Rural-Urban Disparities in Video Telehealth Use During Rapid Mental Health Care Virtualization Among American Indian/Alaska Native Veterans

Isabelle S. Kusters, PhD, MPH; Amber B. Amspoker, PhD; Kristen Frosio, PhD; Stephanie C. Day, PhD; Giselle Day, MPH; Anthony Ecker, PhD; Julianna Hogan, PhD; Jan A. Lindsay, PhD; Jay Shore, MD, MPH

IMPORTANCE American Indian/Alaska Native veterans experience a high risk for health inequities, including mental health (MH) care access. Rapid virtualization of MH care in response to the COVID-19 pandemic facilitated care continuity across the Veterans Health Administration (VHA), but the association between virtualization of care and health inequities among American Indian/Alaska Native veterans is unknown.

OBJECTIVE To examine differences in video telehealth (VTH) use for MH care between American Indian/Alaska Native and non–American Indian/Alaska Native veterans by rurality and urbanicity.

DESIGN, SETTING, AND PARTICIPANTS In this cohort study, VHA administrative data on VTH use among a veteran cohort that received MH care from October 1, 2019, to February 29, 2020 (prepandemic), and April 1 to December 31, 2020 (early pandemic), were examined.

EXPOSURES At least 1 outpatient MH encounter during the study period.

MAIN OUTCOMES AND MEASURES The main outcome was use of VTH among all study groups (ie, American Indian/Alaska Native, non–American Indian/Alaska Native, rural, or urban) before and during the early pandemic. American Indian/Alaska Native veteran status and rurality were examined as factors associated with VTH utilization through mixed models.

RESULTS Of 1 754 311 veterans (mean [SD] age, 54.89 [16.23] years; 85.21% male), 0.48% were rural American Indian/Alaska Native; 29.04%, rural non–American Indian/Alaska Native; 0.77%, urban American Indian/Alaska Native; and 69.71%, urban non–American Indian/Alaska Native. Before the pandemic, a lower percentage of urban (b = −0.91; SE, 0.02; 95% CI, −0.95 to −0.87; P < .001) and non–American Indian/Alaska Native (b = −0.29; SE, 0.09; 95% CI, −0.47 to −0.11; P < .001) veterans used VTH. During the early pandemic period, a greater percentage of urban (b = 1.37; SE, 0.05; 95% CI, 1.27-1.47; P < .001) and non–American Indian/Alaska Native (b = 0.55; SE, 0.19; 95% CI, 0.18-0.92; P = .003) veterans used VTH. There was a significant interaction between rurality and American Indian/Alaska Native status during the early pandemic (b = −1.49; SE, 0.39; 95% CI, −2.25 to −0.73; P < .001). Urban veterans used VTH more than rural veterans, especially American Indian/Alaska Native veterans (non–American Indian/Alaska Native: rurality b = 1.35 [SE, 0.05; 95% CI, 1.25-1.45; P < .001]); American Indian/Alaska Native: rurality b = 2.91 [SE, 0.38; 95% CI, 2.17-3.65; P < .001]). The mean (SE) increase in VTH was 20.34 (0.38) and 15.35 (0.49) percentage points for American Indian/Alaska Native urban and rural veterans, respectively (difference in differences [DID], 4.99 percentage points; SE, 0.62; 95% CI, 3.77-6.21; t = −7.999; df, 11 000; P < .001), and 12.97 (0.24) and 11.31 (0.44) percentage points for non–American Indian/Alaska Native urban and rural veterans, respectively (DID, 1.66; SE, 0.50; 95% CI, 0.68-2.64; t = −3.32; df, 15 000; P < .001).

CONCLUSIONS AND RELEVANCE In this cohort study, although rapid virtualization of MH care was associated with greater VTH use in all veteran groups studied, a significant difference in VTH use was seen between rural and urban populations, especially among American Indian/Alaska Native veterans. The findings suggest that American Indian/Alaska Native veterans in rural areas may be at risk for VTH access disparities.

