ORIGINAL RESEARCH

Diagnoses per Encounter by Telephone, Televideo, and In-Office Visits

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Introduction: **We sought to determine if there are differences between number of International Classification of Disease-10 (ICD-10) codes per visit before and after COVID-19 when comparing in-office visits and between telemedicine vs in-office visits, toward the goal of determining value of telemedicine visits relative to in-office visits.**

Methods: **We did a chart review study assessing the number of ICD-10 codes noted by providers at a large academic medical institution in 2019 and 2020. Only in-office visits were reviewed in 2019. The focus of analysis was on individual patient visits per visit type; however, a subset of patients who had visits in both 2019 and 2020 were also analyzed. We compared mean number of diagnoses for encounter types using encounter, billing and coding data.**

Results: **We analyzed 211,829 patient encounters. For 2020, 73% were in office. Mean number of diagnoses per encounter for 2019 was 2.65 (in office only), compared with 3.04 in office, 2.76 telephone, and 2.48 televideo for 2020.**

Discussion: **We found an increase in the number of diagnoses addressed during in-office visits from 2019 to 2020. When looking at diagnoses managed per visit, all 3 types of visits had similar complexity. These results may guide future reimbursement policy for telemedicine visits. (J Am Board Fam Med 2022;35:491–496.)**

Keywords: **COVID-19, Family Medicine, ICD Codes, Telemedicine**

Introduction

The COVID-19 pandemic has upended many aspects of health care delivery. Some will be temporary shifts that will revert to the traditional way over time. However, many of the accelerated changes will have long-lasting impacts on care delivery. One of these relates to the concept of telemedicine. Aside from asynchronous digital communication not considered here, telemedicine falls into 2 main categories: televideo and audio-only telephone visits. Before the pandemic, telemedicine was used primarily in certain specialty areas, such as dermatology or psychiatry, or in rural-based settings.[1] Telemedicine saw a dramatic increase in adoption during the COVID-19 pandemic because it provided a means to obtain access to health care while eliminating the risk of viral transmission and related to Medicare policy changes that reimbursed televideo and telephone visits in parity with in-office visits in spring 2020.[2,3] An increased usage of 2013% was observed in a sample of 16.7 million individuals with commercial and Medicare Advantage insurance.[4]

Medicaid and commercial insurer coverage and reimbursement is regulated at the state level, resulting in state-to-state variability. Reimbursement may also vary independently of coverage state to state such that services rendered via telemedicine may be reimbursed the same as in-office visits, less than in-office visits, or not at all.[5,6] In the weeks after the March 2020 announcement by Medicare, most commercial insurers and many states followed Medicare's lead and elected to reimburse telemedicine at parity with in-office visits during the public health emergency.[5,6] Medicare's enhanced reimbursement for

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telemedicine was set to be limited to the duration of the COVID-19 pandemic.

Presuming a fee-for service context, the appropriate degree of parity in reimbursement for telemedicine relative to in-office visits as the emergency phase of the pandemic recedes is a matter of debate. Reimbursement should be based on an evidence-based assessment of the value of telemedicine relative to in-office visits.[7] It has been asserted that telemedicine visits include fewer diagnostic services than in-office visits and that reimbursing at the same rate would thus represent overpayment, so telemedicine reimbursement should be similar but lower.[8]

Measures of the value of a specific health care service vary by the service and by the perspective of the entity defining value.[9] Because primary care encompasses a broad view of people's health with attention to all their medical conditions, one potential measure of value in primary care is the number of medical conditions addressed during a health care interaction. In fact, the Centers for Medicare and Medicaid Services explicitly affirms a relationship between the number of diagnoses addressed during an outpatient encounter. Historically, via the Current Procedural Terminology (CPT) system, reimbursement increases as the number of diagnoses increases during outpatient evaluation and management services up to a ceiling limit.[10] Other factors influencing billing and reimbursement include duration and complexity of care and whether a patient is considered new or established. Although data regarding the number of diagnoses reported per encounter are limited, past research has shown that physicians address approximately 2.3 to 3.7 problems during each in-office encounter and report addressing roughly that many diagnoses.[11–18]

