Adverse Events Involving Telehealth in the Veterans Health Administration

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Background: Telehealth involves providing health care remotely using communication tools such as telephone, video, and remote patient monitoring. Research on telehealth has shown many benefits, including improved access to care and reduced costs, and drawbacks, including delays in care, breakdowns in communication, and missed diagnoses. The use of telehealth nationally, including in the Veterans Health Administration (VHA), expanded dramatically during the COVID-19 pandemic. Despite its increased use, few studies have described adverse events or the role of patient safety in the provision of telehealth.

Methods: The authors looked at all reports of adverse events and close calls in the VHA involving the use of telehealth between October 1, 2022, and February 2, 2023, and coded each case for the location of the event, type of event, and causes.

Results: A total of 145 reports met criteria for review. Most events occurred in primary care, outpatient behavioral health, and radiology, with delays in care, medication errors, and equipment problems being common types. Most reported events did not cause harm; 45 cases were identified as an unsafe condition, 37 as a close call, and 15 as causing some harm to the patient. There were 3,609,105 telehealth episodes of care during this time, resulting in a reporting rate of 4.02 per 100,000 episodes of care and 0.42 reports of harm per 100,000 episodes of care.

Conclusion: The most frequent telehealth-related events were delays in care, medication errors, and equipment issues, and most events were not unique to this modality. Further research is needed to characterize safety events unique to telehealth to better define parameters for patient safety activities. Recommendations to reduce errors include ongoing provider training, human factors analysis of telehealth processes, simplifying processes and procedures for providers and patients to get help for technical or knowledge deficits in real time, and examining the business rules for telehealth care.

Telehealth has existed since at least the 1860s, when the telegraph was used during the Civil War to communicate about soldiers wounded in the field.[1] The term *telehealth* was first used in 1974, and since that time the use of many forms of telehealth has grown.[1] More recently telehealth has been defined as "the provision of health care remotely by means of a variety of telecommunication tools, including telephones, smartphones, and mobile wireless devices, with or without a video connection."[2 (p. 154)] Research in telehealth has shown several advantages, including improved access to care, reduced travel for patients, more equitable care for patients, and reduced cost of providing the service.[3] Furthermore, patients are generally satisfied with telehealth, and it has been shown to be comparable with in-person health care for most clinical outcomes measured.[3] The COVID-19 pandemic greatly increased the use of telehealth throughout the world.[4] This expansion shed light on unintended consequences of telehealth, including incomplete or inaccurate physical exams and interference with the patient-provider relationship.[4] Other drawbacks to telehealth found since the COVID-19 pandemic include errors in diagnosis, difficulties communicating between physician and patient, violations of privacy, and increased medical error and malpractice claims.[5] Using thematic analysis of various patient safety data sources across England, Scotland, and Wales from 2021 to 2023, Payne et al. identified 95 adverse events involving telehealth.[6] They found delays in care, inaccurate assessment of severity and/or urgency, and poor follow-up as primary themes in these events.

The Veterans Health Administration (VHA) is the largest integrated health care system in the United States, serving more than nine million veterans each year at 1380 health care facilities, including 170 VA Medical Centers.[7] In response to the COVID-19 pandemic, the VHA also made an unprecedented shift toward the use of telehealth.[8] Between March and June 2020, in the first months of the COVID-19 pandemic, the VHA shifted from providing 14% of its outpatient care by telehealth to 58% for more than 5.4 million patients.[8] Prior to the pandemic, the VHA began laying the groundwork for greater use of telehealth, particularly in rural areas, and in 2018 provided 2.29 million telehealth episodes of care to 782,000 veteran patients.[9] Currently, one in three veterans receive VA care through telehealth.[10] In March 2024, VHA researchers published a special journal issue devoted to virtual care in the VHA over the past 20 years.[11] Findings included that the use of telehealth in primary care contributed to improved rates of follow-up[12] and that homeless veterans substantially increased their use of telehealth during and after the COVID-19 pandemic.[13] Despite these positive results,

researchers also found that racial-ethnic disparities continue to exist in the use of telehealth for pain management.[14] Although there were many important findings regarding telehealth in the VHA, the special issue did not focus on adverse events or the role of patient safety related to the use of telehealth. Given the increase in the use of telehealth in the VHA, it is important to investigate safety events related to its use. The aim of this study was to understand and describe reports of adverse medical events and close calls related to telehealth that have been reported to the VHA National Center for Patient Safety (NCPS). To our knowledge, this is the first study of adverse medical events and close calls related to telehealth in a large national health care system in the United States. In addition, the VHA is a unique setting to conduct this work because it has a very robust, standardized process to capture safety events across the organization and analyze these events over time.

