis to compare changes in outcomes over time for telehealth users and nonusers in 2021. For each outcome, we examined baseline differences in means between telehealth users and nonusers in 2019—before the Minnesota Telehealth Act was enacted and before the COVID-19 pandemic began—and compared those to the differences in means for the same patients in 2021. By regression-adjusting the means, we determined whether changes in average outcomes between telehealth users and nonusers are significant after adjusting for any differences in other patient and area characteristics. We also conducted subgroup analyses to examine differential impacts of telehealth use on selected outcomes by patient and area characteristics (see Section F below for details).

The analytic sample for this study comes from the Minnesota All Payer Claims Database (MN APCD). We extracted the data using a stepwise process applied separately to individuals who (1) had commercial or Medicare Advantage insurance coverage, (2) resided in Minnesota, (3) were enrolled in either commercial or Medicare Advantage insurance coverage for at least three months, (4) had at least one insurance claim in both study years (2019 and 2021), and (5) had data on each of the patient and area characteristics used as control variables in regressions. The final study sample included 787,018 commercially insured patients and 244,735 Medicare Advantage patients. In Table 2.1 and Table 2.2, we describe the four steps of sample selection for commercial and Medicare Advantage patients, respectively. Each table also includes the number of patients retained in the sample at each step in the process. For informational purposes, we separate the fourth step (excluding patients without claims in 2019 or 2021) into two sub-steps in both tables.

Table 2.1. Stepwise process for identifying analytic sample for analysis with 2019 and 2021 outcomes: commercially insured patients

Step	Criteria for retaining patients in the commercial sample	Patients retained in 2019	Patients retained in 2021	% patients excluded in 2019	% patients excluded in 2021
1	Commercial insurance	1,608,998	1,538,517	n.a.	n.a.
2	Valid Minnesota ZIP Code	1,587,143	1,529,950	1%	1%
3	Enrolled for at least three months in both 2019 and 2021	1,106,063	1,106,063	30%	28%
4a	At least one commercial claim in either 2019 or 2021	946,093	980,781	14%	11%
4b	At least one commercial claim in both 2019 and 2021	870,794	870,794	8%	11%
5	No missing data for patient or area-level characteristics	787,018	787,018	10%	10%

Source: Mathematica analysis of data from MN APCD, Extract 26.

n.a. = not applicable.

Table 2.2. Stepwise process for identifying analytic sample for analysis with 2019 and 2021 outcomes: Medicare Advantage patients

Step	Criteria for retaining patients in the Medicare Advantage sample	Patients retained in 2019	Patients retained in 2021	% patients excluded in 2019	% patients excluded in 2021
1	Medicare Advantage insurance	331,748	453,143	n.a.	n.a.
2	Valid Minnesota ZIP Code	330,282	452,456	<1%	<1%
3	Enrolled for at least three months in both 2019 and 2021	289,212	289,212	12%	36%
4a	At least one Medicare Advantage claim in either 2019 or 2021	274,896	257,087	5%	11%
4b	At least one Medicare Advantage claim in both 2019 and 2021	249,774	249,774	9%	3%
5	No missing data for patient or area-level characteristics	244,735	244,735	2%	2%

Source: Mathematica analysis of data from MN APCD, Extract 26.

n.a. = not applicable.

2. Cross-sectional analysis: 2022

We also examined regression-adjusted differences in outcomes in 2022 for telehealth users versus nonusers in 2021. This analysis addresses the same research questions as the DD analysis. However, by measuring telehealth use in 2021 and outcomes in 2022, we avoid any confounding from the contemporaneous measurement of telehealth use and outcomes. For example, in the DD analysis, a claim for a primary care visit conducted via telehealth in 2021 identifies a patient as a telehealth user and also contributes to the count of primary care visits, which is an outcome. As with the DD analysis, we

conducted subgroup analyses to examine differential impacts of telehealth use on selected outcomes by patient and area characteristics (see Section F below for details).

To define our analytic sample, we took a similar approach and used the same stepwise process, as shown below in Tables 2.3 and 2.4. The final study sample included 874,251 commercially insured patients and 346,010 Medicare Advantage patients.

Table 2.3. Stepwise process for identifying analytic sample for analysis with 2022 outcomes: commercially insured patients

Step	Criteria for retaining patients in the commercial sample	Patients retained in 2022	% patients excluded in 2022
1	Commercial insurance	1,652,711	n.a.
2	Valid Minnesota ZIP Code	1,634,128	1%
3	Enrolled for at least three months in both 2021 and 2022	1,221,070	25%
4a	At least one commercial claim in 2022	1,034,888	15%
4b	At least one commercial claim in both 2021 and 2022	958,459	7%
5	No missing data for patient or area-level characteristics	874,251	9%

Source: Mathematica analysis of data from MN APCD, Extract 26.

n.a. = not applicable.

Table 2.4. Stepwise process for identifying analytic sample for analysis with 2022 outcomes: Medicare Advantage patients

Step	Criteria for retaining patients in the Medicare Advantage sample	Patients retained in 2022	% patients excluded in 2022
1	Medicare Advantage insurance	493,411	n.a.
2	Valid Minnesota ZIP Code	491,950	0%
3	Enrolled for at least three months in both 2021 and 2022	412,524	16%
4a	At least one Medicare Advantage claim in 2022	384,014	7%
4b	At least one Medicare Advantage claim in both 2021 and 2022	353,420	8%
5	No missing data for patient or area-level characteristics	346,010	2%

n.a. = not applicable.

B. Data sources

The primary data source for our analysis is the MN APCD, Extract 26, which includes medical claims for most commercial payers[1] and for most Medicare Advantage beneficiaries[2] (as well as other Medicare beneficiaries and individuals covered by Minnesota Health Care Programs) through calendar year 2022. We used the enrollment and claims data from the MN APCD to define the study population, identify the

[1] Patients enrolled in most self-insured plans were not included in this analysis, because those plans are not required to submit to the MN APCD. Minnesota Department of Health. "Minnesota All Payer Claims Database Extract 25 Overview." n.d. https://www.health.state.mn.us/data/apcd/docs/mnapcdoverview.pdf. Accessed August 25, 2023.

[2] Patients enrolled in Medicare Cost programs and in Medicare Fee-for-Service were excluded from this analysis.

use of telehealth and other services, and define outcomes of interest.

We relied on several supplemental data sources for this study. Supplemental data within the MN APCD include:

- Rural–Urban Commuting Area (RUCA) codes: Allowed us to assign patients to metropolitan and nonmetropolitan areas
- Version 13.0 of the Johns Hopkins Adjusted Clinical Group System output: Allowed us to stratify patients by chronic conditions and risk scores

Other supplemental data sources include:

- National Plan and Provider Enumeration System (NPPES) and Provider Enrollment, Chain, and Ownership System (PECOS): Includes data on provider specialties
- American Community Survey (ACS) data: Linking patient Zip Code data from the MN APCD to Zip Code-level data from the ACS allowed us to identify the percentage of the population who have broadband access, live in poverty, or are racial or ethnic minorities

C. Measuring telehealth use

For both analyses—the DD analysis covering changes between 2019 and 2021 and the cross-sectional analysis focusing on 2022—we classified patients with one or more claims for telehealth services in 2021 as telehealth users; all other patients were classified as telehealth nonusers. To identify claims for telehealth services, we used place-of-service (POS) codes, procedure codes, and procedure code modifiers. We assigned each telehealth visit to one of three subcategories, consistent with the Minnesota Telehealth Act's definition of telehealth:

- Audiovisual telehealth (visits using telecommunications technology that involves both audio and visual components, such as an audiovisual visit conducted using a computer with internet connection)
- Audio-only telehealth (visits using telecommunication technology that involves an audio connection without any visual component, such as telephone Evaluation & Management [E&M] services)
- Other telehealth (such as e-visits through patient portals and asynchronous store-and-forward telehealth services)

A complete list of codes used to identify telehealth claims and assign them to one of the three telehealth subcategories is provided in Appendix A, Table A.1. We define any claim with one or more of these codes as a telehealth service claim. Because this study focuses on the delivery of telehealth services to patients, we excluded claims for telehealth facility fees or provider-to-provider communication—as we excluded all other claims for services that are inconsistent with the telehealth expansion under the Minnesota Telehealth Act.[3]

[3] Specifically, we excluded inpatient, outpatient, and professional care delivered in the following settings: ambulance, ED, free-standing ambulatory surgery, hospital, independent lab, intermediate care facility (ICF), skilled nursing facility (SNF), or other.

D. Outcome measures and domains

This report presents results for outcome measures in five domains: (1) access to care, (2) in-person visits, (3) continuity of care, (4) hospitalizations and ED visits for ACSCs, and (5) follow-up after hospitalizations or ED visits for mental illness. For each measure, we report results for the full study population and then stratified by geographic location (metropolitan compared with nonmetropolitan area).

1. Access to care

We compared telehealth users and nonusers to assess whether the relative increase in their use of primary, specialty, or behavioral health care visits was due to the receipt of telehealth care. (A larger relative increase in 2021 or greater use in 2022 would suggest that telehealth connected telehealth users to care they might not otherwise have received.) The access-to-care measures included in this report are listed in Table 2.5, and we indicate whether they were calculated using in-person visits, telehealth visits, or both.

Table 2.5. Access-to-care measures

All measures	Includes in-person visits	Includes telehealth visits
Number of primary care visits per member per year (PMPY)	X	X
Number of specialty care visits PMPY	X	X
Number of primary care or specialty care visits PMPY	X	X
Number of behavioral health care visits PMPY	X	X
Number of in-person primary care visits PMPY	X	
Number of in-person specialty care visits PMPY	X	
Number of in-person primary care or specialty care visits PMPY	X	
Number of in-person behavioral health care visits PMPY	X	

2. In-person visits

To assess whether telehealth services substituted for in-person care or occurred in addition to in-person care, we recalculated several of the access measures shown in Table 2.5, limiting the input data to in-person or face-to-face visits. We hypothesize that a decrease in in-person visits among telehealth users relative to nonusers in 2021 or lower utilization in 2022 would indicate that telehealth services were a *substitute* for in-person care. Conversely, an increase in in-person visits among telehealth users relative to nonusers in 2021 or greater use in 2022 would indicate that patients received telehealth services *in addition to* in-person care.

3. Continuity of care measures

To assess whether continuity of care increased or decreased, we used two complementary measures that focus on receipt of ambulatory visits: (1) the reversed Bice-Boxerman Index (rBBI) of fragmentation of care; and (2) the Usual Provider of Care (UPC) index. (Both measures are explained in Appendix C.) Using a modified version of the National Committee for Quality Assurance's (NCQA) definition of ambulatory visits, we identify beneficiaries with office or other outpatient visits (for example, visits to rural health clinics or critical access hospitals) for E&M, ophthalmological visits for medical examination and

evaluation, or new enrollee and annual wellness visits. To allow meaningful interpretation of continuity of care, both the rBBI and UPC indexes are defined among patients with a minimum of four ambulatory visits during the year.

4. Hospitalizations and emergency department visits for ambulatory care sensitive conditions

To better understand whether telehealth was associated with better or worse outcomes, we used the Agency for Healthcare Research and Quality (AHRQ) Prevention Quality Indicators (PQIs) for ACSCs. These indicators identify hospitalizations and ED visits that might have been avoided with access to high-quality outpatient care. If avoidable hospitalizations or ED visits increased in 2021 among telehealth users relative to nonusers, or if telehealth users had higher rates of avoidable hospitalizations or ED visits in 2022 relative to nonusers, it may suggest that telehealth is associated with poorer quality of care compared to in-person services, or that other unobserved factors may be associated with differences in rates of avoidable hospitalizations or ED visits between telehealth users and nonusers. Conversely, if telehealth users and nonusers have similar increases or decreases or rates of avoidable hospitalizations, that would suggest that telehealth provided comparable quality of care to in-person services.

5. Follow-up after hospitalizations or emergency department visits for mental illness

Timely follow-up care with mental health providers after hospitalizations and ED visits for mental illness and self-harm is known to increase the probability of good health outcomes and reduce rates of rehospitalization and ED reutilization.[4] [5] [6] [7] We assessed whether telehealth improved follow-up care after hospitalizations or ED visits for mental illness or intentional self-harm by examining the percentage of discharges for patients who received follow-up with a mental health provider within 30 days. We based these measures loosely on the NCQA Healthcare Effectiveness Data and Information Set (HEDIS) Follow-Up After Hospitalization for Mental Illness (FUH) and Follow-Up After Emergency Department Visit for Mental Illness (FUM) specifications (see Appendix C).

E. Stratification and control variables

We used a number of variables to account for differences between telehealth users and nonusers that might affect the potential impacts of telehealth on the outcome measures. Such variables include the patient's demographics and health characteristics as well as community or area characteristics. Table 2.6 shows each of these variables and its data source.

[4] Luxton, D.D., J.D. June, and K.A. Comtois. "Can Postdischarge Follow-Up Contacts Prevent Suicide and Suicidal Behavior? A Review of the Evidence." *Crisis*, vol. 34, no. 1, 2013, pp. 32–41. https://doi.org/10.1027/0227-5910/a000158.

[5] Barekatain, M., M.R. Maracy, F. Rajabi, and H. Baratian. "Aftercare Services for Patients with Severe Mental Disorder: A Randomized Controlled Trial." *J Res Med Sci.*, vol. 19, no. 3, 2014, pp. 240–245.

[6] Bruffaerts, R., M. Sabbe, and K. Demyttenaere. "Predicting Community Tenure in Patients with Recurrent Utilization of a Psychiatric Emergency Service." Gen Hosp Psychiatry, vol. 27, no. 4, 2005, pp. 269–274. https://doi.org/10.1016/j.genhosppsych.2005.04.003.

[7] Griswold, K.S., L.E. Zayas, P.A. Pastore, S.J. Smith, C.M. Wagner, and T.J. Servoss. "Primary Care After Psychiatric Crisis: A Qualitative Analysis." *Annals of Family Medicine*, vol. 6, no. 1, 2018, pp. 38–43. http://doi.org/10.1370/afm.760.

In the DD analysis examining changes in outcomes from 2019 to 2021, we measured control variables in 2018 and 2020, respectively (that is, in the year preceding the measurement period for outcomes). Similarly, in the cross-sectional analysis examining outcomes in 2022, we used control variables from 2021.

Table 2.6. Stratification and control variables for regression adjustment

Type of stratification/control variable	Stratification/control variables	Data source
Patient demographics	• Age categories (<18, 18–44, 45–64, and 65+ for commercially insured patients; <65, 65–74, 75–84, and 85+ among Medicare Advantage patients)* • Gender	• MN APCD
Patient chronic conditions Patient risk scores	• Indicators for specific chronic and behavioral health conditions that were prevalent among at least 10 percent of patients in the commercial or MA populations (diabetes,* hypertension,* depression,* lipid metabolism disorders, glaucoma, hypothyroidism, ischemic heart disease, low back pain, and asthma) • Whether patient is high risk of adverse outcomes (risk score above 75th percentile of the distribution)*	• Condition markers based on patients' diagnoses and prescription fills created by the ACG system in the MN APCD • ACG risk score available in the MN APCD
Area characteristics	• High versus low broadband access, based on percentage of population with broadband access • High versus low poverty, based on the percentage of population in poverty* • High versus low share of racial and ethnic minorities, based on the percentages of the population in each racial and ethnic category* • Metropolitan versus nonmetropolitan location based on RUCA codes created by the USDA.[1*]	• ZIP Code-level data on variables from the ACS • ZIP Code-level data on RUCA designation available in the MN APCD
Variation in health system capacity due to changes in COVID-19 incidence	Quarterly rate of COVID-19 hospitalizations in each county in 2021	MDH

* Characteristics also included in subgroup analyses.

[1] RUCA codes are created by the U.S. Department of Agriculture's Economic Research Service and are available at https://www.ers.usda.gov/data-products/rural-urban-commuting-area-codes/. We classified patients as residents of a metropolitan area if their ZIP Code corresponded to any of the following RUCA codes:

RUCA = 1: Metropolitan area core: primary flow within an urbanized area (UA)

RUCA = 2: Metropolitan area high commuting: primary flow 30 percent or more to a UA

RUCA = 3: Metropolitan area low commuting: primary flow 10 to 30 percent to a UA.

Patients in all other RUCA codes, including micropolitan areas, rural areas, or small towns, were classified as living in nonmetropolitan areas.

ACG = Adjusted Clinical Group®; ACS = American Community Survey; MA = Medicare Advantage; MDH = Minnesota Department of Health; MN APCD = Minnesota All Payer Claims Database; RUCA = rural-urban commuting area; USDA = U.S. Department of Agriculture.

We selected these variables based largely on the research questions in the Minnesota Telehealth Act, our initial examination of the percentage of patients in each subgroup category and their rates of telehealth use, and hypothesized pathways through which telehealth use is likely to differentially affect patients with certain characteristics or those living in more socially vulnerable areas.

In the descriptive analyses, we used these variables to stratify the analysis sample to examine whether telehealth use differed by specific patient and area characteristics. In the DD and cross-sectional regression analyses, we used them as control variables and to examine whether the association between telehealth use and access to care (primary care and specialist visits, behavioral health visits) or health outcomes (ACSC admissions) differed by those characteristics.

F. Statistical testing

We tested for statistical significance in each of the regression analyses examining changes in outcomes among telehealth users versus nonusers—that is, the DD analyses examining relative change between 2019 and 2021 (before and after implementation of the Minnesota Telehealth Act), and the cross-sectional regressions examining differences in outcomes in 2022 among telehealth users versus nonusers in 2021 (see Appendix D for details on the regression models). We used a 5 percent level of significance to identify statistically significant estimates.

To address the detection of statistically significant subgroup impact estimates purely by chance, we conducted joint significance tests for all subgroup interactions from the same regression as our primary test for concluding whether there was any evidence of differential impact by subgroup. If this result was not statistically significant, we did not check for significant differences by individual subgroup characteristics. If the result from the joint significance test was statistically significant, we examined the magnitude and statistical significance of individual subgroup interaction terms. Conditional on whether an individual subgroup interactions term was statistically significant, we examined the magnitude and statistical significance of subgroup-specific impact estimates. For example, in the DD regression analyses with subgroup interactions, we proceeded with statistical testing in the following order: (1) we tested the joint significance of all subgroup interaction terms to check if there was evidence for differential impact by *any* of the patient characteristics; (2) we tested for the statistical significance of subgroup interaction terms for each specific patient characteristic to identify whether telehealth impacts differed for a patient subgroup (for example, for patients at high risk of adverse outcomes relative to all patients); and (3) we tested for the subgroup-specific impact (for example, the impact estimate for high-risk patients). See Appendix D for additional details on the statistical testing for subgroup impacts.

III. Results

A. Descriptive statistics

1. Rates of telehealth visits

In the wake of the COVID-19 pandemic and the passage of the Minnesota Telehealth Act, the use of telehealth expanded and was particularly high among commercially insured patients, compared with patients insured through Medicare Advantage. Telehealth use was also higher among patients living in metropolitan areas as opposed to outside those areas. These use patterns were broadly consistent in 2021 and 2022.

Differences by insurance coverage

Telehealth use increased substantially between 2019 and 2021, driven by both the COVID-19 pandemic and the passage of the Minnesota Telehealth Act. However, both before and after telehealth expansion, commercially insured patients made substantially higher use of telehealth compared with patients insured through Medicare Advantage. Although telehealth use decreased in 2022 relative to 2021, it remained substantially higher than 2019 levels for both commercially insured and Medicare Advantage patients in 2022.

Commercially insured patients received a relatively large proportion of behavioral health services, in particular, via telehealth. In 2021, 27.7 percent of behavioral health visits were delivered to commercially insured patients through telehealth, compared with 10.3 percent of behavioral health visits delivered to Medicare Advantage patients through telehealth (Table 3.1), and results were similar for 2022 (Table 3.2).

Differences by geography

Patients in metropolitan areas, whether commercially insured or through Medicare Advantage, made higher use of telehealth than patients living in nonmetropolitan areas; primary care, specialist, and behavioral health visits were delivered via telehealth to patients in metropolitan areas at about twice the rate as to patients in nonmetropolitan areas. The only notable exception was specialist visits among Medicare Advantage patients in 2022, where the telehealth rates drew relatively close (5.4 percent of visits in metropolitan areas compared with 4.0 percent of visits in nonmetropolitan areas; Table 3.2).

We present detailed descriptive statistics for 2021 and 2022 in Tables 3.1. and 3.2. See Appendix E, Table E.1 for comparable statistics for 2019.

Table 3.1. Number and percentage of primary care, specialist, and behavioral health visits delivered by telehealth in 2021

Visit type	Commercially insured patients					Medicare Advantage patients				
	Total # of visits	# of in-person visits	% in-person visits	# of TH visits	% TH visits	Total # of visits	# of in-person visits	% in-person visits	# of TH visits	% TH visits
Total										
Primary care visits	1,416,422	1,127,345	79.6%	289,077	20.4%	556,225	501,262	90.1%	54,963	9.9%
Specialist visits	962,877	838,453	87.1%	124,424	12.9%	462,635	432,534	93.5%	30,101	6.5%
Primary care and specialist visits	2,379,299	1,965,798	82.6%	413,501	17.4%	1,018,860	933,796	91.7%	85,064	8.3%
Behavioral health visits	3,806,999	2,751,714	72.3%	1,055,285	27.7%	927,600	832,425	89.7%	95,175	10.3%
Metropolitan residence										
Primary care visits	1,150,760	891,315	77.5%	259,445	22.5%	424,007	376,063	88.7%	47,944	11.3%
Specialist visits	798,296	685,135	85.8%	113,161	14.2%	339,778	314,663	92.6%	25,115	7.4%
Primary care and specialist visits	1,949,056	1,576,450	80.9%	372,606	19.1%	763,785	690,726	90.4%	73,059	9.6%
Behavioral health visits	3,195,756	2,225,192	69.6%	970,564	30.4%	729,768	647,230	88.7%	82,538	11.3%
Nonmetropolitan residence										
Primary care visits	265,662	236,030	88.8%	29,632	11.2%	132,218	125,199	94.7%	7,019	5.3%
Specialist visits	164,581	153,318	93.2%	11,263	6.8%	122,857	117,871	95.9%	4,986	4.1%
Primary care and specialist visits	430,243	389,348	90.5%	40,895	9.5%	255,075	243,070	95.3%	12,005	4.7%
Behavioral health visits	611,243	526,522	86.1%	84,721	13.9%	197,832	185,195	93.6%	12,637	6.4%

Source: Mathematica analysis of data from MN APCD, Extract 26.

Notes: See the Methods section for more detail on defining the analytic sample and subgroups based on patient characteristics. The table includes patients in the analytic sample for analysis with 2019 and 2021 outcomes. The table excludes Minnesota residents who were insured but did not use services during the year.

TH = Telehealth.

Table 3.2. Number and percentage of primary care, specialist, and behavioral health visits delivered by telehealth in 2022

Visit type	Commercially insured patients					Medicare Advantage patients				
	Total # of visits	# of in-person visits	% in-person visits	# of TH visits	% TH visits	Total # of visits	# of in-person visits	% in-person visits	# of TH visits	% TH visits
Total										
Primary care visits	1,492,927	1,213,920	81.3%	279,007	18.7%	974,330	894,742	91.8%	79,588	8.2%
Specialist visits	963,027	858,437	89.1%	104,590	10.9%	802,288	761,520	94.9%	40,768	5.1%
Primary care and specialist visits	2,455,954	2,072,357	84.4%	383,597	15.6%	1,776,618	1,656,262	93.2%	120,356	6.8%
Behavioral health visits	3,983,247	2,951,545	74.1%	1,031,702	25.9%	1,676,975	1,528,088	91.1%	148,887	8.9%
Metropolitan residence										
Primary care visits	1,213,737	960,746	79.2%	252,991	20.8%	764,808	694,994	90.9%	69,814	9.1%
Specialist visits	793,076	698,948	88.1%	94,128	11.9%	609,619	576,488	94.6%	33,131	5.4%
Primary care and specialist visits	2,006,813	1,659,694	82.7%	347,119	17.3%	1,374,427	1,271,482	92.5%	102,945	7.5%
Behavioral health visits	3,349,424	2,399,451	71.6%	949,973	28.4%	1,350,466	1,220,566	90.4%	129,900	9.6%
Nonmetropolitan residence										
Primary care visits	279,182	253,166	90.7%	26,016	9.3%	209,522	199,748	95.3%	9,774	4.7%
Specialist visits	169,945	159,484	93.8%	10,461	6.2%	192,669	185,032	96.0%	7,637	4.0%
Primary care and specialist visits	449,127	412,650	91.9%	36,477	8.1%	402,191	384,780	95.7%	17,411	4.3%
Behavioral health visits	633,806	552,084	87.1%	81,722	12.9%	326,509	307,522	94.2%	18,987	5.8%

Source: Mathematica analysis of data from MN APCD, Extract 26.

Notes: See the Methods section for more detail on defining the analytic sample and subgroups based on patient characteristics. The table includes patients in the analytic sample for analysis with 2022 outcomes. The table excludes Minnesota residents who were insured but did not use services during the year.

TH = Telehealth.

2. Characteristics of commercially insured telehealth users

Among commercially insured patients, telehealth was more commonly used by younger adult patients, higher-risk patients, patients with comorbidities, and patients in metropolitan areas with high broadband access and high percentages of BIPOC residents. These results were consistent for 2021 and 2022. All differences in telehealth use among subgroups were statistically significant. Specific findings include the following:

- Patients ages 18 to 44 represented the largest group of commercially insured telehealth users, with 40.4 percent using telehealth in 2021 and 37.4 using telehealth in 2022. Patients ages 45 to 64 had the second highest rates of telehealth use. Pediatric patients (under age 18) had the lowest rates of telehealth use, with only 26.0 percent in 2021 and 21.2 percent in 2022 using telehealth.
- Among commercially insured patients, those who were high risk (defined as having ACG risk scores above the 75th percentile of the distribution) used telehealth at substantially higher rates than low-risk patients. In 2021, 49.3 percent of patients at high risk for adverse outcomes used telehealth, compared with 28.1 percent of low-risk patients. In 2022, 44.9 percent of high-risk patients used telehealth, compared with 25.6 percent of low-risk patients.
- Commercially insured patients with comorbidities used telehealth at higher rates than those without comorbidities. Patients diagnosed with depression showed the largest difference in use: 56.8 percent of patients with depression in 2021 and 52.6 percent in 2022 used telehealth, compared with 28.1 percent of patients without depression in 2021 and 25.2 percent of patients without depression in 2022 using telehealth. Other conditions associated with relatively high telehealth use included diabetes, hypertension, hypothyroidism, ischemic heart disease, low back pain, and persistent asthma.
- Telehealth use was more common among commercially insured patients in metropolitan areas than those in nonmetropolitan areas, as defined by the U.S. Department of Agriculture (USDA) rural-urban commuting area (RUCA) codes. More patients in metropolitan areas used telehealth than those in nonmetropolitan areas: 37.4 percent in 2021 and 33.6 percent in 2022 used telehealth, compared with 19.5 percent in 2021 and 17.2 percent in 2022 of patients in nonmetropolitan areas. Telehealth use was also substantially higher among patients in areas with high broadband access: 35.3 percent in 2021 and 31.6 percent in 2022 used telehealth, compared with 20.0 percent in 2021 and 18.1 percent in 2022 of patients in areas with low broadband access.
- Commercially insured patients living in areas with high percentages of BIPOC residents used telehealth at substantially higher rates than those living in areas with low percentages of BIPOC residents. This suggests that telehealth may be a particularly important vehicle for accessing care for BIPOC Minnesotans. In areas with high percentages of BIPOC residents, 41.2 percent of patients in 2021 and 37.2 percent in 2022 used telehealth, compared with 31.4 percent and 28.0 percent of patients, respectively, in areas with low percentages of BIPOC residents. Note that because the MN APCD does not include patient-level data on race and ethnicity, we use ZIP Code-level data from the ACS on the percentage of BIPOC residents as a proxy, which limits our ability to draw conclusions about telehealth usage and outcomes among BIPOC patients.

- Commercially insured patients in areas with low percentages of households living in poverty used telehealth at slightly higher rates compared to patients in areas with high percentages of households living in poverty.

We present these results in Table 3.3 for 2021 and Table 3.4 for 2022. See Appendix E for the distributions of each of the patient and area characteristic groups among commercially insured telehealth users versus nonusers.

Table 3.3. Percentage of commercially insured telehealth users and nonusers in 2021 by patient and area characteristics

Patient characteristics	Total		TH users		TH nonusers		p-value
	N	%	N	%	N	%	
All patients	787,018	100.0%	266,852	33.9%	520,166	68.1%	n.a.
Age:							
Patient is under 18	163,643	100.0%	42,555	26.0%	121,088	74.0%	<.0001[1]
Patient is 18–44	285,480	100.0%	115,306	40.4%	170,174	59.6%	
Patient is 45–64	300,284	100.0%	97,823	32.6%	202,461	67.4%	
Patient is 65+	37,611	100.0%	11,168	29.7%	26,443	70.3%	
Gender:							
Patient is female	429,134	100.0%	164,366	38.3%	264,768	61.7%	<.0001
Patient is male	357,884	100.0%	102,486	28.6%	255,398	71.4%	
Comorbidities:							
Patient is high risk	215,786	100.0%	106,427	49.3%	109,359	50.7%	<.0001
Patient is low risk	571,232	100.0%	160,425	28.1%	410,807	71.9%	
Patient has depression	159,113	100.0%	90,298	56.8%	68,815	43.2%	<.0001
Patient does not have depression	627,905	100.0%	176,554	28.1%	451,351	71.9%	
Patient has diabetes	45,358	100.0%	20,015	44.1%	25,343	55.9%	<.0001
Patient does not have diabetes	741,660	100.0%	246,837	33.3%	494,823	66.7%	
Patient has hypertension	136,821	100.0%	54,346	39.7%	82,475	60.3%	<.0001
Patient does not have hypertension	650,197	100.0%	212,506	32.7%	437,691	67.3%	
Patient has disorders of lipid metabolism	94,851	100.0%	34,074	35.9%	60,777	64.1%	<.0001
Patient does not have disorders of lipid metabolism	692,167	100.0%	232,778	33.6%	459,389	66.4%	
Patient has glaucoma	17,524	100.0%	6,234	35.6%	11,290	64.4%	<.0001
Patient does not have glaucoma	769,494	100.0%	260,618	33.9%	508,876	66.1%	
Patient has hypothyroidism	47,175	100.0%	20,281	43.0%	26,894	57.0%	<.0001

Table 3.3 (*continued*)

Patient characteristics	Total		TH users		TH nonusers		p-value
	N	%	N	%	N	%	
Patient does not have hypothyroidism	739,843	100.0%	246,571	33.3%	493,272	66.7%	
Patient has ischemic heart disease	13,938	100.0%	5,904	42.4%	8,034	57.6%	<.0001
Patient does not have ischemic heart disease	773,080	100.0%	260,948	33.8%	512,132	66.2%	
Patient has low back pain	97,011	100.0%	41,222	42.5%	55,789	57.5%	<.0001
Patient does not have low back pain	690,007	100.0%	225,630	32.7%	464,377	67.3%	
Patient has persistent asthma	74,884	100.0%	35,677	47.6%	39,207	52.4%	<.0001
Patient does not have persistent asthma	712,134	100.0%	231,175	32.5%	480,959	67.5%	
Community characteristics:							
Patient resides in a metropolitan area	633,641	100.0%	236,968	37.4%	396,673	62.6%	<.0001
Patient resides in a nonmetropolitan area	153,377	100.0%	29,884	19.5%	123,493	80.5%	
Patient resides in an area with low broadband access	70,549	100.0%	14,134	20.0%	56,415	80.0%	<.0001
Patient resides in an area with high broadband access	716,469	100.0%	252,718	35.3%	463,751	64.7%	
Patient resides in an area with a high percentage of BIPOC residents	199,883	100.0%	82,293	41.2%	117,590	58.8%	<.0001
Patient resides in an area with a low percentage of BIPOC residents	587,135	100.0%	184,559	31.4%	402,576	68.6%	
Patient lives in an area with a high percentage of households living in poverty	187,018	100.0%	58,755	31.4%	128,263	68.6%	<.0001
Patient lives in an area with a low percentage of households living in poverty	600,000	100.0%	208,097	34.7%	391,903	65.3%	

Source: Mathematica analysis of data from MN APCD, Extract 26.

Table 3.3 (*continued*)

Notes: See the Methods section for more detail on defining the analytic sample and subgroups based on patient characteristics. The table includes patients in the analytic sample for analysis with 2019 and 2021 outcomes. The table excludes Minnesota residents who were insured but did not use services during the year.

[1] We also performed pairwise comparisons, which were all statistically significant p<.0001. Pairwise comparisons used the Tukey-Kramer adjustment for multiple comparisons in determining statistical significance.

n.a. = not applicable; TH = telehealth.

Table 3.4. Percentage of commercially insured telehealth users and nonusers in 2022 by patient and area characteristics

Patient characteristics	Total		TH users		TH nonusers		p-value
	N	%	N	%	N	%	
All patients	874,251	100.000%	265,978	30.4%	608,273	69.6	n.a.
Age:							
Patient is under 18	194,974	100.0%	41,245	21.2%	153,729	78.8%	<.0001[1]
Patient is 18–44	327,903	100.0%	122,706	37.4%	205,197	62.6%	
Patient is 45–64	325,638	100.0%	94,866	29.1%	230,772	70.9%	
Patient is 65+	25,736	100.0%	7,161	27.8%	18,575	72.2%	
Gender:							
Patient is female	477,023	100.0%	167,247	35.1%	309,776	64.9%	<.0001
Patient is male	397,228	100.0%	98,731	24.9%	298,497	75.1%	
Comorbidities:							
Patient is high risk	220,234	100.0%	98,822	44.9%	121,412	55.1%	<.0001
Patient is low risk	654,017	100.0%	167,156	25.6%	486,861	74.4%	
Patient has depression	166,520	100.0%	87,518	52.6%	79,002	47.4%	<.0001
Patient does not have depression	707,731	100.0%	178,460	25.2%	529,271	74.8%	
Patient has diabetes	46,281	100.0%	18,292	39.5%	27,989	60.5%	<.0001
Patient does not have diabetes	827,970	100.0%	247,686	29.9%	580,284	70.1%	
Patient has hypertension	138,280	100.0%	49,709	35.9%	88,571	64.1%	<.0001
Patient does not have hypertension	735,971	100.0%	216,269	29.4%	519,702	70.6%	
Patient has disorders of lipid metabolism	93,178	100.0%	30,019	32.2%	63,159	67.8%	<.0001
Patient does not have disorders of lipid metabolism	781,073	100.0%	235,959	30.2%	545,114	69.8%	
Patient has glaucoma	16,986	100.0%	5,422	31.9%	11,564	68.1%	<.0001
Patient does not have glaucoma	857,265	100.0%	260,556	30.4%	596,709	69.6%	
Patient has hypothyroidism	48,281	100.0%	19,236	39.8%	29,045	60.2%	<.0001
Patient does not have hypothyroidism	825,970	100.0%	246,742	29.9%	579,228	70.1%	

Table 3.4 (*continued*)

Patient characteristics	Total		TH users		TH nonusers		p-value
	N	%	N	%	N	%	
Patient has ischemic heart disease	13,422	100.0%	5,008	37.3%	8,414	62.7%	<.0001
Patient does not have ischemic heart disease	860,829	100.0%	260,970	30.3%	599,859	69.7%	
Patient has low back pain	101,288	100.0%	38,830	38.3%	62,458	61.7%	<.0001
Patient does not have low back pain	772,963	100.0%	227,148	29.4%	545,815	70.6%	
Patient has persistent asthma	78,533	100.0%	33,881	43.1%	44,652	56.9%	<.0001
Patient does not have persistent asthma	795,718	100.0%	232,097	29.2%	563,621	70.8%	
Community characteristics:							
Patient resides in a metropolitan area	704,798	100.0%	236,851	33.6%	467,947	66.4%	<.0001
Patient resides in a nonmetropolitan area	169,453	100.0%	29,127	17.2%	140,326	82.8%	
Patient resides in an area with low broadband access	78,465	100.0%	14,229	18.1%	64,236	81.9%	<.0001
Patient resides in an area with high broadband access	795,786	100.0%	251,749	31.6%	544,037	68.4%	
Patient resides in an area with a high percentage of BIPOC residents	227,311	100.0%	84,529	37.2%	142,782	62.8%	<.0001
Patient resides in an area with a low percentage of BIPOC residents	646,940	100.0%	181,449	28.0%	465,491	72.0%	
Patient lives in an area with a high percentage of households living in poverty	209,443	100.0%	60,773	29.0%	148,670	71.0%	<.0001
Patient lives in an area with a low percentage of households living in poverty	664,808	100.0%	205,205	30.9%	459,603	69.1%	

Source: Mathematica analysis of data from MN APCD, Extract 26.

Notes: See the Methods section for more detail on defining the analytic sample and subgroups based on patient characteristics. Table includes patients in the analytic sample for analysis with 2022 outcomes. Data on patient and area characteristics were obtained from 2021 claims. The table excludes Minnesota residents who were insured but did not use services during the year.

[1] We also performed pairwise comparisons, which were all statistically significant p<.0001. Pairwise comparisons used the Tukey-Kramer adjustment for multiple comparisons in determining statistical significance.

n.a. = not applicable; TH = telehealth.

3. Characteristics of Medicare Advantage telehealth users

Telehealth users insured through Medicare Advantage were similar in many respects to commercially insured telehealth users, but with a few key differences. As with commercially insured patients, among patients insured through Medicare Advantage, telehealth use was more common among younger patients, high-risk patients, and those residing in metropolitan areas with high broadband access and a high percentage of BIPOC residents. However, the differences in telehealth usage rates between those with and without comorbidities were smaller than among commercially insured patients. Nearly all differences in telehealth use among subgroups were statistically significant. Specific findings include the following:

- Telehealth use was highest among Medicare Advantage patients under age 65, suggesting that use is more common among those who qualified for Medicare due to disability rather than age. In 2021, 46.9 percent of patients under 65 used telehealth, and in 2022, 45.2 percent of patients under 65 used telehealth. Usage among all other age groups ranged from about 20 to 25 percent.
- Medicare Advantage patients who were high risk used telehealth at greater rates than those who were low risk. About 31.8 percent of high-risk patients in 2021 and 35.1 percent in 2022 used telehealth, as compared with 18.8 percent of low-risk patients in 2021 and 21.0 percent in 2022.
- Medicare Advantage patients with selected comorbidities used telehealth at higher rates. Among these patients, telehealth use was highest among those with depression (33.7 percent in 2021, and 36.0 percent in 2022) and persistent asthma (31.3 percent in 2021, and 34.2 percent in 2022).
- Telehealth use was higher among Medicare Advantage patients residing in metropolitan areas. In 2021 and 2022, 25.4 percent and 28.3 percent of Medicare Advantage patients residing in metropolitan areas used telehealth, respectively, compared with 14.3 percent and 14.6 percent of those residing in nonmetropolitan areas, respectively. Consistent with the commercially insured population, telehealth usage was also higher among Medicare Advantage patients living in areas with high broadband access, compared with those in areas with low broadband access. In 2021 and 2022, 23.5 percent and 26.0 percent of patients in areas with high broadband access used telehealth, respectively, compared with 14.6 percent and 14.3 percent of patients in areas with low broadband access, respectively.
- Medicare Advantage patients living in areas with a high percentage of BIPOC residents used telehealth at a higher rate than those living in areas with a low percentage of BIPOC residents, suggesting that (as with commercially insured patients) telehealth may be an important vehicle for BIPOC patients accessing care. In 2021 and 2022, 27.3 percent and 31.5 percent of Medicare Advantage patients in areas with a high percentage of BIPOC residents used telehealth, respectively, compared with 20.7 percent and 22.3 percent of patients in areas with a low percentage of BIPOC residents, respectively.
- Medicare Advantage patients in areas with low percentages of households living in poverty used telehealth at just slightly higher rates than patients in areas with high percentages of households living in poverty.

We present these results for Medicare Advantage patients in Table 3.5 for 2021 and Table 3.6 in 2022. See Appendix E for the distributions of each of the patient and area characteristic groups among Medicare Advantage telehealth users versus nonusers.

Table 3.5. Percentage of Medicare Advantage telehealth users and nonusers in 2021 by patient and area characteristics

	Total		TH users		TH nonusers		
Patient characteristics	**N**	**%**	**N**	**%**	**N**	**%**	**p-value**
All patients	244,735	100.0%	54,525	22.3%	190,210	77.7%	n.a.
Age:							
Patient is under 65	7,981	100.0%	3,745	46.9%	4,236	53.1%	<.0001[1]
Patient is 65-74	113,901	100.0%	26,081	22.9%	87,820	77.1%	
Patient is 75-84	91,894	100.0%	18,775	20.4%	73,119	79.6%	
Patient is 85+	30,959	100.0%	5,924	19.1%	25,035	80.9%	
Gender:							
Patient is female	136,473	100.0%	32,420	23.8%	104,053	76.2%	<.0001
Patient is male	108,262	100.0%	22,105	20.4%	86,157	79.6%	
Comorbidities:							
Patient is high risk	65,746	100.0%	20,915	31.8%	44,831	68.2%	<.0001
Patient is low risk	178,989	100.0%	33,610	18.8%	145,379	81.2%	
Patient has depression	59,266	100.0%	19,944	33.7%	39,322	66.3%	<.0001
Patient does not have depression	185,469	100.0%	34,581	18.6%	150,888	81.4%	
Patient has diabetes	47,292	100.0%	12,512	26.5%	34,780	73.5%	<.0001
Patient does not have diabetes	197,443	100.0%	42,013	21.3%	155,430	78.7%	
Patient has hypertension	155,870	100.0%	36,874	23.7%	118,996	76.3%	<.0001
Patient does not have hypertension	88,865	100.0%	17,651	19.9%	71,214	80.1%	
Patient has disorders of lipid metabolism	141,385	100.0%	33,210	23.5%	108,175	76.5%	<.0001
Patient does not have disorders of lipid metabolism	103,350	100.0%	21,315	20.6%	82,035	79.4%	
Patient has glaucoma	34,347	100.0%	7,334	21.4%	27,013	78.6%	<.0001
Patient does not have glaucoma	210,388	100.0%	47,191	22.4%	163,197	77.6%	
Patient has hypothyroidism	40,878	100.0%	10,510	25.7%	30,368	74.3%	<.0001
Patient does not have hypothyroidism	203,857	100.0%	44,015	21.6%	159,842	78.4%	
Patient has ischemic heart disease	36,724	100.0%	9,823	26.7%	26,901	73.3%	<.0001

Table 3.5 (*continued*)

Patient characteristics	Total		TH users		TH nonusers		
	N	%	N	%	N	%	p-value
Patient does not have ischemic heart disease	208,011	100.0%	44,702	21.5%	163,309	78.5%	
Patient has low back pain	45,961	100.0%	12,977	28.2%	32,984	71.8%	<.0001
Patient does not have low back pain	198,774	100.0%	41,548	20.9%	157,226	79.1%	
Patient has persistent asthma	30,576	100.0%	9,567	31.3%	21,009	68.7%	<.0001
Patient does not have persistent asthma	214,159	100.0%	44,958	21.0%	169,201	79.0%	
Community characteristics:							
Patient resides in a metropolitan area	175,469	100.0%	44,610	25.4%	130,859	74.6%	<.0001
Patient resides in a nonmetropolitan area	69,266	100.0%	9,915	14.3%	59,351	85.7%	
Patient resides in an area with low broadband access	32,984	100.0%	4,826	14.6%	28,158	85.4%	<.0001
Patient resides in an area with high broadband access	211,751	100.0%	49,699	23.5%	162,052	76.5%	
Patient resides in an area with a high percentage of BIPOC residents	57,321	100.0%	15,677	27.3%	41,644	72.7%	<.0001
Patient resides in an area with a low percentage of BIPOC residents	187,414	100.0%	38,848	20.7%	148,566	79.3%	
Patient lives in an area with a high percentage of households living in poverty	65,144	100.0%	12,882	19.8%	52,262	80.2%	<.0001
Patient lives in an area with a low percentage of households living in poverty	179,591	100.0%	41,643	23.2%	137,948	76.8%	

Source: Mathematica analysis of data from MN APCD, Extract 26.