We hypothesized that providers report the same number of International Classification of Disease-10 (ICD-10) codes per visit regardless of the medium—in office, televideo, or telephone. Because the number of diagnoses or problems addressed during an encounter could be considered a reflection of the value of the service, in turn reflecting appropriate reimbursement for the service, determining the relative number of diagnoses addressed via different media may help payers and policy makers determine the appropriate reimbursement for televideo and telephone services following the pandemic.

Methods

This study was approved by the institutional review board of the contributing health system's academic medical center (STUDY#17346).

The data included 3 types of patient visits: in office, telephone, and televideo. In-office visits were identified between March 16, 2019 and December 31, 2019 and March 16, 2020 and December 31, 2020. Telephone and televideo visits were identified between March 16, 2020 and December 31, 2020 and not included for 2019 because these types of visits were not offered in the health system before 2020.

Patient encounters of these types were eligible based on the following criteria: 18 years of age and older male or female patients who received care in office or via telephone or televideo at a qualifying outpatient family and community medicine clinic based on the aforementioned date restrictions. Encounters without associated ICD-10 diagnoses were excluded. In addition excluded were encounters not directly performed by billing providers such as those involving supervision of resident physicians.

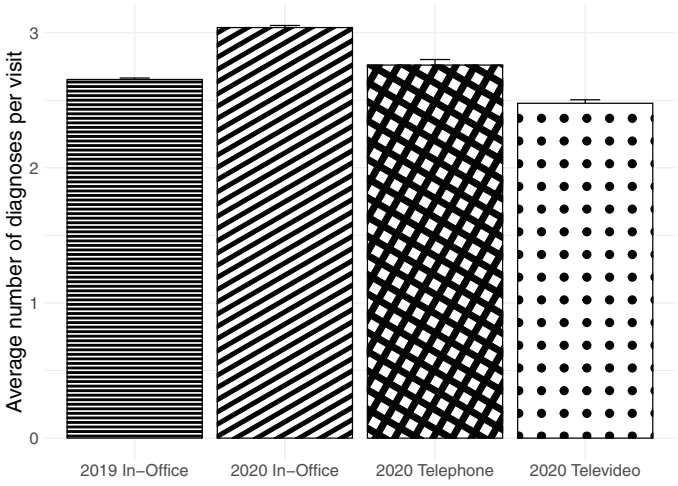
Encounter, billing, and coding data used to compare diagnoses-per-encounter as an indicator of visit complexity were obtained via chart review of billing data. Professional identity of the providers was varied, including family medicine physicians, certified registered nurse practitioners, and physician assistants practicing in 14 offices in a single health system from ambulatory practice settings within a department of family and community medicine. Elements used to identify and assess the encounter include patient medical record number, health care provider name, Healthcare Common Procedure Coding System and CPT code, and ICD-10 coding, up to 12 per encounter.

The statistical program R version 4.1.1 (R Core Team, 2020) was used along with a suite of tidyverse packages[19] to perform data wrangling and produce a reproducible statistical analysis.

Results

A total of 211,829 patient encounters meeting inclusion criteria were queried across the matched time periods. The total number of encounters in 2019 and 2020 were 117,425 (55%) and 94,405 (46%), respectively. Of the 2020 encounters, 69,204 were in office (73%) and 25,201 (27%) were performed using telemedicine platforms: 17,164

Figure 1. Average number of diagnoses by encounter type and year.



televideo (18.2% of total) and 8,037 telephone (8.5% of total).

The mean number of diagnoses evaluated in any encounter by year and setting is shown in Figure 1 with a mean of 2.65 diagnoses per encounter for in-office encounters in 2019, 3.04 for in-office encounters in 2020, 2.76 for telephone encounters in 2020, and 2.48 for televideo encounters in 2020. Compared with the preceding prepandemic year, the practices saw a 9.7% increase in the number of diagnoses addressed during visits of any modality.