METHODS

The VHA National Center for Patient Safety

Within the VHA, NCPS is a national program office focused on improving patient safety by reducing preventable harm. NCPS uses a hub-and-spoke system in which the 18 regional Patient Safety Officers and Patient Safety Professionals (PSPs) at all 170 VA Medical Centers within the 18 regions manage patient safety programs. VHA health care staff are expected to report any incident, including adverse events, close calls, and unsafe conditions, regardless of whether it resulted in patient harm, through the Joint Patient Safety Reporting system (JPSR). The JPSR reports are reviewed by PSPs and investigated by multidisciplinary teams at the VA Medical Centers. The review includes determining the severity of the incident and probability that the incident may occur again, resulting in a Safety Assessment Code (SAC) score. The score is used to determine whether a root cause analysis (RCA), aggregate review, or other actions are needed. Following review, scores are logged into NCPS's adverse event database for national analysis.[15,16]

Data on Adverse Events Involving Telehealth

In the VHA the term *telehealth* is defined as the use of electronic information or telecommunications technologies to support clinical health care, patient and professional health-related education, public health, or health administration at a distance. We were interested in any JPSR report involving medical care provided remotely using any type of synchronous, asynchronous, and remote telecommunications, including images forwarded for clinician review, outpatient visits via telehealth, and inpatient visits using remote clinicians providing care to inpatients or direction to inpatient staff. All JPSR reports that were identified by the PSP as related to virtual health, telemedicine, or telehealth between

October 1, 2022, and February 2, 2023, were analyzed using Polyanalyst, a natural language processing program (Megaputer Intelligence, Inc., Bloomington, Indiana). The search resulted in 303 JPSRs, of which 157 were related to the local call centers, where patients call in to receive general information vs. health care guidance provided through telehealth; therefore, these cases were rejected. In addition, a duplicate case was rejected, resulting in 145 cases for analysis. The reports were then reviewed by two authors for location of the incident, type of incident, cause of the incident, and relationship to telehealth modality. All data were taken directly from the JPSR event description as written by the facility PSP. Because JPSRs are de-identified, there is no information on the patients or clinicians involved in the case. As a comparison, during the same period there were 3,609,105 telehealth episodes of care, excluding radiology image transmission, in the VHA.

RESULTS

A total of 145 JPSR reports were found related to telehealth incidents in the NCPS database between October 1, 2022 (the beginning of fiscal year 2023), and February 2, 2023. Figure 1 displays the location of the incidents. Note that most cases occurred in primary care, followed by the behavioral health clinic and radiology. The SAC scores indicate that 95.2% of events were low risk. The types of incidents include delays in care, equipment issues, medication errors, wrong side (in radiology) or wrong patient, and scheduling errors. Figure 2 displays the major types of incidents with causal connections—for example, delays in care could be caused by technology problems, scheduling issues, and deficits in staff knowledge or communication problems. As another example, medication errors could be caused by deficits in staff training, technology issues, policy issues, or communication problems. Table 1 contains examples of types of incidents and lists the outcomes of these events. Note that the causes of "other issues" and "wrong side or wrong patient" were related to deficits in staff knowledge or training. The type and level of harm was assigned at the facility, and definitions of the harm categories are displayed in Figure 3.

