Telemedicine Can Support Measurable and High-Quality Epilepsy Care During the COVID-19 Pandemic

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Abstract
Routine outpatient epilepsy care has shifted from in-person to telemedicine visits in response to safety concerns posed by the coronavirus disease 2019 (COVID-19) pandemic. But whether telemedicine can support and maintain standardized documentation of high-quality epilepsy care remains unknown. In response, the authors conducted a quality improvement study at a level 4 epilepsy center between January 20, 2019, and May 31, 2020. Weekly average completion proportion of standardized documentation used by a team of neurologists for adult patients for the diagnosis of epilepsy, seizure classification, and frequency were analyzed. By December 15, 2019, a 94% average weekly completion proportion of standardized epilepsy care documentation was achieved that was maintained through May 31, 2020. Moreover, during the period of predominately telemedicine encounters in response to the pandemic, the completion proportion was 90%. This study indicates that high completion of standardized documentation of seizure-related information can be sustained during telemedicine appointments for routine outpatient epilepsy care at a level 4 epilepsy center.

Keywords
telemedicine, health services research, quality of health care, electronic health records, epilepsy

Epilepsy affects 3.4 million people in the United States.[1] In 2018, the Centers for Disease Control and Prevention (CDC) reported that 56% of people with a diagnosis of epilepsy (PWE) continue to have seizures despite treatment.[2] However, access to advanced care is limited; there are 225 epilepsy treatment centers nationally or 1 center for every 8500 patients who would benefit from advanced care.[3] Compared with the general public, PWE have higher rates of premature mortality, injury, cognitive impairment, depression, social isolation, and unemployment.[4]

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And although providers face institutional pressures to complete clinical documentation, a widespread, efficient, and standardized method of documenting epilepsy and quality measure data is largely absent.

These shortcomings in systems and management are amplified during the coronavirus disease 2019 (COVID-19) pandemic. The CDC first reported community transmission of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in the United States in February 2020; as of June 4, 2020, there were 1,856,118 infected and 107,281 deaths attributed to SARS-CoV-2 in the United States alone.[5,6] As infection rates increased, health care systems adopted alternate methods for the preservation of routine clinical care in a safe environment. For example, use of telemedicine has increased to reduce patient volume in hospitals when in-person visits are considered not essential.[7]

Telemedicine is generally well accepted by PWE for routine outpatient care[8–10] and may provide an acceptable model for chronic epilepsy care management.[11–15] Telemedicine also might be financially attractive and reduce medical costs for patients and providers,[16] and expand access to specialty care. However, a unified and well-coordinated apparatus comprised of providers, stakeholders, and standardized clinical processes is needed to deliver long-term management and high-quality care for PWE,[16] and

data are currently lacking on the quality of care provided via telemedicine.

The COVID-19 pandemic poses a unique environment to examine the feasibility of telemedicine for providing patient-centered care. The research team hypothesized that telemedicine could support and maintain standardized documentation for high-quality epilepsy care, outlined by national quality measures.[17]

Methods

This report follows the Revised Standards for QUality Improvement Reporting Excellence (SQUIRE 2.0) guidelines.[18] This study received approval from the Partners Healthcare Institutional Review Board and need for informed consent was waived.

Background

The study is a continuation of a quality improvement (QI) initiative[19] that began January 20, 2019, and ran through May 31, 2020, at a level 4 epilepsy center (Massachusetts General Hospital [MGH]), a site in the Epilepsy Learning Healthcare System (ELHS). Briefly, ELHS is a patient-centered network sponsored by the Epilepsy Foundation of America and the National Association of Epilepsy Centers. Composed of academic hospitals, patient representatives, and nonprofit organizations, ELHS aims to increase the quality of patient-centered care and improve outcomes.[20] During ELHS implementation at the local site, neurologists, epileptologists, and neurosurgeons from MGH and Brigham and Women's Hospital joined to form a QI group, a budding Virtual Center of Excellence in Epilepsy Care.

ELHS previously outlined QI measures (Supplemental Appendix 1, available at http://links.lww.com/AJMQ/A0) and created individual case report forms (CRFs) to collect data to track and improve each measure. At the study epilepsy center, 1 ELHS CRF (Supplemental Appendix 2, available at http://links.lww.com/AJMQ/A0) was converted into a "SmartPhrase" in the electronic health record (EHR; Epic Systems, Verona, WI) for provider-reported seizure type and frequency (henceforth, standardized documentation) (Supplemental Appendix 3, available at http://links.lww.com/AJMQ/A0). The standardized documentation collates data on the diagnosis of epilepsy (yes/no/unsure), seizure type defined by the International League Against Epilepsy (ILAE) (focal/generalized/unclassified),[21] and seizure frequency.

Telemedicine and Office-Based Encounters Before and During the COVID-19 Pandemic

Beginning January 20, 2019, a team of 6 neurologists (4 epileptologists, 2 epilepsy fellows) in the study epilepsy center implemented the standardized documentation for all outpatient encounters. Patient encounters include in-person visits and telemedicine encounters for new and established patients. Telemedicine, in fact, has been implemented at the study epilepsy center for nearly 20 years.