Notes: See the Methods section for more detail on defining the analytic sample and subgroups based on patient characteristics. The table includes patients in the analytic sample for analysis with 2019 and 2021 outcomes. The table excludes Minnesota residents who were insured but did not use services during the year.

[1] We also performed pairwise comparisons, which were all statistically significant p<.0001 except for age group 75–84 years and 85+ years, where p= 0.9806. Pairwise comparisons used the Tukey-Kramer adjustment for multiple comparisons in determining statistical significance.

n.a. = not applicable; TH = telehealth.

Table 3.6. Percentage of Medicare Advantage telehealth users and nonusers in 2022 by patient and area characteristics

Patient characteristics	Total		TH users		TH nonusers		p-value
	N	%	N	%	N	%	
All patients	346,010	100.0%	84,487	24.4%	261,523	75.6%	n.a.
Age:							
Patient is under 65	14,273	100.0%	6,453	45.2%	7,820	54.8%	<.0001[1]
Patient is 65–74	184,575	100.0%	44,640	24.2%	139,935	75.8%	
Patient is 75–84	112,631	100.0%	25,964	23.1%	86,667	76.9%	
Patient is 85+	34,531	100.0%	7,430	21.5%	27,101	78.5%	
Gender:							
Patient is female	192,642	100.0%	50,235	26.1%	142,407	73.9%	<.0001
Patient is male	153,368	100.0%	34,252	22.3%	119,116	77.7%	
Comorbidities:							
Patient is high risk	83,618	100.0%	29,325	35.1%	54,293	64.9%	<.0001
Patient is low risk	262,392	100.0%	55,162	21.0%	207,230	79.0%	
Patient has depression	81,887	100.0%	29,495	36.0%	52,392	64.0%	<.0001
Patient does not have depression	264,123	100.0%	54,992	20.8%	209,131	79.2%	
Patient has diabetes	63,348	100.0%	17,837	28.2%	45,511	71.8%	<.0001
Patient does not have diabetes	282,662	100.0%	66,650	23.6%	216,012	76.4%	
Patient has hypertension	209,298	100.0%	54,058	25.8%	155,240	74.2%	<.0001
Patient does not have hypertension	136,712	100.0%	30,429	22.3%	106,283	77.7%	
Patient has disorders of lipid metabolism	189,823	100.0%	48,703	25.7%	141,120	74.3%	<.0001
Patient does not have disorders of lipid metabolism	156,187	100.0%	35,784	22.9%	120,403	77.1%	
Patient has glaucoma	44,800	100.0%	11,047	24.7%	33,753	75.3%	0.2045
Patient does not have glaucoma	301,210	100.0%	73,440	24.4%	227,770	75.6%	
Patient has hypothyroidism	55,171	100.0%	15,590	28.3%	39,581	71.7%	<.0001
Patient does not have hypothyroidism	290,839	100.0%	68,897	23.7%	221,942	76.3%	
Patient has ischemic heart disease	46,329	100.0%	13,706	29.6%	32,623	70.4%	<.0001
Patient does not have ischemic heart disease	299,681	100.0%	70,781	23.6%	228,900	76.4%	
Patient has low back pain	62,258	100.0%	19,079	30.6%	43,179	69.4%	<.0001

Table 3.6 (*continued*)

Patient characteristics	Total		TH users		TH nonusers		p-value
	N	%	N	%	N	%	
Patient does not have low back pain	283,752	100.0%	65,408	23.1%	218,344	76.9%	
Patient has persistent asthma	41,677	100.0%	14,266	34.2%	27,411	65.8%	<.0001
Patient does not have persistent asthma	304,333	100.0%	70,221	23.1%	234,112	76.9%	
Community characteristics:							
Patient resides in a metropolitan area	247,409	100.0%	70,099	28.3%	177,310	71.7%	<.0001
Patient resides in a nonmetropolitan area	98,601	100.0%	14,388	14.6%	84,213	85.4%	
Patient resides in an area with low broadband access	46,620	100.0%	6,646	14.3%	39,974	85.7%	<.0001
Patient resides in an area with high broadband access	299,390	100.0%	77,841	26.0%	221,549	74.0%	
Patient resides in an area with a high percentage of BIPOC residents	79,537	100.0%	25,077	31.5%	54,460	68.5%	<.0001
Patient resides in an area with a low percentage of BIPOC residents	266,473	100.0%	59,410	22.3%	207,063	77.7%	
Patient lives in an area with a high percentage of households living in poverty	93,959	100.0%	20,506	21.8%	73,453	78.2%	<.0001
Patient lives in an area with a low percentage of households living in poverty	252,051	100.0%	63,981	25.4%	188,070	74.6%	

Source: Mathematica analysis of data from MN APCD, Extract 26.

Notes: See the Methods section for more detail on defining the analytic sample and subgroups based on patient characteristics. The table includes patients in the analytic sample for analysis with 2022 outcomes. Data on patient and area characteristics are obtained from 2021 claims. The table excludes Minnesota residents who were insured but did not use services during the year.

[1] We also performed pairwise comparisons, which were all statistically significant p<.0001. Pairwise comparisons used the Tukey-Kramer adjustment for multiple comparisons in determining statistical significance.

n.a. = not applicable; TH = telehealth.

4. Volume of telehealth services per patient

Commercially insured patients who used telehealth had more visits per year than Medicare Advantage patients, but the number of visits per year for both groups decreased in 2022 relative to 2021. We report the distribution of telehealth visits by type of insurance and by area characteristics for 2021 and 2022 in Table 3.7. We report the distribution of audio-only telehealth visits by type of insurance and by area characteristics for 2021 and 2022 in Table 3.8. Specific findings include the following:

- In both 2021 and 2022, commercially insured telehealth users had more telehealth visits per year than Medicare Advantage telehealth users. In both years, commercially insured telehealth users had a median of 2 telehealth visits per year, compared to a median of 1 visit per year for Medicare Advantage telehealth users.
- There were few differences in the median number of telehealth visits per year based on area characteristics, such as metropolitan/nonmetropolitan residence, broadband access, percentage of BIPOC residents, and percentage of residents living in poverty. This was true in both 2021 and 2022, and for both commercially insured and Medicare Advantage patients. Subgroup differences are reported in Appendix E, Tables E.5 and E.6.
- Among users of audio-only telehealth, the median number of audio-only visits per year for commercially insured patients in both 2021 and was 2 telehealth visits, and the median number for Medicare Advantage patients was 1 visit in 2021 and 1.1 visits in 2022.

Table 3.7. Distribution of any telehealth visits among commercially insured and Medicare Advantage patients that used telehealth services in 2021 and 2022, by type of insurance

	Commercially insured patients				Medicare Advantage patients			
Visit types	**N**	**Mean (SD)**	**Median (IQR)**	**Min-Max**	**N**	**Mean (SD)**	**Median (IQR)**	**Min-Max**
All telehealth visits								
Visits in 2021	266,852	4.77 (7.96)	2 (3)	1, 54	54,525	2.45 (3.46)	1 (1)	1, 30
Visits in 2022	265,978	4.59 (7.55)	2 (3)	1, 51	84,487	2.52 (3.47)	1 (1)	1, 28

Source: Mathematica analysis of data from MN APCD, Extract 26.

Notes: See the Methods section for more detail on defining the analytic sample and subgroups based on patient characteristics. "Visits in 2021" row includes patients in the analytic sample for analysis with 2019 and 2021 outcomes. "Visits in 2022" row includes patients in the analytic sample for analysis with 2022 outcomes. The table excludes Minnesota residents who were insured but did not use services during the year. All telehealth visits include audio-only telehealth visits. Given the large outlier values in the distribution of telehealth visits, we top coded the distribution at the 99.5th percentile of the overall distribution.

SD = standard deviation; IQR = inter-quartile range.

Table 3.8. Distribution of audio-only telehealth visits among commercially insured and Medicare Advantage patients that used audio-only telehealth services in 2021 and 2022, by type of insurance

	Commercially insured patients				Medicare Advantage patients			
Visit types	**N**	**Mean (SD)**	**Median (IQR)**	**Min-Max**	**N**	**Mean (SD)**	**Median (IQR)**	**Min-Max**
Audio-only telehealth visits								
Visits in 2021	11,585	4.55 (7.67)	2 (3)	1, 54	11,362	2.41 (3.15)	1 (1.2)	1, 30
Visits in 2022	14,706	4.66 (7.77)	2 (3)	1, 51	17,286	2.77 (3.72)	1.1 (2)	1, 28

Source: Mathematica analysis of data from MN APCD, Extract 26.

Notes: See the Methods section for more detail on defining the analytic sample and subgroups based on patient characteristics. "Visits in 2021" row includes patients in the analytic sample for analysis with 2019 and 2021 outcomes. "Visits in 2022" row includes patients in the analytic sample for analysis with 2022 outcomes. The table excludes Minnesota residents who were insured but did not use services during the year. Given the large outlier values in the distribution of telehealth visits, we top coded the distribution at the 99.5th percentile of the overall distribution.

SD = standard deviation; IQR = inter-quartile range.

5. Utilization of different forms of telehealth

Audio-visual telehealth visits were the most commonly used form of telehealth among both commercially insured and Medicare Advantage patients, but the two groups differed in the second most commonly used form of telehealth. Among commercially insured patients, the second most commonly used form of telehealth was "any other telehealth use," which includes e-visits and asynchronous telehealth. Among Medicare Advantage patients, the second most commonly used form of telehealth was audio-only. We report the number and percentage of patients using each form of telehealth in Table 3.9. Specific findings include the following:

- About 30.8 percent of commercially insured patients in 2021 and about 26.6 percent in 2022 used audio-visual telehealth, higher than any other form of telehealth. Similarly, about 20.3 percent of Medicare Advantage patients used audio-visual telehealth in 2021 and about 22.2 percent did so in 2022.
- Among commercially insured patients, the second most commonly used form of telehealth was "any other telehealth use," which includes e-visits and asynchronous telehealth. About 5.6 percent of patients used this form of telehealth in 2021, and about 6.4 percent did so in 2022.
- Among Medicare Advantage patients, the second most commonly used form of telehealth was audio-only telehealth, with about 5 percent of patients using this form of telehealth in both 2021 and 2022.

Table 3.9. Number and percentage of commercially insured and Medicare Advantage patients that used telehealth services in 2019, 2021, and 2022, by type of insurance

	Commercially insured patients						Medicare Advantage patients					
	2019		2021		2022		2019		2021		2022	
Telehealth service types	N	%	N	%	N	%	N	%	N	%	N	%
Any telehealth use	46,588	5.9%	266,852	33.9%	265,978	30.4%	1,695	0.7%	54,525	22.3%	84,487	24.4%
Any audio-visual telehealth use	7,800	1.0%	242,609	30.8%	232,281	26.6%	1,478	0.6%	49,599	20.3%	76,712	22.2%
Any audio-only telehealth use	4,678	0.6%	11,585	1.5%	14,706	1.7%	144	0.1%	11,362	4.6%	17,286	5.0%
Any other telehealth use	36,194	4.6%	44,103	5.6%	55,988	6.4%	145	0.1%	1,566	0.6%	4,354	1.3%

Source: Mathematica analysis of data from MN APCD, Extract 26.

Notes: See the Methods section for more detail on defining the analytic sample and subgroups based on patient characteristics. The patients included in the columns for 2019 and 2021 are patients in the analytic sample for analysis with 2019 and 2021 outcomes, and the patients included in the columns for 2022 are patients in the analytic sample for analysis with 2022 outcomes. The table excludes Minnesota residents who were insured but did not use services during the year. "Any other telehealth use" includes services such as e-visits through patient portals and asynchronous store-and-forward services.

Use of audio-only telehealth by patient and area characteristics

Among both commercially insured and Medicare Advantage patients, those who used audio-only telehealth accounted for a relatively small share of all telehealth users, but patients who relied on audio-only telehealth represented relatively vulnerable populations. Compared with commercially insured patients, Medicare Advantage patients made substantially greater use of audio-only telehealth in both 2021 and 2022. In general, audio-only telehealth users tended to be high risk, have comorbidities, live in nonmetropolitan areas or areas with low broadband access, and/or live in areas with high poverty. Table 3.10 presents the characteristics of users of audio-only telehealth. Specific findings include the following:

- Just under 5 percent of Medicare Advantage patients used audio-only telehealth in 2021 and 2022, compared with 1.5 percent of commercially insured patients.
- Among commercially insured patients, rates of audio-only telehealth use were highest among the oldest patients (65+). Among Medicare Advantage patients, those under 65 (and likely qualified due to disability) used telehealth at about twice the rate of older patients.
- Patients who were high risk used audio-only telehealth at substantially higher rates than those who were low risk. Nearly 8 percent of high-risk Medicare Advantage patients and about 3 percent of high-risk commercially insured patients used audio-only telehealth, compared with about 3.5 percent of low-risk Medicare Advantage patients and about 1 percent of low-risk commercially insured patients.
- Both commercially insured patients and Medicare Advantage patients with comorbidities used audio-only telehealth at higher rates than those without comorbidities.
- Among commercially insured patients, rates of audio-only telehealth use were about twice as high for patients who live in nonmetropolitan areas and in areas with low broadband access, compared to those in metropolitan areas and in areas with high broadband access, respectively. Audio-only telehealth use was also higher in areas with a high percentage of households living in poverty (about 2 percent) compared to areas with a low percentage of households living in poverty (about 1.4 percent). Audio-only telehealth usage did not differ substantially by area characteristics for Medicare Advantage patients.

Table 3.10. Percentage of commercially insured and Medicare Advantage patients using audio-only telehealth by patient and area characteristics

	Commercially insured patients				Medicare Advantage patients			
	2021		2022		2021		2022	
Patient characteristics	N	%	N	%	N	%	N	%
All patients	11,585	1.5%	14,706	1.7%	11,362	4.6%	17,286	5.0%
Age:								
Patient is under 18	1,027	0.6%	1,321	0.7%	-	-	-	-
Patient is 18–44	3,947	1.4%	5,655	1.7%	-	-	-	-
Patient is 45–64	5,126	1.7%	6,538	2.0%	-	-	-	-
Patient is 65+	1,485	3.9%	1,192	4.6%	-	-	-	-
Patient is under 65	-	-	-	-	725	9.1%	1,318	9.2%
Patient is 65–74	-	-	-	-	4,730	4.2%	8,285	4.5%
Patient is 75–84	-	-	-	-	4,485	4.9%	6,021	5.3%
Patient is 85+	-	-	-	-	1,422	4.6%	1,662	4.8%
Gender:								
Patient is female	6,564	1.5%	8,852	1.9%	6,652	4.9%	10,101	5.2%
Patient is male	5,021	1.4%	5,854	1.5%	4,710	4.4%	7,185	4.7%
Comorbidities:								
Patient is high risk	6,407	3.0%	7,335	3.3%	5,028	7.6%	7,098	8.5%
Patient is low risk	5,178	0.9%	7,371	1.1%	6,334	3.5%	10,188	3.9%
Patient has depression	4,055	2.5%	5,192	3.1%	3,946	6.7%	6,061	7.4%
Patient does not have depression	7,530	1.2%	9,514	1.3%	7,416	4.0%	11,225	4.2%
Patient has diabetes	1,667	3.7%	1,773	3.8%	2,782	5.9%	4,015	6.3%
Patient does not have diabetes	9,918	1.3%	12,933	1.6%	8,580	4.3%	13,271	4.7%
Patient has hypertension	3,822	2.8%	4,179	3.0%	8,078	5.2%	11,736	5.6%
Patient does not have hypertension	7,763	1.2%	10,527	1.4%	3,284	3.7%	5,550	4.1%

Table 3.10 (*continued*)

Patient characteristics	Commercially insured patients				Medicare Advantage patients			
	2021		2022		2021		2022	
	N	%	N	%	N	%	N	%
Patient has disorders of lipid metabolism	2,689	2.8%	2,872	3.1%	7,074	5.0%	10,278	5.4%
Patient does not have disorders of lipid metabolism	8,896	1.3%	11,834	1.5%	4,288	4.1%	7,008	4.5%
Patient has glaucoma	497	2.8%	515	3.0%	1,639	4.8%	2,396	5.3%
Patient does not have glaucoma	11,088	1.4%	14,191	1.7%	9,723	4.6%	14,890	4.9%
Patient has hypothyroidism	1,218	2.6%	1,422	2.9%	2,239	5.5%	3,261	5.9%
Patient does not have hypothyroidism	10,367	1.4%	13,284	1.6%	9,123	4.5%	14,025	4.8%
Patient has ischemic heart disease	677	4.9%	690	5.1%	2,446	6.7%	3,356	7.2%
Patient does not have ischemic heart disease	10,908	1.4%	14,016	1.6%	8,916	4.3%	13,930	4.6%
Patient has low back pain	2,599	2.7%	2,916	2.9%	2,923	6.4%	4,319	6.9%
Patient does not have low back pain	8,986	1.3%	11,790	1.5%	8,439	4.2%	12,967	4.6%
Patient has persistent asthma	1,908	2.5%	2,373	3.0%	2,138	7.0%	3,163	7.6%
Patient does not have persistent asthma	9,677	1.4%	12,333	1.5%	9,224	4.3%	14,123	4.6%
Community characteristics:								
Patient resides in a metropolitan area	7,870	1.2%	10,626	1.5%	8,003	4.6%	12,587	5.1%
Patient resides in a nonmetropolitan area	3,715	2.4%	4,080	2.4%	3,359	4.8%	4,699	4.8%
Patient resides in an area with low broadband access	2,119	3.0%	2,146	2.7%	1,498	4.5%	2,182	4.7%
Patient resides in an area with high broadband access	9,466	1.3%	12,560	1.6%	9,864	4.7%	15,104	5.0%

Table 3.10 (*continued*)

Patient characteristics	Commercially insured patients				Medicare Advantage patients			
	2021		2022		2021		2022	
	N	%	N	%	N	%	N	%
Patient resides in an area with a high percentage of BIPOC residents	2,780	1.4%	3,780	1.7%	2,693	4.7%	4,449	5.6%
Patient resides in an area with a low percentage of BIPOC residents	8,805	1.5%	10,926	1.7%	8,669	4.6%	12,837	4.8%
Patient lives in an area with a high percentage of households living in poverty	3,671	2.0%	4,495	2.1%	3,257	5.0%	5,010	5.3%
Patient lives in an area with a low percentage of households living in poverty	7,914	1.3%	10,211	1.5%	8,105	4.5%	12,276	4.9%

Source: Mathematica analysis of data from MN APCD, Extract 26.

Notes: See the Methods section for more detail on defining the analytic sample and subgroups based on patient characteristics. The 2021 columns include patients in the analytic sample for analysis with 2019 and 2021 outcomes, and the 2022 columns include patients in the analytic sample for analysis with 2022 outcomes. We obtained data on patient and area characteristics for the 2022 analytic sample from 2021 claims. The table excludes Minnesota residents who were insured but did not use services during the year.

B. Difference-in-differences analysis (2019-2021)

1. Telehealth use and access to care

Overall use of ambulatory care services increased more among telehealth users than among telehealth non-users from 2019 to 2021 (Figure 3.1; Table 3.11). Specifically:

- Among commercially insured patients, telehealth users had more ambulatory visits in 2021 than in 2019, while telehealth non-users had slightly fewer ambulatory visits. Compared with telehealth nonusers, telehealth users increased their use of ambulatory visits by an additional 0.79 primary care physician (PCP) visits per member per year (PMPY), 0.30 specialist visits PMPY, and 2.55 behavioral health visits PMPY.
- Among Medicare Advantage patients, in contrast, both telehealth users and nonusers had fewer ambulatory visits in 2021 relative to 2019. However, the decrease in visits was larger for telehealth nonusers. Consequently, telehealth users had relative increases in ambulatory visits of 1.00 PCP visits PMPY, 0.56 specialist visits PMPY, and 1.70 behavioral health visits PMPY when compared to telehealth non-users.
- Both primary care visits PMPY and specialty care visits PMPY increased more among Medicare Advantage patients than among commercially insured patients. In contrast, behavioral health visits PMPY increased more among commercially insured patients than among Medicare Advantage patients.

Figure 3.1. Changes in ambulatory care visits between 2019 and 2021, by type of insurance

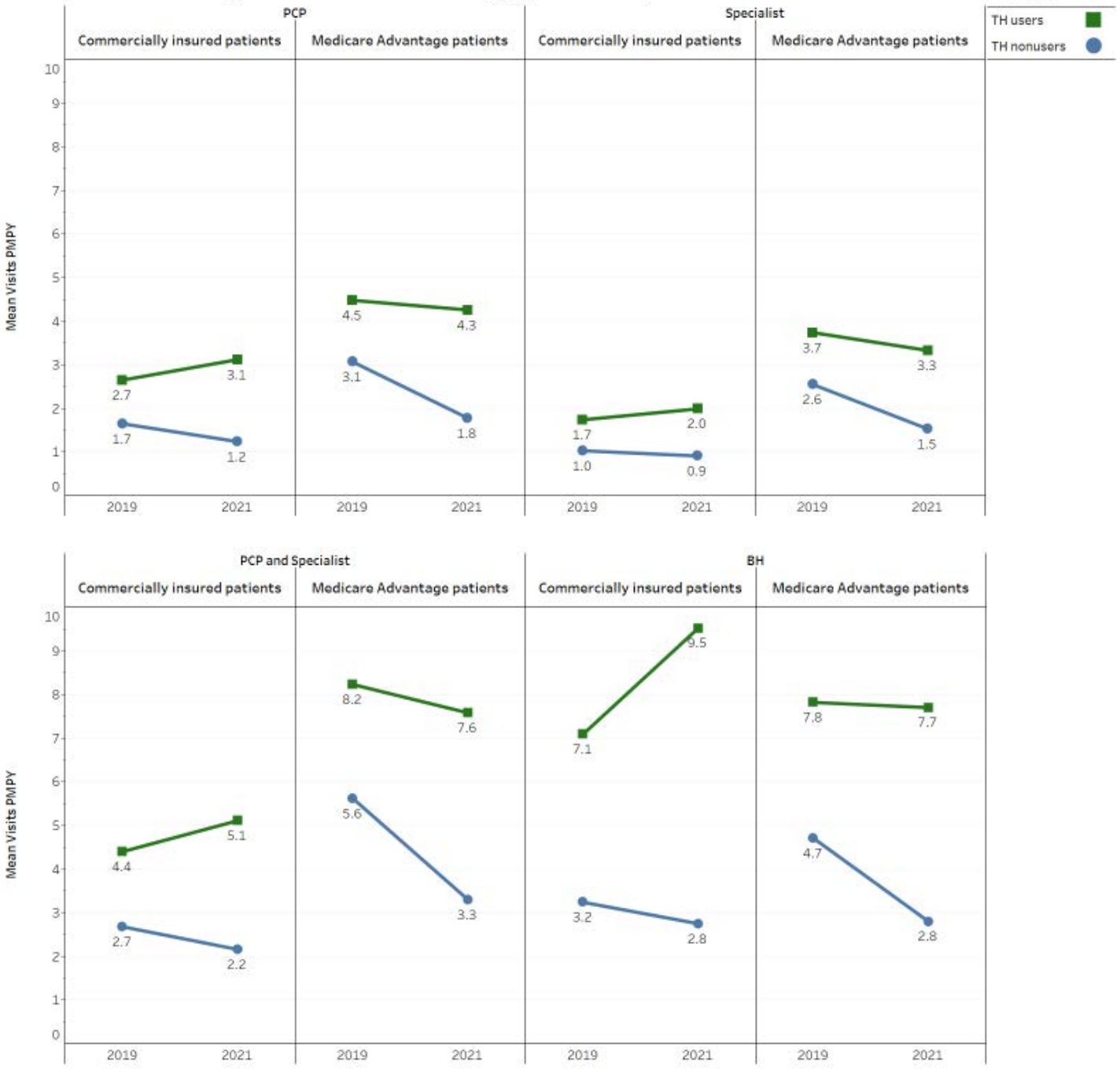

Table 3.11. Unadjusted means in 2019 and 2021 and adjusted difference-in-differences estimates for access to care measures among telehealth users versus nonusers, by type of insurance

Year	Commercially insured patients				Medicare Advantage patients			
	Mean among TH users	Mean among TH nonusers	Adjusted DD estimate	95% CI	Mean among TH users	Mean among TH nonusers	Adjusted DD estimate	95% CI
PCP visits PMPY								
2019	2.62	1.64	NA	NA	4.44	3.05	NA	NA
2021	3.08	1.24	0.79***	(0.77, 0.80)	4.20	1.77	1.00***	(0.95, 1.06)
Specialist visits PMPY								
2019	1.72	1.03	NA	NA	3.70	2.54	NA	NA
2021	1.95	0.91	0.30***	(0.28, 0.31)	3.28	1.52	0.56***	(0.52, 0.61)
PCP and Specialist visits PMPY								
2019	4.33	2.67	NA	NA	8.16	5.60	NA	NA
2021	5.03	2.15	1.09***	(1.06, 1.11)	7.48	3.30	1.56***	(1.47, 1.65)
BH visits PMPY								
2019	6.63	3.15	NA	NA	7.65	4.69	NA	NA
2021	9.02	2.70	2.55***	(2.50, 2.60)	7.51	2.79	1.70***	(1.60, 1.80)

Source: Mathematica analysis of data from Minnesota All Payer Claims Database (MN APCD), Extract 26

Notes: See Methods section for more detail on defining the analytic sample and subgroups based on patient characteristics. Table includes patients in the analytic sample for analysis with 2019 and 2021 outcomes. The table excludes Minnesota residents who were insured but did not use services during the year.

*: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$.

BH = behavioral health; DD = difference-in-differences; CI = confidence interval; PCP = primary care practitioner; PMPY = per member per year; TH = telehealth; NA = not applicable.

2. Any telehealth use and in-person visits

Between 2019 and 2021, there was a reduction in in-person visits among telehealth users and non-users among both commercially insured and Medicare Advantage patients. However, the relative change in visits among telehealth users versus nonusers differed between the commercially insured and Medicare Advantage patients, as shown in the adjusted DD estimates in Table 3.12. Compared with simple relative change estimates, the adjusted DD estimates control for differences driven by patient or geographic characteristics unrelated to whether the patient used telehealth.

- Among commercially insured patients, both telehealth users and non-users had fewer in-person visits in 2021 than in 2019. However, the decrease in use of in-person visits was larger for telehealth users than for non-users, resulting in negative DD estimates or a relative decrease among telehealth users. The largest difference between telehealth users and non-users was for in-person behavioral health visits, with telehealth users receiving 1.27 fewer visits PMPY relative to telehealth non-users between 2019 and 2021. Also, for telehealth users compared to non-telehealth users, in-person PCP visits decreased by 0.25 visits PMPY and in-person specialist visits decreased by 0.16 visits PMPY during that same period.

- For Medicare Advantage patients, telehealth users and non-users had comparable decreases in in-person visits between 2019 and 2021. The differences for in-person PCP and behavioral health visits were not statistically significant, and telehealth users had a relative increase of 0.02 in-person specialist visits PMPY relative to telehealth non-users.

Table 3.12. Unadjusted means in 2019 and 2021 and adjusted difference-in-differences estimates for in-person visit measures for telehealth users versus nonusers, by type of insurance

	Commercially insured patients				Medicare Advantage patients			
Year	Mean among TH users	Mean among TH nonusers	Adjusted DD estimate	95% CI	Mean among TH users	Mean among TH nonusers	Adjusted DD estimate	95% CI
In-person PCP visits PMPY								
2019	2.51	1.61	NA	NA	4.43	3.05	NA	NA
2021	1.96	1.24	-0.25***	(-0.27, -0.23)	3.17	1.77	-0.01	(-0.06, 0.04)
In-person specialist visits PMPY								
2019	1.70	1.03	NA	NA	3.68	2.54	NA	NA
2021	1.47	0.91	-0.16***	(-0.17, -0.15)	2.72	1.52	0.02	(-0.02, 0.07)
In-person PCP and specialist visits PMPY								
2019	4.21	2.64	NA	NA	8.13	5.60	NA	NA
2021	3.43	2.15	-0.41***	(-0.43, -0.39)	5.90	3.29	0.00	(-0.08, 0.08)
In-person BH visits PMPY								
2019	6.50	3.12	NA	NA	7.63	4.69	NA	NA
2021	5.02	2.69	-1.27***	(-1.37, -1.17)	5.75	2.78	-0.03	(-0.12, 0.06)

Source: Mathematica analysis of data from Minnesota All Payer Claims Database (MN APCD), Extract 26.

Notes: See Methods section for more detail on defining the analytic sample and subgroups based on patient characteristics. Table includes patients in the analytic sample for analysis with 2019 and 2021 outcomes. The table excludes Minnesota residents who were insured but did not use services during the year.

*: p < 0.05; **: p < 0.01; ***: p < 0.001.

BH = behavioral health; DD = difference-in-differences; CI = confidence interval; PCP = primary care practitioner; PMPY = per member per year; TH = telehealth; NA = not applicable.

3. Any telehealth use and continuity of care

There were small changes in the continuity of care measures over time among both telehealth users and nonusers. The adjusted DD estimates for both the rBBI and UPC were zero or nearly zero for both commercially insured and Medicare Advantage patients, indicating that the changes in continuity of care were not driven by telehealth use (Table 3.13).

Table 3.13. Unadjusted means in 2019 and 2021 and adjusted difference-in-differences estimates for continuity of care among telehealth users versus nonusers, by type of insurance

Year	Commercially insured patients				Medicare Advantage patients			
	Mean among TH users	Mean among TH nonusers	Adjusted DD estimate	95% CI	Mean among TH users	Mean among TH nonusers	Adjusted DD estimate	95% CI
Reversed Bice-Boxerman Index (rBBI)								
2019	0.851	0.851	NA	NA	0.846	0.825	NA	NA
2021	0.844	0.846	0.00	(-0.00, 0.00)	0.849	0.822	0.00***	(0.00, 0.01)
Percentage of visits with usual provider of care (UPC)								
2019	0.373	0.386	NA	NA	0.366	0.400	NA	NA
2021	0.378	0.394	0.00	(-0.01, -0.00)	0.361	0.406	-0.01***	(-0.01, -0.00)

Source: Mathematica analysis of MN APCD extract 26.

Notes: See Methods section for more detail on defining the analytic sample and subgroups based on patient characteristics. Table includes patients in the analytic sample for analysis with 2019 and 2021 outcomes. The table excludes Minnesota residents who were insured but did not use services during the year.

*: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$.

DD = difference-in-differences; CI = confidence interval; TH = telehealth.

4. Hospitalizations and emergency department visits for ambulatory care sensitive conditions (ACSCs)

Telehealth users had more hospitalizations and ED visits for ACSCs, in general – in both 2019 and 2021. Also, there were differential changes in the number of hospitalizations and ED visits for ACSCs over time among telehealth users compared to nonusers. The adjusted DD estimates for hospitalizations for ACSCs were nearly one per 1,000 commercially insured patients, and nearly 10 per 1,000 Medicare Advantage patients, due to a greater increase in hospitalizations for ACSCs among telehealth users versus non-users over time. The adjusted DD estimates for ED visits for ACSCs was nearly zero and not statistically significant among commercially insured patients. However, the DD estimate was over 8 per 1,000 Medicare Advantage patients, due to an increase in ED visits for ACSCs among telehealth users combined with a small decrease for non-users between 2019 and 2021 (Table 3.14).

Table 3.14. Unadjusted means in 2019 and 2021 and adjusted difference-in-differences estimates for hospitalizations and ED visits for ambulatory care sensitive conditions among telehealth users versus nonusers, by type of insurance

Year	Commercially insured patients				Medicare Advantage patients			
	Mean among TH users	Mean among TH nonusers	Adjusted DD estimate	95% CI	Mean among TH users	Mean among TH nonusers	Adjusted DD estimate	95% CI
Hospitalizations for ambulatory care sensitive conditions (ACSCs) per 1,000 patients per year								
2019	3.3	1.7	NA	NA	19.7	11.3	NA	NA
2021	4.1	1.4	0.86**	(0.36, 1.36)	32.0	13.4	9.48***	(6.91, 12.06)
ED visits for ACSCs per 1,000 patients per year								
2019	12.3	6.7	NA	NA	36.9	23.0	NA	NA
2021	11.4	5.5	-0.11	(-0.88, 0.67)	42.4	19.8	8.14***	(5.11, 11.16)

Source: Mathematica analysis of MN APCD extract 26.

Notes: Mean values and DD estimates are per 1,000 enrollees who had a hospital or ED discharge. See Methods section for more detail on defining the analytic sample and subgroups based on patient characteristics. Table includes patients in the analytic sample for analysis with 2019 and 2021 outcomes. The table excludes Minnesota residents who were insured but did not use services during the year.

*: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$.

DD = difference-in-differences; CI = confidence interval; TH = telehealth.

5. Follow-up visits after hospitalization or emergency department visits for mental illness

There were small changes in the likelihood of a follow-up visit after a hospitalization or ED visit for mental illness between 2019 and 2021 among both telehealth users and nonusers. The adjusted DD estimates for the likelihood of a follow-up visits after a hospitalization for mental illness were zero or nearly zero for both commercially insured and Medicare Advantage patients, indicating no association with telehealth use. Although the DD estimate for follow-up visits after an ED visit for mental illness was statistically nonsignificant among MA patients, it was positive and statistically significant among commercially insured patients, indicating a small relative increase among telehealth users in the likelihood of a follow-up visit after an ED visit for mental illness between 2019 and 2021. (Table 3.15).

Table 3.15. Unadjusted means in 2019 and 2021 and adjusted difference-in-differences estimates for the likelihood of a follow-up visit after a hospitalization or ED visit for mental illness among telehealth users versus nonusers, by type of insurance

	Commercially insured patients				Medicare Advantage patients			
Year	Mean among TH users	Mean among TH nonusers	Adjusted DD estimate	95% CI	Mean among TH users	Mean among TH nonusers	Adjusted DD estimate	95% CI
Proportion of discharges with a follow-up visit after a hospitalization for mental illness								
2019	0.43	0.33	NA	NA	0.79	0.60	NA	NA
2021	0.42	0.27	<0.001	(-0.11, 0.11)	0.70	0.55	0.06	(-0.04, 0.17)
Proportion of discharges with a follow-up visit after an ED visit for mental illness								
2019	0.39	0.34	NA	NA	0.17	0.30	NA	NA
2021	0.39	0.31	0.13***	(0.07, 0.19)	0.08	0.07	0.17	(-0.09, 0.43)

Source: Mathematica analysis of MN APCD extract 26.

Notes: See Methods section for more detail on defining the analytic sample and subgroups based on patient characteristics. Table includes patients in the analytic sample for analysis with 2019 and 2021 outcomes. The table excludes Minnesota residents who were insured but did not use services during the year. The measures for follow-up visit after a hospitalization and ED visit for mental illness are at the hospital discharge level, not patient level.

*: p < 0.05; **: p < 0.01; ***: p < 0.001.

DD = difference-in-differences; CI = confidence interval; TH = telehealth.

6. Audio-only telehealth use and outcomes

As described earlier, audio-only visits were relatively rare in all years we considered, regardless of patients' source of insurance coverage or area of residence. In this analysis, we consider patients who used any audio-only telehealth in 2021 (regardless of their use of other types of telehealth services) and compare them to patients who did not use audio-only telehealth. Given the low rates of audio-only visits observed in 2021 among both commercially insured and Medicare Advantage patients, the findings described below—though statistically significant—may provide limited insight into the relationship between use of audio-only telehealth and other outcomes.

- Among commercially insured patients, audio-only telehealth users increased their use of ambulatory care visits from 2019 to 2021 (after telehealth expansion and payment parity implementation) relative to nonusers of audio-only telehealth. However, their use of in-person services *decreased* relative to patients who did not use audio-only telehealth. The percentage of visits with a usual provider of care among audio-only telehealth users decreased slightly, relative to non-users.
- Similarly, among Medicare Advantage patients, overall use of ambulatory care visits increased among audio-only telehealth users from 2019 to 2021, relative to the change among non-users of audio-only telehealth. The number of in-person ambulatory services also increased among users of audio-only telehealth relative to non-users, but their care became slightly more fragmented. In line with the greater fragmentation of care, audio-only telehealth users experienced a relative decline in the number of visits with their usual provider of care compared to non-users.

Adjusted DD estimates of relative differences in outcomes among audio-only telehealth users versus non-users are reported in Appendix E.

7. Differences by patient and area subgroups

The analyses reported in this section point towards several significant differences among subgroups with respect to the association between telehealth use and relative changes in specific outcomes between 2019 and 2021. Specifically:

- Among commercially insured patients, the increase in PCP and specialist visits (combined) associated with telehealth use varied significantly by patient age, gender, high-risk status, and the presence of specific chronic conditions. Specifically, compared with all other commercially insured patients, the increase was smaller among (1) patients younger than 18 years old, (2) males; and (3) patients with depression; and it was greater among (1) high-risk patients; and (2) patients with diabetes or hypertension. Similarly, while telehealth use in 2021 was associated with a greater increase in behavioral health visits between 2019 and 2021, the increase was smaller among (1) males; and (2) patients with diabetes. The increase in behavioral health visits was greater among (1) patients less than 18 years old; (2) high-risk patients; (3) patients with depression, (4) patients in metropolitan ZIP Codes, and (5) patients in ZIP Codes with a high proportion of BIPOC residents. Although telehealth use in 2021 was associated with a greater increase in ACSC admissions per 1,000 patients between 2019 and 2021, the increase did not vary by area characteristics among commercially insured patients, and was greater among patient with diabetes.
- Among Medicare Advantage patients, telehealth use in 2021 was associated with a greater increase in PCP and specialist visits (combined) between 2019 and 2021, but this increase was smaller among males and patients in ZIP Codes that were in the lowest decile of broadband access; it was greater among (1) patients ages 75 – 84 and 85+(2) high-risk patients (3), patients with diabetes, and (4) patients in ZIP Codes with a high proportion of BIPOC residents. Similarly, while telehealth use in 2021 was associated with a relative increase in behavioral health visits between 2019 and 2021, this increase was smaller among males and among patients in ZIP Codes in the lowest decile of broadband access; it was greater among (1) high-risk patients, (2) patients with diabetes or hypertension, (3) patients in metropolitan ZIP Codes, and (4) patients in ZIP Codes with a high proportion of BIPOC residents. Although telehealth use in 2021 was associated with a greater increase in ACSC admissions per 1,000 patients between 2019 and 2021 among MA patients, the increase did not vary by area characteristics, and was greater among (1) patients ages 75 – 84 and 85+ (2) high-risk patients, and (3) patients with diabetes.

Table 3.16. Adjusted difference-in-differences estimates for changes from 2019 to 2021 in PCP and specialist visits, BH visits, and ACSC admissions, by patient subgroups among commercially insured patients

Patient subgroup definition	% of total population	PCP and specialist visits		BH visits		ACSC admissions per 1,000 patients	
		Adjusted DD estimate (95% CI)	Difference between subgroup estimates statistically significant?	Adjusted DD estimate (95% CI)	Difference between subgroup estimates statistically significant?	Adjusted DD estimate (95% CI)	Difference between subgroup estimates statistically significant?
Main estimate	100%	1.14*** (1.11, 1.17)	NA	2.74*** (2.67, 2.81)	NA	0.79* (0.18, 1.4)	NA
Age:							
Patient is under 18	21%	0.97*** (0.92, 1.02)	Yes	4.15*** (4.00, 4.30)	Yes	NA	No
Patient is 18–44	36%	1.15*** (1.11, 1.18)		3.06*** (2.96, 3.16)		0.43 (-0.25, 1.11)	
Patient is 45–64	38%	1.18*** (1.14, 1.22)		1.89*** (1.82, 1.97)		1.15** (0.39, 1.9)	
Patient is 65+	5%	1.40*** (1.25, 1.56)		1.51*** (1.28, 1.74)		1.35 (-4.37, 7.07)	
Gender:							
Patient is female	55%	1.16*** (1.13, 1.20)	Yes	2.96*** (2.89, 3.03)	Yes	0.51 (-0.23, 1.24)	No
Patient is male	45%	1.11*** (1.07, 1.14)		2.39*** (2.30, 2.48)		1.28** (0.32, 2.24)	
Comorbidities:							
Patient is high risk	27%	1.30*** (1.25, 1.35)	Yes	3.29*** (3.16, 3.41)	Yes	0.77 (-0.09, 1.63)	No
Patient is low risk	73%	1.04*** (1.01, 1.07)		2.38*** (2.31, 2.45)		0.80* (0.15, 1.46)	

Table 3.16 (*continued*)

Patient subgroup definition	% of total population	PCP and specialist visits		BH visits		ACSC admissions per 1,000 patients	
		Adjusted DD estimate (95% CI)	Difference between subgroup estimates statistically significant?	Adjusted DD estimate (95% CI)	Difference between subgroup estimates statistically significant?	Adjusted DD estimate (95% CI)	Difference between subgroup estimates statistically significant?
Patient has depression	20%	1.08*** (1.02, 1.14)	Yes	3.43*** (3.29, 3.57)	Yes	1.30* (0.14, 2.46)	No
Patient does not have depression	80%	1.17*** (1.15, 1.20)		2.39*** (2.33, 2.45)		0.48 (-0.2, 1.16)	
Patient has diabetes	6%	1.24*** (1.13, 1.35)	No	2.54*** (2.35, 2.74)	Yes	6.64** (2, 11.28)	Yes
Patient does not have diabetes	94%	1.13*** (1.10, 1.16)		2.76*** (2.69, 2.83)		0.23 (-0.26, 0.71)	
Patient has hypertension	17%	1.22*** (1.16, 1.29)	Yes	2.80*** (2.66, 2.93)	No	1.56 (-0.12, 3.23)	No
Patient does not have hypertension	83%	1.12*** (1.09, 1.15)		2.73*** (2.65, 2.80)		0.56 (-0.01, 1.12)	

Source: Mathematica analysis of MN APCD extract 26.

Notes: A test of joint statistical significance across all interaction terms identifying differences in subgroup impacts was statistically significant for all three outcomes, suggesting there was evidence for differences across patient characteristics in the association between telehealth use and outcomes. The reported estimates show the estimated association between telehealth use and an outcome for patients in a specific subgroup defined by a patient-level characteristic. We also report (using yes/no values) whether the estimates for complementary subgroups defined by the same characteristic (e.g., patients who have and do not have diabetes) were significantly different from one another. For age, which has multiple categories, we tested whether the differences between estimates for age subgroups were jointly significant.

*: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$.

DD = difference-in-differences; CI = confidence interval; TH = telehealth.

Table 3.17. Adjusted difference-in-differences estimates for changes from 2019 to 2021 in PCP and specialist visits, BH visits, and ACSC admissions, by area subgroups among commercially insured patients

Patient subgroup definition	% of total population	PCP and specialist visits		BH visits		ACSC admissions per 1,000 patients	
		Adjusted DD estimate (95% CI)	Difference between subgroup estimates statistically significant?	Adjusted DD estimate (95% CI)	Difference between subgroup estimates statistically significant?	Adjusted DD estimate (95% CI)	Difference between subgroup estimates statistically significant?
Main estimate	100%	1.09*** (1.07, 1.11)	NA	2.58*** (2.53, 2.63)	NA	0.80*** (0.31, 1.29)	NA
Community characteristics:							
Patient resides in a metropolitan area	81%	1.09*** (1.07, 1.12)	No	2.63*** (2.57, 2.68)	Yes	0.69** (0.14, 1.24)	No
Patient resides in a non-metropolitan area	19%	1.08*** (1.01, 1.15)		2.17*** (2.00, 2.34)		1.67* (-0.09, 3.44)	
Patient resides in an area with low broadband access	9%	1.15*** (1.05, 1.24)	No	2.76*** (2.50, 3.02)	No	0.35 (-2.55, 3.26)	No
Patient resides in an area with high broadband access	91%	1.09*** (1.06, 1.11)		2.57*** (2.51, 2.62)		0.82*** (0.32, 1.33)	
Patient resides in an area with a high percentage of BIPOC residents	25%	1.13*** (1.09, 1.16)	No	2.75*** (2.65, 2.85)	Yes	0.39 (-0.58, 1.37)	No
Patient resides in an area with a low percentage of BIPOC residents	75%	1.07*** (1.04, 1.11)		2.50*** (2.44, 2.56)		0.99** (0.36, 1.62)	
Patient lives in an area with a high percentage of households living in poverty	24%	1.05*** (0.99, 1.11)	No	2.67*** (2.55, 2.79)	No	0.82 (-0.44, 2.08)	No
Patient lives in an area with a low percentage of households living in poverty	76%	1.10*** (1.08, 1.13)		2.55*** (2.5, 2.6)		0.79** (0.23, 1.36)	

Source: Mathematica analysis of MN APCD extract 26.