Most of the reported incidents (n = 130) did not cause harm, including 45 cases identified as unsafe conditions and 37 labeled as close calls. The cases of harm included 12 mild harm, 2 moderate harm, and 1 severe harm. Eight of the incidents causing harm, including the 3 highest harm cases, were delays in care. These delays were in turn caused by lack of familiarity with the telehealth process and missed follow-up scheduling. Another 6 of the harm incidents were medication errors that were also caused by lack of familiarity with the telehealth process and communication problems between providers (see Table 1 for more examples of each type of event). Of the 15 harm incidents, 6 occurred in primary care, 3 on inpatient units, 2 during home telehealth,

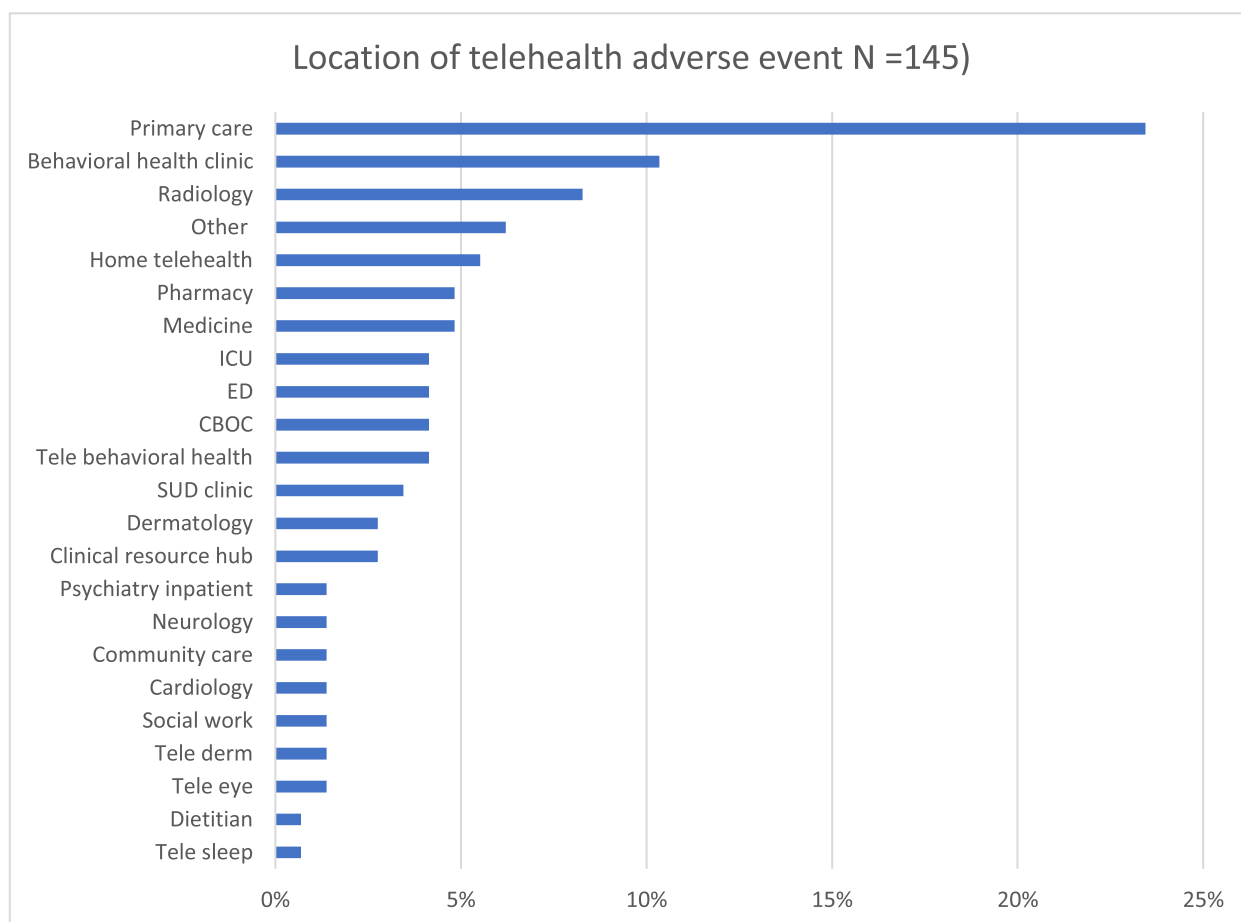**Figure 1:** This bar graph shows locations of telehealth safety incidents (*N* = 145). ED, emergency department; CBOC, community-based outpatient clinic; SUD, substance use disorder.
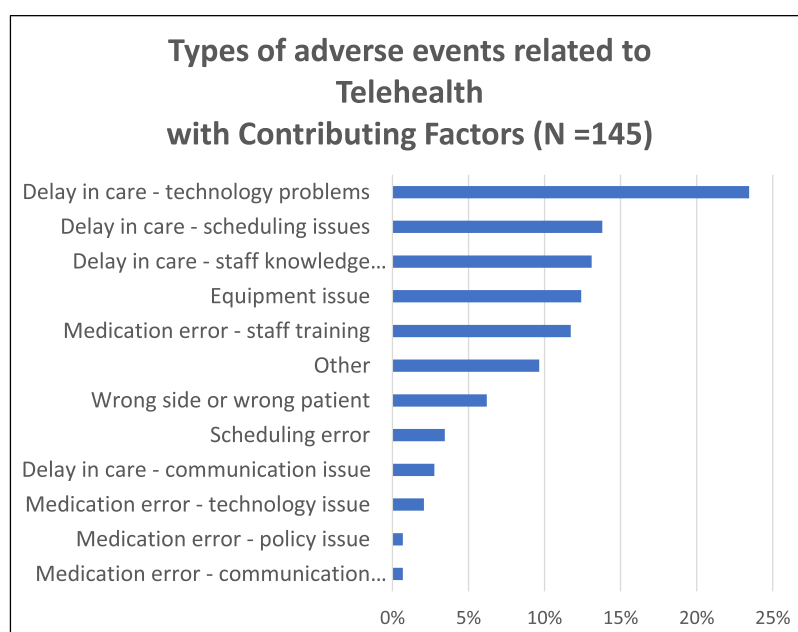