Published online July 26, 2023.
Health disparities in the American Indian/Alaska Native population can be tied to historical and socio-political experiences. This group has been historically and is currently disenfranchised and underrepresented, resulting in barriers that increase health care inequities. Inadequate health care funding, sparse health care facilities, education and employment access challenges, lower income, and culturally misaligned care all interfere with receiving quality and timely health care.

These issues are exacerbated for American Indian/Alaska Native veterans of the US Armed Forces. Literature suggests that this group experiences more serious health issues, including reports of poorer quality of life and more physically unhealthy days, than both American Indian/Alaska Native nonveterans and veterans of other races or ethnicities. American Indian/Alaska Native individuals serve at the highest rates per capita of any racial or ethnic group in the armed forces and disproportionately experience consequences of military service, including higher rates of posttraumatic stress disorder and other mental disorders.

Several factors may explain these inequities. This population is more likely than non-Hispanic White veterans to be uninsured, and many American Indian/Alaska Native veterans report struggles obtaining health care after military service. In an analysis adjusting for insurance status, American Indian/Alaska Native veterans were more likely to delay care due to transportation problems and failure to get through to practitioners’ offices on the telephone or obtain a timely appointment. Other barriers include difficulties navigating and coordinating care across multiple health care systems (eg, Indian Health Service, Veterans Affairs [VA] medical centers) and a lack of culturally safe care. In addition, American Indian/Alaska Native veterans are nearly 4 times more likely than non-American Indian/Alaska Native veterans to live in areas categorized as highly rural, adding unique challenges to obtaining health care.

Although the COVID-19 pandemic prompted many tribal governments to rapidly declare a state of emergency, the American Indian/Alaska Native population was disproportionately impacted by COVID-19 infection and death. During the global virtualization of many health care services, mental health (MH) care access for this group was also affected due to widespread underinvestment in technological infrastructure and information services across Indian Country, among other factors. Resulting health outcomes have been found to be associated with this inequity; in 2020, the highest suicide rate was for non-Hispanic American Indian/Alaska Native persons (23.6 per 100,000 population); the group with the next-highest rate was non-Hispanic White persons (16.8 per 100,000 population).

Work within the Veterans Health Administration (VHA) has demonstrated promise for video telehealth (VTH) to improve access and quality of MH care for rural American Indian/Alaska Native veterans. However, barriers remain for widespread and universal deployment of VTH, including access to bandwidth or Wi-Fi and to technological devices, highlighting the importance of implementation strategies to improve uptake. As health care organizations and the VHA have embraced VTH, it is necessary to investigate opportunities to overcome barriers for expanding technology to serve this population. The aim of this study was to investigate the association of the COVID-19 pandemic with access to MH care by studying VTH utilization among American Indian/Alaska Native and non-American Indian/Alaska Native populations by rurality and urbanicity.

### Methods

Data for this cohort study were obtained from October 1, 2019, to December 31, 2020, through the Corporate Data Warehouse, the VHA’s national administrative database. A national cohort of patients receiving VHA care was identified by selecting records of veterans receiving at least 1 outpatient MH encounter during the data capture period. Mental health clinic stop codes (500 series), a coding system for determining types of care provided, were used to identify visits. The study was approved by the institutional review boards of the Michael E. DeBakey VA Medical Center and Baylor College of Medicine. A waiver was granted for informed consent, given that the data were from database analytics and no active recruitment occurred. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guideline was followed.

Demographic data including rurality (ie, geocoded patient location generated through a spatial intersection process) and race (individuals in the VHA system self-report race and ethnicity categories) were obtained through the database. This process, developed by the VHA, designates areas as urban, rural, or highly rural; urbanized areas are defined in accordance with the US Census Bureau’s definition (at least 2500 inhabitants), and highly rural areas are defined as nonurban areas of counties with population density of less than 7 people per square mile. Race was dichotomized due to the study’s focus on American Indian/Alaska Native veterans and how race interacts with rurality. Non-American Indian/Alaska Native categories included Asian, Black, Hispanic and non-Hispanic White, and Native Hawaiian/Other Pacific Islander.