A subgroup with encounters in continuity across all modalities in 2020 was isolated to create context to the comparison of 2019 and 2020 to assess for changes in individual patient complexity across the implementation of new visit modalities. There were 303 office encounters in 2020 that also had a MRN-matched telephone encounter and a medical record number (MRN)-matched televideo encounter, yielding a total of 909 matched encounters. In Figure 2, comparisons for the average number of diagnoses per encounter for individual patients who had in-office and telephone and televideo visits for 2020 are shown, with the mean diagnoses for these encounters showing 3.51 (SD = 2.14) for in office, 3.10 (SD = 2.09) for telephone, and 3.26 for televideo (SD = 2.04) in 2020.

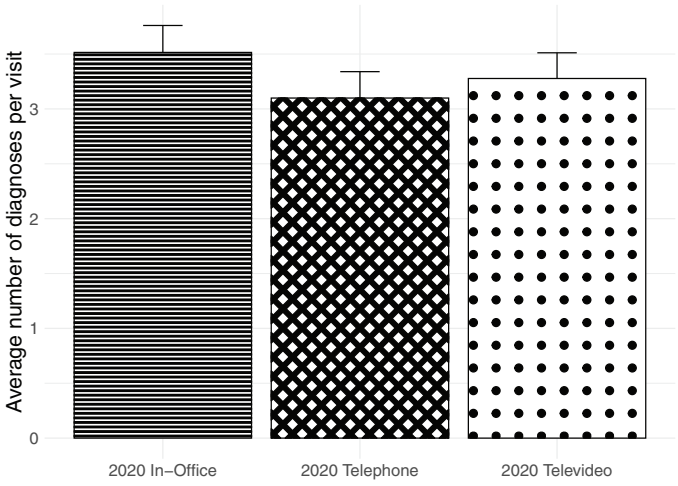
Discussion

We reviewed 211,829 televideo, telephone, and in-office encounters across 14 primary care family medicine sites within a single academic medical center medical group practice across matched time periods during the 2020 year of the COVID-19 pandemic and the preceding year (2019).

We found that the number of diagnoses managed at in-office encounters increased from 2019 to 2020, but both measures were similar to historically observed numbers of problems addressed during visits.[11–18] Findings were similar when controlling for type of visit by comparing the number of diagnoses managed for the same patient across different modalities and comparing by year, suggesting that patient-specific factors were not the cause of the differences.

In 2020 when all 3 types of visits were available, slightly more diagnoses were managed per encounter during in-office visits compared with televideo or telephone. One possibility is that patients who wished to have more problems addressed selectively chose to schedule in-office visits. There is some evidence to suggest that patients over age 65, and who may thus have more problems to address, are less likely to use televideo visits.[20] Another is that patients or providers elected not to discuss certain problems during televideo or telephone visits, perceiving that certain problems were not able to be managed remotely. This could result in fewer overall diagnoses being addressed via televideo or telephone. If such a phenomenon occurred it could also result in "shunting" of patients to in-office visits where patients perceived the problem could be properly addressed. This could reduce the number of problems handled during televideo and telephone visits while inflating the number handled at in-office visits and could explain the increase in number of diagnoses managed during in-office visits from 2019 to 2020. There are potentially other

Figure 2. Comparison of average number of diagnoses for individual patients across encounter type.



reasons for this global increase in the number of diagnoses per encounter in 2020 relative to 2019, such as greater complexity of illness or other factors related to the unique difference in the health care environment between 2019 and 2020. A thorough explanation of the reasons is beyond the scope of this study.