Figure 2: This bar graph shows the types of safety incidents related to telehealth, with contributing factors (*N* = 145).

Table 1. Examples of Types of Safety Incidents Related to Telehealth

Incident Type	Frequency	Examples	Outcome
Delay in care—technology	34	Staff couldn't connect to patient or other staff, images lost, radiology not available or delayed, telehealth provider could not see patient or images, telehealth equipment not functioning.	3 mild harm 10 unsafe conditions 14 close calls 7 no harm
Delay in care—scheduling	20	Follow-up appointment not scheduled, appointment canceled without contacting the patient, or the provider was not available the day of the appointment.	1 moderate harm 2 mild harm 5 unsafe conditions 4 close calls 8 no harm
Delay in care—staff training	19	Staff confusion over protocols and procedures, treatment not ordered, staff not aware of process.	1 severe harm 1 moderate harm 1 mild harm 8 unsafe conditions 1 close call 7 no harm
Equipment issues	18	Power outage, staff not able to use equipment, staff could not see patient or alarms, equipment broken.	1 mild harm 7 unsafe conditions 3 close calls 7 no harm
Medication error—staff training	17	Pharmacy not familiar with telehealth screens, provider confusion over process/protocols, wrong medication/dose entered, medications not ordered, poor medication reconciliation.	3 mild harm 2 unsafe conditions 6 close calls 6 no harm
Other issues	14	Inappropriate consults, no notes, wrong signature, patient wandered while on call, patient with pacemaker sent to MRI, wrong treatment ordered—mostly due to insufficient staff training.	4 unsafe conditions 5 close calls 5 no harm
Wrong side or wrong patient	9	Wrong image label, wrong MRI sent for interpretation, note entered on wrong patient, wrong-side radiation, wrong side marked—mostly due to insufficient staff training.	3 unsafe conditions 3 close calls 3 no harm
Scheduling errors	5	Appointment in VCC is wrong, overbooked appointments, telehealth rooms overbooked.	1 mild harm 1 unsafe condition 1 close call 2 no harm
Delay in care—communication	4	Poor communication between providers or poor documentation.	2 unsafe conditions 2 no harm
Medication error—technology	3	Medications list in EHR confusing, directions unclear.	2 unsafe conditions 1 no harm
Medication error—policy issue	1	Controlled substance prescribing not allowed via telehealth—likely a knowledge issue about DEA rules.	1 unsafe condition
Medication error—communication	1	Communication problem between staff led to medication not being refilled.	1 mild harm