### Key Points

**Question** Are there differences in use of video telehealth (VTH) for mental health care between American Indian/Alaska Native and non-American Indian/Alaska Native veterans by rurality and urbanicity?

**Findings** In this cohort study including 1,754,311 veterans, VTH use increased among all veteran groups during the study period, but a significant difference in VTH use was seen between rural and urban populations, especially among American Indian/Alaska Native veterans.

**Meaning** The findings highlight the importance of addressing geographic, socioeconomic, and infrastructural barriers to health care and the need for improved communication and collaboration between health care practitioners and organizations and the communities they serve.

### Demographic Data

- **Rurality**: Urban, rural, or highly rural.
- **Race**: Asian, Black, Hispanic, and non-Hispanic White, and Native Hawaiian/Other Pacific Islander.

### Data Sources

- **Corporate Data Warehouse** (VHA’s national administrative database).
- **Mental Health Clinic Stop Codes** (500 series).
- **Geocoded Patient Location**.

### Study Period

- **October 1, 2019, to December 31, 2020**.
2019, to February 29, 2020, was defined as the prepandemic period and April 1 to December 31, 2020, was defined as the early pandemic period.

**Statistical Analysis**

Mixed models were used to examine rurality (reference group was rural), American Indian/Alaska Native status (reference group was American Indian/Alaska Native), and the interaction between rurality and American Indian/Alaska Native status as factors associated with the percentage of MH care encounters that were VTH. For both the prepandemic and the early pandemic periods, 2 mixed models were conducted. The first examined associations between each factor (rurality and American Indian/Alaska Native status) and the percentage of MH encounters that were VTH; the second evaluated the associations between each factor (rurality and American Indian/Alaska Native status) and their 2-way interaction and the percentage of MH encounters that were VTH. Each model included age, self-reported gender, and time as covariates. For each month, the percentage of encounters of each modality was calculated at the individual level only among those who had at least 1 MH encounter that month.

The consequences of the COVID-19 pandemic were directly examined for both American Indian/Alaska Native and non-American Indian/Alaska Native veterans by examining the actual difference between rural and urban veterans in change from the prepandemic period to the early pandemic period, using the differences-in-differences approach. Prepandemic was coded 0, and early pandemic was coded 1. For both American Indian/Alaska Native and non-American Indian/Alaska Native veterans, PROC MIXED in SAS, version 9.4 (SAS Institute Inc) was used with time (prepandemic or early pandemic), rurality, and the time × rurality interaction as factors associated with the percentage of MH encounters that were VTH. The intercept was included as a random effect. A significant time × rurality interaction indicated a significant difference between rural and urban veterans in change in the percentage of MH encounters that were VTH. Of primary interest was the point estimate of the difference in differences, which indicated the difference between rural and urban veterans in change in the percentage of MH encounters that were VTH from the prepandemic period to the early pandemic period. Significance was set at 2-sided $P < .05$.

**Results**

The final cohort included 1754 311 veterans. The mean (SD) age of participants was 54.89 (16.23) years, and most were male (1 494 800 [85.21%] male; 259 511 [14.79%] female); 1.25% were American Indian/Alaska Native, and 98.75% were non-American Indian/Alaska Native, including Asian (1.41%), Black (24.96%), Hispanic and non-Hispanic White (71.17%), and Native Hawaiian/other Pacific Islander (1.20%). Given that only 15 574 of these veterans (0.89%) were designated as highly rural, this group was combined with rural veterans, resulting in 8425 (0.48%) rural American Indian/Alaska Native, 509 447 (29.04%) rural non-American Indian/Alaska Native, 13 452 (0.77%) urban American Indian/Alaska Native, and 1 222 987 (69.71%) urban non-American Indian/Alaska Native veterans. Each veteran had 1 set of data for each month of the study: 5 prepandemic months and 9 early pandemic months.