The study epilepsy center transitioned to telemedicine outpatient encounters as the predominant method for seeing patients beginning about March 11, 2020–March 20, 2020, in response to the COVID-19 pandemic. This was done by rescheduling all outpatient visits that were previously in-person visits to exploit the existing secure private telemedicine platform or less secure video technology (eg, Zoom, Skype).[22] The clinician asked specific questions concerning the patient's condition, confirmed the diagnosis, and reviewed the seizure type, frequency, and date of last seizure. Providers used the current ILAE classification to document these data using an Epic SmartPhrase directly in the telemedicine visit note.[21,23] Additionally, the epilepsy center team addressed technological issues experienced by patients while using the telemedicine platforms to improve their virtual visit experience. Patients who reported uncontrolled seizures or a risk for status epilepticus by telephone, through the patient portal, or by email also were screened virtually where possible (ie, via video technology or phone) before being sent physically to the emergency department.

The standardized documentation is completed by the neurologists for all in-person and telemedicine encounters.[19] Follow-up patient encounters occur approximately every 3 months. Because not all providers are present every week, these 6 neurologists collectively have an average of 20 patient encounters per week.

Baseline Measurement

Utilizing standardized documentation data gathered between January 2019 and May 2020, the research team identified 2 time frames; a pre-COVID-19 phase (January 20, 2019–March 11, 2020) and a COVID-19 phase (March 11, 2020–May 31, 2020). The pre-COVID-19 phase consists of data from both in-person patient encounters and telemedicine patient encounters (n = 118; 13% of pre-COVID-19 phase encounters); the COVID-19 phase consists of data dominated by telemedicine patient encounters (n = 194; 87%).

The baseline average weekly completion proportion (ie, centerline), calculated using the first 8 weekly data points corresponding to the initiation of the QI initiative, of standardized documentation among the 6 participating providers was 81%. Using this baseline, the team aimed to increase the average (centerline) of standardized documentation to at least 90% among all encounters with the providers and sustain the centerline during the designated COVID-19 phase (ie, during a shift toward predominately telemedicine encounters).

Key Drivers and Interventions

Several factors aided in the completion of the Specific, Measurable, Achievable, Results (SMART) aim (Figure 1)[24] through team meetings throughout the initiative: (1) continued refinement of standardized documentation; (2) proactive engagement of providers to use the standardized documentation in the new context of telemedicine visits; (3) cultivation of a QI environment in the setting of disruption of normal workflow; and (4) enhanced access and distribution of pertinent data (ie, 1 weekly run chart for the group and 1 for each provider).

The research team previously created a SmartPhrase to efficiently capture the ELHS seizure frequency CRF data elements.[17] A SmartPhrase is an interactive tool embedded in the EHR that can automatically retrieve a prespecified text or template (eg, a structured list of prespecified options for documenting seizure type) into a note. The team first instructed providers on how to use the SmartPhrase directly in the encounter note, then "built in tension" to this process[25] by encouraging research staff to solicit feedback from providers through formal meetings and communication channels to enhance clinical utility. For example, a provider suggested that viewing previously collected patient-reported outcome (PRO) scores (eg, depression, anxiety screening scores) in the SmartPhrase before encounters, in conjunction with seizure data, would be advantageous. Although the research staff has a workflow to retrieve these aggregate data, these scores are cumbersome to locate individually in the EHR during the encounter, which could decrease the likelihood that providers will view these data or the SmartPhrase. Therefore, the research staff modified the SmartPhrase to automatically pull scores from the PRO measurement tools (Supplemental Appendix 3, available at http://links.lww.com/AJMQ/A0) directly into the SmartPhrase/Note.

To continuously engage providers to use the SmartPhrase, research staff sent weekly email reminders and provided hard copies on team- and individual-level feedback, with respect to weekly SmartPhrase completion proportion. The team reevaluated this method of communication and modified it to better accommodate clinicians' disrupted workflow during the surge in telemedicine visits. Meanwhile, the team sustained electronic communication with clinicians during clinic hours in the event that they experienced new issues using the SmartPhrase during a telemedicine visit.

Two neurologists (L.M.V.R.M., D.B.H.) with experience in QI methodology and health services research led the effort to create and sustain a QI atmosphere. The entire team also participated in monthly videoconferences with external QI experts from ELHS.

Critical to managing these drivers of quality is access to data. The research team created infrastructure and a workflow that integrated collection of standardized documentation data from the EHR (collected during the patient encounter) and patient demographic data by Research Electronic Data Capture (REDCap) software. The team stored these data in REDCap and created shortcuts in the software to quickly run reports on weekly documentation completion proportions.

Study of Interventions

The research team studied the implementation of the interventions based on the Model for Improvement methodology.[24] Iterative, weekly Plan-Do-Study-Act (PDSA) cycles were used to test reliable completion of structured SmartPhrases and intervention implementation was evaluated using a statistical process control of time-series data chart (p-chart).

Process Measure

The process measure was defined as the proportion of eligible outpatient encounters (Figure 2) seen in person and through telemedicine by participating providers (denominator) who had completed standardized documentation (numerator) from January 20, 2019, to May 31, 2020.