MRI, magnetic resonance imaging; VCC, virtual call center; EHR, electronic health record; DEA, Drug Enforcement Administration.

and 4 in other locations. A review of the 37 cases classified as close calls identified 18 cases (48.6%) from delays in care secondary to technology, scheduling, and training; 6 from a medication error related to staff training, 3 from equipment, and 2 from radiology imaging. The close calls occurred most frequently in behavioral health, with 7 cases (18.9%), followed by radiology (13.5%) and primary care (13.5%) with 5 cases each (see Table 1).

The modality of telehealth identified in the safety reports ($N = 145$) included 78 cases (53.8%) associated with synchronous clinical video telehealth; 35 cases (24.1%) were associated with asynchronous store and forward of images in dermatology, eye care, and radiology; 18 cases

(12.4%) with telephone visits; and 14 (9.7%) with remote patient monitoring of clinical findings. These safety reports were further categorized as being specifically related to a failure of the telehealth platform, which includes equipment, scheduling, and transmission, in 51 cases (35.2%) (Table 2). In these cases, the modalities included synchronous video visits (60.8%), asynchronous store and forward (23.5%), and remote patient monitoring (15.7%). The breakdown in incident type for safety events associated with the telehealth platform failure is outlined in Table 2.

The types of incidents included in Table 1 were further examined to determine if the reported safety event was unique to a telehealth platform of care. The 34 cases of
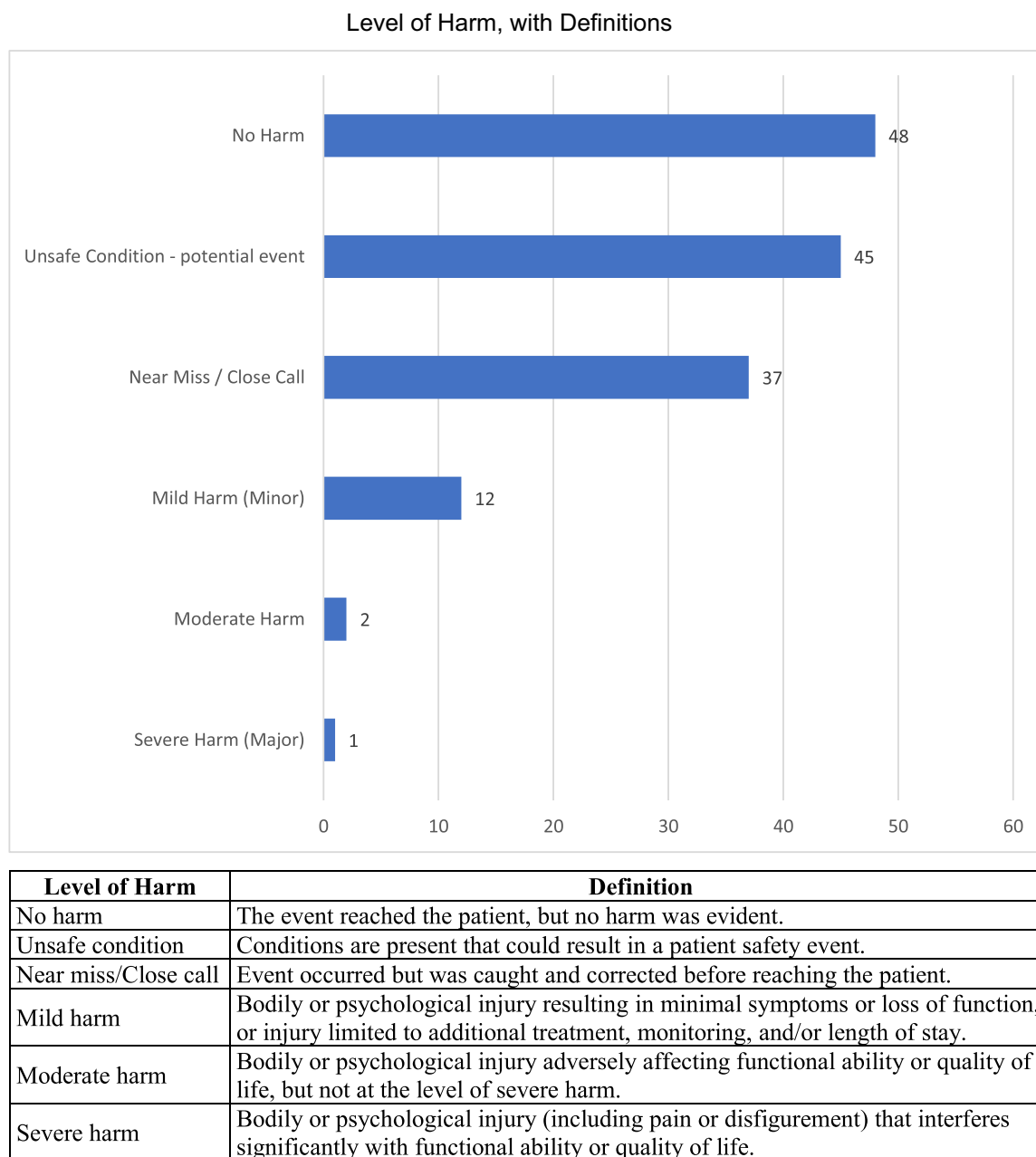
Level of Harm, with Definitions