Table 3.17 (*continued*)

Notes: A test of joint statistical significance across all interaction terms identifying differences in subgroup impacts was not statistically significant for primary care and specialist visits or for ACSC admissions, suggesting there was no evidence for differences across area characteristics in the association between telehealth use and primary care and specialist visits or between telehealth use and ACSC admissions. A test of joint statistical significance across all interaction terms identifying differences in subgroup impacts was statistically significant for behavioral health visits, suggesting there was evidence for differences across area characteristics in the association between telehealth use and behavioral health visits. The reported estimates show the estimated association between telehealth use and an outcome for patients in a specific subgroup defined by an area-level characteristic. We also report (using yes/no values) whether the estimates for complementary subgroups defined by the same characteristic (e.g., patients who live and do not live in a metropolitan area) were significantly different from one another.

*: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$.

DD = difference-in-differences; CI = confidence interval; TH = telehealth.

Table 3.18. Adjusted difference-in-differences estimates for changes from 2019 to 2021 in PCP and specialist visits, BH visits, and ACSC admissions, by patient subgroups among Medicare Advantage patients

Patient subgroup definition	% of total population	PCP and specialist visits		BH visits		ACSC admissions per 1,000 patients	
		Adjusted DD estimate (95% CI)	Difference between subgroup estimates statistically significant?	Adjusted DD estimate (95% CI)	Difference between subgroup estimates statistically significant?	Adjusted DD estimate (95% CI)	Difference between subgroup estimates statistically significant?
Main estimate	100%	1.91*** (1.81, 2.01)	NA	2.03*** (1.92, 2.15)	NA	8.66*** (5.8, 11.52)	NA
Age:							
Patient is under 65	3%	1.65*** (1.35, 1.95)	Yes	2.24*** (1.82, 2.67)	Yes	-2.36 (-13.9, 9.18)	Yes
Patient is 65–74	47%	1.76*** (1.65, 1.87)		1.85*** (1.73, 1.97)		4.86* (1.06, 8.67)	
Patient is 75–84	38%	2.07*** (1.93, 2.22)		2.07*** (1.90, 2.23)		13.54*** (9.02, 18.07)	
Patient is 85+	13%	2.22*** (1.98, 2.47)		2.57*** (2.25, 2.9)		16.87** (4, 29.75)	
Gender:							
Patient is female	56%	1.98*** (1.86, 2.09)	Yes	2.11*** (1.97, 2.25)	Yes	7.91*** (4.5, 11.32)	No
Patient is male	44%	1.82*** (1.69, 1.94)		1.92*** (1.78, 2.06)		9.76*** (4.96, 14.57)	

Table 3.18 (*continued*)

Patient subgroup definition	% of total population	PCP and specialist visits		BH visits		ACSC admissions per 1,000 patients	
		Adjusted DD estimate (95% CI)	Difference between subgroup estimates statistically significant?	Adjusted DD estimate (95% CI)	Difference between subgroup estimates statistically significant?	Adjusted DD estimate (95% CI)	Difference between subgroup estimates statistically significant?
Comorbidities:							
Patient is high risk	27%	2.34*** (2.16, 2.51)	Yes	2.45*** (2.25, 2.65)	Yes	15.56*** (9.72, 21.41)	Yes
Patient is low risk	73%	1.65*** (1.55, 1.74)		1.77*** (1.65, 1.89)		4.37*** (1.89, 6.84)	
Patient has depression	24%	1.83*** (1.68, 1.98)	No	2.08*** (1.89, 2.27)	No	8.05*** (2.13, 13.97)	No
Patient does not have depression	76%	1.96*** (1.85, 2.06)		2.00*** (1.89, 2.12)		9.01*** (5.6, 12.42)	
Patient has diabetes	19%	2.07*** (1.9, 2.24)	Yes	2.22*** (2.02, 2.43)	Yes	20.92*** (11.89, 29.95)	Yes
Patient does not have diabetes	81%	1.86*** (1.75, 1.97)		1.97*** (1.85, 2.10)		5.01*** (2.02, 8)	
Patient has hypertension	64%	1.95*** (1.83, 2.06)	No	2.09*** (1.96, 2.22)	Yes	8.96*** (5.64, 12.29)	No
Patient does not have hypertension	36%	1.84*** (1.71, 1.97)		1.91*** (1.76, 2.05)		8.03*** (4.12, 11.93)	

Source: Mathematica analysis of MN APCD extract 26.

Notes: A test of joint statistical significance across all interaction terms identifying differences in subgroup impacts was statistically significant for all three outcomes, suggesting there was evidence for differences across patient characteristics in the association between telehealth use and outcomes. The reported estimates show the estimated association between telehealth use and an outcome for patients in a specific subgroup defined by a patient-level characteristic. We also report (using yes/no values) whether the estimates for complementary subgroups defined by the same characteristic (e.g., patients who have and do not have diabetes) were significantly different from one another. For age, which has multiple categories, we tested whether the differences between estimates for age subgroups were jointly significant.

*: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$.

DD = difference-in-differences; CI = confidence interval; TH = telehealth.

Table 3.19. Adjusted difference-in-differences estimates for changes from 2019 to 2021 in PCP and specialist visits, BH visits, and ACSC admissions, by area subgroups among Medicare Advantage patients

Patient subgroup definition	% of total population	PCP and specialist visits		BH visits		ACSC admissions per 1,000 patients	
		Adjusted DD estimate (95% CI)	Difference between subgroup estimates statistically significant?	Adjusted DD estimate (95% CI)	Difference between subgroup estimates statistically significant?	Adjusted DD estimate (95% CI)	Difference between subgroup estimates statistically significant?
Main estimate	100%	1.79*** (1.71, 1.86)	NA	1.91*** (1.82, 1.99)	NA	9.43*** (6.86, 12)	NA
Community characteristics:							
Patient resides in a metropolitan area	72%	1.82*** (1.73, 1.91)	No	2.00*** (1.90, 2.10)	Yes	9.56*** (6.39, 12.73)	No
Patient resides in a non-metropolitan area	28%	1.62*** (1.44, 1.8)		1.50*** (1.33, 1.67)		8.82* (1.65, 15.99)	
Patient resides in an area with low broadband access	13%	1.42*** (1.14, 1.69)	Yes	1.64*** (1.37, 1.90)	Yes	10.47* (0.12, 20.83)	No
Patient resides in an area with high broadband access	87%	1.82*** (1.75, 1.9)		1.93*** (1.85, 2.02)		9.33*** (6.6, 12.05)	
Patient resides in an area with a high percentage of BIPOC residents	23%	1.97*** (1.82, 2.12)	Yes	2.14*** (1.96, 2.31)	Yes	13.12*** (7.97, 18.27)	No
Patient resides in an area with a low percentage of BIPOC residents	77%	1.71*** (1.62, 1.81)		1.81*** (1.71, 1.92)		7.94*** (4.77, 11.1)	
Patient lives in an area with a high percentage of households living in poverty	27%	1.67*** (1.51, 1.84)	No	1.84*** (1.64, 2.05)	No	6.73* (0.45, 13)	No
Patient lives in an area with a low percentage of households living in poverty	73%	1.82*** (1.74, 1.91)		1.93*** (1.83, 2.02)		10.26*** (7.41, 13.11)	

Source: Mathematica analysis of MN APCD extract 26.

Table 3.19 (*continued*)

Notes: A test of joint statistical significance across all interaction terms identifying differences in subgroup impacts was statistically significant for primary care and specialist visits and also for behavioral health visits, suggesting there was evidence for differences across area characteristics in the association between telehealth use and these outcomes. The joint significance test across all area subgroups was not statistically significant for ACSC admissions. The reported estimates show the estimated association between telehealth use and an outcome for patients in a specific subgroup defined by an area-level characteristic. We also report (using yes/no values) whether the estimates for complementary subgroups defined by the same characteristic (e.g., patients who live and do not live in a metropolitan area) were significantly different from one another.

*: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$.

DD = difference-in-differences; CI = confidence interval; TH = telehealth.

C. Cross-sectional analysis (2022)

1. Telehealth use and access to care

To supplement the DD analysis over 2019 – 2021, we also examined the association between telehealth use in 2021 and outcomes in 2022. This analysis allows us to examine the lagged association between telehealth use and outcomes, without telehealth visit claims in 2021 affecting both the telehealth measure and the outcome definitions, unlike in the DD analysis. Telehealth use in 2021 was associated with higher levels of ambulatory care use in 2022, after adjusting for patient and area-level characteristics, among both commercially insured and Medicare Advantage patients (Figure 3.2; Table 3.20).

- Among commercially insured patients, those who used telehealth in 2021 had 1.7 more primary care and specialist visits (1.1 more primary care visits, 0.6 more specialist visits) compared with nonusers, and 4.4 more behavioral health visits in 2022.
- Similarly, among Medicare Advantage patients, telehealth use in 2021 was associated with 2.4 more primary care and specialist visits (1.3 more primary care visits, 1.1 more specialist visits), and 2.9 more behavioral health visits in 2022.

Figure 3.2. Ambulatory care visits in 2022, by type of insurance

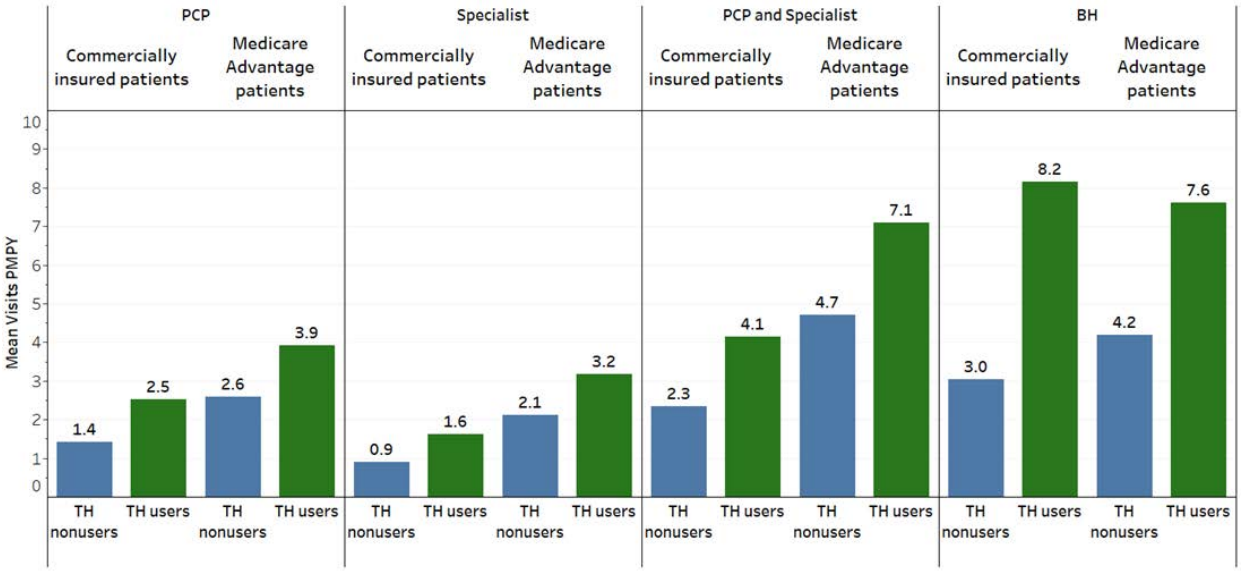

Table 3.20. Unadjusted means in 2022 and adjusted differences in access to care measures among telehealth users versus nonusers, by type of insurance

Visit type	Commercially insured patients				Medicare Advantage patients			
	Mean among TH users	Mean among TH nonusers	Adjusted difference	95% CI	Mean among TH users	Mean among TH nonusers	Adjusted difference	95% CI
PCP visits PMPY	2.49	1.42	1.10***	(1.08, 1.12)	3.86	2.56	1.30***	(1.27, 1.34)
Specialist visits PMPY	1.60	0.91	0.61***	(0.60, 0.62)	3.14	2.11	1.05***	(1.02, 1.07)
PCP and specialist visits PMPY	4.07	2.33	1.71***	(1.68, 1.73)	7.01	4.68	2.35***	(2.30, 2.40)
BH visits PMPY	7.71	2.98	4.36***	(4.27, 4.45)	7.41	4.16	2.90***	(2.84, 2.96)

*: p < 0.05; **: p < 0.01; ***: p < 0.001.
CI = confidence interval; TH = telehealth.

2. Telehealth use and in-person visits

Telehealth use in 2021 was also associated with higher levels of in-person ambulatory care use in 2022, after adjusting for patient and area-level characteristics, among both commercially insured and Medicare Advantage patients (see Table 3.21). These results suggest that telehealth use is complementary to instead of being a substitute for in-person care.

- Among commercially insured patients, compared to nonusers, those who used telehealth in 2021 had 0.7 more in-person primary care and specialist visits (0.4 more in-person primary care visits, 0.3 more in-person specialist visits), and 1.7 more in-person behavioral health visits in 2022.
- Similarly, among patients in MA, telehealth use in 2021 was associated with 1.4 more in-person primary care and specialist visits (0.7 more of both in-person primary care visits and in-person specialist visits), and 1.7 more in-person behavioral health visits in 2022 (*p*-value < 0.001 in all cases).

Table 3.21. Unadjusted means in 2022 and adjusted differences in in-person visits among telehealth users versus nonusers, by type of insurance

Visit type	Commercially insured patients				Medicare Advantage patients			
	Mean among TH users	Mean among TH nonusers	Adjusted difference	95% CI	Mean among TH users	Mean among TH nonusers	Adjusted difference	95% CI
In-person PCP visits PMPY	1.80	1.26	0.40***	(0.38, 0.41)	3.31	2.42	0.69***	(0.67, 0.73)
In-person specialist visits PMPY	1.31	0.87	0.32***	(0.32, 0.33)	2.82	2.05	0.70***	(0.68, 0.72)
In-person PCP and specialist visits PMPY	3.10	2.13	0.72***	(0.70, 0.74)	6.14	4.48	1.39***	(1.35, 1.44)

Table 3.21 (*continued*)

Visit type	Commercially insured patients				Medicare Advantage patients			
	Mean among TH users	Mean among TH nonusers	Adjusted difference	95% CI	Mean among TH users	Mean among TH nonusers	Adjusted difference	95% CI
In-person BH visits PMPY	4.76	2.65	1.69***	(1.65, 1.73)	6.13	3.97	1.68***	(1.62, 1.73)

*: p < 0.05; **: p < 0.01; ***: p < 0.001.

CI = confidence interval; TH = telehealth.

3. Telehealth use and continuity of care

Telehealth use in 2021 was associated with lower continuity or greater fragmentation of care among Medicare advantage patients in 2022, while findings were inconclusive for commercially insured patients (see Table 3.22).

- Among commercially insured patients, telehealth users in 2021 had a slightly lower proportion of visits with their usual provider of care (1 percentage point) but somewhat lower fragmentation of care as measured by the rBBI. These metrics would generally be expected to move in opposite directions.
- Among Medicare Advantage patients, telehealth use in 2021 was associated with more fragmentation as measured by either the proportion of visits with their usual provider of care or the rBBI value: the proportion of visits with a usual provider was 3 percentage points lower among telehealth users, and the rBBI metric was higher among telehealth users.

Table 3.22. Unadjusted means in 2022 and adjusted differences in continuity of care measures among telehealth users versus nonusers, by type of insurance

Metric	Commercially insured patients				Medicare Advantage patients			
	Mean among TH users	Mean among TH nonusers	Adjusted difference	95% CI	Mean among TH users	Mean among TH nonusers	Adjusted difference	95% CI
Reversed Bice-Boxerman index (rBBI)	0.850	0.857	-0.01***	(-0.01, -0.00)	0.861	0.844	0.02***	(0.01, 0.02)
Percentage of visits with usual provider of care (UPC)	0.373	0.379	-0.01***	(-0.01, -0.00)	0.346	0.379	-0.03***	(-0.03, -0.03)

*: p < 0.05; **: p < 0.01; ***: p < 0.001.
CI = confidence interval; TH = telehealth.

4. Hospitalizations and emergency department visits for ambulatory care sensitive conditions (ACSCs)

Telehealth use in 2021 was associated with higher levels of hospitalizations and ED visits for ACSCs in 2022, after adjusting for patient and area-level characteristics, among both commercially insured and Medicare Advantage patients (see Table 3.23). Consistent with the descriptive findings earlier in the report, these results point towards higher need and higher risk patients being more likely to use telehealth, resulting in the positive association between telehealth use and ACSC admissions and ED visits.

- Among commercially insured patients, compared to nonusers, those who used telehealth in 2021 had 1.25 more hospitalizations for ACSCs and 2.8 more ED visits for ACSCs in 2022 (*p*-value < 0.001 in both cases).
- Similarly, among Medicare Advantage patients, telehealth use in 2021 was associated with 7.2 more hospitalizations for ACSCs and 13.06 more ED visits for ACSCs in 2022 (*p*-value < 0.001 in both cases).

Table 3.23. Unadjusted means in 2022 and adjusted differences in hospitalizations and ED visits for ambulatory care sensitive conditions (ACSCs) among telehealth users versus nonusers, by type of insurance

Service	Commercially insured patients				Medicare Advantage patients			
	Mean among TH users	Mean among TH nonusers	Adjusted difference	95% CI	Mean among TH users	Mean among TH nonusers	Adjusted difference	95% CI
Hospitalizations for ACSCs per 1,000 patients per year	3.5	1.9	1.25***	(0.95, 1.54)	32.2	18.9	7.20***	(5.81, 8.59)
ED visits for ACSCs per 1,000 patients per year	11.0	6.9	2.80***	(2.25, 3.31)	44.7	28.7	13.06***	(11.46, 14.67)

Notes: Mean values and DD estimates are per 1,000 patients per year.
*: p < 0.05; **: p < 0.01; ***: p < 0.001.
CI = confidence interval; TH = telehealth.

5. Follow-up visits after hospitalization or emergency department visits for mental illness

Telehealth use in 2021 was associated with a higher likelihood of receiving a follow-up visit after either an inpatient hospitalization or ED visit for mental illness in 2022, after adjusting for patient and area-level characteristics, among both commercially insured and Medicare Advantage patients (see Table 3.24).

- Among commercially insured patients, compared to nonusers, those who used telehealth in 2021 had a higher likelihood of a follow-up visit after an inpatient hospitalization and ED visit for mental illness by 0.12 and 0.26 percentage points, respectively (*p*-value < 0.001 in both cases).
- Similarly, among patients in Medicare Advantage, telehealth use in 2021 was associated with a higher likelihood of a follow-up visit after an inpatient hospitalization and ED visit for mental illness by 0.1 and 0.15 percentage points, respectively (*p*-value < 0.05 in both cases).

Table 3.24. Unadjusted means in 2022 and adjusted differences in the likelihood of a follow-up visit after a hospitalization or ED visit for mental illness among telehealth users versus nonusers, by type of insurance

	Commercially insured patients				Medicare Advantage patients			
Discharge type	Mean among TH users	Mean among TH nonusers	Adjusted difference	95% CI	Mean among TH users	Mean among TH nonusers	Adjusted difference	95% CI
Proportion of discharges with a follow-up visit after a hospitalization for mental illness	0.38	0.30	0.12***	(0.06, 0.18)	0.63	0.45	0.10*	(0.00, 0.19)
Proportion of discharges with a follow-up visit after an ED visit for mental illness	0.40	0.33	0.26***	(0.22, 0.31)	0.18	0.30	0.15*	(0.00, 0.30)

*: p < 0.05; **: p < 0.01; ***: p < 0.001.

CI = confidence interval; TH = telehealth.

6. Audio-only telehealth use and outcomes

In unadjusted analyses, we found that users of audio-only telehealth in 2021 had higher levels of ambulatory care use, including in-person ambulatory care use, in 2022, compared to nonusers – among both commercially insured and MA patients. All estimates were statistically significant at the 1 percent level. For example, primary care and specialist visits in 2022 were higher by 3 and 3.5 visits for audio-only telehealth users versus non-users in 2021, and behavioral health visits were higher by 4.2 and 3.4 visits, among commercially insured and MA patients, respectively. As for any telehealth use, audio-only telehealth use in 2021 was also associated with lower continuity or greater fragmentation of care among Medicare advantage patients in 2022, with mixed findings for commercially insured patients.

7. Differences by patient and area subgroups

Our subgroup analyses pointed towards several significant differences in the association between telehealth use in 2021 and specific outcomes in 2022, by patient and area characteristics.

While telehealth use in 2021 was associated with higher PCP and specialist visits (combined) among all commercially insured patients in the analysis sample in 2022, the magnitude varied significantly by patient age, gender, high-risk status, and having specific chronic conditions. Specifically, the estimated difference was lower among – (1) patients less than 18 years old, and (2) males; and it was higher among – (1) high-risk patients; (2) those with depression; and (3) those with diabetes or hypertension.

Similarly, while telehealth use in 2021 was associated with higher behavioral health visits among all commercially insured patients in the analysis sample in 2022, the estimated difference was lower among – (1) males; and (2) those with diabetes; and it was higher among – (1) patients less than 18 years old; (2) high-risk patients; (3) those with depression; (4) those with hypertension; (5) patients in metropolitan ZIP Codes; (6) those in ZIP Codes with a higher proportion of BIPOC residents; and (7) those in ZIP Codes with a higher proportion of the population in poverty.

Also, while telehealth use in 2021 was associated with higher ACSC admissions per 1,000 patients among all commercially insured patients in the analysis sample in 2022, the estimated difference did not vary by area characteristics and was higher among – (1) older patients (those 65+); (2) males; and (3) those with diabetes or hypertension.

While telehealth use in 2021 was associated with higher PCP and specialist visits (combined) among all MA patients in the analysis sample in 2022, the estimated difference was lower among patients in ZIP Codes with the lowest broadband access and it was higher among – (1) patients less than 65; (2) high-risk patients; and (3) those with depression.

Similarly, while telehealth use in 2021 was associated with higher behavioral health visits among all MA patients in the analysis sample in 2022, the estimated difference was lower among – (1) males; (2) those with hypertension; and (3) patients in ZIP Codes with the lowest broadband access; and it was higher among – (1) patients less than 65 years old; (2) high-risk patients; (3) those with depression; (4) patients in metropolitan ZIP Codes; (5) those in ZIP Codes with a higher proportion of BIPOC residents; and (6) those in ZIP Codes with a higher proportion of the population in poverty.

Finally, while telehealth use in 2021 was associated with higher ACSC admissions among all MA patients in the analysis sample in 2022, the estimated difference was higher among – (1) older patients (those 75-84 or 85+); (2) high-risk patients; (3) those with diabetes or hypertension; and (4) patients in metropolitan areas.

Table 3.25. Adjusted differences in 2022 for PCP and specialist visits, BH visits, and ACSC admissions , by patient subgroups among commercially insured patients

Patient subgroup definition	% of total population	PCP and specialist visits		BH visits		ACSC admissions per 1,000 patients	
		Adjusted difference (95% CI)	p-value for difference in estimates between subgroups	Adjusted difference (95% CI)	p-value for difference in estimates between subgroups	Adjusted difference (95% CI)	p-value for difference in estimates between subgroups
Main estimate	100%	1.85*** (1.82, 1.87)	NA	4.96*** (4.85, 5.07)	NA	1.36*** (1.03, 1.69)	NA
Age:							
Patient is under 18	22%	1.83*** (1.79, 1.86)	Yes	7.79*** (7.62, 7.96)	Yes	NA	Yes
Patient is 18–44	38%	1.80*** (1.77, 1.83)		5.44*** (5.29, 5.59)		0.91*** (0.54, 1.27)	
Patient is 45–64	37%	1.89*** (1.86, 1.92)		3.22*** (3.13, 3.31)		1.50*** (1.06, 1.94)	
Patient is 65+	3%	2.13*** (2.02, 2.23)		2.22*** (2.03, 2.42)		7.06*** (3.75, 10.37)	
Gender:							
Patient is female	55%	1.99*** (1.96, 2.01)	Yes	5.25*** (5.13, 5.37)	Yes	0.96*** (0.62, 1.29)	Yes
Patient is male	45%	1.62*** (1.59, 1.64)		4.51*** (4.39, 4.62)		2.08*** (1.44, 2.72)	
Comorbidities:							
Patient is high risk	25%	2.40*** (2.37, 2.44)	Yes	6.66*** (6.50, 6.81)	Yes	1.18*** (0.65, 1.7)	No
Patient is low risk	75%	1.51*** (1.49, 1.54)		3.96*** (3.87, 4.06)		1.50** (1.17, 1.83)	
Patient has depression	19%	2.07*** (2.03, 2.11)	Yes	7.38*** (7.21, 7.55)	Yes	1.82*** (1.16, 2.49)	No

Table 3.25 (*continued*)

Patient subgroup definition	% of total population	PCP and specialist visits		BH visits		ACSC admissions per 1,000 patients	
		Adjusted difference (95% CI)	p-value for difference in estimates between subgroups	Adjusted difference (95% CI)	p-value for difference in estimates between subgroups	Adjusted difference (95% CI)	p-value for difference in estimates between subgroups
Patient does not have depression	81%	1.74*** (1.72, 1.76)		3.81*** (3.72, 3.90)		1.11*** (0.74, 1.47)	
Patient has diabetes	5%	2.04*** (1.97, 2.11)	Yes	4.28*** (4.11, 4.45)	Yes	10.14*** (7.31, 12.97)	Yes
Patient does not have diabetes	95%	1.83*** (1.81, 1.85)		5.02*** (4.90, 5.13)		0.58*** (0.33, 0.83)	
Patient has hypertension	16%	2.17*** (2.12, 2.21)	Yes	5.42*** (5.29, 5.55)	Yes	4.11*** (3.22, 5)	Yes
Patient does not have hypertension	84%	1.77*** (1.75, 1.79)		4.86*** (4.74, 4.98)		0.61*** (0.3, 0.91)	

Source: Mathematica analysis of MN APCD extract 26.

Notes: A test of joint statistical significance across all interaction terms identifying differences in subgroup impacts was statistically significant for all three outcomes, suggesting there was evidence for differences across patient characteristics in the association between telehealth use and outcomes. The reported estimates show the estimated association between telehealth use and an outcome for patients in a specific subgroup defined by a patient-level characteristic. We also report (using yes/no values) whether the estimates for complementary subgroups defined by the same characteristic (e.g., patients who have and do not have diabetes) were significantly different from one another. For age, which has multiple categories, we tested whether the differences between estimates for age subgroups were jointly significant.

*: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$.

CI = confidence interval; TH = telehealth.

Table 3.26. Adjusted differences in 2022 for PCP and specialist visits, BH visits, and ACSC admissions, by area subgroups among commercially insured patients

Patient subgroup definition	% of total population	PCP and specialist visits		BH visits		ACSC admissions per 1,000 patients	
		Adjusted difference (95% CI)	p-value for difference in estimates between subgroups	Adjusted difference (95% CI)	p-value for difference in estimates between subgroups	Adjusted difference (95% CI)	p-value for difference in estimates between subgroups
Main estimate	100%	1.71*** (1.68, 1.73)	NA	4.39*** (4.31, 4.46)	NA	1.26*** (0.95, 1.57)	NA
Community characteristics:							
Patient resides in a metropolitan area	81%	1.70*** (1.68, 1.73)	No	4.46*** (4.37, 4.54)	Yes	1.23*** (0.89, 1.56)	No
Patient resides in a nonmetropolitan area	19%	1.72*** (1.63, 1.80)		3.83*** (3.5, 4.16)		1.50*** (0.63, 2.37)	
Patient resides in an area with high broadband access	9%	1.78*** (1.69, 1.87)	No	4.53*** (4.14, 4.92)	No	1.26*** (0.94, 1.58)	No
Patient resides in an area with low broadband access	91%	1.70*** (1.68, 1.73)		4.38*** (4.29, 4.46)		1.21 (-0.15, 2.57)	
Patient resides in an area with a high percentage of BIPOC residents	26%	1.73*** (1.68, 1.78)	No	4.70*** (4.55, 4.86)	Yes	1.73*** (1.03, 2.43)	No
Patient resides in an area with a low percentage of BIPOC residents	74%	1.70*** (1.67, 1.72)		4.24*** (4.14, 4.34)		1.03*** (0.69, 1.38)	
Patient lives in an area with a high percentage of households living in poverty	24%	1.67*** (1.61, 1.73)	No	4.95*** (4.74, 5.17)	Yes	1.87*** (1.05, 2.7)	No
Patient lives in an area with a low percentage of households living in poverty	76%	1.72*** (1.69, 1.74)		4.22*** (4.13, 4.31)		1.07*** (0.73, 1.41)	

Source: Mathematica analysis of MN APCD extract 26.

Table 3.26 (*continued*)

Notes: A test of joint statistical significance across all interaction terms identifying differences in subgroup impacts was statistically significant for primary care and specialist visits, suggesting there was evidence for differences across area characteristics in the association between telehealth use and primary care and specialist visits. A test of joint statistical significance across all interaction terms identifying differences in subgroup impacts was not statistically significant for behavioral health visits or for ACSC admissions, suggesting there was no evidence for differences across area characteristics in the association between telehealth use and behavioral health visits or between telehealth use and ACSC admissions. The reported estimates show the estimated association between telehealth use and an outcome for patients in a specific subgroup defined by an area-level characteristic. We also report (using yes/no values) whether the estimates for complementary subgroups defined by the same characteristic (e.g., patients who live and do not live in a metropolitan area) were significantly different from one another.

*: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$.

CI = confidence interval; TH = telehealth.

Table 3.27. Adjusted differences in 2022 for PCP and specialist visits, BH visits, and ACSC admissions, by patient subgroups among Medicare Advantage patients

Patient subgroup definition	% of total population	PCP and specialist visits		BH visits		ACSC admissions per 1,000 patients	
		Adjusted difference (95% CI)	p-value for difference in estimates between subgroups	Adjusted difference (95% CI)	p-value for difference in estimates between subgroups	Adjusted difference (95% CI)	p-value for difference in estimates between subgroups
Main estimate	100%	2.42*** (2.37, 2.47)	NA	3.12*** (3.05, 3.18)	NA	7.45*** (5.93, 8.96)	NA
Age:							
Patient is under 65	4%	3.12*** (2.95, 3.29)	Yes	5.57*** (5.31, 5.83)	Yes	-0.08 (-6.68, 6.52)	Yes
Patient is 65–74	53%	2.42*** (2.37, 2.48)		3.03*** (2.96, 3.11)		5.31*** (3.52, 7.09)	
Patient is 75–84	33%	2.33*** (2.25, 2.41)		2.07*** (2.60, 2.80)		11.00*** (8.43, 13.57)	
Patient is 85+	10%	2.04*** (1.92, 2.17)		2.59*** (2.4, 2.78)		15.65*** (8.68, 22.62)	
Gender:							
Patient is female	56%	2.44*** (2.38, 2.5)	Yes	3.22*** (3.14, 3.29)	Yes	7.33*** (5.57, 9.09)	No
Patient is male	44%	2.39*** (2.33, 2.46)		2.97*** (2.88, 3.06)		7.61*** (5.07, 10.15)	
Comorbidities:							
Patient is high risk	24%	2.87*** (2.78, 2.96)	Yes	3.74*** (3.61, 3.86)	Yes	13.31*** (9.54, 17.08)	Yes
Patient is low risk	76%	2.17*** (2.13, 2.22)		2.77*** (2.70, 2.84)		4.19*** (2.89, 5.48)	
Patient has depression	24%	2.63*** (2.55, 2.71)	Yes	4.19*** (4.06, 4.31)	Yes	6.13*** (3.36, 8.89)	No

Table 3.27 (*continued*)

Patient subgroup definition	% of total population	PCP and specialist visits		BH visits		ACSC admissions per 1,000 patients	
		Adjusted difference (95% CI)	p-value for difference in estimates between subgroups	Adjusted difference (95% CI)	p-value for difference in estimates between subgroups	Adjusted difference (95% CI)	p-value for difference in estimates between subgroups
Patient does not have depression	76%	2.30*** (2.25, 2.36)		2.49*** (2.43, 2.56)		8.21*** (6.45, 9.97)	
Patient has diabetes	18%	2.45*** (2.35, 2.54)	No	3.12*** (2.99, 3.24)	No	18.34*** (14.26, 22.41)	Yes
Patient does not have diabetes	82%	2.42*** (2.36, 2.47)		3.12*** (3.04, 3.19)		4.38*** (2.77, 5.99)	
Patient has hypertension	60%	2.42*** (2.36, 2.48)	No	3.06*** (2.98, 3.14)	Yes	8.93*** (7.17, 10.7)	Yes
Patient does not have hypertension	40%	2.42*** (2.35, 2.5)		3.22*** (3.13, 3.31)		4.70*** (2.62, 6.77)	

Source: Mathematica analysis of MN APCD extract 26.

Notes: A test of joint statistical significance across all interaction terms identifying differences in subgroup impacts was statistically significant for all three outcomes, suggesting there was evidence for differences across patient characteristics in the association between telehealth use and outcomes. The reported estimates show the estimated association between telehealth use and an outcome for patients in a specific subgroup defined by a patient-level characteristic. We also report (using yes/no values) whether the estimates for complementary subgroups defined by the same characteristic (e.g., patients who have and do not have diabetes) were significantly different from one another. For age, which has multiple categories, we tested whether the differences between estimates for age subgroups were jointly significant.

CI = confidence interval; TH = telehealth.

Table 3.28. Adjusted differences in 2022 for PCP and specialist visits, BH visits, and ACSC admissions by area subgroups among Medicare Advantage patients

Patient subgroup definition	% of total population	PCP and specialist visits		BH visits		ACSC admissions per 1,000 patients	
		Adjusted difference (95% CI)	p-value for difference in estimates between subgroups	Adjusted difference (95% CI)	p-value for difference in estimates between subgroups	Adjusted difference (95% CI)	p-value for difference in estimates between subgroups
Main estimate	100%	2.35*** (2.30, 2.40)	NA	2.92*** (2.86, 2.98)	NA	7.29*** (5.92, 8.66)	NA
Community characteristics:							
Patient resides in a metropolitan area	72%	2.34*** (2.29, 2.40)	No	3.01*** (2.94, 3.08)	Yes	7.98*** (6.39, 9.56)	Yes
Patient resides in a nonmetropolitan area	28%	2.38*** (2.25, 2.51)		2.50*** (2.32, 2.69)		4.20** (1, 7.4)	
Patient resides in an area with high broadband access	13%	2.37*** (2.32, 2.42)	Yes	2.95*** (2.88, 3.01)	Yes	6.89*** (5.47, 8.31)	No
Patient resides in an area with low broadband access	87%	2.14*** (1.95, 2.33)		2.62*** (2.36, 2.87)		11.50*** (6.64, 16.36)	
Patient resides in an area with a high percentage of BIPOC residents	23%	2.29*** (2.19, 2.38)	No	3.03*** (2.91, 3.14)	Yes	9.26*** (6.32, 12.2)	No
Patient resides in an area with a low percentage of BIPOC residents	77%	2.38*** (2.32, 2.43)		2.87*** (2.80, 2.94)		6.49*** (4.87, 8.11)	
Patient lives in an area with a high percentage of households living in poverty	27%	2.30*** (2.20, 2.41)	No	3.10*** (2.98, 3.22)	Yes	6.01*** (3.02, 9)	No
Patient lives in an area with a low percentage of households living in poverty	73%	2.36*** (2.31, 2.42)		2.86*** (2.79, 2.93)		7.70*** (6.13, 9.28)	

Source: Mathematica analysis of MN APCD extract 26.

Table 3.28 (*continued*)

Notes: A test of joint statistical significance across all interaction terms identifying differences in subgroup impacts was statistically significant for all three outcomes, suggesting there was evidence for differences across area characteristics in the association between telehealth use and outcomes. The reported estimates show the estimated association between telehealth use and an outcome for patients in a specific subgroup defined by an area-level characteristic. We also report (using yes/no values) whether the estimates for complementary subgroups defined by the same characteristic (e.g., patients who live and do not live in a metropolitan area) were significantly different from one another.

*: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$.

CI = confidence interval; TH = telehealth.

This page has been left blank for double-sided copying.

IV. Summary and Limitations

A. Key findings

1. Characteristics of Minnesotans using telehealth services

Patients who used telehealth services following telehealth expansion differed substantially from those who did not use telehealth in 2021 and 2022, with respect to both their individual characteristics and the characteristics of where they reside—whether commercially insured or insured through Medicare Advantage. Patients who used telehealth were more likely to be high-risk and to have selected comorbidities that included depression, diabetes, hypertension, hypothyroidism, ischemic heart disease, low back pain, and persistent asthma.

With respect to the patients' locales, telehealth use was more common among those residing in metropolitan areas, in areas with high broadband access, and in areas with high percentages of BIPOC residents. These characteristics suggest the importance of infrastructure to support video visits with patients' providers. Note that because the MN APCD does not include patient-level data on race and ethnicity, we use area-level data on the percentage of BIPOC residents as a proxy, which limits our ability to draw conclusions about telehealth usage and outcomes for BIPOC patients.

2. Audio-only telehealth

Patients were much less likely to use audio-only telehealth, compared with audio-visual telehealth. However, Medicare Advantage patients used audio-only telehealth at higher rates (measured as the percent of patients with one or more visits per year) than commercially insured patients. About 5 percent of Medicare Advantage patients, compared with less than 2 percent of commercially insured patients, used audio-only visits in 2021 and 2022.

Among both commercially insured and Medicare Advantage patients, use of audio-only telehealth was more common among high-risk patients and among patients with a broad range of comorbidities, as well as among those living in nonmetropolitan and high-poverty areas. Among commercially insured patients, use of audio-only telehealth was also more common if living in an area with low broadband access.

3. Access to care

Telehealth use was associated with relatively large increases in use of primary care, specialty care, and behavioral health services (both in-person and via telehealth) between 2019 and 2021, among both commercially insured and Medicare Advantage patients. The increase in use of behavioral health visits associated with telehealth was especially marked. Commercially insured patients who used telehealth increased their use of behavioral health services by about 2.5 additional visits per year compared with telehealth nonusers; Medicare Advantage telehealth users increased their use of behavioral health services by nearly 2 visits per year compared with telehealth nonusers.

These increases in service use persisted into the subsequent year. Among both commercially insured and Medicare Advantage patients who used telehealth in 2021, use of ambulatory services was relatively high in 2022.

Telehealth use in 2021 was associated with greater increases in the use of ambulatory visits for high-risk patients, those with diabetes, hypertension, and depression, patients in metropolitan areas, and those in areas with high percentages of BIPOC residents.

4. Use of in-person services

Among commercially insured patients, telehealth in 2021 was associated with a relative decrease from 2019 to 2021 in in-person visits for primary care, specialty care, and behavioral health. This pattern suggests that patients were substituting telehealth for at least some in-person visits. Among Medicare Advantage patients, the general decrease in the use of in-person services from 2019 to 2021 was not significantly associated with telehealth use.

Considering subsequent-year effects, telehealth use was significantly associated with higher use of in-person services in 2022 among both Medicare Advantage and commercially insured patients. Despite this association between telehealth and use of in-person services, commercially insured patients as a whole did not increase their use of in-person services over 2022. However, Medicare Advantage patients used slightly more in-person services on average in 2022 than in 2021—suggesting their return to seeking in-person care as the COVID-19 pandemic waned.

5. Continuity of care

Telehealth use was associated with greater fragmentation of care—alternatively measured by an index (the rBBI) or simply as visits with a usual provider of care—for Medicare Advantage patients, although the magnitude of this change in fragmentation of care was small. In 2022, among Medicare Advantage patients, telehealth use was associated with slightly fewer visits with the patient's usual provider of care as well as slightly greater fragmentation as measured by the rBBI. These same metrics provided inconclusive results for commercially insured patients. In 2022, patients with commercial insurance who had used telehealth in 2021 had fewer visits with their usual provider of care, but fragmentation of care as measured by the rBBI was also lower; these metrics would generally be expected to move in opposite directions. Telehealth was not associated with substantial differences in continuity of care between 2019 and 2021.

6. Hospitalizations and emergency department visits for ambulatory care sensitive conditions (ACSCs)

Among Medicare Advantage patients, telehealth use in 2021 was associated with increases in hospitalizations and ED visits for ACSCs from 2019 to 2021, and with higher levels of hospitalizations and ED visits for ACSCs in 2022. The increases and higher levels of hospitalizations were more pronounced for older patients (75 years and older), high-risk patients, and patients with diabetes and hypertension. The higher level of hospital admissions for ACSCs in 2022 among telehealth users in 2021 was also significantly higher for patients residing in metropolitan areas.

The association between telehealth use and hospitalizations and ED visits for ACSCs among commercially insured patients was smaller in magnitude than for Medicare Advantage patients and not always statistically significant. Telehealth use in 2021 was associated with a relatively small increase in hospitalizations for ACSCs from 2019 to 2021, but not with any changes in ED visits over that same period.

Telehealth use in 2021 was associated with higher levels of hospitalizations and ED visits for ACSCs in 2022, although again the difference between telehealth users and nonusers was smaller than among Medicare Advantage patients. The increase in hospitalizations for ACSCs from 2019 to 2021 among telehealth users in 2021 was significantly higher for patients with diabetes, and the higher level of hospitalizations in 2022 among telehealth users in 2021 was significantly higher for older patients (65 and older), men, and patients with diabetes and hypertension.

These findings should be interpreted with caution, as the statistically significant findings may be driven by confounding factors not captured in the MN APCD claims data, such as patient-level sociodemographic characteristics like race and income. Additional research would be needed to determine whether telehealth use or an unobserved factor is driving the observed positive association between telehealth use and hospital admissions and ED visits for ACSCs.

7. Follow-up visits after hospitalization or emergency department visits for mental illness

Telehealth use in 2021 was associated with a small but statistically significant increase in follow-up visits after an ED visit for mental illness from 2019 to 2021 among commercially insured patients. Over this same period telehealth was not associated with significant differences in follow-up visits after a hospitalization for mental illness among commercially insured patients, nor was telehealth associated with changes in follow-up visits after either a hospitalization or ED visits for mental illness among Medicare Advantage patients.

Telehealth use in 2021 was associated with a higher likelihood of receiving a follow-up visit after either an inpatient hospitalization or ED visit for mental illness in 2022 among both commercially insured and Medicare Advantage patients.

B. Limitations

The MN APCD offers a very high-quality basis for analysis of telehealth use and impacts. Nevertheless, the use of medical claims data always presents some limitations. For this study, these limitations fall principally into three categories:

- Uncertainty about the completeness and accuracy of diagnosis and procedure codes. In clinical settings, some diagnoses may be missed, certain provider specialties may have different coding practices, and some coding may be inaccurate.
- Potential undercounting of diagnoses and procedures. We did not consider claims that were denied or not covered by insurance. Because many behavioral health providers (such as therapists, psychologists, and social workers) do not accept insurance,[8] the report results may undercount telehealth or in-person behavioral health visits (or both).
- Potential misclassification of the types of telehealth. It is difficult to identify claims for audio-only telehealth because providers – especially during the COVID-19 pandemic, when telehealth guidelines

[8] Petersen, A. "Why It's So Hard to Find a Therapist Who Takes Insurance." *The Wall Street Journal*. Tuesday, October 5, 2021. https://www.wsj.com/articles/why-its-so-hard-to-find-a-therapist-who-takes-insurance-11633442400. Accessed August 3, 2023.

were still evolving – often used the same Current Procedural Terminology (CPT) codes for billing audio-only visits as for audiovisual telehealth visits. As a result, the number of audio-only telehealth visits may be under-counted in this report.