Statistical Analysis

The research team summarized demographic and clinical characteristics of those with and without standardized documentation at the patient and encounter level. Age, sex, primary language, epilepsy diagnosis, and all seizure-related characteristics were analyzed at the patient level, whereas patient type and visit type were analyzed at the encounter level.
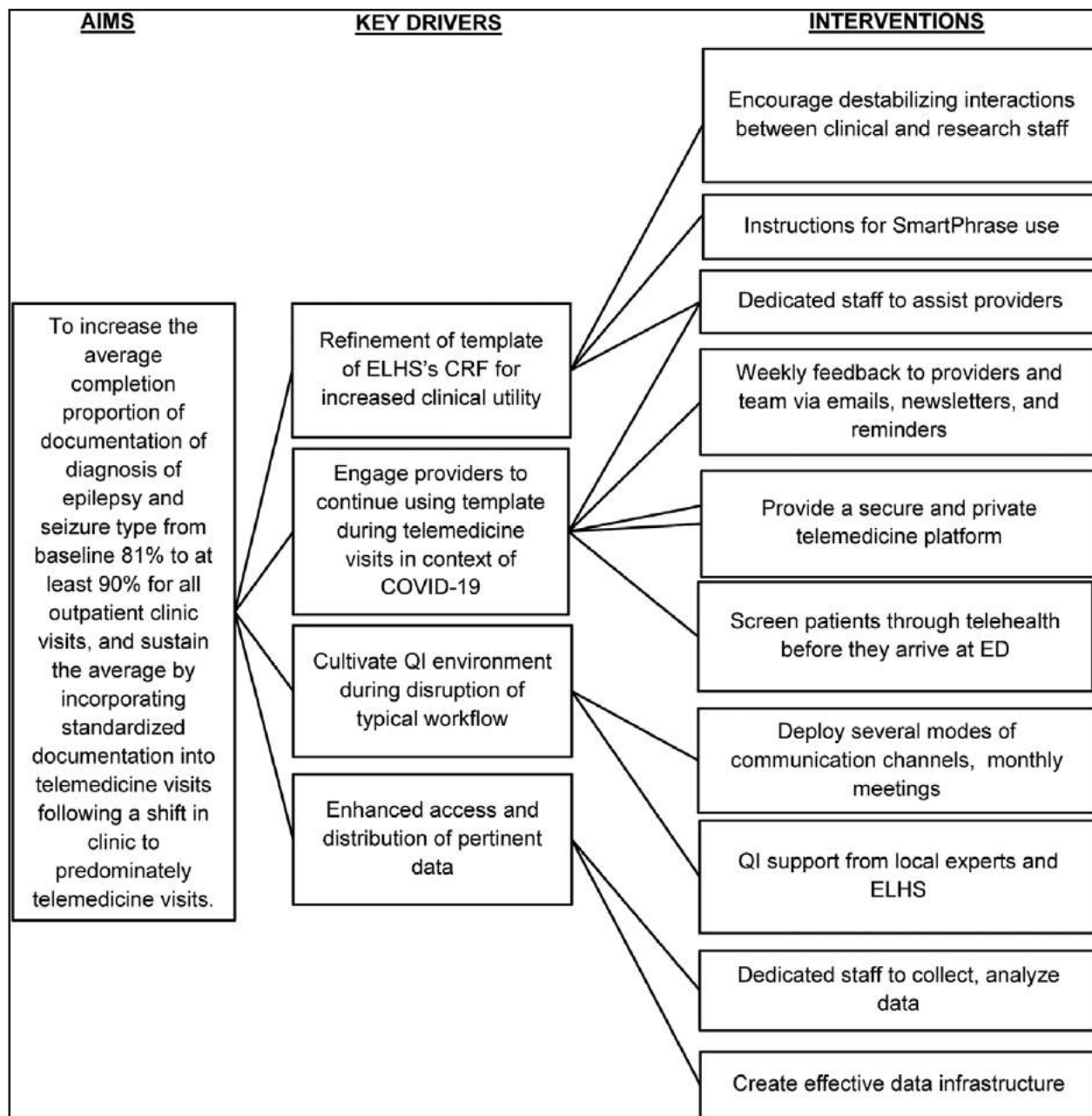
Figure 1. Key driver diagram. Key drivers and interventions for achieving the aim of maintaining high-quality epilepsy care using standardized epilepsy care documentation via telemedicine visits during the COVID-19 pandemic. Abbreviations: COVID-19, coronavirus disease 2019; CRF, case report form; ED, emergency department; ELHS, Epilepsy Learning Healthcare System; QI, quality improvement.

The team reported nonparametric variables with median (Q1–Q3), and categorical data with absolute frequency (n, %) to examine sample representativeness. All the analyses used chi-square tests of independence, Fisher exact test, and Wilcoxon Mann-Whitney *U* test using a 2-sided level of significance of 0.01.