Level of Harm	Definition
No harm	The event reached the patient, but no harm was evident.
Unsafe condition	Conditions are present that could result in a patient safety event.
Near miss/Close call	Event occurred but was caught and corrected before reaching the patient.
Mild harm	Bodily or psychological injury resulting in minimal symptoms or loss of function, or injury limited to additional treatment, monitoring, and/or length of stay.
Moderate harm	Bodily or psychological injury adversely affecting functional ability or quality of life, but not at the level of severe harm.
Severe harm	Bodily or psychological injury (including pain or disfigurement) that interferes significantly with functional ability or quality of life.

Figure 3: This bar graph shows level of harm in safety incidents related to telehealth ($N = 145$). Definitions of each level are given in the table below the graph.

Table 2. Safety Reports in Which the Error Was Directly Related to an Aspect of Telehealth

Incident Type	Count
Delay in care	24
Equipment	14
Scheduling error	3
Training	1
Other	9

"delays in care—technology" revealed 11 failures unique to the telehealth platform, such as video visit connection failure, video visit equipment failure, timely equipment distri-

bution to patient, and imaging transmission for radiology and dermatology. A review of the 17 cases of "medication error—staff training" revealed that these errors occurred in a telehealth setting, such as home telehealth, TeleICU, and telephone visits. None were unique to a telehealth modality; rather, they were related to lack of familiarity with the electronic health record (EHR), handoffs in communication, and incomplete medication reconciliation.

There were 3,609,105 telehealth episodes of care, excluding radiology image transmission, in the VHA between October 1, 2022, and February 2, 2023, for an overall rate of patient safety reporting of 4.02 per 100,000 episodes of care. There were 15 reports of some patient harm during

this time, resulting in a reported rate of harm of 0.42 per 100,000 episodes of care. During this same period, 60,257 safety events were reported in the VHA; of those, 16,044 (26.6%) were adverse events and 44,213 (73.4%) were close calls. The number of inpatient and outpatient encounters in the VHA during this period was 42,088,598. This resulted in an overall rate of patient safety reporting of 143.2 per 100,000 episodes of care and a reported rate of harm of 38.1 per 100,000 episodes of care.

DISCUSSION

A review of patient safety incidents related to telehealth revealed that 90% of the incidents caused no harm to the patient. Cases involving harm were either delays in care or medication errors. In addition, 35.2% of the telehealth safety incidents during the four-month period were determined to be associated with the telehealth platform. This review suggests pathways to help improve the safety of telehealth by addressing the primary causes of adverse events, unsafe conditions and close calls. Finally, errors causing harm are very rare. Mabry et al. studied overall reported adverse medical events in primary care clinics between 2015 and 2017 in one large military hospital. In the primary care clinics, they had 207,241 encounters, 56 total safety reports, and 4 reports associated with minor harm. This resulted in an overall rate of patient safety reporting of 27.02 per 100,000 episodes of care and a reported rate of harm of 1.93 per 100,000 episodes of care,[17] compared to our reported rate of harm of 0.41 per 100,000 episodes of care. Consequently, the results suggest that overall telehealth is a safe modality for patients.