Additionally, the MN APCD does not include patient-level data on important demographic characteristics such as race and ethnicity or income, and consequently we rely on area-level data as a proxy for measuring these characteristics. Area-based findings may not represent individual-level patterns and leave room for bias arising from unmeasured patient characteristics. Also, the MN APCD links claims to ZIP Codes rather than U.S. Census tracts, which means our efforts to identify the characteristics of a given geographic area are not as precise as using a more granular geographic designation than the ZIP Code of residence.

Finally, as for any observational study, we cannot rule out selection bias or unmeasured differences between telehealth users and nonusers that could partially drive our findings. Although the patient- and area-level control variables help minimize the possibility of selection bias, there are likely to be unobserved characteristics (such as attitudes towards seeking health care) that could be correlated with telehealth use and use of ambulatory care, resulting in bias in our estimates.

C. Policy implications

Policymakers considering whether to continue supporting the expansion of telehealth and payment parity might consider several findings from this study, if consistent with their broader goals for health care access in Minnesota. In particular:

- Telehealth use appeared to promote greater access to care by potentially underserved populations. Specifically, telehealth use was associated with overall increases and higher rates of use of ambulatory visits (especially behavioral health visits) among high-risk patients, patients with comorbidities, patients in metropolitan areas, and patients residing in areas with high concentrations of BIPOC residents. These benefits were more limited among patients in areas with low broadband access, especially among patients in Medicare Advantage.
- Telehealth visits appeared to have substituted in part for in-person visits, specifically among commercially insured patients. As a result, among these patients, telehealth expansion did not necessarily result in duplicative services or greater care fragmentation. However, telehealth appeared to augment access to care among Medicare Advantage patients; these patients did not appear to use telehealth as a substitute for in-person visits.
- Telehealth use was associated with slightly greater fragmentation of care, specifically among Medicare Advantage patients. However, it is unclear whether this fragmentation was due to duplication of services or whether telehealth users were able to access referrals to PCPs, specialists, and behavioral health providers that they would not otherwise access.
- Telehealth use was associated with increases and higher levels of hospitalizations and ED visits for ACSCs—hospitalizations and ED visits that should be avoidable when patients are receiving high-quality and well-coordinated care. The unexpected nature of these findings point towards the need for further research with more detailed patient-level data and a more rigorous study design. While the analysis controls for several factors captured in the MN APCD, such as age, sex, comorbidities, and

area-level characteristics of the patient's residence, there may be other factors not captured in the claims data but associated with both telehealth use and higher patient need that are driving the increases in hospitalizations and ED visits for ACSCs. For example, claims data do not contain data on patient-level social risk factors that may affect these outcome measures. At the same time, it is possible that telehealth use does not provide the appropriate level of care or adversely affects care coordination among more clinically and socially vulnerable patients, resulting in worse outcomes. However, the analysis in this report is insufficient to disentangle the contribution of telehealth use versus unobserved factors in driving this finding. Additional research—for example, a randomized study—would be needed to determine whether telehealth use, another factor, or a combination of factors is driving the increases in potentially avoidable hospitalizations and ED visits.

- Telehealth use was associated with slightly but significantly higher rates of follow-up visits following a hospitalization or ED visit for mental illness in 2022, both among commercially insured and Medicare Advantage patients, suggesting that telehealth users were more likely to receive follow-up care than patients not using telehealth.
- While overall use of audio-only services was low, audio-only telehealth may be an important resource for potentially vulnerable populations. Specifically, use was highest among patients who were older, higher-risk, or lived in areas with low broadband connectivity. Such patients might otherwise find it challenging to access in-person care due to age or illnesses, and be unable to use audio-visual telehealth due to low broadband access or low levels of digital literacy.

This page has been left blank for double-sided copying.

Appendix A.

Identifying Telehealth Services

This page has been left blank for double-sided copying.

In Table A.1, we list the place of service (POS)[9], modifier, and procedure codes we used to identify telehealth services and to classify those services as audiovisual, audio only, or other.

Table A.1. Codes used to identify claims for services delivered via telehealth.

Code Type	Code	Description	Telehealth Type
POS	02	Use of telecommunication technology	Audio-visual
POS	10	Use of telecommunication technology	Audio-visual
Modifier	93	Synchronous telemedicine service rendered via telephone or other real-time interactive audio-only telecommunications system	Audio only
Modifier	FQ	Service was provided using audio-only communication technology	Audio only
Modifier	95	Synchronous telemedicine A/V	Audio-visual
Modifier	GT	Via telecommunications system e.g., video	Audio-visual
Modifier	G0	Telehealth services for diagnosis, evaluation, or treatment of symptoms of an acute stroke	Audio-visual
Modifier	GQ	Use of asynchronous telecommunications system	Other
Procedure (CPT)	99441	Telephone E&M services	Audio only
Procedure (CPT)	99442	Telephone E&M services	Audio only
Procedure (CPT)	99443	Telephone E&M services	Audio only
Procedure (CPT)	98966	A nonphysician provider telephone E&M services, 5-10 mins	Audio only
Procedure (CPT)	98967	A nonphysician provider telephone E&M services, 11-20 mins	Audio only
Procedure (CPT)	98968	A nonphysician provider telephone E&M services, 21-30 mins	Audio only
Procedure (HCPCS)	G2552	Brief communication technology-based service, e.g., virtual check-in, by a qualified health care professional	Audio only
Procedure (HCPCS)	G2552	Brief communication technology-based service, e.g., virtual check-in, by a qualified health care professional	Audio only
Procedure (HCPCS)	G2025	RHC/FQHC distant site telehealth service	Audio-visual
Procedure (CPT)	98970	Online digital assessment and management by nonphysicians – e-visits through patient portal	Other
Procedure (CPT)	98971	Online digital assessment and management by nonphysicians – e-visits through patient portal	Other
Procedure (CPT)	98972	Online digital assessment and management by nonphysicians – e-visits through patient portal	Other
Procedure (CPT)	99421	Online digital E&M by physicians and qualified professionals such as NPs – e-visits through patient portal	Other
Procedure (CPT)	99422	Online digital E&M by physicians and qualified professionals such as NPs – e-visits through patient portal	Other
Procedure (CPT)	99423	Online digital E&M by physicians and qualified professionals such as NPs – e-visits through patient portal	Other
Procedure (CPT)	99444	Brief check-in or e-visit	Other
Procedure (CPT)	98969	Brief check-in or e-visit	Other

[9] POS restrictions were applied to certain procedure codes in order to exclude provide visits that occurred in nonambulatory settings.

Table A.1 (*continued*)

Code Type	Code	Description	Telehealth Type
Procedure (HCPCS)	G0071	Communication technology-based services for 5 minutes or more of a virtual communication between a rural health clinic or federally qualified health center practitioner and patient	Other
Procedure (HCPCS)	G2012	Brief communication technology-based service, e.g., virtual check-in, by a physician or other qualified health care professional who can report evaluation and management service	Other
Procedure (HCPCS)	G2061	Online Assessment of established patient by Qualified Nonphysician Healthcare Professional, 5-10 mins	Other
Procedure (HCPCS)	G2062	Online Assessment of established patient by Qualified Nonphysician Healthcare Professional, 11-20 mins	Other
Procedure (HCPCS)	G2063	Online Assessment of established patient by Qualified Nonphysician Healthcare Professional, 21+ mins	Other
Procedure (HCPCS)	G2010	Remote evaluation of recorded video and/or images submitted by an established patient (e.g., store and forward)	Other
Procedure (HCPCS)	G2250	Remote assessment of recorded video and/or images submitted by an established patient (e.g., store and forward)	Other
Procedure (HCPCS)	G2251	Brief communication technology-based service, e.g., virtual check-in, by a qualified health care professional	Other
Procedure (HCPCS)	G2252	Brief communication technology-based service, e.g., virtual check-in, by a qualified health care professional	Other

POS = Place of service; CPT = Current Procedural Terminology; E&M = Evaluation and management; HCPCS = Healthcare Common Procedure Coding System; NP = Nurse practitioner.

Appendix B.

Access to Care Measures

This page has been left blank for double-sided copying.

For this study, we measured the impact of telehealth expansion and payment parity on access to care by examining the association between telehealth use and receipt of primary care, specialty care, or behavioral health services. Here, we describe the methodology we used to classify claims as primary care, specialty care, or behavioral health visits.

Primary care visits. We classified an in-person or telehealth claim as a primary care claim if (1) the service was delivered by a primary care practitioner, including selected specialties of physicians, nurse practitioners, clinical nurse specialists, and physician assistants, and (2) it had a primary care procedure code with place of service (POS) restrictions[10]. The provider taxonomy codes, procedure codes, and POS restrictions we used to identify primary care visits are listed in Table B.1 and Table B.2.

Specialty care visits. We classified an in-person or telehealth claim as a specialist claim if the service was delivered by a specialty provider, such as a surgeon, psychiatrist, or emergency medicine practitioner. We excluded non-specialist taxonomies, such as laboratories, ambulances, chiropractors, and physical and occupational therapists. The provider taxonomy and procedure codes we used to identify specialist visits are also listed in Table B.1 and Table B.2.

Behavioral health visits. We classified an in-person or telehealth claim as a behavioral health claim if (1) the service was delivered by a behavioral health provider, such as a psychiatrist, psychologist, therapist, social worker, or primary care provider, and (2) it included a behavioral health diagnosis or procedure code. The provider taxonomy and procedure codes we used to classify behavioral health claims are listed in Table B.1 and Table B.3.

[10] POS restrictions were applied to certain procedure codes in order to exclude provide visits that occurred in nonambulatory settings.

Table B.1. Provider taxonomy codes used to identify primary care, specialty care, and behavioral health providers.

Type	Code	Description	Primary Care	Specialty Care	Behavioral Health
PECOS	14-50	Nurse Practitioner	Yes	No	Yes
PECOS	14-97	Physician Assistant	Yes	No	Yes
PECOS	14-01	Practitioner - General Practice	Yes	No	Yes
PECOS	14-02	Practitioner - General Surgery	No	Yes	No
PECOS	14-03	Practitioner - Allergy/Immunology	No	Yes	No
PECOS	14-04	Practitioner - Otolaryngology	No	Yes	No
PECOS	14-05	Practitioner - Anesthesiology	No	Yes	No
PECOS	14-06	Practitioner - Cardiovascular Disease (Cardiology)	No	Yes	No
PECOS	14-07	Practitioner - Dermatology	No	Yes	No
PECOS	14-08	Practitioner - Family Practice	Yes	No	Yes
PECOS	14-09	Practitioner - Interventional Pain Management	No	Yes	No
PECOS	14-10	Practitioner - Gastroenterology	No	Yes	No
PECOS	14-11	Practitioner - Internal Medicine	Yes	No	Yes
PECOS	14-12	Practitioner - Osteopathic Manipulative Medicine	No	Yes	No
PECOS	14-13	Practitioner - Neurology	No	Yes	No
PECOS	14-14	Practitioner - Neurosurgery	No	Yes	No
PECOS	14-16	Practitioner - Obstetrics/Gynecology	Yes	No	No
PECOS	14-17	Practitioner - Hospice/Palliative Care	No	Yes	No
PECOS	14-18	Practitioner - Ophthalmology	No	Yes	No
PECOS	14-19	Practitioner - Oral Surgery	No	Yes	No
PECOS	14-20	Practitioner - Orthopedic Surgery	No	Yes	No
PECOS	14-21	Practitioner - Cardiac Electrophysiology	No	Yes	No
PECOS	14-22	Practitioner - Pathology	No	Yes	No
PECOS	14-23	Practitioner - Sports Medicine	No	Yes	No
PECOS	14-24	Practitioner - Plastic and Reconstructive Surgery	No	Yes	No
PECOS	14-25	Practitioner - Physical Medicine and Rehabilitation	No	Yes	No
PECOS	14-26	Practitioner - Psychiatry	No	Yes	Yes
PECOS	14-27	Practitioner - Geriatric Psychiatry	No	Yes	Yes
PECOS	14-28	Practitioner - Colorectal Surgery (Proctology)	No	Yes	No
PECOS	14-29	Practitioner - Pulmonary Disease	No	Yes	No
PECOS	14-30	Practitioner - Diagnostic Radiology	No	Yes	No
PECOS	14-33	Practitioner - Thoracic Surgery	No	Yes	No
PECOS	14-34	Practitioner - Urology	No	Yes	No
PECOS	14-35	Practitioner - Chiropractic	No	Yes	No
PECOS	14-36	Practitioner - Nuclear Medicine	No	Yes	No
PECOS	14-37	Practitioner - Pediatric Medicine	Yes	No	Yes
PECOS	14-38	Practitioner - Geriatric Medicine	Yes	No	Yes

Table B.1 (*continued*)

Type	Code	Description	Primary Care	Specialty Care	Behavioral Health
PECOS	14-39	Practitioner - Nephrology	No	Yes	No
PECOS	14-40	Practitioner - Hand Surgery	No	Yes	No
PECOS	14-41	Practitioner - Optometry	No	Yes	No
PECOS	14-44	Practitioner - Infectious Disease	No	Yes	No
PECOS	14-46	Practitioner - Endocrinology	No	Yes	No
PECOS	14-48	Practitioner - Podiatry	No	Yes	No
PECOS	14-66	Practitioner - Rheumatology	No	Yes	No
PECOS	14-72	Practitioner - Pain Management	No	Yes	No
PECOS	14-76	Practitioner - Peripheral Vascular Disease	No	Yes	No
PECOS	14-77	Practitioner - Vascular Surgery	No	Yes	No
PECOS	14-78	Practitioner - Cardiac Surgery	No	Yes	No
PECOS	14-79	Practitioner - Addiction Medicine	No	Yes	Yes
PECOS	14-81	Practitioner - Critical Care (Intensivists)	No	Yes	No
PECOS	14-82	Practitioner - Hematology	No	Yes	No
PECOS	14-83	Practitioner - Hematology/Oncology	No	Yes	No
PECOS	14-84	Practitioner - Preventive Medicine	Yes	No	Yes
PECOS	14-85	Practitioner - Maxillofacial Surgery	No	Yes	No
PECOS	14-86	Practitioner - Neuropsychiatry	No	Yes	Yes
PECOS	14-90	Practitioner - Medical Oncology	No	Yes	No
PECOS	14-91	Practitioner - Surgical Oncology	No	Yes	No
PECOS	14-92	Practitioner - Radiation Oncology	No	Yes	No
PECOS	14-93	Practitioner - Emergency Medicine	No	Yes	No
PECOS	14-94	Practitioner - Interventional Radiology	No	Yes	No
PECOS	14-98	Practitioner - Gynecological Oncology	No	Yes	No
PECOS	14-C0	Practitioner - Sleep Medicine	No	Yes	No
PECOS	14-C3	Practitioner - Interventional Cardiology	No	Yes	No
PECOS	14-C5	Practitioner - Dentist	No	Yes	No
PECOS	14-C6	Practitioner - Hospitalist	No	Yes	No
PECOS	14-C7	Practitioner - Advanced Heart Failure and Transplant Cardiology	No	Yes	No
PECOS	14-C8	Practitioner - Medical Toxicology	No	Yes	No
PECOS	14-C9	Practitioner - Hematopoietic Cell Transplantation and Cellular Therapy	No	Yes	No
PECOS	14-D3	Practitioner - Medical Genetics and Genomics	No	Yes	No
PECOS	14-D4	Practitioner - Undersea and Hyperbaric Medicine	No	Yes	No
PECOS	14-D7	Practitioner - Micrographic Dermatologic Surgery (MDS)	No	Yes	No
PECOS	14-D8	Practitioner - Adult Congenital Heart Disease (ACHD)	No	Yes	No
PECOS	14-62	Psychologist, Clinical	No	No	Yes

Table B.1 (*continued*)

Type	Code	Description	Primary Care	Specialty Care	Behavioral Health
PECOS	14-68	Psychologist, Clinical	No	No	Yes
PECOS	14-80	Licensed Clinical Social Worker	No	No	Yes
NPPES	207Q00000X	Allopathic & Osteopathic Physicians - Family Medicine - Family Medicine	Yes	No	Yes
NPPES	207QA0505X	Allopathic & Osteopathic Physicians - Family Medicine - Adult Medicine	Yes	No	Yes
NPPES	207QG0300X	Allopathic & Osteopathic Physicians - Family Medicine - Geriatric Medicine	Yes	No	Yes
NPPES	207QH0002X	Allopathic & Osteopathic Physicians - Family Medicine - Hospice and Palliative Medicine	Yes	No	Yes
NPPES	208D00000X	Allopathic & Osteopathic Physicians - General Practice	Yes	No	Yes
NPPES	207R00000X	Allopathic & Osteopathic Physicians - Internal Medicine	Yes	No	Yes
NPPES	207RG0300X	Allopathic & Osteopathic Physicians - Internal Medicine - Geriatric Medicine	Yes	No	Yes
NPPES	207RH0002X	Allopathic & Osteopathic Physicians - Internal Medicine - Hospice and Palliative Medicine	Yes	No	Yes
NPPES	364S00000X	Physician Assistants & Advanced Practice Nursing Providers - Clinical Nurse Specialist	Yes	No	Yes
NPPES	364SA2100X	Physician Assistants & Advanced Practice Nursing Providers - Clinical Nurse Specialist - Acute Care	Yes	No	Yes
NPPES	364SA2200X	Physician Assistants & Advanced Practice Nursing Providers - Clinical Nurse Specialist - Adult Health	Yes	No	Yes
NPPES	364SC2300X	Physician Assistants & Advanced Practice Nursing Providers - Clinical Nurse Specialist - Chronic Care	Yes	No	Yes
NPPES	364SC1501X	Physician Assistants & Advanced Practice Nursing Providers - Clinical Nurse Specialist - Community Health/Public Health	Yes	No	Yes
NPPES	364SF00001X	Physician Assistants & Advanced Practice Nursing Providers - Clinical Nurse Specialist - Family Health	Yes	No	Yes
NPPES	364SG0600X	Physician Assistants & Advanced Practice Nursing Providers - Clinical Nurse Specialist - Gerontology	Yes	No	Yes
NPPES	364SH1100X	Physician Assistants & Advanced Practice Nursing Providers - Clinical Nurse Specialist - Holistic	Yes	No	Yes
NPPES	364SW0102X	Physician Assistants & Advanced Practice Nursing Providers - Clinical Nurse Specialist - Women's Health	Yes	No	Yes
NPPES	363L00000X	Physician Assistants & Advanced Practice Nursing Providers - Nurse Practitioner	Yes	No	Yes
NPPES	363LA2200X	Physician Assistants & Advanced Practice Nursing Providers - Nurse Practitioner - Adult Health	Yes	No	Yes
NPPES	363LC1500X	Physician Assistants & Advanced Practice Nursing Providers - Nurse Practitioner - Community Health	Yes	No	Yes

Table B.1 (*continued*)

Type	Code	Description	Primary Care	Specialty Care	Behavioral Health
NPPES	363LF0000X	Physician Assistants & Advanced Practice Nursing Providers - Nurse Practitioner - Family	Yes	No	Yes
NPPES	363LG0600X	Physician Assistants & Advanced Practice Nursing Providers - Nurse Practitioner - Gerontology	Yes	No	Yes
NPPES	363LP2300X	Physician Assistants & Advanced Practice Nursing Providers - Nurse Practitioner - Primary Care	Yes	No	Yes
NPPES	363LW0102X	Physician Assistants & Advanced Practice Nursing Providers - Nurse Practitioner - Women's Health	Yes	No	Yes
NPPES	363A00000X	Physician Assistants & Advanced Practice Nursing Providers - Physician Assistant	Yes	No	Yes
NPPES	363AM0700X	Physician Assistants & Advanced Practice Nursing Providers - Physician Assistant - Medical	Yes	No	Yes
NPPES	363LP0808X	Physician Assistants & Advanced Practice Nursing Providers - Nurse Practitioner - Psychiatric/Mental Health	No	Yes	Yes
NPPES	102L00000X	Behavioral Health & Social Service Providers - Psychoanalyst	No	No	Yes
NPPES	103TA0400X	Behavioral Health & Social Service Providers - Psychologist - Addiction (substance use disorder)	No	No	Yes
NPPES	103TA0700X	Behavioral Health & Social Service Providers - Psychologist - Adult Development & Aging	No	No	Yes
NPPES	103TB0200X	Behavioral Health & Social Service Providers - Psychologist - Cognitive & Behavioral	No	No	Yes
NPPES	103TC1900X	Behavioral Health & Social Service Providers - Psychologist - Counseling	No	No	Yes
NPPES	103TE1000X	Behavioral Health & Social Service Providers - Psychologist - Educational	No	No	Yes
NPPES	103TE1100X	Behavioral Health & Social Service Providers - Psychologist - Exercise & Sports	No	No	Yes
NPPES	103TF0000X	Behavioral Health & Social Service Providers - Psychologist - Family	No	No	Yes
NPPES	103TF0200X	Behavioral Health & Social Service Providers - Psychologist - Forensic	No	No	Yes
NPPES	103TH0004X	Behavioral Health & Social Service Providers - Psychologist - Health	No	No	Yes
NPPES	103TH0100X	Behavioral Health & Social Service Providers - Psychologist - Health Service	No	No	Yes
NPPES	103TM1700X	Behavioral Health & Social Service Providers - Psychologist - Men & Masculinity	No	No	Yes
NPPES	103TM1800X	Behavioral Health & Social Service Providers - Psychologist - Mental Retardation & Developmental Disabilities	No	No	Yes
NPPES	103TP0016X	Behavioral Health & Social Service Providers - Psychologist - Prescribing (Medical)	No	No	Yes

Table B.1 (*continued*)

Type	Code	Description	Primary Care	Specialty Care	Behavioral Health
NPPES	103TP0814X	Behavioral Health & Social Service Providers - Psychologist - Psychoanalysis	No	No	Yes
NPPES	103TP2700X	Behavioral Health & Social Service Providers - Psychologist - Psychotherapy	No	No	Yes
NPPES	103TP2701X	Behavioral Health & Social Service Providers - Psychologist - Group Psychotherapy	No	No	Yes
NPPES	103TR0400X	Behavioral Health & Social Service Providers - Psychologist - Rehabilitation	No	No	Yes
NPPES	103TW0100X	Behavioral Health & Social Service Providers - Psychologist - Women^	No	No	Yes
NPPES	103TC0700X	Behavioral Health & Social Service Providers - Psychologist - Clinical	No	No	Yes
NPPES	173F00000X	Behavioral Health & Social Service Providers - Psychologist - Sleep Specialist, PhD	No	No	Yes
NPPES	103G00000X	Behavioral Health & Social Service Providers - Clinical Neuropsychologist	No	No	Yes
NPPES	106H00000X	Behavioral Health & Social Service Providers - Marriage & Family Therapist	No	No	Yes
NPPES	102X00000X	Behavioral Health & Social Service Providers - Poetry Therapist	No	No	Yes
NPPES	222Q00000X	Respiratory, Developmental, Rehabilitative and Restorative Service Providers - Developmental Therapist	No	No	Yes
NPPES	225A00000X	Respiratory, Developmental, Rehabilitative and Restorative Service Providers - Music Therapist	No	No	Yes
NPPES	225800000X	Respiratory, Developmental, Rehabilitative and Restorative Service Providers - Recreation Therapist	No	No	Yes
NPPES	225600000X	Respiratory, Developmental, Rehabilitative and Restorative Service Providers - Dance Therapist	No	No	Yes
NPPES	221700000X	Respiratory, Developmental, Rehabilitative and Restorative Service Providers - Art Therapist	No	No	Yes
NPPES	225700000X	Respiratory, Developmental, Rehabilitative and Restorative Service Providers - Massage Therapist	No	No	Yes
NPPES	226000000X	Respiratory, Developmental, Rehabilitative and Restorative Service Providers - Recreation Therapist	No	No	Yes
NPPES	101Y00000X	Behavioral Health & Social Service Providers - Counselor	No	No	Yes
NPPES	101YM0800X	Behavioral Health & Social Service Providers - Counselor - Mental Health	No	No	Yes
NPPES	101YA0400X	Behavioral Health & Social Service Providers - Counselor - substance use disorder/Addiction	No	No	Yes
NPPES	225C00000X	Behavioral Health & Social Service Providers - Counselor - Rehabilitation Counselor	No	No	Yes

Table B.1 (*continued*)

Type	Code	Description	Primary Care	Specialty Care	Behavioral Health
NPPES	101YP1600X	Behavioral Health & Social Service Providers - Counselor - Pastoral	No	No	Yes
NPPES	101YP2500X	Behavioral Health & Social Service Providers - Counselor - Professional	No	No	Yes
NPPES	101YS0200X	Behavioral Health & Social Service Providers - Counselor - School	No	No	Yes
NPPES	364SN0800X	Physician Assistants & Advanced Practice Nursing Providers - Clinical Nurse Specialist - Neuroscience	No	No	Yes
NPPES	364SP0808X	Physician Assistants & Advanced Practice Nursing Providers - Clinical Nurse Specialist - Psychiatric/Mental Health	No	Yes	Yes
NPPES	364SP0809X	Physician Assistants & Advanced Practice Nursing Providers - Nurse Practitioner - Psychiatric/Mental Health, Adult	No	Yes	Yes
NPPES	364SP0811X	Physician Assistants & Advanced Practice Nursing Providers – Clinical Nurse Specialist - Psychiatric/Mental Health, Chronically Ill	No	Yes	Yes
NPPES	364SP0812X	Physician Assistants & Advanced Practice Nursing Providers - Clinical Nurse Specialist - Psychiatric/Mental Health, Community	No	Yes	Yes
NPPES	364SP0813X	Physician Assistants & Advanced Practice Nursing Providers - Clinical Nurse Specialist - Psychiatric/Mental Health, Geropsychiatric	No	Yes	Yes
NPPES	163WP0808X	Physician Assistants & Advanced Practice Nursing Providers - Clinical Nurse Specialist - Psychiatric/Mental Health	No	Yes	Yes
NPPES	163WP0809X	Physician Assistants & Advanced Practice Nursing Providers - Clinical Nurse Specialist - Psychiatric/Mental Health, Adult	No	Yes	Yes
NPPES	163WA0400X	Nursing Service Providers – Registered Nurse - Addiction (substance use disorder)	No	Yes	Yes
NPPES	163WP0000X	Nursing Service Providers – Registered Nurse - Pain Management	No	Yes	Yes
NPPES	225XN1300X	Respiratory, Developmental, Rehabilitative and Restorative Service providers – Occupational Therapist - Neurorehabilitation	No	Yes	Yes
NPPES	225XM0800X	Respiratory, Developmental, Rehabilitative and Restorative Service providers – Occupational Therapist - Mental Health Specialization	No	Yes	Yes
NPPES	207RA0401X	Allopathic & Osteopathic Physicians - Internal Medicine - Addiction Medicine	No	Yes	Yes
NPPES	207QS1201X	Allopathic & Osteopathic Physicians - Family Medicine - Sleep Medicine Specialization	No	Yes	No
NPPES	207QA0401X	Allopathic & Osteopathic Physicians - Family Medicine - Addiction Medicine	No	Yes	Yes

Table B.1 (*continued*)

Type	Code	Description	Primary Care	Specialty Care	Behavioral Health
NPPES	2084N0600X	Allopathic & Osteopathic Physicians - Psychiatry & Neurology - Clinical Neurophysiology	No	Yes	No
NPPES	2084N0400X	Allopathic & Osteopathic Physicians - Psychiatry & Neurology - Neurology	No	Yes	No
NPPES	2084N0402X	Allopathic & Osteopathic Physicians - Psychiatry & Neurology - Neurology with Special Qualifications in Child Neurology	No	Yes	No
NPPES	207T00000X	Allopathic & Osteopathic Physicians - Psychiatry & Neurology - Neurological Surgery	No	Yes	No
NPPES	2084N0008X	Allopathic & Osteopathic Physicians - Psychiatry & Neurology - Neuromuscular Medicine	No	Yes	No
NPPES	2084P0005X	Allopathic & Osteopathic Physicians - Psychiatry & Neurology - Neurodevelopmental Disabilities	No	Yes	Yes
NPPES	2084P0015X	Allopathic & Osteopathic Physicians - Psychiatry & Neurology - Psychosomatic Medicine	No	Yes	Yes
NPPES	2084P2900X	Allopathic & Osteopathic Physicians - Psychiatry & Neurology - Pain Medicine	No	Yes	Yes
NPPES	2084S0010X	Allopathic & Osteopathic Physicians - Psychiatry & Neurology - Sports Medicine	No	Yes	Yes
NPPES	2084S0012X	Allopathic & Osteopathic Physicians - Psychiatry & Neurology - Sleep Medicine	No	Yes	Yes
NPPES	2084V0102X	Allopathic & Osteopathic Physicians - Psychiatry & Neurology - Vascular Neurology	No	Yes	No
NPPES	2084A2900X	Allopathic & Osteopathic Physicians - Psychiatry & Neurology - Neurocritical Care	No	Yes	No
NPPES	2084B0002X	Allopathic & Osteopathic Physicians - Psychiatry & Neurology - Bariatric Medicine	No	Yes	No
NPPES	2084P0301X	Allopathic & Osteopathic Physicians - Psychiatry & Neurology - Brain Injury Medicine	No	Yes	Yes
NPPES	2084F0202X	Allopathic & Osteopathic Physicians - Psychiatry & Neurology - Forensic Psychiatry	No	Yes	Yes
NPPES	2084H0002X	Allopathic & Osteopathic Physicians - Psychiatry & Neurology - Hospice and Palliative Medicine	No	Yes	No
NPPES	2084P0800X	Allopathic & Osteopathic Physicians - Psychiatry & Neurology - Psychiatry	No	Yes	Yes
NPPES	2084P0802X	Allopathic & Osteopathic Physicians - Psychiatry & Neurology - Addiction Psychiatry	No	Yes	Yes
NPPES	2084P0805X	Allopathic & Osteopathic Physicians - Psychiatry & Neurology - Geriatric Psychiatry	No	Yes	Yes
NPPES	2084B0040X	Allopathic & Osteopathic Physicians - Psychiatry & Neurology - Behavioral Neurology & Neuropsychiatry Specialty	No	Yes	Yes
NPPES	2084D0003X	Allopathic & Osteopathic Physicians - Psychiatry & Neurology - Diagnostic Neuroimaging	No	Yes	No

Table B.1 (*continued*)

Type	Code	Description	Primary Care	Specialty Care	Behavioral Health
NPPES	2084A0401X	Allopathic & Osteopathic Physicians - Psychiatry & Neurology - Addiction Medicine	No	Yes	Yes
NPPES	2083A0300X	Allopathic & Osteopathic Physicians - Preventive Medicine - Addiction Medicine	No	Yes	Yes
NPPES	1041C0700X	Behavioral Health & Social Service Providers - Social Worker - Clinical	No	No	Yes
NPPES	1041S0200X	Behavioral Health & Social Service Providers - Social Worker - School	No	No	Yes
NPPES	103T00000X	Behavioral Health & Social Service Providers - Social Worker - Psychologist	No	No	Yes
NPPES	103TS0200X	Behavioral Health & Social Service Providers - Social Worker - School	No	No	Yes
NPPES	208600000X	Allopathic & Osteopathic Physicians - Surgery (General)	No	Yes	No
NPPES	2086S0122X	Allopathic & Osteopathic Physicians - Surgery - Plastic and Reconstructive Surgery	No	Yes	No
NPPES	2086S0105X	Allopathic & Osteopathic Physicians - Surgery - Surgery of the Hand	No	Yes	No
NPPES	2086S0102X	Allopathic & Osteopathic Physicians - Surgery - Surgical Critical Care	No	Yes	No
NPPES	2086X0206X	Allopathic & Osteopathic Physicians - Surgery - Surgical Oncology	No	Yes	No
NPPES	2086S0127X	Allopathic & Osteopathic Physicians - Surgery - Trauma Surgery	No	Yes	No
NPPES	2086S0129X	Allopathic & Osteopathic Physicians - Surgery - Vascular Surgery	No	Yes	No
NPPES	208G00000X	Allopathic & Osteopathic Physicians - Surgery - Thoracic Surgery (Cardiothoracic Vascular Surgery)	No	Yes	No
NPPES	204F00000X	Allopathic & Osteopathic Physicians - Surgery - Transplant Surgery	No	Yes	No
NPPES	208C00000X	Allopathic & Osteopathic Physicians - Surgery - Colon & Rectal Surgery	No	Yes	No
NPPES	204E00000X	Allopathic & Osteopathic Physicians - Oral & Maxillofacial Surgery	No	Yes	No
NPPES	2086H0002X	Allopathic & Osteopathic Physicians - Surgery - Hospice and Palliative Care	No	Yes	No
NPPES	207X00000X	Allopathic & Osteopathic Physicians - Orthopedic Surgery	No	Yes	No
NPPES	207XS0114X	Allopathic & Osteopathic Physicians - Orthopedic Surgery - Adult Reconstructive Orthopedic Surgery	No	Yes	No
NPPES	207XX0004X	Allopathic & Osteopathic Physicians - Orthopedic Surgery - Foot and Ankle Surgery	No	Yes	No
NPPES	207XS0106X	Allopathic & Osteopathic Physicians - Orthopedic Surgery - Hand Surgery	No	Yes	No

Table B.1 (*continued*)

Type	Code	Description	Primary Care	Specialty Care	Behavioral Health
NPPES	207XS0117X	Allopathic & Osteopathic Physicians - Orthopedic Surgery - Orthopedic Surgery of the Spine	No	Yes	No
NPPES	207XX0801X	Allopathic & Osteopathic Physicians - Orthopedic Surgery - Orthopedic Trauma	No	Yes	No
NPPES	207XX0005X	Allopathic & Osteopathic Physicians - Orthopedic Surgery - Sports Medicine	No	Yes	No
NPPES	208200000X	Allopathic & Osteopathic Physicians - Plastic Surgery	No	Yes	No
NPPES	2082S0099X	Allopathic & Osteopathic Physicians - Plastic Surgery - Plastic Surgery Within the Head & Neck	No	Yes	No
NPPES	2082S0105X	Allopathic & Osteopathic Physicians - Plastic Surgery - Surgery of the Hand	No	Yes	No
NPPES	207Y00000X	Allopathic & Osteopathic Physicians - Otolaryngology	No	Yes	No
NPPES	207YS0123X	Allopathic & Osteopathic Physicians - Otolaryngology - Facial Plastic Surgery	No	Yes	No
NPPES	207YX0602X	Allopathic & Osteopathic Physicians - Otolaryngology - Otolaryngic Allergy	No	Yes	No
NPPES	207YX0901X	Allopathic & Osteopathic Physicians - Otolaryngology - Otology &Neurotology	No	Yes	No
NPPES	207YX0007X	Allopathic & Osteopathic Physicians - Otolaryngology - Plastic Surgery within the Head & Neck	No	Yes	No
NPPES	207YX0905X	Allopathic & Osteopathic Physicians - Otolaryngology - Facial Plastic Surgery	No	Yes	No
NPPES	207L00000X	Allopathic & Osteopathic Physicians - Anesthesiology	No	Yes	No
NPPES	207LC0200X	Allopathic & Osteopathic Physicians - Anesthesiology - Critical Care Medicine	No	Yes	No
NPPES	207RC0000X	Allopathic & Osteopathic Physicians – Internal Medicine – Cardiovascular Disease	No	Yes	No
NPPES	207RG0100X	Allopathic & Osteopathic Physicians – Internal Medicine – Gastroenterology	No	Yes	No
NPPES	207RP1001X	Allopathic & Osteopathic Physicians – Internal Medicine – Pulmonary Disease	No	Yes	No
NPPES	207RN0300X	Allopathic & Osteopathic Physicians – Internal Medicine – Nephrology	No	Yes	No
NPPES	207RI0200X	Allopathic & Osteopathic Physicians – Internal Medicine – Infectious Disease	No	Yes	No
NPPES	207RE0101X	Allopathic & Osteopathic Physicians – Internal Medicine – Endocrinology, Diabetes, and Metabolism	No	Yes	No
NPPES	207RR0500X	Allopathic & Osteopathic Physicians – Internal Medicine – Rheumatology	No	Yes	No

Table B.1 (*continued*)

Type	Code	Description	Primary Care	Specialty Care	Behavioral Health
NPPES	207RC0200X	Allopathic & Osteopathic Physicians – Internal Medicine – Critical Care Medicine	No	Yes	No
NPPES	207RH0000X	Allopathic & Osteopathic Physicians – Internal Medicine – Hematology	No	Yes	No
NPPES	207RH0003X	Allopathic & Osteopathic Physicians – Internal Medicine – Hematology & Oncology	No	Yes	No
NPPES	207RX0202X	Allopathic & Osteopathic Physicians – Internal Medicine – Medical Oncology	No	Yes	No
NPPES	207RB0002X	Allopathic & Osteopathic Physicians – Internal Medicine – Obesity Medicine	No	Yes	No
NPPES	207RC0001X	Allopathic & Osteopathic Physicians – Internal Medicine – Clinical Cardiac Electrophysiology	No	Yes	No
NPPES	207RH0005X	Allopathic & Osteopathic Physicians – Internal Medicine – Hypertension Specialist	No	Yes	No
NPPES	207RI0001X	Allopathic & Osteopathic Physicians – Internal Medicine – Clinical & Laboratory Immunology	No	Yes	No
NPPES	207RI0008X	Allopathic & Osteopathic Physicians – Internal Medicine – Hepatology	No	Yes	No
NPPES	207RM1200X	Allopathic & Osteopathic Physicians – Internal Medicine – Magnetic Resonance Imaging (MRI)	No	Yes	No
NPPES	207RS0010X	Allopathic & Osteopathic Physicians – Internal Medicine – Sports Medicine	No	Yes	No
NPPES	207RT0003X	Allopathic & Osteopathic Physicians – Internal Medicine – Transplant Hepatology	No	Yes	No
NPPES	207RA0001X	Allopathic & Osteopathic Physicians – Internal Medicine – Advanced Heart Failure and Transplant Cardiology	No	Yes	No
NPPES	207RI0001X	Allopathic & Osteopathic Physicians – Internal Medicine – Clinical & Laboratory Immunology	No	Yes	No
NPPES	207RI0011X	Allopathic & Osteopathic Physicians – Internal Medicine – Interventional Cardiology	No	Yes	No
NPPES	207RA0001X	Allopathic & Osteopathic Physicians – Internal Medicine – Advanced Heart Failure and Transplant Cardiology	No	Yes	No
NPPES	207N00000X	Allopathic & Osteopathic Physicians – Dermatology	No	Yes	No
NPPES	207NI0002X	Allopathic & Osteopathic Physicians – Clinical & Laboratory Dermatological Immunology	No	Yes	No
NPPES	207ND0101X	Allopathic & Osteopathic Physicians – MOHS-Micrographic Surgery	No	Yes	No
NPPES	207ND0900X	Allopathic & Osteopathic Physicians – Dermapathology	No	Yes	No
NPPES	207NS0135X	Allopathic & Osteopathic Physicians – Procedural Dermatology	No	Yes	No

Table B.1 (*continued*)

Type	Code	Description	Primary Care	Specialty Care	Behavioral Health
NPPES	207V00000X	Allopathic & Osteopathic Physicians - Obstetrics & Gynecology	Yes	No	No
NPPES	207VB0002X	Allopathic & Osteopathic Physicians – Obstetrics & Gynecology - Obesity Medicine	No	Yes	No
NPPES	207VC0200X	Allopathic & Osteopathic Physicians – Obstetrics & Gynecology - Critical Care Medicine	No	Yes	No
NPPES	207VF0040X	Allopathic & Osteopathic Physicians – Obstetrics & Gynecology - Female Pelvic Medicine and Reconstructive Surgery	No	Yes	No
NPPES	207VX0201X	Allopathic & Osteopathic Physicians – Obstetrics & Gynecology - Gynecologic Oncology	No	Yes	No
NPPES	207VG0400X	Allopathic & Osteopathic Physicians - Obstetrics & Gynecology - Gynecology	Yes	No	No
NPPES	207VX0000X	Allopathic & Osteopathic Physicians - Obstetrics & Gynecology - Obstetrics	Yes	No	No
NPPES	207VE0102X	Allopathic & Osteopathic Physicians – Obstetrics & Gynecology - Reproductive Endocrinology	No	Yes	No
NPPES	207VH0002X	Allopathic & Osteopathic Physicians – Obstetrics & Gynecology - Hospice and Palliative Medicine**	No	Yes	No
NPPES	207W00000X	Allopathic & Osteopathic Physicians – Ophthalmology	No	Yes	No
NPPES	207WX0009X	Allopathic & Osteopathic Physicians – Ophthalmology - Glaucoma Specialist	No	Yes	No
NPPES	207WX0107X	Allopathic & Osteopathic Physicians – Ophthalmology - Retina Specialist	No	Yes	No
NPPES	207WX0108X	Allopathic & Osteopathic Physicians – Ophthalmology - Uveitis and Ocular Inflammatory Disease	No	Yes	No
NPPES	207WX0120X	Allopathic & Osteopathic Physicians – Ophthalmology - Cornea and External Diseases Specialist	No	Yes	No
NPPES	207WX0200X	Allopathic & Osteopathic Physicians – Ophthalmology - Ophthalmic Plastic and Reconstructive Surgery	No	Yes	No
NPPES	1223S0112X	Dental Providers – Dentist – Oral and Maxillofacial Surgery	No	Yes	No
NPPES	207ZP0101X	Allopathic & Osteopathic Physicians – Pathology - Anatomic Pathology	No	Yes	No
NPPES	207ZP0102X	Allopathic & Osteopathic Physicians – Pathology - Anatomic Pathology & Clinical Pathology	No	Yes	No
NPPES	207ZP0104X	Allopathic & Osteopathic Physicians – Pathology - Chemical Pathology	No	Yes	No
NPPES	207ZC0006X	Allopathic & Osteopathic Physicians – Pathology - Clinical Pathology	No	Yes	No

Table B.1 (*continued*)

Type	Code	Description	Primary Care	Specialty Care	Behavioral Health
NPPES	207ZP0105X	Allopathic & Osteopathic Physicians – Pathology - Laboratory Medicine	No	Yes	No
NPPES	207ZC0500X	Allopathic & Osteopathic Physicians – Pathology - Cytopathology	No	Yes	No
NPPES	207ZD0900X	Allopathic & Osteopathic Physicians – Pathology - Dermapathology	No	Yes	No
NPPES	207ZF0201X	Allopathic & Osteopathic Physicians – Pathology - Forensic Pathology	No	Yes	No
NPPES	207ZH0000X	Allopathic & Osteopathic Physicians – Pathology - Hematology	No	Yes	No
NPPES	207ZI0100X	Allopathic & Osteopathic Physicians – Pathology - Immunopathology	No	Yes	No
NPPES	207ZM0300X	Allopathic & Osteopathic Physicians – Pathology - Medical Microbiology	No	Yes	No
NPPES	207ZP0007X	Allopathic & Osteopathic Physicians – Pathology - Molecular Genetic Pathology	No	Yes	No
NPPES	208100000X	Allopathic & Osteopathic Physicians – Physical Medicine & Rehabilitation	No	Yes	No
NPPES	2081P0301X	Allopathic & Osteopathic Physicians – Physical Medicine & Rehabilitation - Brain Injury Medicine	No	Yes	No
NPPES	2081S0010X	Allopathic & Osteopathic Physicians – Physical Medicine & Rehabilitation -Sports Medicine	No	Yes	No
NPPES	2081H0002X	Allopathic & Osteopathic Physicians – Physical Medicine & Rehabilitation - Hospice and Palliative Medicine	No	Yes	No
NPPES	2081N0008X	Allopathic & Osteopathic Physicians – Physical Medicine & Rehabilitation - Neuromuscular Medicine	No	Yes	No
NPPES	2081P2900X	Allopathic & Osteopathic Physicians – Physical Medicine & Rehabilitation - Pain Medicine	No	Yes	No
NPPES	2081P0004X	Allopathic & Osteopathic Physicians – Physical Medicine & Rehabilitation - Spinal Cord Injury Medicine	No	Yes	No
NPPES	208VP0000X	Allopathic & Osteopathic Physicians – Physical Medicine & Rehabilitation - Interventional Pain Medicine	No	Yes	No
NPPES	1223X0008X	Allopathic & Osteopathic Physicians – Radiology	No	Yes	No
NPPES	2085R0202X	Allopathic & Osteopathic Physicians – Radiology - Diagnostic Radiology	No	Yes	No
NPPES	2085R0001X	Allopathic & Osteopathic Physicians – Radiology - Radiation Oncology	No	Yes	No
NPPES	204C00000X	Allopathic & Osteopathic Physicians – Radiology - Nuclear Medicine Practitioner	No	Yes	No