The team outlined the implementation of the interventions using p-charts and tracked the weekly percentage of completed provider-reported standardized documentation in eligible in-person and telemedicine patient encounters at the clinic. The team calculated average weekly completion proportion (ie, the centerline) and 3 SD control limits throughout the study
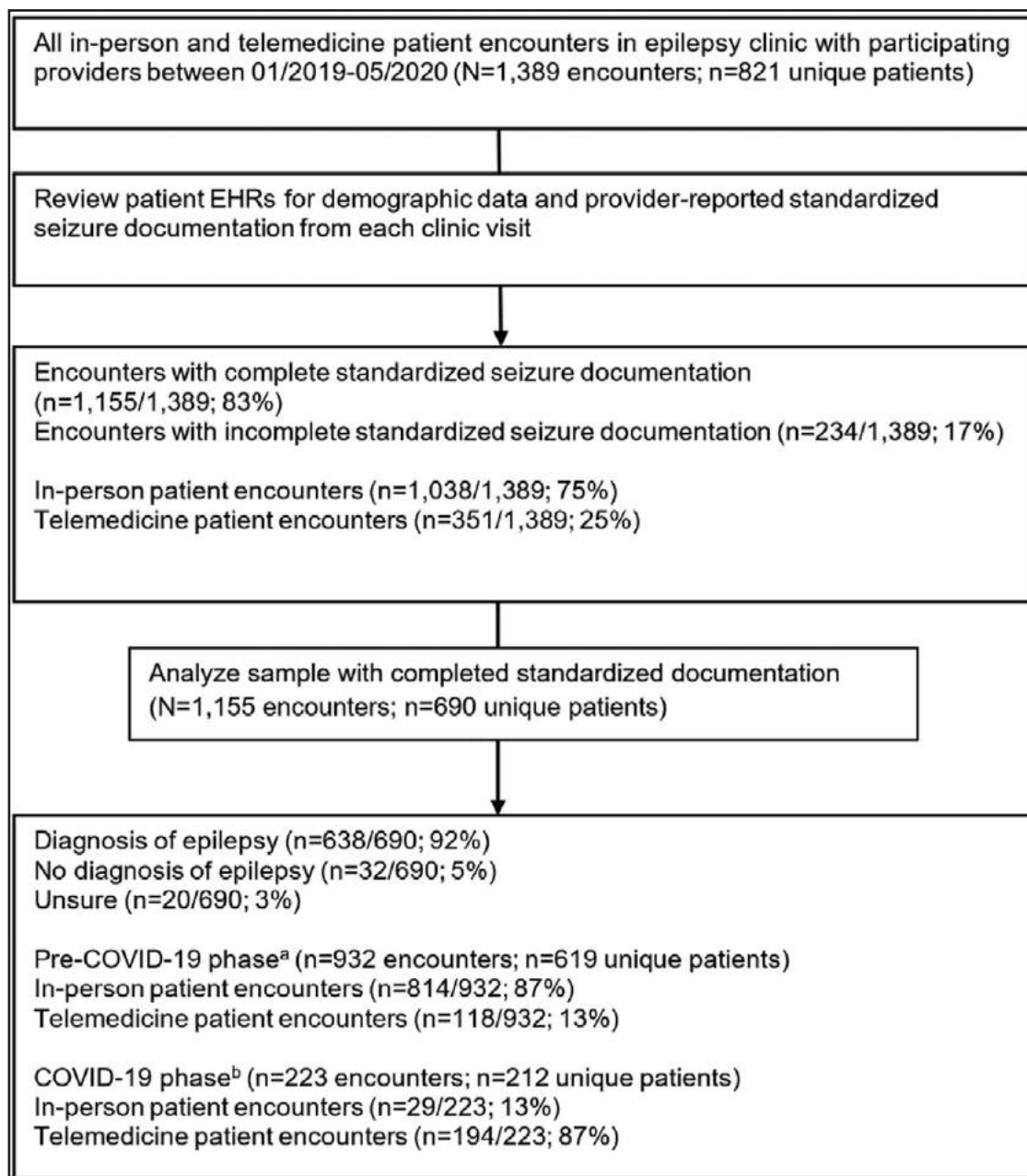
Figure 2. Identification of sample with complete standardized epilepsy care documentation at a level 4 epilepsy center. Process of identifying sample of patients seen by 6 neurologists implementing standardized epilepsy care documentation at a level 4 epilepsy center. [a]Pre-COVID-19 phase consists of patient encounters from January 20, 2019, to March 11, 2020. [b]COVID-19 phase consists of encounters between March 11, 2020, and May 31, 2020. Abbreviations: COVID-19, coronavirus disease 2019; EHR, electronic health record.

period (January 20, 2019–May 31, 2020) to examine variation (ie, points outside 3 SD) in completion proportions. The team identified a new shift in the centerline by 8 consecutive points above or below the centerline, and then calculated the average weekly completion proportions during the pre-COVID-19 phase and the COVID-19 phase.

Finally, 2 secondary analyses were performed. The average weekly completion proportions were calculated between 2 similar time frames separated by 1 year (ie, March 2019–May 2019 and March 2020–May 2020). The team then examined the average completion proportion through the study period between modes of care.

Table 1. Characteristics of Patients Seen by Participating Neurologists Between January 20, 2019, and May 31, 2020.