More than 50% of the types of incidents were delays related to technology, scheduling, staff knowledge, and communication (53.1%). Delays in care was also the most prevalent type of adverse event specifically related to the telehealth platform (see Table 2). Two additional categories of incidents were medication errors related to staff training, technology, policy, and communication issues (15.2%) and telemedicine-related equipment problems (12.4%). Payne et al. also found delays in care and poor follow-up in the telehealth cases they studied.[6] Because delays also represented the highest harm events in our study, it makes sense to focus first on reducing telehealth-associated delays in care to improve patient safety. This may be accomplished in the following ways:

1. Ensure that all providers, particularly new providers, are adequately trained before seeing patients via telehealth. By policy, all VHA clinicians providing telemedicine receive mandatory training on using its synchronous video modality, Clinical Video Telemedicine (CVT), and on procedures for managing a medical or psychiatric emergency that occurs during a telemedicine session.

2. Use human-factors analysis of the telehealth processes for synchronous and asynchronous care, including the scheduling and transmission, to uncover potential breakdowns in care or situations with a high likelihood of errors, such as first CVT appointment for patients and staff.

3. Make it simple for providers to get help for technical or knowledge deficits in real time before delays occur.

4. Examine the business rules regarding provider communication for telehealth modalities.

The significant increase in telehealth since the advent of the COVID-19 pandemic calls for continued examination of the quality and safety of this care modality, including engagement and communication of patients, caregivers, and the health care team. The National Quality Forum's Telehealth Measurement Framework, created in 2017, provides a conceptual model to guide telehealth measurement to address the modality of care's impact on health care delivery and outcomes in four domains: access to care, financial impact/cost, experience, and effectiveness. This framework incorporates different aspects of quality of health care from the perspectives of the patient/family/caregiver, care team, and health system that may provide a platform for developing measures of adverse events that align with the types of events identified in this study.[18] In addition, the VHA Virtual Care State of the Art (SOTA) conference's framework presents another opportunity to study adverse events in the integration and utilization of telehealth along the continuum of a veteran's interface with virtual care from access to engagement to outcomes.[19] The use of these telehealth frameworks alongside established patient safety outcomes presents an opportunity to further characterize the unique vulnerabilities posed by the variety of telehealth care modalities.[20]

Limitations

There are several limitations to this study. As noted in other literature, self-reported safety event reporting systems capture approximately 37% of overall safety incidents.[21] However, given the immaturity of the study of patient safety outcomes related to telehealth, the description of the frequency and type of adverse events presents a starting point for the discussion of patient safety in telehealth modalities that should be considered for future exploration. The nature of the types of events and causal connections aligns with the domains of the measurement and process frameworks that have been highlighted. Another limitation is that all cases were in the VHA, a system of care that serves only US veterans; therefore. results may not easily generalize to other health care settings. However, the events that were analyzed represent findings from the largest integrated health system in the nation, which provides services in rural, suburban, and urban settings at multiple levels of care, such as intensive, acute, ambulatory, emergency, and long term.

Finally, it is possible that the natural language processing program failed to identify events related to telehealth.

CONCLUSION

A study of the patient safety reports related to telehealth in the VHA identified 145 unique incidents, the overwhelming majority of which were low risk. The most frequently occurring incidents were delays in care, medication errors, and telemedicine equipment issues. Further research is needed to characterize patient safety incidents unique to telehealth modalities of care. Recommendations to reduce errors involving telehealth include ensuring that all providers, particularly new providers, are adequately trained before seeing patients via telehealth. Human factors analysis of the telehealth processes associated with each modality is recommended to uncover potential breakdowns in care or situations with a high likelihood of errors being made. Making it simple for providers to get help with technical or knowledge deficits in real time, before delays occur, and examination of business rules for provider communication with telehealth modalities are also necessary.

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