Table B.1 (*continued*)

Type	Code	Description	Primary Care	Specialty Care	Behavioral Health
NPPES	207U00000X	Allopathic & Osteopathic Physicians – Nuclear Medicine	No	Yes	No
NPPES	207UN0901X	Allopathic & Osteopathic Physicians – Nuclear Medicine - Nuclear Cardiology	No	Yes	No
NPPES	207UN0902X	Allopathic & Osteopathic Physicians – Nuclear Medicine - Nuclear Medicine Practitioner	No	Yes	No
NPPES	207UN0903X	Allopathic & Osteopathic Physicians – Nuclear Medicine - Nuclear Medicine Practitioner	No	Yes	No
NPPES	2085B0100X	Allopathic & Osteopathic Physicians – Radiology - Body Imaging	No	Yes	No
NPPES	2085D0003X	Allopathic & Osteopathic Physicians – Radiology - Diagnostic Neuroimaging	No	Yes	No
NPPES	2085N0700X	Allopathic & Osteopathic Physicians – Radiology - Neuroradiology	No	Yes	No
NPPES	2085N0904X	Allopathic & Osteopathic Physicians – Radiology - Nuclear Radiology	No	Yes	No
NPPES	2085R0204X	Allopathic & Osteopathic Physicians – Radiology - Vascular & Interventional	No	Yes	No
NPPES	2085R0205X	Allopathic & Osteopathic Physicians – Radiology - Radiological Physics	No	Yes	No
NPPES	2085U0001X	Allopathic & Osteopathic Physicians – Radiology - Diagnostic Ultrasound	No	Yes	No
NPPES	2085R0203X	Allopathic & Osteopathic Physicians – Radiology - Therapeutic Radiology	No	Yes	No
NPPES	2085H0002X	Allopathic & Osteopathic Physicians – Radiology - Hospice and Palliative Medicine	No	Yes	No
NPPES	208800000X	Allopathic & Osteopathic Physicians – Urology	No	Yes	No
NPPES	2088F0040X	Allopathic & Osteopathic Physicians – Urology - Female Pelvic Medicine & Reconstructive Surgery	No	Yes	No
NPPES	152W00000X	Eye and Vision Services Providers - Optometrist	No	Yes	No
NPPES	152WC0802X	Eye and Vision Services Providers - Optometrist - Corneal and Contact Management	No	Yes	No
NPPES	152WL0500X	Eye and Vision Services Providers - Optometrist - Low Vision Rehabilitation	No	Yes	No
NPPES	152WX0102X	Eye and Vision Services Providers - Optometrist - Occupational Vision	No	Yes	No
NPPES	152WS0006X	Eye and Vision Services Providers - Optometrist - Sports Vision	No	Yes	No
NPPES	152WV0400X	Eye and Vision Services Providers - Optometrist - Vision Therapy	No	Yes	No
NPPES	213E00000X	Podiatric Medicine & Surgery Service Providers – Podiatrist – General Practice	No	Yes	No

Table B.1 (*continued*)

Type	Code	Description	Primary Care	Specialty Care	Behavioral Health
NPPES	213ES0103X	Podiatric Medicine & Surgery Service Providers – Podiatrist – Foot & Ankle Surgery	No	Yes	No
NPPES	213ES0131X	Podiatric Medicine & Surgery Service Providers – Podiatrist – Foot Surgery	No	Yes	No
NPPES	213EG0000X	Podiatric Medicine & Surgery Service Providers – Podiatrist – General Practice	Yes	No	No
NPPES	213EP1101X	Podiatric Medicine & Surgery Service Providers – Podiatrist – Primary Podiatric Medicine	No	Yes	No
NPPES	213EP0504X	Podiatric Medicine & Surgery Service Providers – Podiatrist – Public Medicine	No	Yes	No
NPPES	213ER0200X	Podiatric Medicine & Surgery Service Providers – Podiatrist – Radiology	No	Yes	No
NPPES	213ES0000X	Podiatric Medicine & Surgery Service Providers – Podiatrist – Sports Medicine	No	Yes	No
NPPES	207P00000X	Allopathic & Osteopathic Physicians - Emergency Medicine	No	Yes	No
NPPES	207PE0004X	Allopathic & Osteopathic Physicians - Emergency Medicine - Emergency Medical Services	No	Yes	No
NPPES	207PH0002X	Allopathic & Osteopathic Physicians - Emergency Medicine - Hospice and Palliative Medicine	No	Yes	No
NPPES	207PS0010X	Allopathic & Osteopathic Physicians - Emergency Medicine - Sports Medicine	No	Yes	No
NPPES	207PE0005X	Allopathic & Osteopathic Physicians - Emergency Medicine - Undersea and Hyperbaric Medicine	No	Yes	No
NPPES	207PT0002X	Allopathic & Osteopathic Physicians - Emergency Medicine - Medical Toxicology	No	Yes	No
NPPES	207K00000X	Allopathic & Osteopathic Physicians - Allergy and Immunology	No	Yes	No
NPPES	207KA0200X	Allopathic & Osteopathic Physicians - Allergy and Immunology - Allergy	No	Yes	No
NPPES	207KI0005X	Allopathic & Osteopathic Physicians - Allergy and Immunology - Clinical and Laboratory Immunology	No	Yes	No
NPPES	207RA0201X	Allopathic & Osteopathic Physicians - Internal Medicine - Allergy & Immunology	No	Yes	No
NPPES	207LH0002X	Allopathic & Osteopathic Physicians – Anesthesiology – Hospice and Palliative Medicine	No	Yes	No
NPPES	207YS0012X	Allopathic & Osteopathic Physicians – Otolaryngology – Sleep Medicine	No	Yes	No
NPPES	207QA0000X	Allopathic & Osteopathic Physicians - Family Medicine - Adolescent Medicine	Yes	No	Yes
NPPES	207QB0002X	Allopathic & Osteopathic Physicians - Family Medicine - Obesity Medicine (Family Medicine) Physician	Yes	No	Yes

Table B.1 (*continued*)

Type	Code	Description	Primary Care	Specialty Care	Behavioral Health
NPPES	207RA0000X	Allopathic & Osteopathic Physicians - Internal Medicine - Adolescent Medicine	Yes	No	Yes
NPPES	208000000X	Allopathic & Osteopathic Physicians - Pediatrics	Yes	No	Yes
NPPES	2080A0000X	Allopathic & Osteopathic Physicians - Pediatrics - Adolescent Medicine	Yes	No	Yes
NPPES	2080C0008X	Allopathic & Osteopathic Physicians - Pediatrics - Child Abuse Pediatrics	Yes	No	Yes
NPPES	2080P0006X	Allopathic & Osteopathic Physicians - Pediatrics - Developmental - Behavioral Pediatrics	Yes	No	Yes
NPPES	2080P0008X	Allopathic & Osteopathic Physicians - Pediatrics - Neurodevelopmental Disabilities	Yes	No	Yes
NPPES	2080B0002X	Allopathic & Osteopathic Physicians - Pediatrics - Obesity Medicine	Yes	No	Yes
NPPES	2084P0804X	Allopathic & Osteopathic Physicians - Psychiatry & Neurology - Child & Adolescent Psychiatry	No	No	Yes
NPPES	103GC0700X	Behavioral Health & Social Service Providers - Clinical Neuropsychologist - Clinical (Deactivated)	No	No	Yes
NPPES	103TC2200X	Behavioral Health & Social Service Providers - Psychologist - Clinical Child & Adolescent	No	No	Yes
NPPES	104100000X	Behavioral Health & Social Service Providers - Social Worker	No	No	Yes

Note: Provider types are not mutually exclusive. For example, certain primary care providers are also classified as behavioral health providers, and some specialty care providers are also classified as behavioral health providers. However, no primary care providers are classified as specialty care providers.

NPPES = National Plan and Provider Enumeration System; PECOS = (Medicare) Provider Enrollment, Chain, and Ownership System.

Table B.2. Procedure codes used to identify primary and specialty care visits.

Code Type	Code	Description	POS restriction
Procedure (CPT)	96160	Administration of patient-focused health risk assessment instrument (e.g., health hazard appraisal) with scoring and documentation, per standardized instrument	No
Procedure (CPT)	96161	Administration of caregiver-focused health risk assessment instrument (e.g., depression inventory) for the benefit of the patient, with scoring and documentation, per standardized instrument	No
Procedure (CPT)	98966-98968	Telephone assessment and management service provided by a qualified non-physician health care professional to an established client, parent, or guardian	No
Procedure (CPT)	98969-98972	Online Digital Assessment and Management Service by Qualified Nonphysician Health Care Professional	No
Procedure (CPT)	98980	Remote Therapeutic Monitoring Treatment Management Services	No
Procedure (CPT)	99091	Remote Physiologic Patient Monitoring	No
Procedure (CPT)	99421-99423	Online digital E&M services - physicians or other qualified health professionals	No
Procedure (CPT)	99441-99443	Telephone E&M	No
Procedure (CPT)	99444	Online E&M (deleted in 2020 and replaced w/99421-99423)	No
Procedure (CPT)	99453-99454	Chronic Care Remote Patient Monitoring Codes	No
Procedure (CPT)	99457	Remote physiologic monitoring treatment management services	No
Procedure (CPT)	99474	Home blood pressure monitoring support (new in 2020)	No
Procedure (CPT)	98975-98977	Remote therapeutic monitoring services. Code 98975 represents the initial setup and patient education for the equipment. Codes 98976 (respiratory system) and 98977 (musculoskeletal system) represent the device supply w/ scheduled recording and/or programmed alert transmission for a 30-day period (new in 2022)	No
Procedure (CPT)	99201	Office or Other OP visit (99201 deleted in 2021)	No
Procedure (CPT)	99202-99205	Office or Other Outpatient Services – New Patient	No
Procedure (CPT)	99211-99215	Office or Other Outpatient Services – Established Patient	No
Procedure (CPT)	99324-99328	New Patient Visit in Domiciliary, Rest or Custodial Care	No
Procedure (CPT)	99334-99337	Established Patient Visit in Domiciliary, Rest or Custodial Care	No
Procedure (CPT)	99339-99340	Care plan oversight for a patient in home or domiciliary care	No
Procedure (CPT)	99341-99345	Home or residence E&M services, new patient	No
Procedure (CPT)	99347-99350	Home or residence E&M services, established patient	No
Procedure (CPT)	99424, 99426	Principal Care Management	No
Procedure (CPT)	99429	Other Preventive Medicine Services	No
Procedure (CPT)	99439	Chronic Care Management Services	No

Table B.2 (*continued*)

Code Type	Code	Description	POS restriction
Procedure (CPT)	99483	Cognitive Assessment and Care Plan Services	No
Procedure (CPT)	99484	General Behavioral Health Integration Care Management	No
Procedure (CPT)	99487	Complex Chronic Care Management Services	No
Procedure (CPT)	99489	Complex Chronic Care Management Services	No
Procedure (CPT)	99490-99491	Chronic Care Management Services	No
Procedure (CPT)	99492	Initial psychiatric collaborative care management, first 70 minutes in the first calendar month of behavioral health care manager activities	No
Procedure (CPT)	99493	Subsequent psychiatric collaborative care management, first 60 minutes in a subsequent month of behavioral health care manager activities	No
Procedure (CPT)	99494	Initial or subsequent psychiatric collaborative care management, each additional 30 minutes in a calendar month of behavioral health care manager activities	No
Procedure (CPT)	99495-99496	Transitional care management (99495 - moderate medical complexity requiring a face-to-face visit within 14 days of discharge; 99496 - high medical complexity requiring a face-to-face visit within seven days of discharge)	Yes
Procedure (CPT)	99497	Advanced directive counseling and discussion	Yes
Procedure (CPT)	99498	Advance Care Planning	Yes
Procedure (CPT)	99354-99355	Prolonged Service with Direct Patient Contact (Except with Office or Other Outpatient Services)	No
Procedure (CPT)	99358-99359	Prolonged Service on Date Other Than the Face-to-Face Evaluation and Management Service Without Direct Patient Contact	Yes
Procedure (CPT)	99415-99416	Prolonged Clinical Staff Services with Physician or Other Qualified Health Care Professional Supervision	No
Procedure (HCPCS)	G0076-G0087	Home Care Management Services	No
Procedure (HCPCS)	G0101	Cervical or vaginal cancer screening; pelvic and clinical breast examination	No
Procedure (HCPCS)	G0102	Prostate cancer screening; digital rectal examination (DRE)	No
Procedure (HCPCS)	G0108	Diabetes outpatient self-management training services, individual, per 30 minutes	No
Procedure (HCPCS)	G0109	Diabetes outpatient self-management training services, group session (2 or more), per 30 minutes	No
Procedure (HCPCS)	G0296	Visit to determine lung cancer screening eligibility	No
Procedure (HCPCS)	G0402	Welcome to Medicare visit	No
Procedure (HCPCS)	G0438-G0439	Annual wellness visit; includes a personalized prevention plan of service (PPPS); initial and subsequent visits	No
Procedure (HCPCS)	G0442	Annual alcohol misuse screening, 15 minutes	No
Procedure (HCPCS)	G0444	Annual depression screening	No
Procedure (HCPCS)	G0502-G0504	Psychiatric collaborative care management Other (Deleted in 2018 and replaced with 99492-99494)	No

Table B.2 (*continued*)

Code Type	Code	Description	POS restriction
Procedure (HCPCS)	G0506	CCM service: Comprehensive assessment and care planning for patients needing chronic care	No
Procedure (HCPCS)	G0507	CCM service: Care management services for behavioral health conditions (Deleted in 2018 and replaced with 99484)	No
Procedure (HCPCS)	G2010	Remote evaluation of recorded video and/or images submitted by an established patient	No
Procedure (HCPCS)	G2012	Virtual check-in by a physician or other qualified health care professional who can report E&M services	No
Procedure (HCPCS)	G2061-G2063	Qualified nonphysician healthcare professional online assessment and management service, for an established patient	No
Procedure (HCPCS)	G2064	Principal care management service at least 30 minutes – physician or other qualified health care professional	No
Procedure (HCPCS)	G2065	Principal care management service at least 30 minutes – clinical staff time directed by a physician or other qualified health care professional	No
Procedure (HCPCS)	G2214	Psychiatric Collaborative Care Management (new in 2021)	No
Procedure (HCPCS)	G2250	Remote assessment of recorded video and/ or images submitted by an established patient (new in 2021)	No
Procedure (HCPCS)	G2251	Brief communication technology-based service, e.g., virtual check-in, by a qualified health care professional who cannot report E&M services (new in 2021)	No
Procedure (HCPCS)	G2252	Brief communication technology-based service, e.g., virtual check-in, by a physician or other qualified health care professional who can report E&M services (new in 2021)	No
Procedure (HCPCS)	G9978-G9986	Remote in-home visit for the E&M of a patient (BPCI) (new in 2019)	No
Procedure (HCPCS)	G9987	Bundled payments (BPCI advanced) model home visit for patient assessment (new in 2019)	No
Procedure (HCPCS)	Q0091	Screening Papanicolaou smear; obtaining, preparing and conveyance of cervical or vaginal smear to lab	No
Procedure (HCPCS)	G2212	Prolonged office/outpatient E&M services	No
Procedure (HCPCS)	92002	Ophthalmological services: medical examination and evaluation	No
Procedure (HCPCS)	92004	Ophthalmological services: medical examination and evaluation	No
Procedure (HCPCS)	92012	Ophthalmological services: medical examination and evaluation	No
Procedure (HCPCS)	92014	Ophthalmological services: medical examination and evaluation	No

Table B.2 (*continued*)

Code Type	Code	Description	POS restriction
Procedure (HCPCS)	G0071	Payment for communication technology-based services for 5 minutes or more of a virtual (non-face-to-face) communication between a rural health clinic (RHC) or federally qualified health center (FQHC) practitioner and RHC or FQHC patient, or 5 minutes or more of remote evaluation of recorded video and/or images by an RHC or FQHC practitioner, occurring in lieu of an office visit	No
Procedure (HCPCS)	G0468	FQHC visit, IPPE or AWV; a FQHC visit that includes an initial preventive physical examination (IPPE) or annual wellness visit (AWV) and includes a typical bundle of Medicare-covered services that would be furnished per diem to a patient receiving an IPPE or AWV as maintained by CMS	No

POS = Place of service; CPT = Current Procedural Terminology; E&M = Evaluation and management; HCPCS = Healthcare Common Procedure Coding System; OP = Outpatient; CCM = Chronic Care Management; PPPS = Personalized Prevention Plan of Service; FQHC = Federally-Qualified Health Center; RHC = Rural Health Center; IPPE = Initial Preventive Physical Examination; AWV = Annual Wellness Visit; CMS = Centers for Medicare and Medicaid Services; NPPES = National Plan and Provider Enumeration System; PECOS = (Medicare) Provider Enrollment, Chain, and Ownership System.

Table B.3. Codes used to identify behavioral health visits.

Type	Code	Description	POS Restriction
Procedure (CPT)	90791	Psychiatric Diagnostic Interview Examination	Yes
Procedure (CPT)	90792	Psychiatric Diagnostic Interview Examination	Yes
Procedure (CPT)	90832	Psychotherapy	Yes
Procedure (CPT)	90833	Psychotherapy with evaluation and management (E&M)	Yes
Procedure (CPT)	90834	Psychotherapy	Yes
Procedure (CPT)	90836	Psychotherapy with evaluation and management (E&M)	Yes
Procedure (CPT)	90837	Psychotherapy	Yes
Procedure (CPT)	90838	Psychotherapy with evaluation and management (E&M)	Yes
Procedure (CPT)	90839	Psychotherapy for crisis	Yes
Procedure (CPT)	90845	Other Psychotherapy Procedures	Yes
Procedure (CPT)	90846	Family psychotherapy	Yes
Procedure (CPT)	90847	Family psychotherapy	Yes
Procedure (CPT)	90849	Family psychotherapy	Yes
Procedure (CPT)	90853	Group psychotherapy	Yes
Procedure (CPT)	90865	Narcosynthesis for psychiatric diagnostic and/or therapeutic purposes	Yes
Procedure (CPT)	90870	Electroconvulsive therapy	Yes
Procedure (CPT)	90880	Medical hypnotherapy	Yes
Procedure (CPT)	90899	Unlisted psychiatric service or procedure	Yes
Procedure (CPT)	96105	Assessment of Aphasia and Cognitive Performance Testing	Yes
Procedure (CPT)	96116	Neurobehavioral status exam	Yes
Procedure (CPT)	96125	Standardized cognitive performance testing	Yes
Procedure (CPT)	96127	Brief emotional/behavioral assessment (e.g., depression inventory, attention-deficit/hyperactivity disorder scale)	Yes
Procedure (CPT)	96130	Psychological testing evaluation services by physician or other qualified health care professional	Yes
Procedure (CPT)	96132	Neuropsychological testing evaluation services by physician or other qualified health care professional	Yes
Procedure (CPT)	96136	Psychological or neuropsychological test administration and scoring by physician or other qualified health care professional, two or more tests, any method	Yes
Procedure (CPT)	96138	Psychological or neuropsychological test administration and scoring by technician, two or more tests, any method	Yes
Procedure (CPT)	96146	Psychological or neuropsychological test administration, with single automated instrument via electronic platform	Yes
Procedure (CPT)	96150	Health and behavior assessment (e.g., health-focused clinical interview, behavioral observations, psychophysiological monitoring, health-oriented questionnaires)	Yes
Procedure (CPT)	96151	Health and behavior assessment (e.g., health-focused clinical interview, behavioral observations, psychophysiological monitoring, health-oriented questionnaires)	Yes

Table B.3 (*continued*)

Type	Code	Description	POS Restriction
Procedure (CPT)	96152	Health and behavior intervention, individual	Yes
Procedure (CPT)	96153	Health and behavior intervention, group	Yes
Procedure (CPT)	96154	Health and behavior intervention, family	Yes
Procedure (CPT)	96155	Health and behavior intervention, family	Yes
Procedure (CPT)	96156	Health behavior assessment or re-assessment – new in 2020	Yes
Procedure (CPT)	96158	Health and behavior intervention, individual - new in 2020	Yes
Procedure (CPT)	96164	Health and behavior intervention, group - new in 2020	Yes
Procedure (CPT)	96167	Health and behavior intervention, family - new in 2020	Yes
Procedure (CPT)	96170	Health and behavior intervention, family - new in 2020	Yes
Procedure (CPT)	97129	Therapeutic interventions that focus on cognitive function - initial 15 min - new in 2020	Yes
Procedure (CPT)	97151	Behavior Identification Assessment, administered by QHP	Yes
Procedure (CPT)	97152	Behavior Identification Supporting Assessment, administered by one technician under the direction of QHP,	Yes
Procedure (CPT)	97153	Adaptive Behavior Treatment by Protocol, administered by technician under the direction of a QHP	Yes
Procedure (CPT)	97154	Group Adaptive Behavior Treatment by Protocol, administered by technician under direction of QHP	Yes
Procedure (CPT)	97155	Adaptive Behavior Treatment with Protocol Modification, administered by QHP	Yes
Procedure (CPT)	97156	Family Adaptive Behavior Treatment Guidance, administered by QHP	Yes
Procedure (CPT)	97157	Multiple-Family Group Adaptive Behavior Treatment Guidance, administered by QHP (without the patient present)	Yes
Procedure (CPT)	97158	Group Adaptive Behavior Treatment with Protocol Modification, administered by QHP face-to-face with multiple patients,	Yes
Procedure (CPT)	99406	Smoking and tobacco use cessation counseling visit, greater than 3 minutes up to 10 minutes	No
Procedure (CPT)	99407	Smoking and tobacco use cessation counseling visit, intensive, greater than 10 minutes	No
Procedure (CPT)	99408	Alcohol and/or substance (other than tobacco) abuse structured screening (e.g., AUDIT, DAST), and brief intervention (SBI) services	No
Procedure (CPT)	99409	Alcohol and/or substance (other than tobacco) abuse structured screening (e.g., AUDIT, DAST), and brief intervention (SBI) services	No
Procedure (CPT)	99484	Care management services for behavioral health conditions	No
Procedure (CPT)	99492	First 70 minutes in the first calendar month for behavioral health care manager activities	No
Procedure (CPT)	99493	First 60 minutes in a subsequent month for behavioral health care manager activities	No
Procedure (CPT)	99494	Each additional 30 minutes in a calendar month of behavioral health care manager activities listed	No

Table B.3 (*continued*)

Type	Code	Description	POS Restriction
Procedure (CPT)	0360T	Observational behavioral follow-up assessment	No
Procedure (CPT)	0364T	Adaptive behavior treatment by protocol, administered by technician, face-to-face with one patient	No
Procedure (CPT)	0365T	Adaptive behavior treatment by protocol, administered by technician, face-to-face with one patient, each additional 30 min	No
Procedure (CPT)	0702T	Remote therapeutic monitoring of a standardized online digital cognitive behavioral therapy program ; supply and technical support – new in 2022	No
Procedure (CPT)	0703T	Remote therapeutic monitoring of a standardized online digital cognitive behavioral therapy program; physician or other qualified health care professional – new in 2022	Yes
Procedure (CPT)	90785	Interactive complexity add-on	Yes
Procedure (CPT)	90840	Psychotherapy for crisis - additional 30 minutes	Yes
Procedure (CPT)	96121	Neurobehavioral status exam, each additional hour	Yes
Procedure (CPT)	96131	Psychological testing evaluation services by physician or other qualified health care professional, each additional hour	Yes
Procedure (CPT)	96133	Neuropsychological testing evaluation services by physician or other qualified health care professional, each additional hour	Yes
Procedure (CPT)	96137	Psychological or neuropsychological test administration and scoring by physician or other qualified health care professional, two or more tests, any method, additional hour	Yes
Procedure (CPT)	96139	Psychological or neuropsychological test administration and scoring by technician, two or more tests, any method, each additional hour	Yes
Procedure (CPT)	96159	Health and behavior intervention, individual additional 15 min- new in 2020	Yes
Procedure (CPT)	96165	Health and behavior intervention, group additional 15 min- new in 2020	Yes
Procedure (CPT)	96168	Health and behavior intervention, family additional 15 min- new in 2020	Yes
Procedure (CPT)	96171	Health and behavior intervention, family additional 15 min- new in 2020	Yes
Procedure (CPT)	97130	Therapeutic interventions that focus on cognitive function - each additional 15 min - new in 2020	Yes
Procedure (HCPCS)	G0396	Alcohol and/or substance (other than tobacco) abuse structured screening (e.g., AUDIT, DAST), and brief intervention (SBI) services	No
Procedure (HCPCS)	G0397	Alcohol and/or substance (other than tobacco) abuse structured screening (e.g., AUDIT, DAST), and brief intervention (SBI) services	No
Procedure (HCPCS)	G0409	Social work and psychological services, directly relating to and/or furthering the patient's rehabilitation goals	No
Procedure (HCPCS)	G0443	Brief face-to-face behavioral counseling for alcohol misuse	No

Table B.3 (*continued*)

Type	Code	Description	POS Restriction
Procedure (HCPCS)	G0445	High intensity behavioral counseling to prevent sexually transmitted infection	No
Procedure (HCPCS)	G0446	Annual, face-to-face intensive behavioral therapy for cardiovascular disease, individual, 15 minutes	No
Procedure (HCPCS)	G0447	Face-to-face behavioral counseling for obesity, 15 minutes	No
Procedure (HCPCS)	G0473	Face-to-face behavioral counseling for obesity, group (2–10), 30 minutes	No
Procedure (HCPCS)	G0502	Psychiatric collaborative care management	No
Procedure (HCPCS)	G0503	Psychiatric collaborative care management	No
Procedure (HCPCS)	G0504	Psychiatric collaborative care management	No
Procedure (HCPCS)	G2011	Alcohol and/or substance abuse structured assessment and brief intervention - new in 2019	No
Procedure (HCPCS)	G2076	Intake activities, including a physician assessment, - opioid treatment program - new in 2020	Yes
Procedure (HCPCS)	G2086-G2088	Office-based treatment for opioid use disorder - new in 2020	No
Procedure (HCPCS)	G2214	Psychiatric Collaborative Care Management (new in 2021)	No
Diagnosis (ICD-10)	F01-F09	Mental disorders due to known physiological conditions	No
Diagnosis (ICD-10)	F10-F19	Mental and behavioral disorders due to psychoactive substance use (substance use disorders)	No
Diagnosis (ICD-10)	F20-F29	Schizophrenia, schizotypal, delusional, and other non-mood psychotic disorders	No
Diagnosis (ICD-10)	F30-F39	Mood [affective] disorders	No
Diagnosis (ICD-10)	F40-F48	Anxiety, dissociative, stress-related, somatoform and other nonpsychotic mental disorders	No
Diagnosis (ICD-10)	F50-F59	Behavioral syndromes associated with physiological disturbances and physical factors	No
Diagnosis (ICD-10)	F60-F69	Disorders of adult personality and behavior	No
Diagnosis (ICD-10)	F70-F79	Intellectual disabilities	No
Diagnosis (ICD-10)	F80-F89	Pervasive and specific developmental disorders	No
Diagnosis (ICD-10)	F90-F98	Behavioral and emotional disorders with onset usually occurring in childhood and adolescence	No
Diagnosis (ICD-10)	F99	Unspecified mental disorder	No

POS = Place of service; CPT = Current Procedural Terminology; E&M = Evaluation and management; HCPCS = Healthcare Common Procedure Coding System; ICD = International Classification of Diseases, Functioning, and Disability; AUDIT = Alcohol Use Disorders Identification Test; DAST = Drug Abuse Screening Test.

Appendix C.

Continuity of Care and Follow-Up Visit Measures

This page has been left blank for double-sided copying.

Continuity of care

One continuity of care measure is the reverse Bice-Boxerman Index (rBBI); it measures fragmentation of care based on the number of visits, the number of providers, and the distribution of visits across providers. The rBBI is estimated from the Bice-Boxerman Continuity of Care Index (BBI), which identifies the number of providers delivering ambulatory services to a patient and the percentage of those services each provider delivers. The BBI for each patient is calculated by dividing the number of visits to each provider by the total number of visits to all providers.

BBI is defined as:

$$\left(\sum n_i^2\right) / \left[N\left(N-1\right)\right],$$

where n_i is the number of visits the beneficiary had with the i^{th} practitioner, and *N* is the total number of all ambulatory visits the beneficiary had during the measurement period.

BBI scores range from 0 to 1. To convert these scores to a fragmentation measure, we reverse the raw BBI scores by subtracting them from 1 to create the rBBI. An rBBI score of 1 indicates the patient had visits with many different providers; an rBBI score of 0 indicates the patient had all their visits with a single provider. We use the rBBI to determine whether telehealth use was associated with an increase or decrease in care fragmentation from 2019 to 2021.

One limitation of the rBBI is that it is not constrained by diagnosis. Accordingly, if a patient develops a new condition during the measurement year and sees a new provider for that condition, the rBBI does not account for that new diagnosis and subsequent new utilization in its scoring algorithm.

The usual provider of care (UPC) index is another continuity of care measure; UPC represents the percentage of a patient's visits with their most frequently seen ambulatory practitioner (either primary care or a specialist). The formula for this measure is as follows:

$$max\left(\frac{n_i}{N}\right) \text{ over all } i \text{ practitioners}$$

where n_i is the number of ambulatory visits to practitioner i (unique National Provider Identifier [NPI]) during the measurement period, and *N* is the patient's total number of all ambulatory visits during the measurement period. We calculate the UPC index to examine whether telehealth use in 2021 was associated with an increased or decreased concentration of services with a single provider for telehealth users compared with telehealth nonusers.

Both the rBBI and the UPC measures were defined for patients with at least four ambulatory visits during a measurement period or year, since continuity of care measures cannot be meaningfully interpreted for patients with a low number of ambulatory visits.

Follow-up visits

To measure follow-up after hospitalizations or ED visits for mental illness, we first identify discharges for hospitalizations and ED visits for mental illness or self-harm. Table C.1 provides the codes for identifying eligible hospitalizations and ED visits, and Table C.2 provides the list of eligible diagnoses for mental illness or self-harm. After identifying the relevant discharges, we then calculate the percentage of those discharges for which the patient received follow-up care from mental health providers within 30 days. Table C.3 provides the list of codes to identify follow-up services.

Mental health providers include psychiatrists, psychologists, psychiatric nurse practitioners (NPs), clinical nurse specialists (CNSs), masters-prepared social workers (MSWs), certified or licensed marital and family therapists (MFTs) or licensed professional counselors (PCs, PCCs, PCC-Ss), physician assistants (PAs) certified to practice psychiatry, authorized certified community mental health centers (CMHCs or the comparable term used within the state in which it is located), or authorized certified community behavioral health clinics (CCBHC). Follow-up with a primary care physician (PCP) does not fulfill the follow-up requirement for this measure, unless the PCP is certified as a behavioral health provider. Eligible follow-up visits include outpatient visits, telehealth visits, behavioral health outpatient visits, intensive outpatient or partial hospitalization visits, observation visits, targeted case management visits, visits occurring in a behavioral health setting, telephone visits, psychiatric collaborative care management, or electroconvulsive therapy.

Table C.1. Codes used to identify hospitalizations and ED visits.

Category	Code type	Code
ED visit	CPT	99281
ED visit	CPT	99282
ED visit	CPT	99283
ED visit	CPT	99284
ED visit	CPT	99285
ED visit	UBREV	0450
ED visit	UBREV	0451
ED visit	UBREV	0452
ED visit	UBREV	0456
ED visit	UBREV	0459
ED visit	UBREV	0981
ED visit	POS	23
Inpatient stay	UBREV	0100
Inpatient stay	UBREV	0101
Inpatient stay	UBREV	0110
Inpatient stay	UBREV	0111
Inpatient stay	UBREV	0112
Inpatient stay	UBREV	0113
Inpatient stay	UBREV	0114
Inpatient stay	UBREV	0116

Table C.1 (*continued*)

Category	Code type	Code
Inpatient stay	UBREV	0117
Inpatient stay	UBREV	0118
Inpatient stay	UBREV	0119
Inpatient stay	UBREV	0120
Inpatient stay	UBREV	0121
Inpatient stay	UBREV	0122
Inpatient stay	UBREV	0123
Inpatient stay	UBREV	0124
Inpatient stay	UBREV	0126
Inpatient stay	UBREV	0127
Inpatient stay	UBREV	0128
Inpatient stay	UBREV	0129
Inpatient stay	UBREV	0130
Inpatient stay	UBREV	0131
Inpatient stay	UBREV	0132
Inpatient stay	UBREV	0133
Inpatient stay	UBREV	0134
Inpatient stay	UBREV	0136
Inpatient stay	UBREV	0137
Inpatient stay	UBREV	0138
Inpatient stay	UBREV	0139
Inpatient stay	UBREV	0140
Inpatient stay	UBREV	0141
Inpatient stay	UBREV	0142
Inpatient stay	UBREV	0143
Inpatient stay	UBREV	0144
Inpatient stay	UBREV	0146
Inpatient stay	UBREV	0147
Inpatient stay	UBREV	0148
Inpatient stay	UBREV	0149
Inpatient stay	UBREV	0150
Inpatient stay	UBREV	0151
Inpatient stay	UBREV	0152
Inpatient stay	UBREV	0153
Inpatient stay	UBREV	0154
Inpatient stay	UBREV	0156
Inpatient stay	UBREV	0157
Inpatient stay	UBREV	0158
Inpatient stay	UBREV	0159

Table C.1 (*continued*)

Category	Code type	Code
Inpatient stay	UBREV	0160
Inpatient stay	UBREV	0164
Inpatient stay	UBREV	0167
Inpatient stay	UBREV	0169
Inpatient stay	UBREV	0170
Inpatient stay	UBREV	0171
Inpatient stay	UBREV	0172
Inpatient stay	UBREV	0173
Inpatient stay	UBREV	0174
Inpatient stay	UBREV	0179
Inpatient stay	UBREV	0190
Inpatient stay	UBREV	0191
Inpatient stay	UBREV	0192
Inpatient stay	UBREV	0193
Inpatient stay	UBREV	0194
Inpatient stay	UBREV	0199
Inpatient stay	UBREV	0200
Inpatient stay	UBREV	0201
Inpatient stay	UBREV	0202
Inpatient stay	UBREV	0203
Inpatient stay	UBREV	0204
Inpatient stay	UBREV	0206
Inpatient stay	UBREV	0207
Inpatient stay	UBREV	0208
Inpatient stay	UBREV	0209
Inpatient stay	UBREV	0210
Inpatient stay	UBREV	0211
Inpatient stay	UBREV	0212
Inpatient stay	UBREV	0213
Inpatient stay	UBREV	0214
Inpatient stay	UBREV	0219
Inpatient stay	UBREV	1000
Inpatient stay	UBREV	1001
Inpatient stay	UBREV	1002

Table C.2. Codes used to identify behavioral health conditions and intentional self-harm

Category	Code type	Code
Behavioral health condition	ICD-10 CM	F03.91
Behavioral health condition	ICD-10 CM	F10.10
Behavioral health condition	ICD-10 CM	F10.120
Behavioral health condition	ICD-10 CM	F10.121
Behavioral health condition	ICD-10 CM	F10.129
Behavioral health condition	ICD-10 CM	F10.14
Behavioral health condition	ICD-10 CM	F10.150
Behavioral health condition	ICD-10 CM	F10.151
Behavioral health condition	ICD-10 CM	F10.159
Behavioral health condition	ICD-10 CM	F10.180
Behavioral health condition	ICD-10 CM	F10.181
Behavioral health condition	ICD-10 CM	F10.182
Behavioral health condition	ICD-10 CM	F10.188
Behavioral health condition	ICD-10 CM	F10.19
Behavioral health condition	ICD-10 CM	F10.20
Behavioral health condition	ICD-10 CM	F10.220
Behavioral health condition	ICD-10 CM	F10.221
Behavioral health condition	ICD-10 CM	F10.229
Behavioral health condition	ICD-10 CM	F10.230
Behavioral health condition	ICD-10 CM	F10.231
Behavioral health condition	ICD-10 CM	F10.232
Behavioral health condition	ICD-10 CM	F10.239
Behavioral health condition	ICD-10 CM	F10.24
Behavioral health condition	ICD-10 CM	F10.250
Behavioral health condition	ICD-10 CM	F10.251
Behavioral health condition	ICD-10 CM	F10.259
Behavioral health condition	ICD-10 CM	F10.26
Behavioral health condition	ICD-10 CM	F10.27
Behavioral health condition	ICD-10 CM	F10.280
Behavioral health condition	ICD-10 CM	F10.281
Behavioral health condition	ICD-10 CM	F10.282
Behavioral health condition	ICD-10 CM	F10.288
Behavioral health condition	ICD-10 CM	F10.29
Behavioral health condition	ICD-10 CM	F11.10
Behavioral health condition	ICD-10 CM	F11.120
Behavioral health condition	ICD-10 CM	F11.121
Behavioral health condition	ICD-10 CM	F11.122
Behavioral health condition	ICD-10 CM	F11.129
Behavioral health condition	ICD-10 CM	F11.14

Table C.2 (*continued*)

Category	Code type	Code
Behavioral health condition	ICD-10 CM	F11.150
Behavioral health condition	ICD-10 CM	F11.151
Behavioral health condition	ICD-10 CM	F11.159
Behavioral health condition	ICD-10 CM	F11.181
Behavioral health condition	ICD-10 CM	F11.182
Behavioral health condition	ICD-10 CM	F11.188
Behavioral health condition	ICD-10 CM	F11.19
Behavioral health condition	ICD-10 CM	F11.20
Behavioral health condition	ICD-10 CM	F11.220
Behavioral health condition	ICD-10 CM	F11.221
Behavioral health condition	ICD-10 CM	F11.222
Behavioral health condition	ICD-10 CM	F11.229
Behavioral health condition	ICD-10 CM	F11.23
Behavioral health condition	ICD-10 CM	F11.24
Behavioral health condition	ICD-10 CM	F11.250
Behavioral health condition	ICD-10 CM	F11.251
Behavioral health condition	ICD-10 CM	F11.259
Behavioral health condition	ICD-10 CM	F11.281
Behavioral health condition	ICD-10 CM	F11.282
Behavioral health condition	ICD-10 CM	F11.288
Behavioral health condition	ICD-10 CM	F11.29
Behavioral health condition	ICD-10 CM	F12.10
Behavioral health condition	ICD-10 CM	F12.120
Behavioral health condition	ICD-10 CM	F12.121
Behavioral health condition	ICD-10 CM	F12.122
Behavioral health condition	ICD-10 CM	F12.129
Behavioral health condition	ICD-10 CM	F12.150
Behavioral health condition	ICD-10 CM	F12.151
Behavioral health condition	ICD-10 CM	F12.159
Behavioral health condition	ICD-10 CM	F12.180
Behavioral health condition	ICD-10 CM	F12.188
Behavioral health condition	ICD-10 CM	F12.19
Behavioral health condition	ICD-10 CM	F12.20
Behavioral health condition	ICD-10 CM	F12.220
Behavioral health condition	ICD-10 CM	F12.221
Behavioral health condition	ICD-10 CM	F12.222
Behavioral health condition	ICD-10 CM	F12.229
Behavioral health condition	ICD-10 CM	F12.23
Behavioral health condition	ICD-10 CM	F12.250

Table C.2 (*continued*)

Category	Code type	Code
Behavioral health condition	ICD-10 CM	F12.251
Behavioral health condition	ICD-10 CM	F12.259
Behavioral health condition	ICD-10 CM	F12.280
Behavioral health condition	ICD-10 CM	F12.288
Behavioral health condition	ICD-10 CM	F12.29
Behavioral health condition	ICD-10 CM	F13.10
Behavioral health condition	ICD-10 CM	F13.120
Behavioral health condition	ICD-10 CM	F13.121
Behavioral health condition	ICD-10 CM	F13.129
Behavioral health condition	ICD-10 CM	F13.14
Behavioral health condition	ICD-10 CM	F13.150
Behavioral health condition	ICD-10 CM	F13.151
Behavioral health condition	ICD-10 CM	F13.159
Behavioral health condition	ICD-10 CM	F13.180
Behavioral health condition	ICD-10 CM	F13.181
Behavioral health condition	ICD-10 CM	F13.182
Behavioral health condition	ICD-10 CM	F13.188
Behavioral health condition	ICD-10 CM	F13.19
Behavioral health condition	ICD-10 CM	F13.20
Behavioral health condition	ICD-10 CM	F13.220
Behavioral health condition	ICD-10 CM	F13.221
Behavioral health condition	ICD-10 CM	F13.229
Behavioral health condition	ICD-10 CM	F13.230
Behavioral health condition	ICD-10 CM	F13.231
Behavioral health condition	ICD-10 CM	F13.232
Behavioral health condition	ICD-10 CM	F13.239
Behavioral health condition	ICD-10 CM	F13.24
Behavioral health condition	ICD-10 CM	F13.250
Behavioral health condition	ICD-10 CM	F13.251
Behavioral health condition	ICD-10 CM	F13.259
Behavioral health condition	ICD-10 CM	F13.26
Behavioral health condition	ICD-10 CM	F13.27
Behavioral health condition	ICD-10 CM	F13.280
Behavioral health condition	ICD-10 CM	F13.281
Behavioral health condition	ICD-10 CM	F13.282
Behavioral health condition	ICD-10 CM	F13.288
Behavioral health condition	ICD-10 CM	F13.29
Behavioral health condition	ICD-10 CM	F14.10
Behavioral health condition	ICD-10 CM	F14.120

Table C.2 (*continued*)

Category	Code type	Code
Behavioral health condition	ICD-10 CM	F14.121
Behavioral health condition	ICD-10 CM	F14.122
Behavioral health condition	ICD-10 CM	F14.129
Behavioral health condition	ICD-10 CM	F14.14
Behavioral health condition	ICD-10 CM	F14.150
Behavioral health condition	ICD-10 CM	F14.151
Behavioral health condition	ICD-10 CM	F14.159
Behavioral health condition	ICD-10 CM	F14.180
Behavioral health condition	ICD-10 CM	F14.181
Behavioral health condition	ICD-10 CM	F14.182
Behavioral health condition	ICD-10 CM	F14.188
Behavioral health condition	ICD-10 CM	F14.19
Behavioral health condition	ICD-10 CM	F14.20
Behavioral health condition	ICD-10 CM	F14.220
Behavioral health condition	ICD-10 CM	F14.221
Behavioral health condition	ICD-10 CM	F14.222
Behavioral health condition	ICD-10 CM	F14.229
Behavioral health condition	ICD-10 CM	F14.23
Behavioral health condition	ICD-10 CM	F14.24
Behavioral health condition	ICD-10 CM	F14.250
Behavioral health condition	ICD-10 CM	F14.251
Behavioral health condition	ICD-10 CM	F14.259
Behavioral health condition	ICD-10 CM	F14.280
Behavioral health condition	ICD-10 CM	F14.281
Behavioral health condition	ICD-10 CM	F14.282
Behavioral health condition	ICD-10 CM	F14.288
Behavioral health condition	ICD-10 CM	F14.29
Behavioral health condition	ICD-10 CM	F15.10
Behavioral health condition	ICD-10 CM	F15.120
Behavioral health condition	ICD-10 CM	F15.121
Behavioral health condition	ICD-10 CM	F15.122
Behavioral health condition	ICD-10 CM	F15.129
Behavioral health condition	ICD-10 CM	F15.14
Behavioral health condition	ICD-10 CM	F15.150
Behavioral health condition	ICD-10 CM	F15.151
Behavioral health condition	ICD-10 CM	F15.159
Behavioral health condition	ICD-10 CM	F15.180
Behavioral health condition	ICD-10 CM	F15.181
Behavioral health condition	ICD-10 CM	F15.182