Characteristics	Complete documentation (n = 1155 encounters; n = 690 unique patients)	Incomplete documentation (n = 234 encounters; n = 209 unique patients)	All patients (n = 1389 encounters; n = 821 unique patients)
Demographics[a]			
Age, median (Q1–Q3)	44 (31–59)	45 (32–59)	44 (31–59)
Sex, n (%)			
Male	308/689[b] (44.7)	111/209 (53.1)	380/820[b] (46.3)
Female	381/689[b] (55.3)	98/209 (46.9)	440/820[b] (53.7)
Primary language, n (%)			
English	641/690 (92.9)	197/209 (94.3)	766/821 (93.3)
Other than English	49/690 (7.1)	12/209 (5.7)	55/821 (6.7)
Clinical			
Patient type[c], n (%)			
Follow-up	1023/1152[b] (88.8)	192/234 (82.0)	1215/1386[b] (87.7)
New patient	129/1152[b] (11.2)	42/234 (18.0)	171/1386[b] (12.3)
Visit type[c], n (%)			
Office	843/1155 (73.0)	195/234 (83.3)	1038/1389 (74.7)
Telemedicine	312/1155 (27.0)	39/234 (16.7)	351/1389 (25.3)
Diagnosis of epilepsy[a], n (%)			
Yes	638/690 (92.5)	24/28 (85.7)	651/704 (92.5)
No	32/690 (4.6)	1/28 (3.6)	33/704 (4.7)
Unsure	20/690 (2.9)	3/28 (10.7)	20/704 (2.8)
No. of discrete seizures in past year[a], n (%)			
1	402/638 (63.0)	NA	NA
2	195/638 (30.6)	NA	NA
≥3	41/638 (6.4)	NA	NA
Classification of all seizures[a], n (%)			
Generalized	328/918 (35.7)	NA	NA
Focal	527/918 (57.4)	NA	NA
Unclassified	63/918 (6.9)	NA	NA
Seizure frequency in past year[a], n (%)			
≥10 per day most days	7/918 (0.8)	NA	NA
4 d per week with ≥2 seizures	17/918 (1.9)	NA	NA
≥4 d in the past week	20/918 (2.2)	NA	NA
1–3 in the past week	74/918 (8.3)	NA	NA
1–3 in the past month	108/918 (12.1)	NA	NA
≤10 in the past 12 m	162/918 (18.1)	NA	NA
Less than once per year	249/918 (27.8)	NA	NA
Unknown	50/918 (5.6)	NA	NA
Frequency not well defined	231/918 (25.8)	NA	NA

Breakdown of demographic and clinical characteristics among all outpatient encounters between January 20, 2019, and May 31, 2020. [a]Patient-level unit of analysis. [b]Missing data on sex (n = 1) and patient type (n = 3) because of nonreporting in the electronic health record. [c]Encounter-level unit of analysis. Abbreviations: NA, not applicable; Q, quarter.

Statistical analysis was conducted and p-charts were created using SAS software, version 9.4 for Windows (SAS Institute Inc., Cary, NC). The code is provided in Supplemental Appendix 4 (available at http://links.lww.com/AJMQ/A0).

Results
Patient Characteristics

There were 1389 patient encounters recorded between January 20, 2019, and May 31, 2020. Of those, 1155 (83%; 690 unique patients) had complete standardized documentation in the EHR and were included in the descriptive analysis. Table 1 and Supplemental Table 1 (available at http://links.lww.com/AJMQ/A0) describe the demographics and clinical characteristics of patients seen during the study period, broken down by complete and incomplete documentation. There

were no differences in demographics between patients with complete and incomplete standardized documentation (Supplemental Table 2, available at http://links.lww.com/AJMQ/A0).

Table 2 and Supplemental Table 3 (available at http://links.lww.com/AJMQ/A0) with the article online describe the demographic and clinical characteristics of patients between the pre-COVID-19 and COVID-19 phases. During the pre-COVID-19 phase (January 20, 2020–March 11, 2020), there were 932 outpatient encounters with complete standardized documentation (619 unique patients). More than 87% of these encounters were office-based and less than 13% deployed telemedicine resources, either through video or phone calls; less than 13% were new patients and more than 87% were established patients (Table 2). In the COVID-19 phase (March 11, 2020–May 31, 2020), there were 223 patient encounters, consisting of

Table 2. Characteristics of Patients With Complete Standardized Documentation Between Pre-COVID-19 and COVID-19 Phases.

Characteristics	Pre-COVID-19 phase (n = 932 encounters; n = 619 unique patients)	COVID-19 phase (n = 223 encounters; n = 212 unique patients)	P
Demographics[a]			
Age, median (Q1−Q3)	44 (31−58)	43.5 (30−60)	0.78
Sex, n (%)			0.82
Male	282/619 (45.6)	98/211[b] (46.4)	
Female	337/619 (54.4)	113/211[b] (53.6)	
Primary language, n (%)			0.34
English	572/619 (92.4)	200/212 (94.3)	
Other than English	47/619 (7.6)	12/212 (5.7)	
Clinical			
Patient type[c], n (%)			<0.001
Follow-up	810/929[b] (87.2)	213/223 (95.5)	
New patient	119/929[b] (12.8)	10/223 (4.5)	
Visit type[c], n (%)			<0.001
Office	814/932 (87.3)	29/223 (13.0)	
Telemedicine	118/932 (12.7)	194/223 (87.0)	
Diagnosis of epilepsy[a], n (%)			0.25
Yes	576/619 (93.0)	200/212 (94.3)	
No	29/619 (4.7)	5/212 (2.4)	
Unsure	14/619 (2.3)	7/212 (3.3)	
No. of discrete seizures in past year[a], n (%)			0.75
1	363/576 (63.0)	120/200 (60.0)	
2	175/576 (30.4)	66/200 (33.0)	
≥3	38/576 (6.6)	14/200 (7.0)	
Classification of all seizures[a], n (%)			0.10
Generalized	295/830 (35.5)	86/294 (29.2)	
Focal	475/830 (57.2)	189/294 (64.3)	
Unclassified	60/830 (7.2)	19/294 (6.5)	
Seizure frequency in past year[a], n (%)			0.003
≥10 per day most days	7/830 (0.8)	2/294 (0.7)	
4 d per week with ≥2 seizures	14/830 (1.7)	5/294 (1.7)	
≥4 d in the past week	18/830 (2.2)	4/294 (1.4)	
1−3 in the past week	62/830 (7.5)	36/294 (12.2)	
1−3 in the past month	104/830 (12.5)	41/294 (14.0)	
≤10 in the past 12 mo	155/830 (18.7)	41/294 (14.0)	
Less than once per year	231/830 (27.8)	60/294 (20.4)	
Unknown	35/830 (4.2)	26/294 (8.8)	
Frequency not well defined	204/830 (24.6)	79/294 (26.9)	