Before the pandemic, a lower percentage of MH encounters were VTH for urban veterans compared with rural veterans ($b = −0.91; SE, 0.02; 95% CI, −0.95 to −0.87; $P < .001$) and for non-American Indian/Alaska Native veterans compared with American Indian/Alaska Native veterans ($b = −0.29; SE, 0.09; 95% CI, −0.47 to −0.11; $P < .001$). In the early pandemic, the direction of these associations reversed such that a greater percentage of MH encounters were VTH for urban veterans compared with rural veterans ($b = 1.37; SE, 0.05; 95% CI, 1.27-1.47; $P < .001$) and for non-American Indian/Alaska Native veterans compared with American Indian/Alaska Native veterans ($b = 0.55; SE, 0.19; 95% CI, 0.18-0.92; $P < .001$). The Table shows the percentage of each type of MH encounter by modality (VTH, telephone, or face-to-face). The Figure shows the percentage of MH encounters conducted via VTH over time by rurality and American Indian/Alaska Native status.

There was a significant interaction between rurality and American Indian/Alaska Native status during the early pandemic ($b = −1.49; SE, 0.39; 95% CI, −2.25 to −0.73; $P < .001$) such that urban veterans used VTH more than rural veterans, especially American Indian/Alaska Native veterans (non-American Indian/Alaska Native: rurality $b = 1.35$ [SE, 0.05; 95% CI, 1.25-1.45; $P < .001$]; American Indian/Alaska Native: rurality $b = 2.91$ [SE, 0.38; 95% CI, 2.17-3.65; $P < .001$]).

When controlling for age and self-reported gender, a greater percentage of MH encounters were VTH in the early pandemic period compared with the prepandemic period. These differences varied by rurality and American Indian/Alaska Native status. Among American Indian/Alaska Native veterans, urban veterans had a mean (SE) increase in VTH use of 20.34 (0.38) percentage points (from 3.68% [0.33%] prepandemic to 24.02% [0.33%] during the early pandemic), whereas rural veterans had a mean (SE) increase of only 15.35 (0.49) percentage points (from 5.06% [0.38%] prepandemic to 20.41% [0.38%] during the early pandemic). The difference in differences between urban and rural American Indian/Alaska Native veterans was 4.99 percentage points (SE, 0.62; 95% CI, 3.77-6.21; $t_9 = −7.999; df = 11 000; P < .001$).

Among non-American Indian/Alaska Native veterans, urban veterans had a mean (SE) increase of 12.97 (0.24) percentage points (from 2.86% [0.24%] prepandemic to 15.83% [0.24%] during the early pandemic), whereas rural veterans had a mean (SE) increase of only 11.31 (0.44) percentage points (from 4.47% [0.38%] prepandemic to 15.78% [0.38%] during the early pandemic). The difference in differences between urban and rural non-American Indian/Alaska Native veterans was 1.66 percentage points (SE, 0.50; 95% CI, 0.68-2.64; $t_9 = −3.32; df = 15 000; P < .001$), which is one-third the magnitude of the difference in differences for American Indian/Alaska Native veterans. In other words, although urban veterans had a greater increase in the percentage of MH visits that were VTH than did rural veterans, the rural-urban discrepancy was larger for American Indian/Alaska Native than for non-American Indian/Alaska Native veterans.
## Table. Mental Health Encounters of Each Modality Over Time Among Veterans With Mental Health Encounters, by Rurality and American Indian/Alaska Native Status

<table>
<thead>
<tr>
<th>Modalities</th>
<th>2019 No. (%)</th>
<th>2020 No. (%)</th>
<th>Urban American Indian/Alaska Native veterans (n = 16 452)</th>
<th>Rural American Indian/Alaska Native veterans (n = 13 452)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Veterans with encounters, No. (%)</td>
<td>Veterans with encounters, No. (%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Rural American Indian/Alaska Native veterans (n = 13 452)</td>
<td>Urban American Indian/Alaska Native veterans (n = 16 452)</td>
</tr>
<tr>
<td>VTH</td>
<td></td>
<td></td>
<td>3.4 (17.2)</td>
<td>3.0 (16.2)</td>
</tr>
<tr>
<td>Telephone</td>
<td>9.5 (26.4)</td>
<td>8.7 (25.6)</td>
<td>10.1 (26.6)</td>
<td>9.0 (26.2)</td>
</tr>
<tr>
<td>Face to face</td>
<td>87.1 (30.8)</td>
<td>88.2 (29.6)</td>
<td>87.4 (30.9)</td>
<td>87.9 (30.2)</td>
</tr>
</tbody>
</table>