Table C.2 (*continued*)

Category	Code type	Code
Behavioral health condition	ICD-10 CM	F15.188
Behavioral health condition	ICD-10 CM	F15.19
Behavioral health condition	ICD-10 CM	F15.20
Behavioral health condition	ICD-10 CM	F15.220
Behavioral health condition	ICD-10 CM	F15.221
Behavioral health condition	ICD-10 CM	F15.222
Behavioral health condition	ICD-10 CM	F15.229
Behavioral health condition	ICD-10 CM	F15.23
Behavioral health condition	ICD-10 CM	F15.24
Behavioral health condition	ICD-10 CM	F15.250
Behavioral health condition	ICD-10 CM	F15.251
Behavioral health condition	ICD-10 CM	F15.259
Behavioral health condition	ICD-10 CM	F15.280
Behavioral health condition	ICD-10 CM	F15.281
Behavioral health condition	ICD-10 CM	F15.282
Behavioral health condition	ICD-10 CM	F15.288
Behavioral health condition	ICD-10 CM	F15.29
Behavioral health condition	ICD-10 CM	F16.10
Behavioral health condition	ICD-10 CM	F16.120
Behavioral health condition	ICD-10 CM	F16.121
Behavioral health condition	ICD-10 CM	F16.122
Behavioral health condition	ICD-10 CM	F16.129
Behavioral health condition	ICD-10 CM	F16.14
Behavioral health condition	ICD-10 CM	F16.150
Behavioral health condition	ICD-10 CM	F16.151
Behavioral health condition	ICD-10 CM	F16.159
Behavioral health condition	ICD-10 CM	F16.180
Behavioral health condition	ICD-10 CM	F16.183
Behavioral health condition	ICD-10 CM	F16.188
Behavioral health condition	ICD-10 CM	F16.19
Behavioral health condition	ICD-10 CM	F16.20
Behavioral health condition	ICD-10 CM	F16.220
Behavioral health condition	ICD-10 CM	F16.221
Behavioral health condition	ICD-10 CM	F16.229
Behavioral health condition	ICD-10 CM	F16.24
Behavioral health condition	ICD-10 CM	F16.250
Behavioral health condition	ICD-10 CM	F16.251
Behavioral health condition	ICD-10 CM	F16.259
Behavioral health condition	ICD-10 CM	F16.280

Table C.2 (*continued*)

Category	Code type	Code
Behavioral health condition	ICD-10 CM	F16.283
Behavioral health condition	ICD-10 CM	F16.288
Behavioral health condition	ICD-10 CM	F16.29
Behavioral health condition	ICD-10 CM	F18.10
Behavioral health condition	ICD-10 CM	F18.120
Behavioral health condition	ICD-10 CM	F18.121
Behavioral health condition	ICD-10 CM	F18.129
Behavioral health condition	ICD-10 CM	F18.14
Behavioral health condition	ICD-10 CM	F18.150
Behavioral health condition	ICD-10 CM	F18.151
Behavioral health condition	ICD-10 CM	F18.159
Behavioral health condition	ICD-10 CM	F18.17
Behavioral health condition	ICD-10 CM	F18.180
Behavioral health condition	ICD-10 CM	F18.188
Behavioral health condition	ICD-10 CM	F18.19
Behavioral health condition	ICD-10 CM	F18.20
Behavioral health condition	ICD-10 CM	F18.220
Behavioral health condition	ICD-10 CM	F18.221
Behavioral health condition	ICD-10 CM	F18.229
Behavioral health condition	ICD-10 CM	F18.24
Behavioral health condition	ICD-10 CM	F18.250
Behavioral health condition	ICD-10 CM	F18.251
Behavioral health condition	ICD-10 CM	F18.259
Behavioral health condition	ICD-10 CM	F18.27
Behavioral health condition	ICD-10 CM	F18.280
Behavioral health condition	ICD-10 CM	F18.288
Behavioral health condition	ICD-10 CM	F18.29
Behavioral health condition	ICD-10 CM	F19.10
Behavioral health condition	ICD-10 CM	F19.120
Behavioral health condition	ICD-10 CM	F19.121
Behavioral health condition	ICD-10 CM	F19.122
Behavioral health condition	ICD-10 CM	F19.129
Behavioral health condition	ICD-10 CM	F19.14
Behavioral health condition	ICD-10 CM	F19.150
Behavioral health condition	ICD-10 CM	F19.151
Behavioral health condition	ICD-10 CM	F19.159
Behavioral health condition	ICD-10 CM	F19.16
Behavioral health condition	ICD-10 CM	F19.17
Behavioral health condition	ICD-10 CM	F19.180

Table C.2 (*continued*)

Category	Code type	Code
Behavioral health condition	ICD-10 CM	F19.181
Behavioral health condition	ICD-10 CM	F19.182
Behavioral health condition	ICD-10 CM	F19.188
Behavioral health condition	ICD-10 CM	F19.19
Behavioral health condition	ICD-10 CM	F19.20
Behavioral health condition	ICD-10 CM	F19.220
Behavioral health condition	ICD-10 CM	F19.221
Behavioral health condition	ICD-10 CM	F19.222
Behavioral health condition	ICD-10 CM	F19.229
Behavioral health condition	ICD-10 CM	F19.230
Behavioral health condition	ICD-10 CM	F19.231
Behavioral health condition	ICD-10 CM	F19.232
Behavioral health condition	ICD-10 CM	F19.239
Behavioral health condition	ICD-10 CM	F19.24
Behavioral health condition	ICD-10 CM	F19.250
Behavioral health condition	ICD-10 CM	F19.251
Behavioral health condition	ICD-10 CM	F19.259
Behavioral health condition	ICD-10 CM	F19.26
Behavioral health condition	ICD-10 CM	F19.27
Behavioral health condition	ICD-10 CM	F19.280
Behavioral health condition	ICD-10 CM	F19.281
Behavioral health condition	ICD-10 CM	F19.282
Behavioral health condition	ICD-10 CM	F19.288
Behavioral health condition	ICD-10 CM	F19.29
Behavioral health condition	ICD-10 CM	F20.0
Behavioral health condition	ICD-10 CM	F20.1
Behavioral health condition	ICD-10 CM	F20.2
Behavioral health condition	ICD-10 CM	F20.3
Behavioral health condition	ICD-10 CM	F20.5
Behavioral health condition	ICD-10 CM	F20.81
Behavioral health condition	ICD-10 CM	F20.89
Behavioral health condition	ICD-10 CM	F20.9
Behavioral health condition	ICD-10 CM	F21
Behavioral health condition	ICD-10 CM	F22
Behavioral health condition	ICD-10 CM	F23
Behavioral health condition	ICD-10 CM	F24
Behavioral health condition	ICD-10 CM	F25.0
Behavioral health condition	ICD-10 CM	F25.1
Behavioral health condition	ICD-10 CM	F25.8

Table C.2 (*continued*)

Category	Code type	Code
Behavioral health condition	ICD-10 CM	F25.9
Behavioral health condition	ICD-10 CM	F28
Behavioral health condition	ICD-10 CM	F29
Behavioral health condition	ICD-10 CM	F30.10
Behavioral health condition	ICD-10 CM	F30.11
Behavioral health condition	ICD-10 CM	F30.12
Behavioral health condition	ICD-10 CM	F30.13
Behavioral health condition	ICD-10 CM	F30.2
Behavioral health condition	ICD-10 CM	F30.3
Behavioral health condition	ICD-10 CM	F30.4
Behavioral health condition	ICD-10 CM	F30.8
Behavioral health condition	ICD-10 CM	F30.9
Behavioral health condition	ICD-10 CM	F31.0
Behavioral health condition	ICD-10 CM	F31.10
Behavioral health condition	ICD-10 CM	F31.11
Behavioral health condition	ICD-10 CM	F31.12
Behavioral health condition	ICD-10 CM	F31.13
Behavioral health condition	ICD-10 CM	F31.2
Behavioral health condition	ICD-10 CM	F31.30
Behavioral health condition	ICD-10 CM	F31.31
Behavioral health condition	ICD-10 CM	F31.32
Behavioral health condition	ICD-10 CM	F31.4
Behavioral health condition	ICD-10 CM	F31.5
Behavioral health condition	ICD-10 CM	F31.60
Behavioral health condition	ICD-10 CM	F31.61
Behavioral health condition	ICD-10 CM	F31.62
Behavioral health condition	ICD-10 CM	F31.63
Behavioral health condition	ICD-10 CM	F31.64
Behavioral health condition	ICD-10 CM	F31.70
Behavioral health condition	ICD-10 CM	F31.71
Behavioral health condition	ICD-10 CM	F31.72
Behavioral health condition	ICD-10 CM	F31.73
Behavioral health condition	ICD-10 CM	F31.74
Behavioral health condition	ICD-10 CM	F31.75
Behavioral health condition	ICD-10 CM	F31.76
Behavioral health condition	ICD-10 CM	F31.77
Behavioral health condition	ICD-10 CM	F31.78
Behavioral health condition	ICD-10 CM	F31.81
Behavioral health condition	ICD-10 CM	F31.89

Table C.2 (*continued*)

Category	Code type	Code
Behavioral health condition	ICD-10 CM	F31.9
Behavioral health condition	ICD-10 CM	F32.0
Behavioral health condition	ICD-10 CM	F32.1
Behavioral health condition	ICD-10 CM	F32.2
Behavioral health condition	ICD-10 CM	F32.3
Behavioral health condition	ICD-10 CM	F32.4
Behavioral health condition	ICD-10 CM	F32.5
Behavioral health condition	ICD-10 CM	F32.8
Behavioral health condition	ICD-10 CM	F32.81
Behavioral health condition	ICD-10 CM	F32.89
Behavioral health condition	ICD-10 CM	F32.9
Behavioral health condition	ICD-10 CM	F33.0
Behavioral health condition	ICD-10 CM	F33.1
Behavioral health condition	ICD-10 CM	F33.2
Behavioral health condition	ICD-10 CM	F33.3
Behavioral health condition	ICD-10 CM	F33.40
Behavioral health condition	ICD-10 CM	F33.41
Behavioral health condition	ICD-10 CM	F33.42
Behavioral health condition	ICD-10 CM	F33.8
Behavioral health condition	ICD-10 CM	F33.9
Behavioral health condition	ICD-10 CM	F34.0
Behavioral health condition	ICD-10 CM	F34.1
Behavioral health condition	ICD-10 CM	F34.8
Behavioral health condition	ICD-10 CM	F34.81
Behavioral health condition	ICD-10 CM	F34.89
Behavioral health condition	ICD-10 CM	F34.9
Behavioral health condition	ICD-10 CM	F39
Behavioral health condition	ICD-10 CM	F40.00
Behavioral health condition	ICD-10 CM	F40.01
Behavioral health condition	ICD-10 CM	F40.02
Behavioral health condition	ICD-10 CM	F40.10
Behavioral health condition	ICD-10 CM	F40.11
Behavioral health condition	ICD-10 CM	F40.210
Behavioral health condition	ICD-10 CM	F40.218
Behavioral health condition	ICD-10 CM	F40.220
Behavioral health condition	ICD-10 CM	F40.228
Behavioral health condition	ICD-10 CM	F40.230
Behavioral health condition	ICD-10 CM	F40.231
Behavioral health condition	ICD-10 CM	F40.232

Table C.2 (*continued*)

Category	Code type	Code
Behavioral health condition	ICD-10 CM	F40.233
Behavioral health condition	ICD-10 CM	F40.240
Behavioral health condition	ICD-10 CM	F40.241
Behavioral health condition	ICD-10 CM	F40.242
Behavioral health condition	ICD-10 CM	F40.243
Behavioral health condition	ICD-10 CM	F40.248
Behavioral health condition	ICD-10 CM	F40.290
Behavioral health condition	ICD-10 CM	F40.291
Behavioral health condition	ICD-10 CM	F40.298
Behavioral health condition	ICD-10 CM	F40.8
Behavioral health condition	ICD-10 CM	F40.9
Behavioral health condition	ICD-10 CM	F41.0
Behavioral health condition	ICD-10 CM	F41.1
Behavioral health condition	ICD-10 CM	F41.3
Behavioral health condition	ICD-10 CM	F41.8
Behavioral health condition	ICD-10 CM	F41.9
Behavioral health condition	ICD-10 CM	F42
Behavioral health condition	ICD-10 CM	F42.2
Behavioral health condition	ICD-10 CM	F42.3
Behavioral health condition	ICD-10 CM	F42.4
Behavioral health condition	ICD-10 CM	F42.8
Behavioral health condition	ICD-10 CM	F42.9
Behavioral health condition	ICD-10 CM	F43.0
Behavioral health condition	ICD-10 CM	F43.10
Behavioral health condition	ICD-10 CM	F43.11
Behavioral health condition	ICD-10 CM	F43.12
Behavioral health condition	ICD-10 CM	F43.20
Behavioral health condition	ICD-10 CM	F43.21
Behavioral health condition	ICD-10 CM	F43.22
Behavioral health condition	ICD-10 CM	F43.23
Behavioral health condition	ICD-10 CM	F43.24
Behavioral health condition	ICD-10 CM	F43.25
Behavioral health condition	ICD-10 CM	F43.29
Behavioral health condition	ICD-10 CM	F43.8
Behavioral health condition	ICD-10 CM	F43.9
Behavioral health condition	ICD-10 CM	F44.0
Behavioral health condition	ICD-10 CM	F44.1
Behavioral health condition	ICD-10 CM	F44.2
Behavioral health condition	ICD-10 CM	F44.4

Table C.2 (*continued*)

Category	Code type	Code
Behavioral health condition	ICD-10 CM	F44.5
Behavioral health condition	ICD-10 CM	F44.6
Behavioral health condition	ICD-10 CM	F44.7
Behavioral health condition	ICD-10 CM	F44.81
Behavioral health condition	ICD-10 CM	F44.89
Behavioral health condition	ICD-10 CM	F44.9
Behavioral health condition	ICD-10 CM	F45.0
Behavioral health condition	ICD-10 CM	F45.1
Behavioral health condition	ICD-10 CM	F45.20
Behavioral health condition	ICD-10 CM	F45.21
Behavioral health condition	ICD-10 CM	F45.22
Behavioral health condition	ICD-10 CM	F45.29
Behavioral health condition	ICD-10 CM	F45.41
Behavioral health condition	ICD-10 CM	F45.42
Behavioral health condition	ICD-10 CM	F45.8
Behavioral health condition	ICD-10 CM	F45.9
Behavioral health condition	ICD-10 CM	F48.1
Behavioral health condition	ICD-10 CM	F48.2
Behavioral health condition	ICD-10 CM	F48.8
Behavioral health condition	ICD-10 CM	F48.9
Behavioral health condition	ICD-10 CM	F50.00
Behavioral health condition	ICD-10 CM	F50.01
Behavioral health condition	ICD-10 CM	F50.02
Behavioral health condition	ICD-10 CM	F50.2
Behavioral health condition	ICD-10 CM	F50.8
Behavioral health condition	ICD-10 CM	F50.81
Behavioral health condition	ICD-10 CM	F50.82
Behavioral health condition	ICD-10 CM	F50.89
Behavioral health condition	ICD-10 CM	F50.9
Behavioral health condition	ICD-10 CM	F51.01
Behavioral health condition	ICD-10 CM	F51.02
Behavioral health condition	ICD-10 CM	F51.03
Behavioral health condition	ICD-10 CM	F51.04
Behavioral health condition	ICD-10 CM	F51.05
Behavioral health condition	ICD-10 CM	F51.09
Behavioral health condition	ICD-10 CM	F51.11
Behavioral health condition	ICD-10 CM	F51.12
Behavioral health condition	ICD-10 CM	F51.13
Behavioral health condition	ICD-10 CM	F51.19

Table C.2 (*continued*)

Category	Code type	Code
Behavioral health condition	ICD-10 CM	F51.3
Behavioral health condition	ICD-10 CM	F51.4
Behavioral health condition	ICD-10 CM	F51.5
Behavioral health condition	ICD-10 CM	F51.8
Behavioral health condition	ICD-10 CM	F51.9
Behavioral health condition	ICD-10 CM	F52.0
Behavioral health condition	ICD-10 CM	F52.1
Behavioral health condition	ICD-10 CM	F52.21
Behavioral health condition	ICD-10 CM	F52.22
Behavioral health condition	ICD-10 CM	F52.31
Behavioral health condition	ICD-10 CM	F52.32
Behavioral health condition	ICD-10 CM	F52.4
Behavioral health condition	ICD-10 CM	F52.5
Behavioral health condition	ICD-10 CM	F52.6
Behavioral health condition	ICD-10 CM	F52.8
Behavioral health condition	ICD-10 CM	F52.9
Behavioral health condition	ICD-10 CM	F53
Behavioral health condition	ICD-10 CM	F53.0
Behavioral health condition	ICD-10 CM	F53.1
Behavioral health condition	ICD-10 CM	F59
Behavioral health condition	ICD-10 CM	F60.0
Behavioral health condition	ICD-10 CM	F60.1
Behavioral health condition	ICD-10 CM	F60.2
Behavioral health condition	ICD-10 CM	F60.3
Behavioral health condition	ICD-10 CM	F60.4
Behavioral health condition	ICD-10 CM	F60.5
Behavioral health condition	ICD-10 CM	F60.6
Behavioral health condition	ICD-10 CM	F60.7
Behavioral health condition	ICD-10 CM	F60.81
Behavioral health condition	ICD-10 CM	F60.89
Behavioral health condition	ICD-10 CM	F60.9
Behavioral health condition	ICD-10 CM	F63.0
Behavioral health condition	ICD-10 CM	F63.1
Behavioral health condition	ICD-10 CM	F63.2
Behavioral health condition	ICD-10 CM	F63.3
Behavioral health condition	ICD-10 CM	F63.81
Behavioral health condition	ICD-10 CM	F63.89
Behavioral health condition	ICD-10 CM	F63.9
Behavioral health condition	ICD-10 CM	F64.0

Table C.2 (*continued*)

Category	Code type	Code
Behavioral health condition	ICD-10 CM	F64.1
Behavioral health condition	ICD-10 CM	F64.2
Behavioral health condition	ICD-10 CM	F64.8
Behavioral health condition	ICD-10 CM	F64.9
Behavioral health condition	ICD-10 CM	F65.0
Behavioral health condition	ICD-10 CM	F65.1
Behavioral health condition	ICD-10 CM	F65.2
Behavioral health condition	ICD-10 CM	F65.3
Behavioral health condition	ICD-10 CM	F65.4
Behavioral health condition	ICD-10 CM	F65.50
Behavioral health condition	ICD-10 CM	F65.51
Behavioral health condition	ICD-10 CM	F65.52
Behavioral health condition	ICD-10 CM	F65.81
Behavioral health condition	ICD-10 CM	F65.89
Behavioral health condition	ICD-10 CM	F65.9
Behavioral health condition	ICD-10 CM	F66
Behavioral health condition	ICD-10 CM	F68.10
Behavioral health condition	ICD-10 CM	F68.11
Behavioral health condition	ICD-10 CM	F68.12
Behavioral health condition	ICD-10 CM	F68.13
Behavioral health condition	ICD-10 CM	F68.8
Behavioral health condition	ICD-10 CM	F68.A
Behavioral health condition	ICD-10 CM	F69
Behavioral health condition	ICD-10 CM	F80.0
Behavioral health condition	ICD-10 CM	F80.1
Behavioral health condition	ICD-10 CM	F80.2
Behavioral health condition	ICD-10 CM	F80.4
Behavioral health condition	ICD-10 CM	F80.81
Behavioral health condition	ICD-10 CM	F80.82
Behavioral health condition	ICD-10 CM	F80.89
Behavioral health condition	ICD-10 CM	F80.9
Behavioral health condition	ICD-10 CM	F81.0
Behavioral health condition	ICD-10 CM	F81.2
Behavioral health condition	ICD-10 CM	F81.81
Behavioral health condition	ICD-10 CM	F81.89
Behavioral health condition	ICD-10 CM	F81.9
Behavioral health condition	ICD-10 CM	F82
Behavioral health condition	ICD-10 CM	F84.0
Behavioral health condition	ICD-10 CM	F84.2

Table C.2 (*continued*)

Category	Code type	Code
Behavioral health condition	ICD-10 CM	F84.3
Behavioral health condition	ICD-10 CM	F84.5
Behavioral health condition	ICD-10 CM	F84.8
Behavioral health condition	ICD-10 CM	F84.9
Behavioral health condition	ICD-10 CM	F88
Behavioral health condition	ICD-10 CM	F89
Behavioral health condition	ICD-10 CM	F90.0
Behavioral health condition	ICD-10 CM	F90.1
Behavioral health condition	ICD-10 CM	F90.2
Behavioral health condition	ICD-10 CM	F90.8
Behavioral health condition	ICD-10 CM	F90.9
Behavioral health condition	ICD-10 CM	F91.0
Behavioral health condition	ICD-10 CM	F91.1
Behavioral health condition	ICD-10 CM	F91.2
Behavioral health condition	ICD-10 CM	F91.3
Behavioral health condition	ICD-10 CM	F91.8
Behavioral health condition	ICD-10 CM	F91.9
Behavioral health condition	ICD-10 CM	F93.0
Behavioral health condition	ICD-10 CM	F93.8
Behavioral health condition	ICD-10 CM	F93.9
Behavioral health condition	ICD-10 CM	F94.0
Behavioral health condition	ICD-10 CM	F94.1
Behavioral health condition	ICD-10 CM	F94.2
Behavioral health condition	ICD-10 CM	F94.8
Behavioral health condition	ICD-10 CM	F94.9
Behavioral health condition	ICD-10 CM	F95.0
Behavioral health condition	ICD-10 CM	F95.1
Behavioral health condition	ICD-10 CM	F95.2
Behavioral health condition	ICD-10 CM	F95.8
Behavioral health condition	ICD-10 CM	F95.9
Behavioral health condition	ICD-10 CM	F98.0
Behavioral health condition	ICD-10 CM	F98.1
Behavioral health condition	ICD-10 CM	F98.21
Behavioral health condition	ICD-10 CM	F98.29
Behavioral health condition	ICD-10 CM	F98.3
Behavioral health condition	ICD-10 CM	F98.4
Behavioral health condition	ICD-10 CM	F98.5
Behavioral health condition	ICD-10 CM	F98.8
Behavioral health condition	ICD-10 CM	F98.9

Table C.2 (*continued*)

Category	Code type	Code
Behavioral health condition	ICD-10 CM	F99
Intentional self-harm	ICD-10 CM	T14.91XA
Intentional self-harm	ICD-10 CM	T14.91XD
Intentional self-harm	ICD-10 CM	T14.91XS
Intentional self-harm	ICD-10 CM	T36.0X2A
Intentional self-harm	ICD-10 CM	T36.0X2D
Intentional self-harm	ICD-10 CM	T36.0X2S
Intentional self-harm	ICD-10 CM	T36.1X2A
Intentional self-harm	ICD-10 CM	T36.1X2D
Intentional self-harm	ICD-10 CM	T36.1X2S
Intentional self-harm	ICD-10 CM	T36.2X2A
Intentional self-harm	ICD-10 CM	T36.2X2D
Intentional self-harm	ICD-10 CM	T36.2X2S
Intentional self-harm	ICD-10 CM	T36.3X2A
Intentional self-harm	ICD-10 CM	T36.3X2D
Intentional self-harm	ICD-10 CM	T36.3X2S
Intentional self-harm	ICD-10 CM	T36.4X2A
Intentional self-harm	ICD-10 CM	T36.4X2D
Intentional self-harm	ICD-10 CM	T36.4X2S
Intentional self-harm	ICD-10 CM	T36.5X2A
Intentional self-harm	ICD-10 CM	T36.5X2D
Intentional self-harm	ICD-10 CM	T36.5X2S
Intentional self-harm	ICD-10 CM	T36.6X2A
Intentional self-harm	ICD-10 CM	T36.6X2D
Intentional self-harm	ICD-10 CM	T36.6X2S
Intentional self-harm	ICD-10 CM	T36.7X2A
Intentional self-harm	ICD-10 CM	T36.7X2D
Intentional self-harm	ICD-10 CM	T36.7X2S
Intentional self-harm	ICD-10 CM	T36.8X2A
Intentional self-harm	ICD-10 CM	T36.8X2D
Intentional self-harm	ICD-10 CM	T36.8X2S
Intentional self-harm	ICD-10 CM	T36.92XA
Intentional self-harm	ICD-10 CM	T36.92XD
Intentional self-harm	ICD-10 CM	T36.92XS
Intentional self-harm	ICD-10 CM	T37.0X2A
Intentional self-harm	ICD-10 CM	T37.0X2D
Intentional self-harm	ICD-10 CM	T37.0X2S
Intentional self-harm	ICD-10 CM	T37.1X2A
Intentional self-harm	ICD-10 CM	T37.1X2D

Table C.2 (*continued*)

Category	Code type	Code
Intentional self-harm	ICD-10 CM	T37.1X2S
Intentional self-harm	ICD-10 CM	T37.2X2A
Intentional self-harm	ICD-10 CM	T37.2X2D
Intentional self-harm	ICD-10 CM	T37.2X2S
Intentional self-harm	ICD-10 CM	T37.3X2A
Intentional self-harm	ICD-10 CM	T37.3X2D
Intentional self-harm	ICD-10 CM	T37.3X2S
Intentional self-harm	ICD-10 CM	T37.4X2A
Intentional self-harm	ICD-10 CM	T37.4X2D
Intentional self-harm	ICD-10 CM	T37.4X2S
Intentional self-harm	ICD-10 CM	T37.5X2A
Intentional self-harm	ICD-10 CM	T37.5X2D
Intentional self-harm	ICD-10 CM	T37.5X2S
Intentional self-harm	ICD-10 CM	T37.8X2A
Intentional self-harm	ICD-10 CM	T37.8X2D
Intentional self-harm	ICD-10 CM	T37.8X2S
Intentional self-harm	ICD-10 CM	T37.92XA
Intentional self-harm	ICD-10 CM	T37.92XD
Intentional self-harm	ICD-10 CM	T37.92XS
Intentional self-harm	ICD-10 CM	T38.0X2A
Intentional self-harm	ICD-10 CM	T38.0X2D
Intentional self-harm	ICD-10 CM	T38.0X2S
Intentional self-harm	ICD-10 CM	T38.1X2A
Intentional self-harm	ICD-10 CM	T38.1X2D
Intentional self-harm	ICD-10 CM	T38.1X2S
Intentional self-harm	ICD-10 CM	T38.2X2A
Intentional self-harm	ICD-10 CM	T38.2X2D
Intentional self-harm	ICD-10 CM	T38.2X2S
Intentional self-harm	ICD-10 CM	T38.3X2A
Intentional self-harm	ICD-10 CM	T38.3X2D
Intentional self-harm	ICD-10 CM	T38.3X2S
Intentional self-harm	ICD-10 CM	T38.4X2A
Intentional self-harm	ICD-10 CM	T38.4X2D
Intentional self-harm	ICD-10 CM	T38.4X2S
Intentional self-harm	ICD-10 CM	T38.5X2A
Intentional self-harm	ICD-10 CM	T38.5X2D
Intentional self-harm	ICD-10 CM	T38.5X2S
Intentional self-harm	ICD-10 CM	T38.6X2A
Intentional self-harm	ICD-10 CM	T38.6X2D

Table C.2 (*continued*)

Category	Code type	Code
Intentional self-harm	ICD-10 CM	T38.6X2S
Intentional self-harm	ICD-10 CM	T38.7X2A
Intentional self-harm	ICD-10 CM	T38.7X2D
Intentional self-harm	ICD-10 CM	T38.7X2S
Intentional self-harm	ICD-10 CM	T38.802A
Intentional self-harm	ICD-10 CM	T38.802D
Intentional self-harm	ICD-10 CM	T38.802S
Intentional self-harm	ICD-10 CM	T38.812A
Intentional self-harm	ICD-10 CM	T38.812D
Intentional self-harm	ICD-10 CM	T38.812S
Intentional self-harm	ICD-10 CM	T38.892A
Intentional self-harm	ICD-10 CM	T38.892D
Intentional self-harm	ICD-10 CM	T38.892S
Intentional self-harm	ICD-10 CM	T38.902A
Intentional self-harm	ICD-10 CM	T38.902D
Intentional self-harm	ICD-10 CM	T38.902S
Intentional self-harm	ICD-10 CM	T38.992A
Intentional self-harm	ICD-10 CM	T38.992D
Intentional self-harm	ICD-10 CM	T38.992S
Intentional self-harm	ICD-10 CM	T39.012A
Intentional self-harm	ICD-10 CM	T39.012D
Intentional self-harm	ICD-10 CM	T39.012S
Intentional self-harm	ICD-10 CM	T39.092A
Intentional self-harm	ICD-10 CM	T39.092D
Intentional self-harm	ICD-10 CM	T39.092S
Intentional self-harm	ICD-10 CM	T39.1X2A
Intentional self-harm	ICD-10 CM	T39.1X2D
Intentional self-harm	ICD-10 CM	T39.1X2S
Intentional self-harm	ICD-10 CM	T39.2X2A
Intentional self-harm	ICD-10 CM	T39.2X2D
Intentional self-harm	ICD-10 CM	T39.2X2S
Intentional self-harm	ICD-10 CM	T39.312A
Intentional self-harm	ICD-10 CM	T39.312D
Intentional self-harm	ICD-10 CM	T39.312S
Intentional self-harm	ICD-10 CM	T39.392A
Intentional self-harm	ICD-10 CM	T39.392D
Intentional self-harm	ICD-10 CM	T39.392S
Intentional self-harm	ICD-10 CM	T39.4X2A
Intentional self-harm	ICD-10 CM	T39.4X2D

Table C.2 (*continued*)

Category	Code type	Code
Intentional self-harm	ICD-10 CM	T39.4X2S
Intentional self-harm	ICD-10 CM	T39.8X2A
Intentional self-harm	ICD-10 CM	T39.8X2D
Intentional self-harm	ICD-10 CM	T39.8X2S
Intentional self-harm	ICD-10 CM	T39.92XA
Intentional self-harm	ICD-10 CM	T39.92XD
Intentional self-harm	ICD-10 CM	T39.92XS
Intentional self-harm	ICD-10 CM	T40.0X2A
Intentional self-harm	ICD-10 CM	T40.0X2D
Intentional self-harm	ICD-10 CM	T40.0X2S
Intentional self-harm	ICD-10 CM	T40.1X2A
Intentional self-harm	ICD-10 CM	T40.1X2D
Intentional self-harm	ICD-10 CM	T40.1X2S
Intentional self-harm	ICD-10 CM	T40.2X2A
Intentional self-harm	ICD-10 CM	T40.2X2D
Intentional self-harm	ICD-10 CM	T40.2X2S
Intentional self-harm	ICD-10 CM	T40.3X2A
Intentional self-harm	ICD-10 CM	T40.3X2D
Intentional self-harm	ICD-10 CM	T40.3X2S
Intentional self-harm	ICD-10 CM	T40.4X2A
Intentional self-harm	ICD-10 CM	T40.4X2D
Intentional self-harm	ICD-10 CM	T40.4X2S
Intentional self-harm	ICD-10 CM	T40.5X2A
Intentional self-harm	ICD-10 CM	T40.5X2D
Intentional self-harm	ICD-10 CM	T40.5X2S
Intentional self-harm	ICD-10 CM	T40.602A
Intentional self-harm	ICD-10 CM	T40.602D
Intentional self-harm	ICD-10 CM	T40.602S
Intentional self-harm	ICD-10 CM	T40.692A
Intentional self-harm	ICD-10 CM	T40.692D
Intentional self-harm	ICD-10 CM	T40.692S
Intentional self-harm	ICD-10 CM	T40.7X2A
Intentional self-harm	ICD-10 CM	T40.7X2D
Intentional self-harm	ICD-10 CM	T40.7X2S
Intentional self-harm	ICD-10 CM	T40.8X2A
Intentional self-harm	ICD-10 CM	T40.8X2D
Intentional self-harm	ICD-10 CM	T40.8X2S
Intentional self-harm	ICD-10 CM	T40.902A
Intentional self-harm	ICD-10 CM	T40.902D

Table C.2 (*continued*)

Category	Code type	Code
Intentional self-harm	ICD-10 CM	T40.902S
Intentional self-harm	ICD-10 CM	T40.992A
Intentional self-harm	ICD-10 CM	T40.992D
Intentional self-harm	ICD-10 CM	T40.992S
Intentional self-harm	ICD-10 CM	T41.0X2A
Intentional self-harm	ICD-10 CM	T41.0X2D
Intentional self-harm	ICD-10 CM	T41.0X2S
Intentional self-harm	ICD-10 CM	T41.1X2A
Intentional self-harm	ICD-10 CM	T41.1X2D
Intentional self-harm	ICD-10 CM	T41.1X2S
Intentional self-harm	ICD-10 CM	T41.202A
Intentional self-harm	ICD-10 CM	T41.202D
Intentional self-harm	ICD-10 CM	T41.202S
Intentional self-harm	ICD-10 CM	T41.292A
Intentional self-harm	ICD-10 CM	T41.292D
Intentional self-harm	ICD-10 CM	T41.292S
Intentional self-harm	ICD-10 CM	T41.3X2A
Intentional self-harm	ICD-10 CM	T41.3X2D
Intentional self-harm	ICD-10 CM	T41.3X2S
Intentional self-harm	ICD-10 CM	T41.42XA
Intentional self-harm	ICD-10 CM	T41.42XD
Intentional self-harm	ICD-10 CM	T41.42XS
Intentional self-harm	ICD-10 CM	T41.5X2A
Intentional self-harm	ICD-10 CM	T41.5X2D
Intentional self-harm	ICD-10 CM	T41.5X2S
Intentional self-harm	ICD-10 CM	T42.0X2A
Intentional self-harm	ICD-10 CM	T42.0X2D
Intentional self-harm	ICD-10 CM	T42.0X2S
Intentional self-harm	ICD-10 CM	T42.1X2A
Intentional self-harm	ICD-10 CM	T42.1X2D
Intentional self-harm	ICD-10 CM	T42.1X2S
Intentional self-harm	ICD-10 CM	T42.2X2A
Intentional self-harm	ICD-10 CM	T42.2X2D
Intentional self-harm	ICD-10 CM	T42.2X2S
Intentional self-harm	ICD-10 CM	T42.3X2A
Intentional self-harm	ICD-10 CM	T42.3X2D
Intentional self-harm	ICD-10 CM	T42.3X2S
Intentional self-harm	ICD-10 CM	T42.4X2A
Intentional self-harm	ICD-10 CM	T42.4X2D

Table C.2 (*continued*)

Category	Code type	Code
Intentional self-harm	ICD-10 CM	T42.4X2S
Intentional self-harm	ICD-10 CM	T42.5X2A
Intentional self-harm	ICD-10 CM	T42.5X2D
Intentional self-harm	ICD-10 CM	T42.5X2S
Intentional self-harm	ICD-10 CM	T42.6X2A
Intentional self-harm	ICD-10 CM	T42.6X2D
Intentional self-harm	ICD-10 CM	T42.6X2S
Intentional self-harm	ICD-10 CM	T42.72XA
Intentional self-harm	ICD-10 CM	T42.72XD
Intentional self-harm	ICD-10 CM	T42.72XS
Intentional self-harm	ICD-10 CM	T42.8X2A
Intentional self-harm	ICD-10 CM	T42.8X2D
Intentional self-harm	ICD-10 CM	T42.8X2S
Intentional self-harm	ICD-10 CM	T43.012A
Intentional self-harm	ICD-10 CM	T43.012D
Intentional self-harm	ICD-10 CM	T43.012S
Intentional self-harm	ICD-10 CM	T43.022A
Intentional self-harm	ICD-10 CM	T43.022D
Intentional self-harm	ICD-10 CM	T43.022S
Intentional self-harm	ICD-10 CM	T43.1X2A
Intentional self-harm	ICD-10 CM	T43.1X2D
Intentional self-harm	ICD-10 CM	T43.1X2S
Intentional self-harm	ICD-10 CM	T43.202A
Intentional self-harm	ICD-10 CM	T43.202D
Intentional self-harm	ICD-10 CM	T43.202S
Intentional self-harm	ICD-10 CM	T43.212A
Intentional self-harm	ICD-10 CM	T43.212D
Intentional self-harm	ICD-10 CM	T43.212S
Intentional self-harm	ICD-10 CM	T43.222A
Intentional self-harm	ICD-10 CM	T43.222D
Intentional self-harm	ICD-10 CM	T43.222S
Intentional self-harm	ICD-10 CM	T43.292A
Intentional self-harm	ICD-10 CM	T43.292D
Intentional self-harm	ICD-10 CM	T43.292S
Intentional self-harm	ICD-10 CM	T43.3X2A
Intentional self-harm	ICD-10 CM	T43.3X2D
Intentional self-harm	ICD-10 CM	T43.3X2S
Intentional self-harm	ICD-10 CM	T43.4X2A
Intentional self-harm	ICD-10 CM	T43.4X2D

Table C.2 (*continued*)

Category	Code type	Code
Intentional self-harm	ICD-10 CM	T43.4X2S
Intentional self-harm	ICD-10 CM	T43.502A
Intentional self-harm	ICD-10 CM	T43.502D
Intentional self-harm	ICD-10 CM	T43.502S
Intentional self-harm	ICD-10 CM	T43.592A
Intentional self-harm	ICD-10 CM	T43.592D
Intentional self-harm	ICD-10 CM	T43.592S
Intentional self-harm	ICD-10 CM	T43.602A
Intentional self-harm	ICD-10 CM	T43.602D
Intentional self-harm	ICD-10 CM	T43.602S
Intentional self-harm	ICD-10 CM	T43.612A
Intentional self-harm	ICD-10 CM	T43.612D
Intentional self-harm	ICD-10 CM	T43.612S
Intentional self-harm	ICD-10 CM	T43.622A
Intentional self-harm	ICD-10 CM	T43.622D
Intentional self-harm	ICD-10 CM	T43.622S
Intentional self-harm	ICD-10 CM	T43.632A
Intentional self-harm	ICD-10 CM	T43.632D
Intentional self-harm	ICD-10 CM	T43.632S
Intentional self-harm	ICD-10 CM	T43.642A
Intentional self-harm	ICD-10 CM	T43.642D
Intentional self-harm	ICD-10 CM	T43.642S
Intentional self-harm	ICD-10 CM	T43.692A
Intentional self-harm	ICD-10 CM	T43.692D
Intentional self-harm	ICD-10 CM	T43.692S
Intentional self-harm	ICD-10 CM	T43.8X2A
Intentional self-harm	ICD-10 CM	T43.8X2D
Intentional self-harm	ICD-10 CM	T43.8X2S
Intentional self-harm	ICD-10 CM	T43.92XA
Intentional self-harm	ICD-10 CM	T43.92XD
Intentional self-harm	ICD-10 CM	T43.92XS
Intentional self-harm	ICD-10 CM	T44.0X2A
Intentional self-harm	ICD-10 CM	T44.0X2D
Intentional self-harm	ICD-10 CM	T44.0X2S
Intentional self-harm	ICD-10 CM	T44.1X2A
Intentional self-harm	ICD-10 CM	T44.1X2D
Intentional self-harm	ICD-10 CM	T44.1X2S
Intentional self-harm	ICD-10 CM	T44.2X2A
Intentional self-harm	ICD-10 CM	T44.2X2D

Table C.2 (*continued*)

Category	Code type	Code
Intentional self-harm	ICD-10 CM	T44.2X2S
Intentional self-harm	ICD-10 CM	T44.3X2A
Intentional self-harm	ICD-10 CM	T44.3X2D
Intentional self-harm	ICD-10 CM	T44.3X2S
Intentional self-harm	ICD-10 CM	T44.4X2A
Intentional self-harm	ICD-10 CM	T44.4X2D
Intentional self-harm	ICD-10 CM	T44.4X2S
Intentional self-harm	ICD-10 CM	T44.5X2A
Intentional self-harm	ICD-10 CM	T44.5X2D
Intentional self-harm	ICD-10 CM	T44.5X2S
Intentional self-harm	ICD-10 CM	T44.6X2A
Intentional self-harm	ICD-10 CM	T44.6X2D
Intentional self-harm	ICD-10 CM	T44.6X2S
Intentional self-harm	ICD-10 CM	T44.7X2A
Intentional self-harm	ICD-10 CM	T44.7X2D
Intentional self-harm	ICD-10 CM	T44.7X2S
Intentional self-harm	ICD-10 CM	T44.8X2A
Intentional self-harm	ICD-10 CM	T44.8X2D
Intentional self-harm	ICD-10 CM	T44.8X2S
Intentional self-harm	ICD-10 CM	T44.902A
Intentional self-harm	ICD-10 CM	T44.902D
Intentional self-harm	ICD-10 CM	T44.902S
Intentional self-harm	ICD-10 CM	T44.992A
Intentional self-harm	ICD-10 CM	T44.992D
Intentional self-harm	ICD-10 CM	T44.992S
Intentional self-harm	ICD-10 CM	T45.0X2A
Intentional self-harm	ICD-10 CM	T45.0X2D
Intentional self-harm	ICD-10 CM	T45.0X2S
Intentional self-harm	ICD-10 CM	T45.1X2A
Intentional self-harm	ICD-10 CM	T45.1X2D
Intentional self-harm	ICD-10 CM	T45.1X2S
Intentional self-harm	ICD-10 CM	T45.2X2A
Intentional self-harm	ICD-10 CM	T45.2X2D
Intentional self-harm	ICD-10 CM	T45.2X2S
Intentional self-harm	ICD-10 CM	T45.3X2A
Intentional self-harm	ICD-10 CM	T45.3X2D
Intentional self-harm	ICD-10 CM	T45.3X2S
Intentional self-harm	ICD-10 CM	T45.4X2A
Intentional self-harm	ICD-10 CM	T45.4X2D

Table C.2 (*continued*)

Category	Code type	Code
Intentional self-harm	ICD-10 CM	T45.4X2S
Intentional self-harm	ICD-10 CM	T45.512A
Intentional self-harm	ICD-10 CM	T45.512D
Intentional self-harm	ICD-10 CM	T45.512S
Intentional self-harm	ICD-10 CM	T45.522A
Intentional self-harm	ICD-10 CM	T45.522D
Intentional self-harm	ICD-10 CM	T45.522S
Intentional self-harm	ICD-10 CM	T45.602A
Intentional self-harm	ICD-10 CM	T45.602D
Intentional self-harm	ICD-10 CM	T45.602S
Intentional self-harm	ICD-10 CM	T45.612A
Intentional self-harm	ICD-10 CM	T45.612D
Intentional self-harm	ICD-10 CM	T45.612S
Intentional self-harm	ICD-10 CM	T45.622A
Intentional self-harm	ICD-10 CM	T45.622D
Intentional self-harm	ICD-10 CM	T45.622S
Intentional self-harm	ICD-10 CM	T45.692A
Intentional self-harm	ICD-10 CM	T45.692D
Intentional self-harm	ICD-10 CM	T45.692S
Intentional self-harm	ICD-10 CM	T45.7X2A
Intentional self-harm	ICD-10 CM	T45.7X2D
Intentional self-harm	ICD-10 CM	T45.7X2S
Intentional self-harm	ICD-10 CM	T45.8X2A
Intentional self-harm	ICD-10 CM	T45.8X2D
Intentional self-harm	ICD-10 CM	T45.8X2S
Intentional self-harm	ICD-10 CM	T45.92XA
Intentional self-harm	ICD-10 CM	T45.92XD
Intentional self-harm	ICD-10 CM	T45.92XS
Intentional self-harm	ICD-10 CM	T46.0X2A
Intentional self-harm	ICD-10 CM	T46.0X2D
Intentional self-harm	ICD-10 CM	T46.0X2S
Intentional self-harm	ICD-10 CM	T46.1X2A
Intentional self-harm	ICD-10 CM	T46.1X2D
Intentional self-harm	ICD-10 CM	T46.1X2S
Intentional self-harm	ICD-10 CM	T46.2X2A
Intentional self-harm	ICD-10 CM	T46.2X2D
Intentional self-harm	ICD-10 CM	T46.2X2S
Intentional self-harm	ICD-10 CM	T46.3X2A
Intentional self-harm	ICD-10 CM	T46.3X2D