Comparison of the characteristics among encounters with complete standardized epilepsy care documentation between the pre-COVID-19 phase (January 20, 2019−March 11, 2020) and the COVID-19 phase (March 11, 2020−May 31, 2020). [a]Patient-level unit of analysis. [b]Missing data on sex (n = 1) and patient type (n = 3) because of nonreporting in the electronic health record. [c]Encounter-level unit of analysis. Abbreviations: COVID-19, coronavirus disease 2019; Q, quarter.

212 unique patients, with complete standardized documentation. Among these encounters, 87% were telemedicine visits and 13% were office-based. The proportion of established and new patient encounters were >95% and <5%, respectively (Table 2).

Standardized Documentation Completion in Pre-COVID-19 and COVID-19 Phases

Over 16 months of standardized data collection implementation, the research team performed 70 PDSA cycles in the epilepsy clinic. The QI interventions led to an increase in documentation of the diagnosis, seizure frequency, and seizure type from a baseline of 81% (n = 82/101; January 20, 2019−March 10, 2019) to a new centerline of 94% by December 15, 2019 (n = 163/173; October 20, 2019−December 15, 2019). Figure 3 displays the statistical process control chart of the weekly

proportion of completed standardized documentation among eligible patient encounters.

During the pre-COVID-19 phase, in which the majority of visits were office-based, the completion proportion was 81% (n = 932/1146 encounters). Implementing the interventions, the 94% centerline of standardized documentation completion was sustained through the COVID-19 phase (Figure 3), during which the majority of visits were conducted via telemedicine. The completion proportion overall for the COVID-19 phase was 92% (n = 223/243 encounters).

Although the new centerline was sustained during the COVID-19 phase, the weekly completion proportions fluctuated around the centerline. During the first week coinciding with the beginning of the COVID-19 pandemic, providers still conducted office visits and achieved a completion proportion of 95% (n = 36/38 encounters). Despite a near-complete transition to telemedicine by March 20, 2020, a 100% (n = 34/34 encounters) completion proportion was
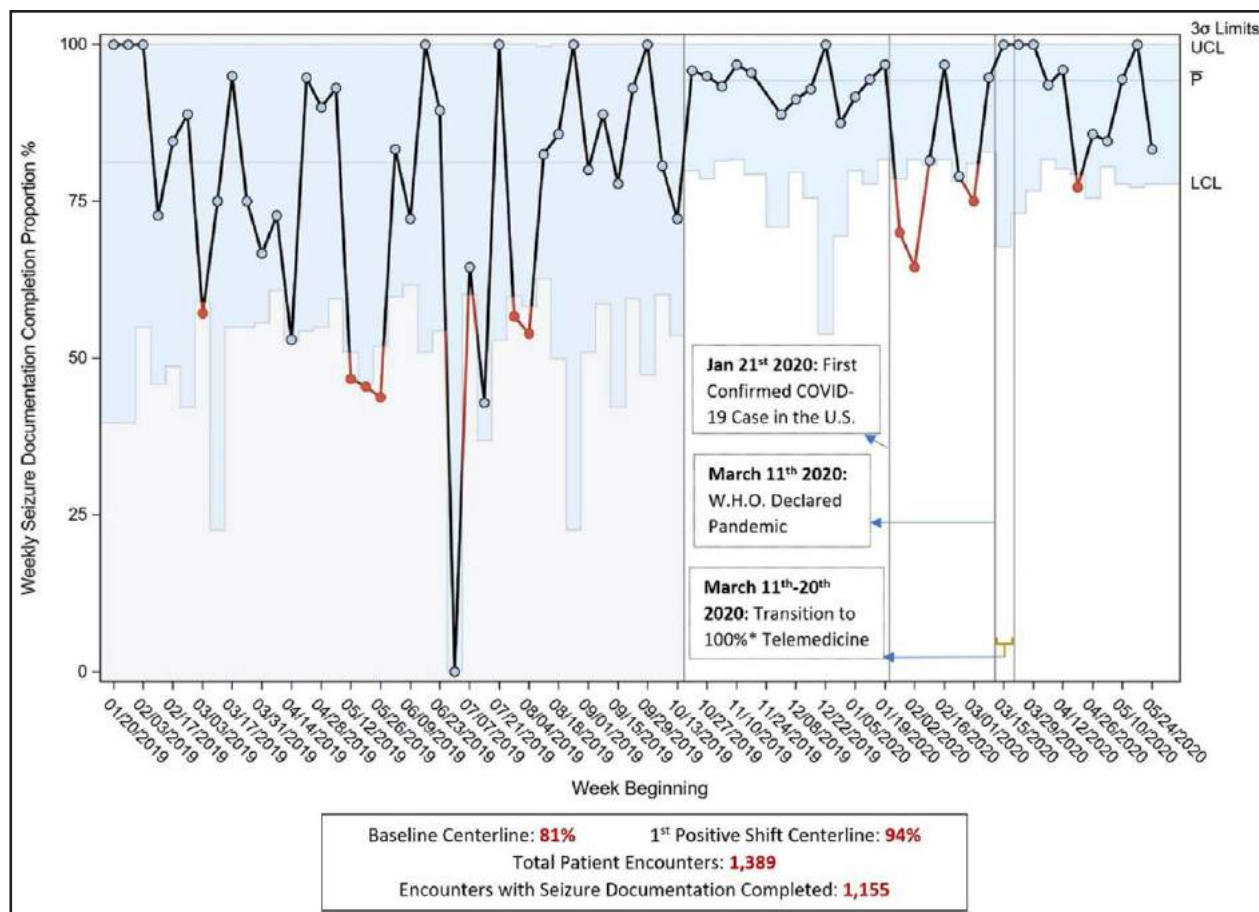
Figure 3. Weekly standardized epilepsy care documentation completion for all outpatient visits among participating providers between January 20, 2019, and May 31, 2020. Statistical process control chart (p-chart) tracking standardized epilepsy care documentation (ie, the SmartPhrase template) for all outpatient encounters among participating providers between January 20, 2019 (week 1), and May 31, 2020 (week 70). *A transition phase toward predominately telemedicine visits between March 11, 2020, and March 20, 2020. Abbreviations: COVID-19, coronavirus disease 2019; LCL, lower control limit; UCL, upper control limit; U.S., United States; W.H.O., World Health Organization.