### Discussion

We investigated the association of a period of necessitated rapid virtualization of MH care with VTH utilization for MH care among American Indian/Alaska Native and non-American Indian/Alaska Native populations by rurality and urbanity. Although use of VTH for MH care increased in all groups regardless of urban or rural status, American Indian/Alaska Native veteran populations had lower likelihood of VTH encounters than their non-American Indian/Alaska Native counterparts. Additionally, our results indicate that American Indian/Alaska Native veterans living in rural areas had fewer MH VTH encounters than their urban counterparts. This finding highlights the importance of understanding and addressing the diverse needs of the 574 federally recognized tribes throughout the US. Each group has its own unique history and cultural practices, with heterogeneous group members reflecting different geography, sociodemographic status, and identity. Thus, it is imperative to understand and approach issues and barriers as multidimensional and multifactorial. Further research should investigate the nuances of the relationship between cultural factors and VTH uptake and use, with specific focus on the difference in health care-seeking behaviors.

Abbreviation: VTH, video telehealth.
between urban and rural populations as well as historical factors affecting VTH utilization for these groups, particularly the potential influence of health care practitioners from outside a community on MH care-seeking behaviors.

Structural factors may also be associated with decreased uptake of VTH. Our results demonstrated a large difference in VTH use between rural and urban populations, especially among American Indian/Alaska Native veterans. For rural populations, geographic obstacles coupled with poor economic conditions can create infrastructural barriers that hinder access to regular broadband internet and telephone service and, thus, the adoption of VTH services. Additionally, inequities are further exacerbated by reduced or absent broadband service and higher prices. Federal and local agencies should reduce this digital divide for already marginalized populations through policies and programs promoting increased broadband coverage. Additionally, national emergencies, such as the COVID-19 pandemic, can create an additional burden on the health care system and individuals. Hospitals and clinics were forced to rapidly pivot to virtual care for many types of encounters, exacerbating prior disparities in care provision and access, since communities varied in terms of readiness and resources to respond and meet demand. Patients’ incentives to seek care also may have been affected by the pandemic; communities faced additional health stressors during this period, potentially causing individuals to prioritize other needs over MH care.

In addition, research has demonstrated that health care practitioners are often gatekeepers for dissemination of health care innovations, including VTH, and this may introduce bias or additional barriers to patient uptake. Our results demonstrated that although VTH use increased in all groups during the study period, use for some groups, specifically the American Indian/Alaska Native rural population, increased significantly less. Although specific reasons for this disparity (eg, trust in the health care practitioner or health care organization, geographic factors, or personal preferences for care modality) were not investigated in this study due to the nature of the available data, the results underscore the importance of overarching collaborative, bidirectional conversations between health care practitioners and organizations and the communities they serve, with the goal of increasing overall care uptake and quality. Health care practitioner training and systems improvement should be implemented to maximize patient experience, with attention to cultural factors for all parties, following an organizational assessment of readiness to change. For example, health care practitioners should be trained in ways to strengthen therapeutic alliance with patients, such as the cultural safety framework. Health care organizations should refine best practices for the dissemination of available resources and addressing technical and logistic barriers to care.

Limitations
This study has some limitations. Most importantly, COVID-19 restrictions (eg, lockdown procedures, mask and gathering mandates, and clinic access) around the US varied, prohibiting a closer look into geographic variations of VTH use. Second, not all who identify as rural American Indian/Alaska Native veterans live on reservations; thus, generalization based on region was necessary due to the data available, impacting the precision of results. Additionally, data regarding whether patients were offered VTH and subsequently chose not to engage or chose to engage in another type of care were not available. Finally, there are noted inaccuracies with race and ethnicity classification measures in VHA medical records, especially for American Indian/Alaska Native veterans with variable group affiliations and personal identities.