Table C.2 (*continued*)

Category	Code type	Code
Intentional self-harm	ICD-10 CM	T46.3X2S
Intentional self-harm	ICD-10 CM	T46.4X2A
Intentional self-harm	ICD-10 CM	T46.4X2D
Intentional self-harm	ICD-10 CM	T46.4X2S
Intentional self-harm	ICD-10 CM	T46.5X2A
Intentional self-harm	ICD-10 CM	T46.5X2D
Intentional self-harm	ICD-10 CM	T46.5X2S
Intentional self-harm	ICD-10 CM	T46.6X2A
Intentional self-harm	ICD-10 CM	T46.6X2D
Intentional self-harm	ICD-10 CM	T46.6X2S
Intentional self-harm	ICD-10 CM	T46.7X2A
Intentional self-harm	ICD-10 CM	T46.7X2D
Intentional self-harm	ICD-10 CM	T46.7X2S
Intentional self-harm	ICD-10 CM	T46.8X2A
Intentional self-harm	ICD-10 CM	T46.8X2D
Intentional self-harm	ICD-10 CM	T46.8X2S
Intentional self-harm	ICD-10 CM	T46.902A
Intentional self-harm	ICD-10 CM	T46.902D
Intentional self-harm	ICD-10 CM	T46.902S
Intentional self-harm	ICD-10 CM	T46.992A
Intentional self-harm	ICD-10 CM	T46.992D
Intentional self-harm	ICD-10 CM	T46.992S
Intentional self-harm	ICD-10 CM	T47.0X2A
Intentional self-harm	ICD-10 CM	T47.0X2D
Intentional self-harm	ICD-10 CM	T47.0X2S
Intentional self-harm	ICD-10 CM	T47.1X2A
Intentional self-harm	ICD-10 CM	T47.1X2D
Intentional self-harm	ICD-10 CM	T47.1X2S
Intentional self-harm	ICD-10 CM	T47.2X2A
Intentional self-harm	ICD-10 CM	T47.2X2D
Intentional self-harm	ICD-10 CM	T47.2X2S
Intentional self-harm	ICD-10 CM	T47.3X2A
Intentional self-harm	ICD-10 CM	T47.3X2D
Intentional self-harm	ICD-10 CM	T47.3X2S
Intentional self-harm	ICD-10 CM	T47.4X2A
Intentional self-harm	ICD-10 CM	T47.4X2D
Intentional self-harm	ICD-10 CM	T47.4X2S
Intentional self-harm	ICD-10 CM	T47.5X2A
Intentional self-harm	ICD-10 CM	T47.5X2D

Table C.2 (*continued*)

Category	Code type	Code
Intentional self-harm	ICD-10 CM	T47.5X2S
Intentional self-harm	ICD-10 CM	T47.6X2A
Intentional self-harm	ICD-10 CM	T47.6X2D
Intentional self-harm	ICD-10 CM	T47.6X2S
Intentional self-harm	ICD-10 CM	T47.7X2A
Intentional self-harm	ICD-10 CM	T47.7X2D
Intentional self-harm	ICD-10 CM	T47.7X2S
Intentional self-harm	ICD-10 CM	T47.8X2A
Intentional self-harm	ICD-10 CM	T47.8X2D
Intentional self-harm	ICD-10 CM	T47.8X2S
Intentional self-harm	ICD-10 CM	T47.92XA
Intentional self-harm	ICD-10 CM	T47.92XD
Intentional self-harm	ICD-10 CM	T47.92XS
Intentional self-harm	ICD-10 CM	T48.0X2A
Intentional self-harm	ICD-10 CM	T48.0X2D
Intentional self-harm	ICD-10 CM	T48.0X2S
Intentional self-harm	ICD-10 CM	T48.1X2A
Intentional self-harm	ICD-10 CM	T48.1X2D
Intentional self-harm	ICD-10 CM	T48.1X2S
Intentional self-harm	ICD-10 CM	T48.202A
Intentional self-harm	ICD-10 CM	T48.202D
Intentional self-harm	ICD-10 CM	T48.202S
Intentional self-harm	ICD-10 CM	T48.292A
Intentional self-harm	ICD-10 CM	T48.292D
Intentional self-harm	ICD-10 CM	T48.292S
Intentional self-harm	ICD-10 CM	T48.3X2A
Intentional self-harm	ICD-10 CM	T48.3X2D
Intentional self-harm	ICD-10 CM	T48.3X2S
Intentional self-harm	ICD-10 CM	T48.4X2A
Intentional self-harm	ICD-10 CM	T48.4X2D
Intentional self-harm	ICD-10 CM	T48.4X2S
Intentional self-harm	ICD-10 CM	T48.5X2A
Intentional self-harm	ICD-10 CM	T48.5X2D
Intentional self-harm	ICD-10 CM	T48.5X2S
Intentional self-harm	ICD-10 CM	T48.6X2A
Intentional self-harm	ICD-10 CM	T48.6X2D
Intentional self-harm	ICD-10 CM	T48.6X2S
Intentional self-harm	ICD-10 CM	T48.902A
Intentional self-harm	ICD-10 CM	T48.902D

Table C.2 (*continued*)

Category	Code type	Code
Intentional self-harm	ICD-10 CM	T48.902S
Intentional self-harm	ICD-10 CM	T48.992A
Intentional self-harm	ICD-10 CM	T48.992D
Intentional self-harm	ICD-10 CM	T48.992S
Intentional self-harm	ICD-10 CM	T49.0X2A
Intentional self-harm	ICD-10 CM	T49.0X2D
Intentional self-harm	ICD-10 CM	T49.0X2S
Intentional self-harm	ICD-10 CM	T49.1X2A
Intentional self-harm	ICD-10 CM	T49.1X2D
Intentional self-harm	ICD-10 CM	T49.1X2S
Intentional self-harm	ICD-10 CM	T49.2X2A
Intentional self-harm	ICD-10 CM	T49.2X2D
Intentional self-harm	ICD-10 CM	T49.2X2S
Intentional self-harm	ICD-10 CM	T49.3X2A
Intentional self-harm	ICD-10 CM	T49.3X2D
Intentional self-harm	ICD-10 CM	T49.3X2S
Intentional self-harm	ICD-10 CM	T49.4X2A
Intentional self-harm	ICD-10 CM	T49.4X2D
Intentional self-harm	ICD-10 CM	T49.4X2S
Intentional self-harm	ICD-10 CM	T49.5X2A
Intentional self-harm	ICD-10 CM	T49.5X2D
Intentional self-harm	ICD-10 CM	T49.5X2S
Intentional self-harm	ICD-10 CM	T49.6X2A
Intentional self-harm	ICD-10 CM	T49.6X2D
Intentional self-harm	ICD-10 CM	T49.6X2S
Intentional self-harm	ICD-10 CM	T49.7X2A
Intentional self-harm	ICD-10 CM	T49.7X2D
Intentional self-harm	ICD-10 CM	T49.7X2S
Intentional self-harm	ICD-10 CM	T49.8X2A
Intentional self-harm	ICD-10 CM	T49.8X2D
Intentional self-harm	ICD-10 CM	T49.8X2S
Intentional self-harm	ICD-10 CM	T49.92XA
Intentional self-harm	ICD-10 CM	T49.92XD
Intentional self-harm	ICD-10 CM	T49.92XS
Intentional self-harm	ICD-10 CM	T50.0X2A
Intentional self-harm	ICD-10 CM	T50.0X2D
Intentional self-harm	ICD-10 CM	T50.0X2S
Intentional self-harm	ICD-10 CM	T50.1X2A
Intentional self-harm	ICD-10 CM	T50.1X2D

Table C.2 (*continued*)

Category	Code type	Code
Intentional self-harm	ICD-10 CM	T50.1X2S
Intentional self-harm	ICD-10 CM	T50.2X2A
Intentional self-harm	ICD-10 CM	T50.2X2D
Intentional self-harm	ICD-10 CM	T50.2X2S
Intentional self-harm	ICD-10 CM	T50.3X2A
Intentional self-harm	ICD-10 CM	T50.3X2D
Intentional self-harm	ICD-10 CM	T50.3X2S
Intentional self-harm	ICD-10 CM	T50.4X2A
Intentional self-harm	ICD-10 CM	T50.4X2D
Intentional self-harm	ICD-10 CM	T50.4X2S
Intentional self-harm	ICD-10 CM	T50.5X2A
Intentional self-harm	ICD-10 CM	T50.5X2D
Intentional self-harm	ICD-10 CM	T50.5X2S
Intentional self-harm	ICD-10 CM	T50.6X2A
Intentional self-harm	ICD-10 CM	T50.6X2D
Intentional self-harm	ICD-10 CM	T50.6X2S
Intentional self-harm	ICD-10 CM	T50.7X2A
Intentional self-harm	ICD-10 CM	T50.7X2D
Intentional self-harm	ICD-10 CM	T50.7X2S
Intentional self-harm	ICD-10 CM	T50.8X2A
Intentional self-harm	ICD-10 CM	T50.8X2D
Intentional self-harm	ICD-10 CM	T50.8X2S
Intentional self-harm	ICD-10 CM	T50.902A
Intentional self-harm	ICD-10 CM	T50.902D
Intentional self-harm	ICD-10 CM	T50.902S
Intentional self-harm	ICD-10 CM	T50.912A
Intentional self-harm	ICD-10 CM	T50.912D
Intentional self-harm	ICD-10 CM	T50.912S
Intentional self-harm	ICD-10 CM	T50.992A
Intentional self-harm	ICD-10 CM	T50.992D
Intentional self-harm	ICD-10 CM	T50.992S
Intentional self-harm	ICD-10 CM	T50.A12A
Intentional self-harm	ICD-10 CM	T50.A12D
Intentional self-harm	ICD-10 CM	T50.A12S
Intentional self-harm	ICD-10 CM	T50.A22A
Intentional self-harm	ICD-10 CM	T50.A22D
Intentional self-harm	ICD-10 CM	T50.A22S
Intentional self-harm	ICD-10 CM	T50.A92A
Intentional self-harm	ICD-10 CM	T50.A92D

Table C.2 (*continued*)

Category	Code type	Code
Intentional self-harm	ICD-10 CM	T50.A92S
Intentional self-harm	ICD-10 CM	T50.B12A
Intentional self-harm	ICD-10 CM	T50.B12D
Intentional self-harm	ICD-10 CM	T50.B12S
Intentional self-harm	ICD-10 CM	T50.B92A
Intentional self-harm	ICD-10 CM	T50.B92D
Intentional self-harm	ICD-10 CM	T50.B92S
Intentional self-harm	ICD-10 CM	T50.Z12A
Intentional self-harm	ICD-10 CM	T50.Z12D
Intentional self-harm	ICD-10 CM	T50.Z12S
Intentional self-harm	ICD-10 CM	T50.Z92A
Intentional self-harm	ICD-10 CM	T50.Z92D
Intentional self-harm	ICD-10 CM	T50.Z92S
Intentional self-harm	ICD-10 CM	T51.0X2A
Intentional self-harm	ICD-10 CM	T51.0X2D
Intentional self-harm	ICD-10 CM	T51.0X2S
Intentional self-harm	ICD-10 CM	T51.1X2A
Intentional self-harm	ICD-10 CM	T51.1X2D
Intentional self-harm	ICD-10 CM	T51.1X2S
Intentional self-harm	ICD-10 CM	T51.2X2A
Intentional self-harm	ICD-10 CM	T51.2X2D
Intentional self-harm	ICD-10 CM	T51.2X2S
Intentional self-harm	ICD-10 CM	T51.3X2A
Intentional self-harm	ICD-10 CM	T51.3X2D
Intentional self-harm	ICD-10 CM	T51.3X2S
Intentional self-harm	ICD-10 CM	T51.8X2A
Intentional self-harm	ICD-10 CM	T51.8X2D
Intentional self-harm	ICD-10 CM	T51.8X2S
Intentional self-harm	ICD-10 CM	T51.92XA
Intentional self-harm	ICD-10 CM	T51.92XD
Intentional self-harm	ICD-10 CM	T51.92XS
Intentional self-harm	ICD-10 CM	T52.0X2A
Intentional self-harm	ICD-10 CM	T52.0X2D
Intentional self-harm	ICD-10 CM	T52.0X2S
Intentional self-harm	ICD-10 CM	T52.1X2A
Intentional self-harm	ICD-10 CM	T52.1X2D
Intentional self-harm	ICD-10 CM	T52.1X2S
Intentional self-harm	ICD-10 CM	T52.2X2A
Intentional self-harm	ICD-10 CM	T52.2X2D

Table C.2 (*continued*)

Category	Code type	Code
Intentional self-harm	ICD-10 CM	T52.2X2S
Intentional self-harm	ICD-10 CM	T52.3X2A
Intentional self-harm	ICD-10 CM	T52.3X2D
Intentional self-harm	ICD-10 CM	T52.3X2S
Intentional self-harm	ICD-10 CM	T52.4X2A
Intentional self-harm	ICD-10 CM	T52.4X2D
Intentional self-harm	ICD-10 CM	T52.4X2S
Intentional self-harm	ICD-10 CM	T52.8X2A
Intentional self-harm	ICD-10 CM	T52.8X2D
Intentional self-harm	ICD-10 CM	T52.8X2S
Intentional self-harm	ICD-10 CM	T52.92XA
Intentional self-harm	ICD-10 CM	T52.92XD
Intentional self-harm	ICD-10 CM	T52.92XS
Intentional self-harm	ICD-10 CM	T53.0X2A
Intentional self-harm	ICD-10 CM	T53.0X2D
Intentional self-harm	ICD-10 CM	T53.0X2S
Intentional self-harm	ICD-10 CM	T53.1X2A
Intentional self-harm	ICD-10 CM	T53.1X2D
Intentional self-harm	ICD-10 CM	T53.1X2S
Intentional self-harm	ICD-10 CM	T53.2X2A
Intentional self-harm	ICD-10 CM	T53.2X2D
Intentional self-harm	ICD-10 CM	T53.2X2S
Intentional self-harm	ICD-10 CM	T53.3X2A
Intentional self-harm	ICD-10 CM	T53.3X2D
Intentional self-harm	ICD-10 CM	T53.3X2S
Intentional self-harm	ICD-10 CM	T53.4X2A
Intentional self-harm	ICD-10 CM	T53.4X2D
Intentional self-harm	ICD-10 CM	T53.4X2S
Intentional self-harm	ICD-10 CM	T53.5X2A
Intentional self-harm	ICD-10 CM	T53.5X2D
Intentional self-harm	ICD-10 CM	T53.5X2S
Intentional self-harm	ICD-10 CM	T53.6X2A
Intentional self-harm	ICD-10 CM	T53.6X2D
Intentional self-harm	ICD-10 CM	T53.6X2S
Intentional self-harm	ICD-10 CM	T53.7X2A
Intentional self-harm	ICD-10 CM	T53.7X2D
Intentional self-harm	ICD-10 CM	T53.7X2S
Intentional self-harm	ICD-10 CM	T53.92XA
Intentional self-harm	ICD-10 CM	T53.92XD

Table C.2 (*continued*)

Category	Code type	Code
Intentional self-harm	ICD-10 CM	T53.92XS
Intentional self-harm	ICD-10 CM	T54.0X2A
Intentional self-harm	ICD-10 CM	T54.0X2D
Intentional self-harm	ICD-10 CM	T54.0X2S
Intentional self-harm	ICD-10 CM	T54.1X2A
Intentional self-harm	ICD-10 CM	T54.1X2D
Intentional self-harm	ICD-10 CM	T54.1X2S
Intentional self-harm	ICD-10 CM	T54.2X2A
Intentional self-harm	ICD-10 CM	T54.2X2D
Intentional self-harm	ICD-10 CM	T54.2X2S
Intentional self-harm	ICD-10 CM	T54.3X2A
Intentional self-harm	ICD-10 CM	T54.3X2D
Intentional self-harm	ICD-10 CM	T54.3X2S
Intentional self-harm	ICD-10 CM	T54.92XA
Intentional self-harm	ICD-10 CM	T54.92XD
Intentional self-harm	ICD-10 CM	T54.92XS
Intentional self-harm	ICD-10 CM	T55.0X2A
Intentional self-harm	ICD-10 CM	T55.0X2D
Intentional self-harm	ICD-10 CM	T55.0X2S
Intentional self-harm	ICD-10 CM	T55.1X2A
Intentional self-harm	ICD-10 CM	T55.1X2D
Intentional self-harm	ICD-10 CM	T55.1X2S
Intentional self-harm	ICD-10 CM	T56.0X2A
Intentional self-harm	ICD-10 CM	T56.0X2D
Intentional self-harm	ICD-10 CM	T56.0X2S
Intentional self-harm	ICD-10 CM	T56.1X2A
Intentional self-harm	ICD-10 CM	T56.1X2D
Intentional self-harm	ICD-10 CM	T56.1X2S
Intentional self-harm	ICD-10 CM	T56.2X2A
Intentional self-harm	ICD-10 CM	T56.2X2D
Intentional self-harm	ICD-10 CM	T56.2X2S
Intentional self-harm	ICD-10 CM	T56.3X2A
Intentional self-harm	ICD-10 CM	T56.3X2D
Intentional self-harm	ICD-10 CM	T56.3X2S
Intentional self-harm	ICD-10 CM	T56.4X2A
Intentional self-harm	ICD-10 CM	T56.4X2D
Intentional self-harm	ICD-10 CM	T56.4X2S
Intentional self-harm	ICD-10 CM	T56.5X2A
Intentional self-harm	ICD-10 CM	T56.5X2D

Table C.2 (*continued*)

Category	Code type	Code
Intentional self-harm	ICD-10 CM	T56.5X2S
Intentional self-harm	ICD-10 CM	T56.6X2A
Intentional self-harm	ICD-10 CM	T56.6X2D
Intentional self-harm	ICD-10 CM	T56.6X2S
Intentional self-harm	ICD-10 CM	T56.7X2A
Intentional self-harm	ICD-10 CM	T56.7X2D
Intentional self-harm	ICD-10 CM	T56.7X2S
Intentional self-harm	ICD-10 CM	T56.812A
Intentional self-harm	ICD-10 CM	T56.812D
Intentional self-harm	ICD-10 CM	T56.812S
Intentional self-harm	ICD-10 CM	T56.892A
Intentional self-harm	ICD-10 CM	T56.892D
Intentional self-harm	ICD-10 CM	T56.892S
Intentional self-harm	ICD-10 CM	T56.92XA
Intentional self-harm	ICD-10 CM	T56.92XD
Intentional self-harm	ICD-10 CM	T56.92XS
Intentional self-harm	ICD-10 CM	T57.0X2A
Intentional self-harm	ICD-10 CM	T57.0X2D
Intentional self-harm	ICD-10 CM	T57.0X2S
Intentional self-harm	ICD-10 CM	T57.1X2A
Intentional self-harm	ICD-10 CM	T57.1X2D
Intentional self-harm	ICD-10 CM	T57.1X2S
Intentional self-harm	ICD-10 CM	T57.2X2A
Intentional self-harm	ICD-10 CM	T57.2X2D
Intentional self-harm	ICD-10 CM	T57.2X2S
Intentional self-harm	ICD-10 CM	T57.3X2A
Intentional self-harm	ICD-10 CM	T57.3X2D
Intentional self-harm	ICD-10 CM	T57.3X2S
Intentional self-harm	ICD-10 CM	T57.8X2A
Intentional self-harm	ICD-10 CM	T57.8X2D
Intentional self-harm	ICD-10 CM	T57.8X2S
Intentional self-harm	ICD-10 CM	T57.92XA
Intentional self-harm	ICD-10 CM	T57.92XD
Intentional self-harm	ICD-10 CM	T57.92XS
Intentional self-harm	ICD-10 CM	T58.02XA
Intentional self-harm	ICD-10 CM	T58.02XD
Intentional self-harm	ICD-10 CM	T58.02XS
Intentional self-harm	ICD-10 CM	T58.12XA
Intentional self-harm	ICD-10 CM	T58.12XD

Table C.2 (*continued*)

Category	Code type	Code
Intentional self-harm	ICD-10 CM	T58.12XS
Intentional self-harm	ICD-10 CM	T58.2X2A
Intentional self-harm	ICD-10 CM	T58.2X2D
Intentional self-harm	ICD-10 CM	T58.2X2S
Intentional self-harm	ICD-10 CM	T58.8X2A
Intentional self-harm	ICD-10 CM	T58.8X2D
Intentional self-harm	ICD-10 CM	T58.8X2S
Intentional self-harm	ICD-10 CM	T58.92XA
Intentional self-harm	ICD-10 CM	T58.92XD
Intentional self-harm	ICD-10 CM	T58.92XS
Intentional self-harm	ICD-10 CM	T59.0X2A
Intentional self-harm	ICD-10 CM	T59.0X2D
Intentional self-harm	ICD-10 CM	T59.0X2S
Intentional self-harm	ICD-10 CM	T59.1X2A
Intentional self-harm	ICD-10 CM	T59.1X2D
Intentional self-harm	ICD-10 CM	T59.1X2S
Intentional self-harm	ICD-10 CM	T59.2X2A
Intentional self-harm	ICD-10 CM	T59.2X2D
Intentional self-harm	ICD-10 CM	T59.2X2S
Intentional self-harm	ICD-10 CM	T59.3X2A
Intentional self-harm	ICD-10 CM	T59.3X2D
Intentional self-harm	ICD-10 CM	T59.3X2S
Intentional self-harm	ICD-10 CM	T59.4X2A
Intentional self-harm	ICD-10 CM	T59.4X2D
Intentional self-harm	ICD-10 CM	T59.4X2S
Intentional self-harm	ICD-10 CM	T59.5X2A
Intentional self-harm	ICD-10 CM	T59.5X2D
Intentional self-harm	ICD-10 CM	T59.5X2S
Intentional self-harm	ICD-10 CM	T59.6X2A
Intentional self-harm	ICD-10 CM	T59.6X2D
Intentional self-harm	ICD-10 CM	T59.6X2S
Intentional self-harm	ICD-10 CM	T59.7X2A
Intentional self-harm	ICD-10 CM	T59.7X2D
Intentional self-harm	ICD-10 CM	T59.7X2S
Intentional self-harm	ICD-10 CM	T59.812A
Intentional self-harm	ICD-10 CM	T59.812D
Intentional self-harm	ICD-10 CM	T59.812S
Intentional self-harm	ICD-10 CM	T59.892A
Intentional self-harm	ICD-10 CM	T59.892D

Table C.2 (*continued*)

Category	Code type	Code
Intentional self-harm	ICD-10 CM	T59.892S
Intentional self-harm	ICD-10 CM	T59.92XA
Intentional self-harm	ICD-10 CM	T59.92XD
Intentional self-harm	ICD-10 CM	T59.92XS
Intentional self-harm	ICD-10 CM	T60.0X2A
Intentional self-harm	ICD-10 CM	T60.0X2D
Intentional self-harm	ICD-10 CM	T60.0X2S
Intentional self-harm	ICD-10 CM	T60.1X2A
Intentional self-harm	ICD-10 CM	T60.1X2D
Intentional self-harm	ICD-10 CM	T60.1X2S
Intentional self-harm	ICD-10 CM	T60.2X2A
Intentional self-harm	ICD-10 CM	T60.2X2D
Intentional self-harm	ICD-10 CM	T60.2X2S
Intentional self-harm	ICD-10 CM	T60.3X2A
Intentional self-harm	ICD-10 CM	T60.3X2D
Intentional self-harm	ICD-10 CM	T60.3X2S
Intentional self-harm	ICD-10 CM	T60.4X2A
Intentional self-harm	ICD-10 CM	T60.4X2D
Intentional self-harm	ICD-10 CM	T60.4X2S
Intentional self-harm	ICD-10 CM	T60.8X2A
Intentional self-harm	ICD-10 CM	T60.8X2D
Intentional self-harm	ICD-10 CM	T60.8X2S
Intentional self-harm	ICD-10 CM	T60.92XA
Intentional self-harm	ICD-10 CM	T60.92XD
Intentional self-harm	ICD-10 CM	T60.92XS
Intentional self-harm	ICD-10 CM	T61.02XA
Intentional self-harm	ICD-10 CM	T61.02XD
Intentional self-harm	ICD-10 CM	T61.02XS
Intentional self-harm	ICD-10 CM	T61.12XA
Intentional self-harm	ICD-10 CM	T61.12XD
Intentional self-harm	ICD-10 CM	T61.12XS
Intentional self-harm	ICD-10 CM	T61.772A
Intentional self-harm	ICD-10 CM	T61.772D
Intentional self-harm	ICD-10 CM	T61.772S
Intentional self-harm	ICD-10 CM	T61.782A
Intentional self-harm	ICD-10 CM	T61.782D
Intentional self-harm	ICD-10 CM	T61.782S
Intentional self-harm	ICD-10 CM	T61.8X2A
Intentional self-harm	ICD-10 CM	T61.8X2D

Table C.2 (*continued*)

Category	Code type	Code
Intentional self-harm	ICD-10 CM	T61.8X2S
Intentional self-harm	ICD-10 CM	T61.92XA
Intentional self-harm	ICD-10 CM	T61.92XD
Intentional self-harm	ICD-10 CM	T61.92XS
Intentional self-harm	ICD-10 CM	T62.0X2A
Intentional self-harm	ICD-10 CM	T62.0X2D
Intentional self-harm	ICD-10 CM	T62.0X2S
Intentional self-harm	ICD-10 CM	T62.1X2A
Intentional self-harm	ICD-10 CM	T62.1X2D
Intentional self-harm	ICD-10 CM	T62.1X2S
Intentional self-harm	ICD-10 CM	T62.2X2A
Intentional self-harm	ICD-10 CM	T62.2X2D
Intentional self-harm	ICD-10 CM	T62.2X2S
Intentional self-harm	ICD-10 CM	T62.8X2A
Intentional self-harm	ICD-10 CM	T62.8X2D
Intentional self-harm	ICD-10 CM	T62.8X2S
Intentional self-harm	ICD-10 CM	T62.92XA
Intentional self-harm	ICD-10 CM	T62.92XD
Intentional self-harm	ICD-10 CM	T62.92XS
Intentional self-harm	ICD-10 CM	T63.002A
Intentional self-harm	ICD-10 CM	T63.002D
Intentional self-harm	ICD-10 CM	T63.002S
Intentional self-harm	ICD-10 CM	T63.012A
Intentional self-harm	ICD-10 CM	T63.012D
Intentional self-harm	ICD-10 CM	T63.012S
Intentional self-harm	ICD-10 CM	T63.022A
Intentional self-harm	ICD-10 CM	T63.022D
Intentional self-harm	ICD-10 CM	T63.022S
Intentional self-harm	ICD-10 CM	T63.032A
Intentional self-harm	ICD-10 CM	T63.032D
Intentional self-harm	ICD-10 CM	T63.032S
Intentional self-harm	ICD-10 CM	T63.042A
Intentional self-harm	ICD-10 CM	T63.042D
Intentional self-harm	ICD-10 CM	T63.042S
Intentional self-harm	ICD-10 CM	T63.062A
Intentional self-harm	ICD-10 CM	T63.062D
Intentional self-harm	ICD-10 CM	T63.062S
Intentional self-harm	ICD-10 CM	T63.072A
Intentional self-harm	ICD-10 CM	T63.072D

Table C.2 (*continued*)

Category	Code type	Code
Intentional self-harm	ICD-10 CM	T63.072S
Intentional self-harm	ICD-10 CM	T63.082A
Intentional self-harm	ICD-10 CM	T63.082D
Intentional self-harm	ICD-10 CM	T63.082S
Intentional self-harm	ICD-10 CM	T63.092A
Intentional self-harm	ICD-10 CM	T63.092D
Intentional self-harm	ICD-10 CM	T63.092S
Intentional self-harm	ICD-10 CM	T63.112A
Intentional self-harm	ICD-10 CM	T63.112D
Intentional self-harm	ICD-10 CM	T63.112S
Intentional self-harm	ICD-10 CM	T63.122A
Intentional self-harm	ICD-10 CM	T63.122D
Intentional self-harm	ICD-10 CM	T63.122S
Intentional self-harm	ICD-10 CM	T63.192A
Intentional self-harm	ICD-10 CM	T63.192D
Intentional self-harm	ICD-10 CM	T63.192S
Intentional self-harm	ICD-10 CM	T63.2X2A
Intentional self-harm	ICD-10 CM	T63.2X2D
Intentional self-harm	ICD-10 CM	T63.2X2S
Intentional self-harm	ICD-10 CM	T63.302A
Intentional self-harm	ICD-10 CM	T63.302D
Intentional self-harm	ICD-10 CM	T63.302S
Intentional self-harm	ICD-10 CM	T63.312A
Intentional self-harm	ICD-10 CM	T63.312D
Intentional self-harm	ICD-10 CM	T63.312S
Intentional self-harm	ICD-10 CM	T63.322A
Intentional self-harm	ICD-10 CM	T63.322D
Intentional self-harm	ICD-10 CM	T63.322S
Intentional self-harm	ICD-10 CM	T63.332A
Intentional self-harm	ICD-10 CM	T63.332D
Intentional self-harm	ICD-10 CM	T63.332S
Intentional self-harm	ICD-10 CM	T63.392A
Intentional self-harm	ICD-10 CM	T63.392D
Intentional self-harm	ICD-10 CM	T63.392S
Intentional self-harm	ICD-10 CM	T63.412A
Intentional self-harm	ICD-10 CM	T63.412D
Intentional self-harm	ICD-10 CM	T63.412S
Intentional self-harm	ICD-10 CM	T63.422A
Intentional self-harm	ICD-10 CM	T63.422D

Table C.2 (*continued*)

Category	Code type	Code
Intentional self-harm	ICD-10 CM	T63.422S
Intentional self-harm	ICD-10 CM	T63.432A
Intentional self-harm	ICD-10 CM	T63.432D
Intentional self-harm	ICD-10 CM	T63.432S
Intentional self-harm	ICD-10 CM	T63.442A
Intentional self-harm	ICD-10 CM	T63.442D
Intentional self-harm	ICD-10 CM	T63.442S
Intentional self-harm	ICD-10 CM	T63.452A
Intentional self-harm	ICD-10 CM	T63.452D
Intentional self-harm	ICD-10 CM	T63.452S
Intentional self-harm	ICD-10 CM	T63.462A
Intentional self-harm	ICD-10 CM	T63.462D
Intentional self-harm	ICD-10 CM	T63.462S
Intentional self-harm	ICD-10 CM	T63.482A
Intentional self-harm	ICD-10 CM	T63.482D
Intentional self-harm	ICD-10 CM	T63.482S
Intentional self-harm	ICD-10 CM	T63.512A
Intentional self-harm	ICD-10 CM	T63.512D
Intentional self-harm	ICD-10 CM	T63.512S
Intentional self-harm	ICD-10 CM	T63.592A
Intentional self-harm	ICD-10 CM	T63.592D
Intentional self-harm	ICD-10 CM	T63.592S
Intentional self-harm	ICD-10 CM	T63.612A
Intentional self-harm	ICD-10 CM	T63.612D
Intentional self-harm	ICD-10 CM	T63.612S
Intentional self-harm	ICD-10 CM	T63.622A
Intentional self-harm	ICD-10 CM	T63.622D
Intentional self-harm	ICD-10 CM	T63.622S
Intentional self-harm	ICD-10 CM	T63.632A
Intentional self-harm	ICD-10 CM	T63.632D
Intentional self-harm	ICD-10 CM	T63.632S
Intentional self-harm	ICD-10 CM	T63.692A
Intentional self-harm	ICD-10 CM	T63.692D
Intentional self-harm	ICD-10 CM	T63.692S
Intentional self-harm	ICD-10 CM	T63.712A
Intentional self-harm	ICD-10 CM	T63.712D
Intentional self-harm	ICD-10 CM	T63.712S
Intentional self-harm	ICD-10 CM	T63.792A
Intentional self-harm	ICD-10 CM	T63.792D

Table C.2 (*continued*)

Category	Code type	Code
Intentional self-harm	ICD-10 CM	T63.792S
Intentional self-harm	ICD-10 CM	T63.812A
Intentional self-harm	ICD-10 CM	T63.812D
Intentional self-harm	ICD-10 CM	T63.812S
Intentional self-harm	ICD-10 CM	T63.822A
Intentional self-harm	ICD-10 CM	T63.822D
Intentional self-harm	ICD-10 CM	T63.822S
Intentional self-harm	ICD-10 CM	T63.832A
Intentional self-harm	ICD-10 CM	T63.832D
Intentional self-harm	ICD-10 CM	T63.832S
Intentional self-harm	ICD-10 CM	T63.892A
Intentional self-harm	ICD-10 CM	T63.892D
Intentional self-harm	ICD-10 CM	T63.892S
Intentional self-harm	ICD-10 CM	T63.92XA
Intentional self-harm	ICD-10 CM	T63.92XD
Intentional self-harm	ICD-10 CM	T63.92XS
Intentional self-harm	ICD-10 CM	T64.02XA
Intentional self-harm	ICD-10 CM	T64.02XD
Intentional self-harm	ICD-10 CM	T64.02XS
Intentional self-harm	ICD-10 CM	T64.82XA
Intentional self-harm	ICD-10 CM	T64.82XD
Intentional self-harm	ICD-10 CM	T64.82XS
Intentional self-harm	ICD-10 CM	T65.0X2A
Intentional self-harm	ICD-10 CM	T65.0X2D
Intentional self-harm	ICD-10 CM	T65.0X2S
Intentional self-harm	ICD-10 CM	T65.1X2A
Intentional self-harm	ICD-10 CM	T65.1X2D
Intentional self-harm	ICD-10 CM	T65.1X2S
Intentional self-harm	ICD-10 CM	T65.212A
Intentional self-harm	ICD-10 CM	T65.212D
Intentional self-harm	ICD-10 CM	T65.212S
Intentional self-harm	ICD-10 CM	T65.222A
Intentional self-harm	ICD-10 CM	T65.222D
Intentional self-harm	ICD-10 CM	T65.222S
Intentional self-harm	ICD-10 CM	T65.292A
Intentional self-harm	ICD-10 CM	T65.292D
Intentional self-harm	ICD-10 CM	T65.292S
Intentional self-harm	ICD-10 CM	T65.3X2A
Intentional self-harm	ICD-10 CM	T65.3X2D

Table C.2 (*continued*)

Category	Code type	Code
Intentional self-harm	ICD-10 CM	T65.3X2S
Intentional self-harm	ICD-10 CM	T65.4X2A
Intentional self-harm	ICD-10 CM	T65.4X2D
Intentional self-harm	ICD-10 CM	T65.4X2S
Intentional self-harm	ICD-10 CM	T65.5X2A
Intentional self-harm	ICD-10 CM	T65.5X2D
Intentional self-harm	ICD-10 CM	T65.5X2S
Intentional self-harm	ICD-10 CM	T65.6X2A
Intentional self-harm	ICD-10 CM	T65.6X2D
Intentional self-harm	ICD-10 CM	T65.6X2S
Intentional self-harm	ICD-10 CM	T65.812A
Intentional self-harm	ICD-10 CM	T65.812D
Intentional self-harm	ICD-10 CM	T65.812S
Intentional self-harm	ICD-10 CM	T65.822A
Intentional self-harm	ICD-10 CM	T65.822D
Intentional self-harm	ICD-10 CM	T65.822S
Intentional self-harm	ICD-10 CM	T65.832A
Intentional self-harm	ICD-10 CM	T65.832D
Intentional self-harm	ICD-10 CM	T65.832S
Intentional self-harm	ICD-10 CM	T65.892A
Intentional self-harm	ICD-10 CM	T65.892D
Intentional self-harm	ICD-10 CM	T65.892S
Intentional self-harm	ICD-10 CM	T65.92XA
Intentional self-harm	ICD-10 CM	T65.92XD
Intentional self-harm	ICD-10 CM	T65.92XS
Intentional self-harm	ICD-10 CM	T71.112A
Intentional self-harm	ICD-10 CM	T71.112D
Intentional self-harm	ICD-10 CM	T71.112S
Intentional self-harm	ICD-10 CM	T71.122A
Intentional self-harm	ICD-10 CM	T71.122D
Intentional self-harm	ICD-10 CM	T71.122S
Intentional self-harm	ICD-10 CM	T71.132A
Intentional self-harm	ICD-10 CM	T71.132D
Intentional self-harm	ICD-10 CM	T71.132S
Intentional self-harm	ICD-10 CM	T71.152A
Intentional self-harm	ICD-10 CM	T71.152D
Intentional self-harm	ICD-10 CM	T71.152S
Intentional self-harm	ICD-10 CM	T71.162A
Intentional self-harm	ICD-10 CM	T71.162D

Table C.2 (*continued*)

Category	Code type	Code
Intentional self-harm	ICD-10 CM	T71.162S
Intentional self-harm	ICD-10 CM	T71.192A
Intentional self-harm	ICD-10 CM	T71.192D
Intentional self-harm	ICD-10 CM	T71.192S
Intentional self-harm	ICD-10 CM	T71.222A
Intentional self-harm	ICD-10 CM	T71.222D
Intentional self-harm	ICD-10 CM	T71.222S
Intentional self-harm	ICD-10 CM	T71.232A
Intentional self-harm	ICD-10 CM	T71.232D
Intentional self-harm	ICD-10 CM	T71.232S

Table C.3. Codes used to identify follow-up services.