The primary finding of this study is that the number of diagnoses managed in televideo and telephone visits is similar to the number managed per visit by this group in office during the pandemic and before the pandemic and is similar to observed historic counts of problems managed per visit. There is not necessarily a one-to-one relationship between problems addressed and diagnoses submitted. However, it is striking that despite the significant differences between in-office and televideo visits, providers continued to address approximately the same number of problems or diagnoses at each visit regardless of medium instead of a trend for telephone or televideo visits narrowly focused on 1 problem. When value is measured as the quantity of diagnoses managed per visit, it seems that the 3 types of visits have similar value. Throughout the continuation of the pandemic, when televideo and telephone visits are available along with in-office visits within the same practice, the number of diagnoses managed at in-office visits may become higher as patients or providers may prefer them to meet perceived goals of the encounter.

Our results are consistent with previously published primary care studies that documented between 2.3 and 3.7 addressed problems per visit.[11,13–15,17] Discordance between the number of problems discussed at a visit or noted in the chart and the number of problems billed has been demonstrated previously, with billing forms listing only 69% of the problems discussed.[14,21,22] However, these studies were performed before widespread use of electronic health records (EHRs), and there may be better alignment between documentation and billing when EHRs are used.

Rather than the number of problems discussed, the number of diagnoses reported could be a target for measurement. In a more recent characterization of encounters in a practice-based research network and the Agency for Healthcare Research and Quality, physicians reported the number of ICD-9 diagnostic codes per visit, which would presumably be similar to reporting of ICD-10 codes for these purposes.[12] In 46.7% of visits, there was a single diagnosis code; in 32.6% of visits there were 2 diagnosis codes; and in 20.0% of visits there were 3 codes.[12] In a similar study using an expanded reporting tool, 1 diagnosis was reported at 37.0% of visits, 2 diagnoses at 28.6% of visits, 3 diagnoses at 18.1% of visits, 4 diagnoses at 9.4% of visits, and 5 or 6 at 5.9% of visits.[18]

This study addressed the assertion that reimbursement for televideo visits should be based on evidence.[7] Our findings align with the suggestion that televideo visits should be reimbursed at a level similar to but slightly lower than in-office visits from the perspective of complexity to the patient.[8] Using the number of diagnoses addressed during an encounter as a metric, reimbursement for televideo

services should be 93% of the reimbursement for in-office visits.

We do not explicitly advocate for reimbursement for telemedicine services in a fee-for-service setting to be higher, lower, or equivalent to in-office services. However, as payers consider the appropriate reimbursement of televideo and telephone visits relative to in-office visits, the very similar value as measured by number of diagnoses handled in the various settings should be taken into account. In this manner, telemedicine value can be considered "noninferior." This suggests that reimbursement should be similar, although this calculus does not consider the cost of providing in-office visits relative to televideo or telephone visits.

This study was not able to assess quality of care provided or patient satisfaction, important components of health care value. To the extent that value is defined by quantity of diagnoses addressed, in office, televideo, and telephone have similar value. In addition, our findings suggest that offering televideo or telephone visits within a clinic may result in a greater number of diagnoses being handled during in-office visits at that clinic.

This study was limited by its analysis of data obtained from 1 institution in 1 geographic area. Data before 2019 were not analyzed, which could have suggested if 2019 or 2020 were historically aberrant. In addition the COVID-19 pandemic itself could have created unique circumstances from which broader conclusions cannot be extrapolated.

Providers in the study had little or no prior experience with televideo and little training on how to optimize billing for televideo services. Thus their practice style and approach to billing may have evolved during the course of the data collection period, a factor that would be attenuated in future studies. This study focused only on family medicine providers. Specialist practice and billing habits should be a target for future work. In addition, as this data represented only providers in a single academic practice, study of physicians in nonacademic settings should be undertaken. While reimbursement should be linked to value, we acknowledge that reimbursement may also justifiably reflect the cost of providing the service, which varies by in-office, televideo, and telephone modalities.

Future research could expand this study to a larger geographic area and across multiple institutions. Analysis of behaviors surrounding use of televideo and telephone visits in future years, particularly when a new baseline is established, could confirm that value is similar or whether the existing findings are unique to the pandemic era.

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