Conclusions
In this cohort study, VTH use increased among all veteran groups during the early COVID-19 pandemic period vs the pre-pandemic period, but a significant difference in VTH use was seen between rural and urban populations, especially among...
Disparities in Telehealth Use for Mental Health Care Among American Indian/Alaska Native Veterans

American Indian/Alaska Native veterans. Understanding factors affecting uptake of VTH for MH care when virtualization is necessitated by emergency situations (eg, a natural disaster, disease outbreak, or security threat) is important to ensure progress toward more equitable care. Future studies should examine potential differences in VTH use for this population based on gender or regional differences and ways the COVID-19 pandemic may have affected utilization. Additional studies should be conducted to understand the importance of inequitable access to broadband internet, along with other social factors affecting health, such as geography, rurality, and socio-economic status, for this population.

ARTICLE INFORMATION

Accepted for Publication: May 15, 2023.
Published Online: July 26, 2023.

Author Affiliations: Department of Clinical, Health, and Applied Sciences, University of Houston–Clear Lake, Houston, Texas (Kusters); Center for Medical Ethics and Health Policy, Baylor College of Medicine, Houston, Texas (Kusters); Baylor College of Medicine, Houston, Texas (Amspoker, S. C. Day, Ecker, Hogan, Lindsay); Center for Innovations in Quality, Effectiveness and Safety, Michael E. DeBakey VA Medicine Center, Houston, Texas (Amspoker, Froso, S. C. Day, G. Day, Ecker, Hogan, Lindsay); South Central Mental Illness Research, Education and Clinical Center, US Department of Veterans Affairs (Frosio, S. C. Day, G. Day, Ecker, Hogan, Lindsay); Baker Institute for Public Policy, Rice University, Houston, Texas (Lindsay); Veterans Health Administration Office of Rural Health, Salt Lake City, Utah (Shore); Centers for American Indian and Alaska Native veterans in the Veterans Health Administration: characteristics and service utilization patterns. American Indian and Alaska Native veteran. Accessed March 10, 2023. https://minorityhealth.hhs.gov/omh/browse.aspx?lvl=3&lvlid=62

Author Contributions: Drs Amspoker and Lindsay had full access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

Concept and design: Kusters, Amspoker, Hogan, Lindsay, Shore.

Acquisition, analysis, or interpretation of data: Amspoker, Froso, S. C. Day, G. Day, Ecker, Hogan, Lindsay, Shore.

Drafting of the manuscript: Amspoker, Froso, S. C. Day, G. Day, Ecker, Hogan, Lindsay, Shore.

Critical revision of the manuscript for important intellectual content: Kusters, Froso, S. C. Day, Ecker, Hogan, Lindsay, Shore.

Statistical analysis: Amspoker, Hogan.

Obtained funding: Ecker, Hogan, Lindsay, Shore.

Administrative, technical, or material support: S. Day, G. Day, Hogan, Shore.

Supervision: Ecker, Hogan, Lindsay, Shore.

Conflict of Interest Disclosures: Dr Ecker reported receiving grants from the Veterans Affairs (VA) Office of Rural Health during the conduct of the study. No other disclosures were reported.

Funding/Sponsorship: This work was supported by grants from the Veterans Health Administration (VHA) Office of Rural Health, the Veterans Rural Health Resource Center–Salt Lake City, grant CIN13-413 from the Houston VA Health Services Research and Development Center for Innovations in Quality, Effectiveness and Safety, and by the VA South Central Mental Illness Research, Education and Clinical Center.

Role of the Funder/Sponsor: The funders had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

Disclaimer: The opinions expressed are those of the authors and do not necessarily reflect those of the VA, the US government, University of Houston–Clear Lake, University of Colorado, or Baylor College of Medicine.

Data Sharing Statement: See the Supplement.

REFERENCES


© 2023 American Medical Association. All rights reserved.