maintained between March 15, 2020, and April 5, 2020. As patient volume continued to surge and staff were redeployed to dedicated COVID-19 units, the completion proportion fell to 89% (n = 153/171) between April 5, 2020, and May 31, 2020.

Secondary Analyses

Supplemental Table 4 (available at http://links.lww. com/AJMQ/A0) compares characteristics of patients in the period of March 1, 2019–May 31, 2019 (n = 187 encounters) and March 1, 2020–May 31, 2020 (n = 244 encounters). The average number of patient encounters per week in March 2019–May 2019 and March 2020–May 2020 were 14 and 19, respectively. In the 2019 period, 93% (n = 174) of the visits occurred in the office and 7% (n = 13) occurred via telemedicine. Of visits in the 2020 period, which necessarily included encounters in both the pre-COVID-19

and COVID-19 phases, 19% (n = 46/244) were conducted in the office and 81% (n = 198/244) occurred via telemedicine. Overall, the average completion proportion from March/May 2019 (72%; Supplemental Figure 1, available at http://links.lww.com/AJMQ/A0) was lower than March/May 2020 (90%; Supplemental Figure 2, available at http://links.lww.com/AJMQ/ A0), and COVID-19 phase (92%) completion proportions, likely indicating a minimal impact of time of year. Supplemental Figures 3 and 4 (available at http:// links.lww.com/AJMQ/A0) display the control charts for telemedicine and in-person visits, respectively, throughout the study period.

Discussion

For nearly 20 years, MGH neurologists have provided telemedicine care to patients with a wide range of neurological disorders, including epilepsy. During

this period, the study institution's patients and clinicians have progressively incorporated telemedicine into their routines and learned about its advantages and challenges, yet there has been little to date about the quality of care for PWE provided by telemedicine. As a continuation of this QI project, the research team implemented standardized epilepsy care documentation for telemedicine visits with adult outpatients at a level 4 epilepsy center to maintain quality of care during the COVID-19 pandemic. These QI efforts were sustained using an existing, evidence-based, provider-reported standardized documentation template (ie, SmartPhrase). The SmartPhrase use increased during this period, bringing the average documentation completion proportion from 81% to 94%. This study suggests that telemedicine can support measurable, high-quality care with a standardized documentation process during the COVID-19 pandemic.

Lessons Learned During the COVID-19 Pandemic

Preliminary studies have demonstrated proof of concept for using telemedicine resources for routine epilepsy management.[13,26,27] Comparing in-person and telemedicine visits for epilepsy care, no significant differences in outcomes were reported.[27] With comprehensive guidance and necessary devices, PWE have reported favorable views toward telemedicine visits for routine care.[15,28] Previous studies have even indicated that telemedicine is advantageous during crises and natural disasters,[29,30] enabling continuity of high-quality epilepsy care.[17]

Present study results enhance these data, indicating that telemedicine supports the value of standards[31]; it is possible to rapidly deploy telemedicine to accommodate nearly all outpatient encounters, while meeting national epilepsy quality measures, during a public health crisis. Virtual visits show promise for routine specialty care, remote imaging assessment, medication adjustments, and even limited evaluation for surgical management of PWE while promoting the practice of social distancing. In this light, present study data underscore the calls at the national and global levels to implement standardized clinical processes and scale telemedicine utilization.[31,32] With increased preparedness, telemedicine could have the capability to support more standardized measures (Supplemental Table 5, available at http://links.lww.com/AJMQ/A0), and in doing so would serve a critical function in expanding access to equitable, high-quality epilepsy care.