Visit type	Code type	Code	Description
Outpatient Visit, Visit Setting Unspecified	CPT	90791	Psychiatric Diagnostic Evaluation Services
Outpatient Visit, Visit Setting Unspecified	CPT	90792	Psychiatric Diagnostic Evaluation Services
Outpatient Visit, Visit Setting Unspecified	CPT	90832	Psychotherapy Services and Procedures
Outpatient Visit, Visit Setting Unspecified	CPT	90833	Psychotherapy Services and Procedures
Outpatient Visit, Visit Setting Unspecified	CPT	90834	Psychotherapy Services and Procedures
Outpatient Visit, Visit Setting Unspecified	CPT	90836	Psychotherapy Services and Procedures
Outpatient Visit, Visit Setting Unspecified	CPT	90837	Psychotherapy Services and Procedures
Outpatient Visit, Visit Setting Unspecified	CPT	90838	Psychotherapy Services and Procedures
Outpatient Visit, Visit Setting Unspecified	CPT	90839	Psychotherapy Services and Procedures
Outpatient Visit, Visit Setting Unspecified	CPT	90840	Psychotherapy Services and Procedures
Outpatient Visit, Visit Setting Unspecified	CPT	90845	Psychotherapy Services and Procedures
Outpatient Visit, Visit Setting Unspecified	CPT	90847	Other Psychotherapy Procedures
Outpatient Visit, Visit Setting Unspecified	CPT	90849	Other Psychotherapy Procedures
Outpatient Visit, Visit Setting Unspecified	CPT	90853	Other Psychotherapy Procedures
Outpatient Visit, Visit Setting Unspecified	CPT	90875	Other Psychotherapy Procedures
Outpatient Visit, Visit Setting Unspecified	CPT	90876	Other Psychiatric Services or Procedures
Outpatient Visit, Visit Setting Unspecified	CPT	99221	Other Psychiatric Services or Procedures
Outpatient Visit, Visit Setting Unspecified	CPT	99222	Other Psychiatric Services or Procedures
Outpatient Visit, Visit Setting Unspecified	CPT	99223	Initial hospital inpatient or observation care, new or established patient
Outpatient Visit, Visit Setting Unspecified	CPT	99231	Initial hospital inpatient or observation care, new or established patient
Outpatient Visit, Visit Setting Unspecified	CPT	99232	Initial hospital inpatient or observation care, new or established patient
Outpatient Visit, Visit Setting Unspecified	CPT	99233	Subsequent Hospital Inpatient or Observation Care
Outpatient Visit, Visit Setting Unspecified	CPT	99238	Subsequent Hospital Inpatient or Observation Care
Outpatient Visit, Visit Setting Unspecified	CPT	99239	Subsequent Hospital Inpatient or Observation Care
Outpatient Visit, Visit Setting Unspecified	CPT	99251	Hospital Inpatient or Observation Discharge Services
Outpatient Visit, Visit Setting Unspecified	CPT	99252	Hospital Inpatient or Observation Discharge Services
Outpatient Visit, Visit Setting Unspecified	CPT	99253	Inpatient or observation consultations
Outpatient Visit, Visit Setting Unspecified	CPT	99245	Inpatient or observation consultations
Outpatient Visit, Visit Setting Unspecified	CPT	99255	Inpatient or observation consultations
Telehealth Visit, Visit Setting Unspecified			Telehealth Visit, Visit Setting Unspecified

Table C.3 (*continued*)

Visit type	Code type	Code	Description
Behavioral Health (BH) Outpatient Visit	CPT	98960	Education and Training for Patient Self-Management
Behavioral Health (BH) Outpatient Visit	CPT	98961	Education and Training for Patient Self-Management
Behavioral Health (BH) Outpatient Visit	CPT	98962	Education and Training for Patient Self-Management
Behavioral Health (BH) Outpatient Visit	CPT	99078	Miscellaneous Medicine Services
Behavioral Health (BH) Outpatient Visit	CPT	99201	E&M New Patient
Behavioral Health (BH) Outpatient Visit	CPT	99202	E&M New Patient
Behavioral Health (BH) Outpatient Visit	CPT	99203	E&M New Patient
Behavioral Health (BH) Outpatient Visit	CPT	99204	E&M New Patient
Behavioral Health (BH) Outpatient Visit	CPT	99205	E&M New Patient
Behavioral Health (BH) Outpatient Visit	CPT	99211	E&M Established Patient
Behavioral Health (BH) Outpatient Visit	CPT	99212	E&M Established Patient
Behavioral Health (BH) Outpatient Visit	CPT	99213	E&M Established Patient
Behavioral Health (BH) Outpatient Visit	CPT	99214	E&M Established Patient
Behavioral Health (BH) Outpatient Visit	CPT	99215	E&M Established Patient
Behavioral Health (BH) Outpatient Visit	CPT	99241	New or Established Patient Office or Other Outpatient Consultation Services
Behavioral Health (BH) Outpatient Visit	CPT	99242	New or Established Patient Office or Other Outpatient Consultation Services
Behavioral Health (BH) Outpatient Visit	CPT	99243	New or Established Patient Office or Other Outpatient Consultation Services
Behavioral Health (BH) Outpatient Visit	CPT	99244	New or Established Patient Office or Other Outpatient Consultation Services
Behavioral Health (BH) Outpatient Visit	CPT	99245	New or Established Patient Office or Other Outpatient Consultation Services
Behavioral Health (BH) Outpatient Visit	CPT	99341	E&M Home or Residence Services New Patient
Behavioral Health (BH) Outpatient Visit	CPT	99342	E&M Home or Residence Services New Patient
Behavioral Health (BH) Outpatient Visit	CPT	99344	E&M Home or Residence Services New Patient
Behavioral Health (BH) Outpatient Visit	CPT	99345	E&M Home or Residence Services New Patient
Behavioral Health (BH) Outpatient Visit	CPT	99347	E&M Home or Residence Services Established Patient
Behavioral Health (BH) Outpatient Visit	CPT	99348	E&M Home or Residence Services Established Patient
Behavioral Health (BH) Outpatient Visit	CPT	99349	E&M Home or Residence Services Established Patient
Behavioral Health (BH) Outpatient Visit	CPT	99350	E&M Home or Residence Services Established Patient
Behavioral Health (BH) Outpatient Visit	CPT	99381	E&M Preventive Medicine Services New Patient
Behavioral Health (BH) Outpatient Visit	CPT	99382	E&M Preventive Medicine Services New Patient
Behavioral Health (BH) Outpatient Visit	CPT	99383	E&M Preventive Medicine Services New Patient

Table C.3 (*continued*)

Visit type	Code type	Code	Description
Behavioral Health (BH) Outpatient Visit	CPT	99384	E&M Preventive Medicine Services New Patient
Behavioral Health (BH) Outpatient Visit	CPT	99385	E&M Preventive Medicine Services New Patient
Behavioral Health (BH) Outpatient Visit	CPT	99386	E&M Preventive Medicine Services New Patient
Behavioral Health (BH) Outpatient Visit	CPT	99387	E&M Preventive Medicine Services New Patient
Behavioral Health (BH) Outpatient Visit	CPT	99391	E&M Preventive Medicine Services Established Patient
Behavioral Health (BH) Outpatient Visit	CPT	99392	E&M Preventive Medicine Services Established Patient
Behavioral Health (BH) Outpatient Visit	CPT	99393	E&M Preventive Medicine Services Established Patient
Behavioral Health (BH) Outpatient Visit	CPT	99394	E&M Preventive Medicine Services Established Patient
Behavioral Health (BH) Outpatient Visit	CPT	99395	E&M Preventive Medicine Services Established Patient
Behavioral Health (BH) Outpatient Visit	CPT	99396	E&M Preventive Medicine Services Established Patient
Behavioral Health (BH) Outpatient Visit	CPT	99397	E&M Preventive Medicine Services Established Patient
Behavioral Health (BH) Outpatient Visit	CPT	99401	Preventive Medicine, Individual Counseling
Behavioral Health (BH) Outpatient Visit	CPT	99402	Preventive Medicine, Individual Counseling
Behavioral Health (BH) Outpatient Visit	CPT	99403	Preventive Medicine, Individual Counseling
Behavioral Health (BH) Outpatient Visit	CPT	99404	Preventive Medicine, Individual Counseling
Behavioral Health (BH) Outpatient Visit	CPT	99411	Preventive Medicine, Group Counseling
Behavioral Health (BH) Outpatient Visit	CPT	99412	Preventive Medicine, Group Counseling
Behavioral Health (BH) Outpatient Visit	CPT	99483	Cognitive Assessment and Care Plan Services
Behavioral Health (BH) Outpatient Visit	CPT	99492	Psychiatric Collaborative Care Management Services
Behavioral Health (BH) Outpatient Visit	CPT	99493	Psychiatric Collaborative Care Management Services
Behavioral Health (BH) Outpatient Visit	CPT	99494	Psychiatric Collaborative Care Management Services
Behavioral Health (BH) Outpatient Visit	CPT	99510	Home Visit Services
Behavioral Health (BH) Outpatient Visit	HCPCS	G0155	Services of clinical social worker in home health or hospice settings
Behavioral Health (BH) Outpatient Visit	HCPCS	G0176	Activity therapy, such as music, dance, art or play therapies not for recreation, related to the care and treatment of patient's disabling mental health problems, per session
Behavioral Health (BH) Outpatient Visit	HCPCS	G0177	Training and educational services related to the care and treatment of patient's disabling mental health problems per session

Table C.3 (*continued*)

Visit type	Code type	Code	Description
Behavioral Health (BH) Outpatient Visit	HCPCS	G0409	Social work and psychological services, directly relating to and/or furthering the patient's rehabilitation goals
Behavioral Health (BH) Outpatient Visit	HCPCS	G0463	Hospital outpatient clinic visit for assessment and management of a patient
Behavioral Health (BH) Outpatient Visit	HCPCS	G0512	Rural health clinic or federally qualified health center (RHC or FQHC) only, psychiatric collaborative care model (psychiatric COCM)
Behavioral Health (BH) Outpatient Visit	HCPCS	H0002	Behavioral health screening to determine eligibility for admission to treatment program
Behavioral Health (BH) Outpatient Visit	HCPCS	H0004	Behavioral health counseling and therapy
Behavioral Health (BH) Outpatient Visit	HCPCS	H0031	Mental health assessment, by non-physician
Behavioral Health (BH) Outpatient Visit	HCPCS	H0034	Medication training and support
Behavioral Health (BH) Outpatient Visit	HCPCS	H0036	Community psychiatric supportive treatment, face-to-face
Behavioral Health (BH) Outpatient Visit	HCPCS	H0037	Community psychiatric supportive treatment program
Behavioral Health (BH) Outpatient Visit	HCPCS	H0039	Assertive community treatment
Behavioral Health (BH) Outpatient Visit	HCPCS	H0040	Assertive community treatment program
Behavioral Health (BH) Outpatient Visit	HCPCS	H2000	Comprehensive multidisciplinary evaluation
Behavioral Health (BH) Outpatient Visit	HCPCS	H2010	Comprehensive medication services
Behavioral Health (BH) Outpatient Visit	HCPCS	H2011	Crisis intervention service
Behavioral Health (BH) Outpatient Visit	HCPCS	H2013	Psychiatric health facility service
Behavioral Health (BH) Outpatient Visit	HCPCS	H2014	Skills training and development
Behavioral Health (BH) Outpatient Visit	HCPCS	H2015	Comprehensive community support services
Behavioral Health (BH) Outpatient Visit	HCPCS	H2016	Comprehensive community support services, per diem
Behavioral Health (BH) Outpatient Visit	HCPCS	H2017	Psychosocial rehabilitation services
Behavioral Health (BH) Outpatient Visit	HCPCS	H2018	Psychosocial rehabilitation services
Behavioral Health (BH) Outpatient Visit	HCPCS	H2019	Therapeutic behavioral services
Behavioral Health (BH) Outpatient Visit	HCPCS	H2020	Therapeutic behavioral services
Behavioral Health (BH) Outpatient Visit	HCPCS	T1015	Clinic visit/encounter, all-inclusive
Behavioral Health (BH) Outpatient Visit	UBREV	0510	Clinic- General
Behavioral Health (BH) Outpatient Visit	UBREV	0513	Clinic -Psychiatric clinic
Behavioral Health (BH) Outpatient Visit	UBREV	0515	Clinic-Pediatric clinic
Behavioral Health (BH) Outpatient Visit	UBREV	0516	Clinic-Urgent care clinic
Behavioral Health (BH) Outpatient Visit	UBREV	0517	Clinic-Family Practice
Behavioral Health (BH) Outpatient Visit	UBREV	0519	Clinic-Other
Behavioral Health (BH) Outpatient Visit	UBREV	0520	Freestanding Clinic
Behavioral Health (BH) Outpatient Visit	UBREV	0521	Freestanding Clinic
Behavioral Health (BH) Outpatient Visit	UBREV	0522	Freestanding Clinic

Table C.3 (*continued*)

Visit type	Code type	Code	Description
Behavioral Health (BH) Outpatient Visit	UBREV	0523	Freestanding Clinic
Behavioral Health (BH) Outpatient Visit	UBREV	0526	Freestanding Clinic
Behavioral Health (BH) Outpatient Visit	UBREV	0527	Freestanding Clinic
Behavioral Health (BH) Outpatient Visit	UBREV	0528	Freestanding Clinic
Behavioral Health (BH) Outpatient Visit	UBREV	0529	Freestanding Clinic
Behavioral Health (BH) Outpatient Visit	UBREV	0900	Behavioral Health Treatments/Services
Behavioral Health (BH) Outpatient Visit	UBREV	0902	Behavioral Health Treatments/Services
Behavioral Health (BH) Outpatient Visit	UBREV	0903	Behavioral Health Treatments/Services
Behavioral Health (BH) Outpatient Visit	UBREV	0904	Behavioral Health Treatments/Services
Behavioral Health (BH) Outpatient Visit	UBREV	0911	Behavioral Health Treatments/Services
Behavioral Health (BH) Outpatient Visit	UBREV	0914	Behavioral Health Treatments/Services
Behavioral Health (BH) Outpatient Visit	UBREV	0915	Behavioral Health Treatments/Services
Behavioral Health (BH) Outpatient Visit	UBREV	0916	Behavioral Health Treatments/Services
Behavioral Health (BH) Outpatient Visit	UBREV	0917	Behavioral Health Treatments/Services
Behavioral Health (BH) Outpatient Visit	UBREV	0919	Behavioral Health Treatments/Services
Behavioral Health (BH) Outpatient Visit	UBREV	0982	Professional Fees - Outpatient services
Behavioral Health (BH) Outpatient Visit	UBREV	0983	Professional Fees - Clinic
Intensive Outpatient/Partial Hospitalization	HCPCS	G0410	Group psychotherapy other than of a multiple-family group, in a partial hospitalization setting
Intensive Outpatient/Partial Hospitalization	HCPCS	G0411	Interactive group psychotherapy, in a partial hospitalization setting
Intensive Outpatient/Partial Hospitalization	HCPCS	H0035	Mental health partial hospitalization, treatment
Intensive Outpatient/Partial Hospitalization	HCPCS	H2001	Rehabilitation program
Intensive Outpatient/Partial Hospitalization	HCPCS	H2012	Behavioral health day treatment
Intensive Outpatient/Partial Hospitalization	HCPCS	S0201	Partial hospitalization services
Intensive Outpatient/Partial Hospitalization	HCPCS	S9480	Intensive outpatient psychiatric services
Intensive Outpatient/Partial Hospitalization	HCPCS	S9484	Crisis intervention mental health services
Intensive Outpatient/Partial Hospitalization	HCPCS	S9485	Crisis intervention mental health services
Intensive Outpatient/Partial Hospitalization	UBREV	0905	Intensive outpatient services - psychiatric
Intensive Outpatient/Partial Hospitalization	UBREV	0907	Community behavioral health program - day treatment
Intensive Outpatient/Partial Hospitalization	UBREV	0912	Behavioral health treatments/services - Partial hospitalization - less intensive
Intensive Outpatient/Partial Hospitalization	UBREV	0913	Behavioral health treatments/services - Partial hospitalization - intensive
Visit Setting Unspecified CPT	POS	52	Psychiatric Facility-Partial Hospitalization
Visit Setting Unspecified CPT	POS	53	Community Mental Health Center
TCM Services	CPT	99495	Transitional Care Management Services
TCM Services	CPT	99496	Transitional Care Management Services
BH Setting Visit	UBREV	0513	

Table C.3 (*continued*)

Visit type	Code type	Code	Description
BH Setting Visit	UBREV	0900	
BH Setting Visit	UBREV	0901	
BH Setting Visit	UBREV	0902	
BH Setting Visit	UBREV	0903	
BH Setting Visit	UBREV	0904	
BH Setting Visit	UBREV	0905	
BH Setting Visit	UBREV	0907	
BH Setting Visit	UBREV	0911	
BH Setting Visit	UBREV	0912	
BH Setting Visit	UBREV	0913	
BH Setting Visit	UBREV	0914	
BH Setting Visit	UBREV	0915	
BH Setting Visit	UBREV	0916	
BH Setting Visit	UBREV	0917	
BH Setting Visit	UBREV	0919	
Observation Visit	CPT	99217	Initial observation
Observation Visit	CPT	99218	Initial observation
Observation Visit	CPT	99219	Initial observation
Observation Visit	CPT	99220	Initial observation
Telephone Visit	CPT	98966	Non-Face-to-Face Nonphysician Telephone Services
Telephone Visit	CPT	98967	Non-Face-to-Face Nonphysician Telephone Services
Telephone Visit	CPT	98968	Non-Face-to-Face Nonphysician Telephone Services
Telephone Visit	CPT	99441	Telephone Services
Telephone Visit	CPT	99442	Telephone Services
Telephone Visit	CPT	99443	Telephone Services
Psychiatric Collaborative Care Management	CPT	99492	Psychiatric Collaborative Care Management Services
Psychiatric Collaborative Care Management	CPT	99493	Psychiatric Collaborative Care Management Services
Psychiatric Collaborative Care Management	CPT	99494	Psychiatric Collaborative Care Management Services
Psychiatric Collaborative Care Management	HCPCS	G0512	Psychiatric Collaborative Care Management Services
Electroconvulsive Therapy	CPT	90870	Electroconvulsive Therapy
Electroconvulsive Therapy	ICD-10-PCS	GZB0ZZZ	Electroconvulsive Therapy
Electroconvulsive Therapy	ICD-10-PCS	GZB1ZZZ	Electroconvulsive Therapy

Table C.3 (*continued*)

Visit type	Code type	Code	Description
Electroconvulsive Therapy	ICD-10-PCS	GZB2ZZZ	Electroconvulsive Therapy
Electroconvulsive Therapy	ICD-10-PCS	GZB3ZZZ	Electroconvulsive Therapy
Electroconvulsive Therapy	ICD-10-PCS	GZB4ZZZ	Electroconvulsive Therapy

Appendix D.

Regression Models

This page has been left blank for double-sided copying.

Difference-in-differences regression models

We used regression-adjusted difference-in-differences (DD) models to examine changes in all outcomes among telehealth users versus nonusers between 2019 and 2021, that is, from before to after the implementation of the Minnesota Telehealth Act.

We estimated the following equation representing a linear DD model:

$$(1) \quad y_{ict} = \beta_0 + \beta_1 TH_i + \beta_2 Post_t + \beta_3 TH_i * Post_t + \beta_4 X_{it} + \beta_5 Z_{ct} + \varepsilon_{ict}$$

where *i* represents a person; *c* represents an area or ZIP Code[11]; *t* is a time period (either 2019 or 2021); y_{ict} is the outcome for person *i* in ZIP Code c, and at time *t*; TH_i is a dummy variable indicating telehealth use in 2021; $Post_t$ is a dummy variable indicating post-period (1 if 2021, 0 if 2019); β_0 is the intercept (the average outcome for telehealth nonusers in the pre-period); β_1 is the telehealth coefficient (the average difference in outcomes for telehealth users versus nonusers in the pre-period; β_2 is the post coefficient (the average change in outcomes in the post-period for TH nonusers); β_3 is the difference-in-differences estimate, which represents the average change in outcomes for TH users compared with TH nonusers in the post-period; β_4 and β_5 represent coefficients on sets of time-varying patient (X_{it}) and area-level (Z_{ct}) controls, respectively; and ε_{ict} is the random error term.

Cross-sectional regression models

We used regression-adjusted cross-sectional models to examine differences in all outcomes in 2022 between telehealth users versus nonusers in 2021.

We estimated the following equation representing a linear cross-sectional model:

$$(2) \quad y_{ic} = \alpha_0 + \alpha_1 TH_i + \alpha_2 X_i + \alpha_3 Z_c + \varepsilon_{ic}$$

where *i* represents a person and *c* represents an area or ZIP Code; y_{ic} is the outcome for person *i* in Zip code *c*; TH_i is a dummy variable indicating telehealth use in 2021; α_0 is the intercept (the average outcome for telehealth nonusers in 2022); α_1 is the telehealth coefficient (the average difference in outcomes for telehealth users versus nonusers in 2022; α_2 and α_3 represent coefficients on sets of patient (X_i) and area-level control variables (Z_c), respectively; and ε_{ic} is the random error term.

Subgroup analysis

We estimated separate regressions for examining subgroup impacts by patient characteristics and area characteristics, respectively. In each regression we included additional interaction terms to test whether the impact of telehealth use on an outcome varied by a specific patient or area characteristic.

[11] To account for correlation in outcomes among patients in the same ZIP Code, we adjusted standard errors in the regressions for ZIP-code-level clustering.

For the DD regressions shown in Equation (1) above, we added interaction terms for the subgroup variable (e.g., high-risk indicator) interacted with the indicators for telehealth use (TH_i), *Post*, and $TH_i * Post_t$. The coefficient on the triple interaction term for the subgroup variable, telehealth use, and post, is the *difference* in the effect of telehealth on that subgroup relative to the main DD estimate. Testing the significance of that triple interaction term tells us whether the effect *differs significantly* for a subgroup or not. To avoid multiple comparisons, testing the joint significance of all triple interaction terms in the model is our primary test for detecting any evidence of subgroup effects, and that test tells us whether *any* of the triple interaction terms are statistically significant. The subgroup-specific effect (e.g., the effect on high-risk patients) was obtained by summing the main DD estimate with the coefficient on the triple interaction term for the subgroup of interest, while accounting for all other subgroup interactions included in the model and holding those other subgroup variables fixed at their mean. We also tested the statistical significance of each subgroup-specific impact estimate.

Similarly, for the cross-sectional regression shown in Equation (2) above, we added interaction terms for subgroup variable (e.g., high-risk indicator) interacted with the indicators for telehealth use (TH_i). We tested the joint significance of all such subgroup interactions in the model, the significance of individual subgroup interactions, and finally, calculated the subgroup-specific impact as the sum of the main DD estimate and the coefficient on the subgroup-specific interaction for the subgroup of interest, while accounting for all other subgroup interactions included in the model and holding those other subgroup variables fixed at their mean. We also tested the statistical significance of each subgroup-specific impact estimate.

Appendix E.

Supplemental Results Tables

This page has been left blank for double-sided copying.

Telehealth visits by insurance and geography in 2019

Utilization of telehealth to deliver primary, specialty, and behavioral health visits in 2019 (Table E.1) was much lower relative to 2021 and 2022 (presented in Tables 3.1 and 3.2 respectively).

Table E.1. Number and percentage of primary care, specialist, and behavioral health visits delivered by telehealth in 2019

	Commercially insured patients					Medicare Advantage patients				
Visit type	Total # of visits	# of in-person visits	% in-person visits	# of TH visits	% TH visits	Total # of visits	# of in-person visits	% in-person visits	# of TH visits	% TH visits
Total										
Primary care visits	1,533,584	1,490,248	97.2%	43,336	2.8%	812,652	811,791	99.9%	861	0.1%
Specialist visits	987,811	982,488	99.5%	5,323	0.5%	677,840	676,536	99.8%	1,304	0.2%
Primary care and specialist visits	2,521,395	2,472,736	98.1%	48,659	1.9%	1,490,492	1,488,327	99.9%	2,165	0.1%
Behavioral health visits	3,500,699	3,447,551	98.5%	53,148	1.5%	1,295,725	1,293,627	99.8%	2,098	0.2%
Metropolitan residence										
Primary care visits	1,232,706	1,193,677	96.8%	39,029	3.2%	641,452	641,006	99.9%	446	0.1%
Specialist visits	815,795	812,035	99.5%	3,760	0.5%	526,652	526,199	99.9%	453	0.1%
Primary care and specialist visits	2,048,501	2,005,712	97.9%	42,789	2.1%	1,168,104	1,167,205	99.9%	899	0.1%
Behavioral health visits	2,906,455	2,859,835	98.4%	46,620	1.6%	1,048,220	1,047,055	99.9%	1,165	0.1%
Nonmetropolitan residence										
Primary care visits	300,878	296,571	98.6%	4,307	1.4%	171,200	170,785	99.8%	415	0.2%
Specialist visits	172,016	170,453	99.1%	1,563	0.9%	151,188	150,337	99.4%	851	0.6%
Primary care and specialist visits	472,894	467,024	98.8%	5,870	1.2%	322,388	321,122	99.6%	1,266	0.4%
Behavioral health visits	594,244	587,716	98.9%	6,528	1.1%	247,505	246,572	99.6%	933	0.4%

Source: Mathematica analysis of data from Minnesota All Payer Claims Database (MN APCD), Extract 26.

Notes: See Methods section for more detail on defining the analytic sample and subgroups based on patient characteristics. Table includes patients in the analytic sample for analysis with 2019 and 2021 outcomes. The table excludes Minnesota residents who were insured but did not use services during the year.

TH = Telehealth.

Telehealth users and nonusers by age, gender, and geography

Tables E.2, E.3, and E.4 show the percentages of telehealth users within each subgroup category for 2019, 2021, and 2022 respectively. The tables report the percentages separately for commercially insured and Medicare Advantage patients.

Table E.2. Number and percentage of insured patients that used any telehealth services in 2019, by type of insurance and subgroup

Patient subgroup	Commercially Insured Patients		Medicare Advantage Patients	
	N	%	N	%
Age:				
Patient is under 18	5,684	12.2%	-	-
Patient is 18–44	24,805	53.2%	-	-
Patient is 45–64	15,601	33.5%	-	-
Patient is 65+	498	1.1%	-	-
Patient is under 65	-	-	354	20.9%
Patient is 65–74	-	-	805	47.5%
Patient is 75–84	-	-	429	25.3%
Patient is 85+	-	-	107	6.3%
Gender:				
Patient is female	33,994	73.0%	979	57.8%
Patient is male	12,594	27.0%	716	42.2%
Comorbidities:				
Patient is high risk	15,580	33.4%	779	46.0%
Patient is low risk	31,008	66.6%	916	54.0%
Patient has depression	14,519	31.2%	828	48.8%
Patient does not have depression	32,069	68.8%	867	51.2%
Patient has diabetes	2,188	4.7%	388	22.9%
Patient does not have diabetes	44,400	95.3%	1,307	77.1%
Patient has hypertension	7,224	15.5%	1,107	65.3%
Patient does not have hypertension	39,364	84.5%	588	34.7%
Patient has disorders of lipid metabolism	3,834	8.2%	937	55.3%

Table E.2 (*continued*)

Patient subgroup	Commercially Insured Patients		Medicare Advantage Patients	
	N	%	N	%
Patient does not have disorders of lipid metabolism	42,754	91.8%	758	44.7%
Patient has glaucoma	882	1.9%	215	12.7%
Patient does not have glaucoma	45,706	98.1%	1,480	87.3%
Patient has hypothyroidism	3,632	7.8%	347	20.5%
Patient does not have hypothyroidism	42,956	92.2%	1,348	79.5%
Patient has ischemic heart disease	560	1.2%	344	20.3%
Patient does not have ischemic heart disease	46,028	98.8%	1,351	79.7%
Patient has low back pain	7,859	16.9%	521	30.7%
Patient does not have low back pain	38,729	83.1%	1,174	69.3%
Patient has persistent asthma	6,213	13.3%	337	19.9%
Patient does not have persistent asthma	40,375	86.7%	1,358	80.1%
Community characteristics:				
Patient resides in a metropolitan area	41,366	88.8%	806	47.6%
Patient resides in a nonmetropolitan area	5,222	11.2%	889	52.4%
Patient resides in an area with low broadband access	2,463	5.3%	440	26.0%
Patient resides in an area with high broadband access	44,125	94.7%	1,255	74.0%
Patient resides in an area with a high percentage of BIPOC residents	13,760	29.5%	308	18.2%
Patient resides in an area with a low percentage of BIPOC residents	32,828	70.5%	1,387	81.8%
Patient lives in an area with a high percentage of households living in poverty	10,226	21.9%	575	33.9%
Patient lives in an area with a low percentage of households living in poverty	36,362	78.1%	1,120	66.1%

Source: Mathematica analysis of data from Minnesota All Payer Claims Database (MN APCD), Extract 26.

Notes: See Methods section for more detail on defining the analytic sample and subgroups based on patient characteristics. Table includes patients in the analytic sample for analysis with 2019 and 2021 outcomes. The table excludes Minnesota residents who were insured but did not use services during the year.

Table E.3. Number and percentage of insured patients that used any telehealth services in 2021, by type of insurance and subgroup

Patient subgroup	Commercially Insured Patients		Medicare Advantage Patients	
	N	%	N	%
Age:				
Patient is under 18	42,555	15.90%	-	-
Patient is 18–44	115,306	43.20%	-	-
Patient is 45–64	97,823	36.70%	-	-
Patient is 65+	11,168	4.20%	-	-
Patient is under 65	-	-	3,745	6.90%
Patient is 65–74	-	-	26,081	47.80%
Patient is 75–84	-	-	18,775	34.40%
Patient is 85+	-	-	5,924	10.90%
Gender:				
Patient is female	164,366	61.60%	32,420	59.50%
Patient is male	102,486	38.40%	22,105	40.50%
Comorbidities:				
Patient is high risk	106,427	39.90%	20,915	38.40%
Patient is low risk	160,425	60.10%	33,610	61.60%
Patient has depression	90,298	33.80%	19,944	36.60%
Patient does not have depression	176,554	66.20%	34,581	63.40%
Patient has diabetes	20,015	7.50%	12,512	22.90%
Patient does not have diabetes	246,837	92.50%	42,013	77.10%
Patient has hypertension	54,346	20.40%	36,874	67.60%
Patient does not have hypertension	212,506	79.60%	17,651	32.40%
Patient has disorders of lipid metabolism	34,074	12.80%	33,210	60.90%
Patient does not have disorders of lipid metabolism	232,778	87.20%	21,315	39.10%
Patient has glaucoma	6,234	2.30%	7,334	13.50%
Patient does not have glaucoma	260,618	97.70%	47,191	86.50%
Patient has hypothyroidism	20,281	7.60%	10,510	19.30%

Table E.3 (*continued*)

Patient subgroup	Commercially Insured Patients		Medicare Advantage Patients	
	N	%	N	%
Patient does not have hypothyroidism	246,571	92.40%	44,015	80.70%
Patient has ischemic heart disease	5,904	2.20%	9,823	18.00%
Patient does not have ischemic heart disease	260,948	97.80%	44,702	82.00%
Patient has low back pain	41,222	15.40%	12,977	23.80%
Patient does not have low back pain	225,630	84.60%	41,548	76.20%
Patient has persistent asthma	35,677	13.40%	9,567	17.50%
Patient does not have persistent asthma	231,175	86.60%	44,958	82.50%
Community characteristics:				
Metropolitan areas	236,968	88.80%	44,610	81.80%
Nonmetropolitan areas	29,884	11.20%	9,915	18.20%
Patient resides in an area with low broadband access	14,134	5.30%	4,826	8.90%
Patient resides in an area with high broadband access	252,718	94.70%	49,699	91.10%
Patient resides in an area with a high percentage of BIPOC residents	82,293	30.80%	15,677	28.80%
Patient resides in an area with a low percentage of BIPOC residents	184,559	69.20%	38,848	71.20%
Patient lives in an area with a high percentage of households living in poverty	58,755	22.00%	12,882	23.60%
Patient lives in an area with a low percentage of households living in poverty	208,097	78.00%	41,643	76.40%

Source: Mathematica analysis of data from Minnesota All Payer Claims Database (MN APCD), Extract 26.

Notes: See Methods section for more detail on defining the analytic sample and subgroups based on patient characteristics. Table includes patients in the analytic sample for analysis with 2019 and 2021 outcomes. The table excludes Minnesota residents who were insured but did not use services during the year.

Table E.4. Number and percentage of insured patients that used any telehealth services in 2022, by type of insurance and subgroup

Patient subgroup	Commercially Insured Patients		Medicare Advantage Patients	
	N	%	N	%
Age:				
Patient is under 18	41,245	15.50%	-	-
Patient is 18–44	122,706	46.10%	-	-
Patient is 45–64	94,866	35.70%	-	-
Patient is 65+	7,161	2.70%	-	-
Patient is under 65	-	-	6,453	7.60%
Patient is 65–74	-	-	44,640	52.80%
Patient is 75–84	-	-	25,964	30.70%
Patient is 85+	-	-	7,430	8.80%
Gender:				
Patient is female	167,247	62.90%	50,235	59.50%
Patient is male	98,731	37.10%	34,252	40.50%
Comorbidities:				
Patient is high risk	98,822	37.20%	29,325	34.70%
Patient is low risk	167,156	62.80%	55,162	65.30%
Patient has depression	87,518	32.90%	29,495	34.90%
Patient does not have depression	178,460	67.10%	54,992	65.10%
Patient has diabetes	18,292	6.90%	17,837	21.10%
Patient does not have diabetes	247,686	93.10%	66,650	78.90%
Patient has hypertension	49,709	18.70%	54,058	64.00%
Patient does not have hypertension	216,269	81.30%	30,429	36.00%
Patient has disorders of lipid metabolism	30,019	11.30%	48,703	57.60%
Patient does not have disorders of lipid metabolism	235,959	88.70%	35,784	42.40%
Patient has glaucoma	5,422	2.00%	11,047	13.10%
Patient does not have glaucoma	260,556	98.00%	73,440	86.90%
Patient has hypothyroidism	19,236	7.20%	15,590	18.50%

Table E.4 (*continued*)

Patient subgroup	Commercially Insured Patients		Medicare Advantage Patients	
	N	%	N	%
Patient does not have hypothyroidism	246,742	92.80%	68,897	81.50%
Patient has ischemic heart disease	5,008	1.90%	13,706	16.20%
Patient does not have ischemic heart disease	260,970	98.10%	70,781	83.80%
Patient has low back pain	38,830	14.60%	19,079	22.60%
Patient does not have low back pain	227,148	85.40%	65,408	77.40%
Patient has persistent asthma	33,881	12.70%	14,266	16.90%
Patient does not have persistent asthma	232,097	87.30%	70,221	83.10%
Community characteristics:				
Metropolitan areas	236,851	89.00%	70,099	83.00%
Nonmetropolitan areas	29,127	11.00%	14,388	17.00%
Patient resides in an area with low broadband access	14,229	5.30%	6,646	7.90%
Patient resides in an area with high broadband access	251,749	94.70%	77,841	92.10%
Patient resides in an area with a high percentage of BIPOC residents	84,529	31.80%	25,077	29.70%
Patient resides in an area with a low percentage of BIPOC residents	181,449	68.20%	59,410	70.30%
Patient lives in an area with a high percentage of households living in poverty	60,773	22.80%	20,506	24.30%
Patient lives in an area with a low percentage of households living in poverty	205,205	77.20%	63,981	75.70%

Source: Mathematica analysis of data from Minnesota All Payer Claims Database (MN APCD), Extract 26.

Notes: See Methods section for more detail on defining the analytic sample and subgroups based on patient characteristics. Table includes patients in the analytic sample for analysis with 2022 outcomes. The table excludes Minnesota residents who were insured but did not use services during 2022.

*Numbers presented as a range are suppressed due to small cell size.

Volume of telehealth services per patient

Tables E.5 and E.6 report the distribution of counts of telehealth visits per patient per year for 2021 and 2022 respectively. The tables also include volumes of visits by patient subgroup.

Table E.5. Distribution of any telehealth visits among commercially insured and Medicare Advantage patients that used telehealth services in 2021, by type of insurance

	Commercially insured patients				Medicare Advantage patients			
Area subgroup	N	Mean (SD)	Median (IQR)	Min-Max	N	Mean (SD)	Median (IQR)	Min-Max
All telehealth visits								
All patients	266,852	4.77 (7.96)	2 (3)	1, 54	54,525	2.45 (3.46)	1 (1)	1, 30
Patient resides in a metropolitan area	236,968	4.93 (8.16)	2 (3)	1, 54	44,610	2.53 (3.57)	1 (1.2)	1, 30
Patient resides in a nonmetropolitan area	29,884	3.53 (6.03)	1.3 (2)	1, 54	9,915	2.08 (2.88)	1 (1)	1, 30
Patient resides in an area with high broadband access	252,718	4.81 (8.01)	2 (3)	1, 54	49,699	2.47 (3.49)	1 (1)	1, 30
Patient resides in an area with low broadband access	14,134	4.08 (7.02)	2 (2.4)	1, 54	4,826	2.21 (3.08)	1 (1)	1, 30
Patient resides in an area with a high percentage of BIPOC residents	184,559	4.42 (7.43)	2 (3)	1, 54	38,848	2.35 (3.26)	1 (1)	1, 30
Patient resides in an area with a low percentage of BIPOC residents	82,293	5.57 (8.99)	2 (4)	1, 54	15,677	2.69 (3.9)	1 (2)	1, 30
Patient lives in an area with a high percentage of households living in poverty	58,755	5.37 (8.72)	2 (4)	1, 54	12,882	2.62 (3.83)	1 (1.4)	1, 30
Patient lives in an area with a low percentage of households living in poverty	208,097	4.6 (7.73)	2 (3)	1, 54	41,643	2.39 (3.33)	1 (1)	1, 30

Source: Mathematica analysis of data from Minnesota All Payer Claims Database (MN APCD), Extract 26.

Notes: See Methods section for more detail on defining the analytic sample and subgroups based on patient characteristics. table includes patients in the analytic sample for analysis with 2019 and 2021 outcomes. The table excludes Minnesota residents who were insured but did not use services during the year. All telehealth visits include audio-only telehealth visits. Given the large outlier values in the distribution of telehealth visits, we top coded the distribution at the 99.5th percentile of the overall distribution.

SD = standard deviation; IQR = inter-quartile range.

Table E.6. Distribution of any telehealth visits among commercially insured and Medicare Advantage patients that used telehealth services in 2022, by type of insurance

Area subgroup	Commercially insured patients				Medicare Advantage patients			
	N	Mean (SD)	Median (IQR)	Min-Max	N	Mean (SD)	Median (IQR)	Min-Max
All telehealth visits								
All patients	265,978	4.59 (7.55)	2 (3)	1, 51	84,487	2.52 (3.47)	1 (1)	1, 28
Patient resides in a metropolitan area	236,851	4.73 (7.73)	2 (3)	1, 51	70,099	2.59 (3.57)	1 (2)	1, 28
Patient resides in a nonmetropolitan area	29,127	3.49 (5.81)	1.3 (2)	1, 51	14,388	2.18 (2.94)	1 (1)	1, 28
Patient resides in an area with high broadband access	251,749	4.63 (7.59)	2 (3)	1, 51	77,841	2.53 (3.49)	1 (1.4)	1, 28
Patient resides in an area with low broadband access	14,229	4.02 (6.77)	2 (3)	1, 51	6,646	2.34 (3.26)	1 (1)	1, 28
Patient resides in an area with a high percentage of BIPOC residents	181,449	4.25 (7.07)	2 (3)	1, 51	59,410	2.42 (3.3)	1 (1)	1, 28
Patient resides in an area with a low percentage of BIPOC residents	84,529	5.33 (8.44)	2 (4)	1, 51	25,077	2.75 (3.85)	1 (2)	1, 28
Patient lives in an area with a high percentage of households living in poverty	60,773	5.17 (8.22)	2 (4)	1, 51	20,506	2.66 (3.75)	1 (2)	1, 28
Patient lives in an area with a low percentage of households living in poverty	205,205	4.42 (7.33)	2 (3)	1, 51	63,981	2.47 (3.38)	1 (1)	1, 28

Source: Mathematica analysis of data from Minnesota All Payer Claims Database (MN APCD), Extract 26.

Notes: See Methods section for more detail on defining the analytic sample and subgroups based on patient characteristics. table includes patients in the analytic sample for analysis with 2022 outcomes. Data on patient and area characteristics are obtained from 2021 claims. The table excludes Minnesota residents who were insured but did not use services during the year. All telehealth visits include audio-only telehealth visits. Given the large outlier values in the distribution of telehealth visits, we top coded the distribution at the 99.5th percentile of the overall distribution.

SD = standard deviation; IQR = inter-quartile range.

Audio-only telehealth use

We found low rates of audio-only visits among patients in both metropolitan and nonmetropolitan areas of residence. Users of audio-only visits are patients who used any audio-only telehealth in 2021, regardless of their use of other types of telehealth services. In Table E.7, we show, by insurance type, the unadjusted means and the difference-in-differences estimates for access to care, in-person visits, and continuity of care for audio-only telehealth users compared with nonusers. In Table E.8, we show, by insurance type, the unadjusted means and the adjusted estimates for access to care, in-person visits, and continuity of care for audio-only telehealth users compared with nonusers. Given the low rates of audio-only visits observed in 2021 and 2022 among both commercially insured and Medicare Advantage patients, any statistically significant findings in this table need to be interpreted carefully.

Table E.7. Unadjusted means in 2019 and 2021 and difference-in-differences estimates for all outcomes among audio-only telehealth users versus nonusers, by type of insurance

	Commercially insured patients				Medicare Advantage patients			
Year	Mean among A-TH users	Mean among A-TH nonusers	DD estimate	95% CI	Mean among A-TH users	Mean among A-TH nonusers	DD estimate	95% CI
PCP visits PMPY								
2019	3.31	1.95	NA	NA	4.73	3.29	NA	NA
2021	4.12	1.83	0.94***	(0.88, 1.00)	4.88	2.19	1.26***	(1.18, 1.35)
Specialist visits PMPY								
2019	2.32	1.25	NA	NA	3.90	2.74	NA	NA
2021	2.72	1.24	0.41***	(0.37, 0.47)	3.82	1.82	0.85***	(0.77, 0.92)
PCP and Specialist visits PMPY								
2019	5.58	3.20	NA	NA	8.66	6.05	NA	NA
2021	6.82	3.07	1.36***	(1.27, 1.45)	8.70	4.01	2.09***	(1.95, 2.22)
BH visits PMPY								
2019	7.55	4.29	NA	NA	7.57	5.24	NA	NA
2021	9.71	4.77	1.67***	(1.48, 1.86)	7.98	3.64	2.01***	(1.86, 2.17)
In-person PCP visits PMPY								
2019	3.24	1.90	NA	NA	4.72	3.29	NA	NA
2021	2.72	1.46	-0.09**	(-0.15, -0.04)	3.77	2.00	0.34***	(0.26, 0.42)
In-person specialist visits PMPY								
2019	2.29	1.24	NA	NA	3.89	2.74	NA	NA
2021	2.05	1.08	-0.09***	(-0.14, -0.04)	3.15	1.72	0.27***	(0.20, 0.34)
In-person PCP and specialist visits PMPY								
2019	5.49	3.14	NA	NA	8.63	6.04	NA	NA
2021	4.74	2.55	-0.17***	(-0.25, -0.08)	6.91	3.73	0.59***	(0.46, 0.72)

Table E.7 (*continued*)

Year	Commercially insured patients				Medicare Advantage patients			
	Mean among A-TH users	Mean among A-TH nonusers	DD estimate	95% CI	Mean among A-TH users	Mean among A-TH nonusers	DD estimate	95% CI
In-person BH visits PMPY								
2019	7.45	4.22	NA	NA	7.55	5.23	NA	NA
2021	6.29	3.44	-0.38***	(-0.53, -0.23)	6.41	3.30	0.79***	(0.64, 0.94)
Hospitalizations for ACSCs								
2019	9.6	2.1	NA	NA	22.5	12.7	NA	NA
2021	14.2	2.2	4.52***	(2.84, 6.21)	35.5	16.6	9.06***	(4.43, 13.70)
ED visits for ACSCs								
2019	26.8	8.4	NA	NA	47.2	25.1	NA	NA
2021	27.7	7.3	2.05	(-0.93, 5.03)	57.2	23.2	11.84***	(6.65, 17.03)
Follow-up visit after a hospitalization for mental illness								
2019	0.41	0.39	NA	NA	0.79	0.69	NA	NA
2021	0.49	0.39	0.07	(-0.01, 0.15)	0.71	0.65	0.01	(-0.09, 0.12)
Follow-up visit after an ED visit for mental illness								
2019	0.40	0.37	NA	NA	0.16	0.24	NA	NA
2021	0.38	0.37	0.05	(-0.05, 0.15)	0.07	0.07	0.14	(-0.20, 0.47)
Reversed Bice-Boxerman Index								
2019	0.84	0.85	NA	NA	0.85	0.83	NA	NA
2021	0.84	0.85	0.01**	(0.00, 0.01)	0.85	0.83	0.01*	(0.00, 0.01)
Percentage of visits with usual provider of care								
2019	0.37	0.38	NA	NA	0.36	0.39	NA	NA
2021	0.37	0.39	-0.01***	(-0.02, -0.01)	0.35	0.39	-0.01***	(-0.02, -0.01)

Source: Mathematica analysis of data from Minnesota All Payer Claims Database (MN APCD), Extract 26.

Notes: Mean values and DD estimates are per 1,000 enrollees who had a hospital or ED discharge for ACSCs. See Methods section for more detail on defining the analytic sample and subgroups based on patient characteristics. Table includes patients in the analytic sample for analysis with 2019 and 2021 outcomes. The table excludes Minnesota residents who were insured but did not use services during the year.

*: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$.

A-TH = audio-only telehealth; BH = behavioral health; DD = difference-in-differences; CI = confidence interval; PCP = primary care practitioner; PMPY = per member per year; ED = emergency department; ACSCs = Ambulatory care sensitive conditions.

Table E.8. Unadjusted means in 2022 and estimated difference for all outcomes among audio-only telehealth users versus nonusers, by type of insurance

Outcome	Commercially insured patients				Medicare Advantage patients			
	Mean among A-TH users	Mean among A-TH nonusers	Difference	95% CI	Mean among A-TH nonusers	Mean among A-TH nonusers	Difference	95% CI
PCP visits PMPY	3.24	1.78	1.80***	(1.78, 1.83)	4.28	2.81	1.99***	(1.96, 2.03)
Specialist visits PMPY	2.18	1.14	1.19***	(1.17, 1.22)	3.44	2.31	1.50***	(1.47, 1.53)
PCP and specialist visits PMPY	5.42	2.91	2.97***	(2.92, 3.01)	7.72	5.12	3.49***	(3.44, 3.54)
BH visits PMPY	8.97	4.72	4.20***	(4.10, 4.29)	7.54	4.84	3.38***	(3.32, 3.45)
In-person PCP visits PMPY	2.49	1.45	1.09***	(1.07, 1.11)	3.75	2.59	1.39***	(1.36, 1.43)
In-person specialist visits PMPY	1.81	1.02	0.83***	(0.81, 0.85)	3.12	2.2	1.12***	(1.09, 1.15)
In-person PCP and specialist visits PMPY	4.31	2.46	1.91***	(1.87, 1.94)	6.87	4.79	2.51***	(2.46, 2.56)
In-person BH visits PMPY	6.49	3.49	2.56***	(2.50, 2.62)	6.51	4.43	2.47***	(2.41, 2.53)
Reversed Bice-Boxerman index (rBBI)	0.84	0.85	0.00**	(-0.01, 0.00)	0.86	0.85	0.01***	(0.01, 0.02)
Percentage of visits with UPC	0.37	0.38	-0.01***	(-0.02, -0.01)	0.35	0.37	-0.03***	(-0.03, -0.03)
Hospitalizations for ACSCs	11.2	2.3	10.12***	(9.31, 10.94)	40.7	21.1	18.77***	(16.57, 20.97)
ED visits for ACSCs	29.6	8	20.31***	(18.90, 21.71)	58.9	31.1	30.56***	(28.21, 32.90)
Follow-up visit after a hospitalization for mental illness	0.39	0.35	0.08***	(0.05, 0.12)	0.65	0.53	0.08**	(0.03, 0.14)
Follow-up visit after an ED visit for mental illness	0.42	0.37	0.14***	(0.09, 0.19)	0.23	0.24	0.13*	(0.02, 0.24)

Source: Mathematica analysis of data from Minnesota All Payer Claims Database (MN APCD), Extract 26.

Notes: Mean values and DD estimates are per 1,000 enrollees who had a hospital or ED discharge for ACSCs. See Methods section for more detail on defining the analytic sample and subgroups based on patient characteristics. Table includes patients in the analytic sample for analysis with 2022 outcomes. The table excludes Minnesota residents who were insured but did not use services during the year.

*: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$.

A-TH = audio-only telehealth; BH = behavioral health; CI = confidence interval; PCP = primary care practitioner; PMPY = per member per year; ED = emergency department; ACSCs = Ambulatory care sensitive conditions.

Patients meeting criteria for continuity of care, follow-up, and ACSC measures

Table E.9. Number and percentage of patients meeting criteria for inclusion in continuity of care measures (i.e., at least 4 ambulatory visits)

Year	Commercially insured patients		Medicare Advantage patients	
	Number of patients	% of patients	Number of patients	% of patients
2019	286,376	36.4%	167,604	68.5%
2021	307,352	39.1%	121,920	49.8%
2022	319,989	36.6%	238,446	68.9%

Source: Mathematica analysis of data from Minnesota All Payer Claims Database (MN APCD), Extract 26.

Notes: See Methods section for more detail on defining the analytic sample and subgroups based on patient characteristics. Rows for 2019 and 2021 include patients in the analytic sample for analysis with 2019 and 2021 outcomes, and row for 2022 includes patients in the analytic sample for analysis with 2022 outcomes. The table excludes Minnesota residents who were insured but did not use services during the year.

Mathematica Inc.

Our employee-owners work nationwide and around the world.

Find us at **mathematica.org** and **edi-global.com**.