Previous studies have noted an increase in SmartPhrase completion 2 months after implementation, with SmartPhrase compliance typically declining after 6 months.[33,34] However, none have analyzed compliance to quality measures in a 100% virtual visit scenario. Through PDSA cycle methodology, the research team found that incorporating electronic data collection into practice was critical to maintaining a 94% completion proportion over 3 months, even after a dramatic shift to virtual visits. Refining the SmartPhrase in the EHR allowed providers to have efficient, structured virtual visits, as well as enabling seamless data collection and analysis for QI.

Critically, provider engagement has been the cornerstone to success in achieving such high weekly completion proportions of standardized documentation. With multiple emails and information already circulating on COVID-19 updates, information overload was reduced by replacing weekly reports with a reminder that support could be provided if needed and enabling a downloadable application (WhatsApp) for quick communication. These initiatives fostered cooperation between providers and enhanced commitment to the project in a stressful work environment.

Determinants of Successful QI Initiatives and Failure Modes

The recent surge in telemedicine has stimulated further adaptation among the public and private sectors. Anecdotal evidence at the study epilepsy center suggests patients are actively using their online patient portal during the pandemic, possibly because of newer incentives. Phone calls also are temporarily considered telemedicine by insurance companies. Although physician billing and out-of-state physician credentialing constitute substantial obstacles for deploying physicians via telemedicine,[35] despite previous studies demonstrating substantial benefits for relaxing restrictions,[22,36,37] on March 17, 2020, the Centers for Medicare & Medicaid Services issued an 1135 Waiver for telemedicine coverage by Medicare and major private insurance companies.[36,38] Significant issues persist, however, as telemedicine billing evolves and insurance coverage remains inconsistent across payers[38]; insurance companies ask for different codes and modifiers.[39]

Multiple challenges hindered the effort to reach a 100% completion rate for standardized documentation for telemedicine visits. The rapid conversion of all nonessential clinic visits to a virtual platform

forced providers, patients, and caregivers nationwide to adopt technology to which many were unaccustomed. Another challenge likely was physician burnout; some physicians were redeployed, whereas others were not and exclusively assigned telemedicine visits, potentially inducing fatigue related to excessive encounters (eg, Zoom fatigue).[40]

Despite the technology existing for decades, infrastructure for widespread telemedicine deployment is lacking.[10,15,37] Many barriers are attributed to the technology itself, including poor internet connectivity, EHR functionality, telemedicine software privacy (ie, Health Insurance Portability and Accountability Act compliance), and hardware/software incongruency. Patient-related technology difficulties include lack of accessibility to devices, nonintuitive design, and language barriers. The QI framework in this study, however, provides a unique foundation to test future interventions for these barriers, such as providing telemedicine training for clinicians, providing brief and comprehensive instructions to patients before their virtual visit, assigning bilingual physicians to non-English–speaking patients, and increasing availability of virtual interpreter services.

Limitations

There are limitations to this project. Other health care institutions might lack the resources and experienced QI staff (eg, physicians committed to leading QI initiatives) that facilitated the study interventions. Similarly, teleconsultations were being held at the study clinic long before the COVID-19 outbreak, which shortened clinicians' and patients' learning curves and favored SmartPhrase use. Study results essentially represent a snapshot of a QI initiative that has been implemented for well over a year, which benefited from the resources available to a level 4 epilepsy center. Therefore, generalization of study findings to other settings might be limited.

The research team recognizes that causal links cannot be drawn between the improvement and maintenance in standardized documentation and the interventions. The framework adopted, however, has been successful in sustaining provider documentation in a real-world setting and the results did demonstrate stability over the first weeks of COVID-19 pandemic. The QI framework could signify a viable alternative when a randomized trial is not feasible.

Last, a relatively short time frame (March 11, 2020–May 31, 2020) was used to measure compliance to standardized epilepsy documentation in the COVID-19 phase. There are currently concerns that the pandemic could last for several more months,[41]

which could pose new barriers to point-of-care data collection. Accordingly, the team is designing new QI initiatives through PDSA cycles that can support the promising results in the long run without compromising clinical workflow during all too brief clinic visits.

Conclusions

The achievement and sustainability of a 94% completion proportion in standardized epilepsy care documentation are feasible and should be pursued during telemedicine encounters with PWE, even during the COVID-19 pandemic.

Author Contributions

Dr Moura contributed to study conceptualization and design, acquisition of data, analysis and interpretation of data, and revision of article for intellectual content. Dr Donahue and Mr Smith contributed to interpretation of data and drafting of article for intellectual content. Ms Dass contributed to analysis and interpretation of data, and drafting of article for intellectual content. Dr Sanches contributed to interpretation of data and drafting of article for intellectual content. Drs Ayub, McGraw, Zafar, and Cash contributed to acquisition and interpretation of data, and revision of article for intellectual content. Dr Hoch contributed to study conceptualization and design, acquisition and interpretation of data, and revision of article for intellectual content.

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