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A Statewide Telemedicine Referral System for Regional Monoclonal Antibody Infusion Centers

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Abstract

Background: Regional infusion centers (RICs) played an integral role in treating high-risk patients with COVID-19, with mild to moderate symptoms, who did not need acute hospitalization, with monoclonal antibodies. While any medical provider could place a RIC referral, it was recognized that many people face challenges with accessing care. A dedicated medical team was created to provide telemedical evaluation of patients and place appropriate referrals to RICs. The objective of this work was to assess patient populations who utilized a telemedicine referral system for COVID-19 antibody infusions.

Methods: Providers used Pulsara, a Health Insurance Portability and Accountability Act-compliant video chat platform, to remotely screen patients and refer them to regional monoclonal antibody infusion centers if they met criteria. Basic demographic data were collected anonymously on all patients referred to the RICs, and medically underserved populations were determined using the uniform data system mapper.

Results: A total of 6,031 patients were referred to RICs through Pulsara. Of these, 1,723 (29%) lived in medically underserved areas and 1,042 (17%) lived in mixed zones. In the second half of the program, 36 providers virtually screened 3,531 patients with 1,890 patients (53.5%) receiving an infusion.

Conclusions: The successful implementation of a telehealth referral system facilitated the decentralization of monoclonal antibody infusion therapy from emergency departments to RICs. This system reached a significant number of people living within medically underserved areas.

Keywords: telemedicine, telehealth, public health, infectious disease, COVID-19, medically underserved, monoclonal antibody

Introduction

In August 2021, in response to a surge in COVID-19 cases associated with the Delta variant, Texas Governor Greg Abbott announced that the Texas Department of State Health Services (DSHS) and the Texas Division of Emergency Management (TDEM) were launching COVID-19 monoclonal antibody regional infusion centers (RICs) throughout the state. This initiative aimed to provide access to timely care and effective treatment of patients with COVID-19 in an outpatient setting. RICs played an integral role in treating high-risk patients with COVID-19, with mild to moderate symptoms, who did not need acute hospitalization, with monoclonal antibodies.¹ Infusion centers are outpatient facilities that are equipped with advanced equipment and specialized staff for administering infusion therapies, which was traditionally only performed in hospitals.

The first infusion center located in Texas opened in Lubbock, TX, during the COVID-19 Delta wave of 2021. That center was expanded and folded into the TDEM/DSHS RIC program along with San Antonio, El Paso, and other urban populations. The RICs remained open through the significant waves of COVID-19 during 2021 and 2022. The RICs helped

increase bed capacity in an already overwhelmed health care system so that resources remained available for the most ill patients. While any medical provider could place a RIC referral, it was recognized that many people face challenges with accessing care. Many patients live in rural areas or, due to socioeconomic factors, have limited access to medical providers. A dedicated medical team was created to provide telemedical evaluation of patients and place appropriate referrals to RICs. This telemedicine initiative aimed to reach high-risk COVID-19-positive patients with mild to moderate symptoms and limited or no access to medical care. This included patients living in remote areas where primary care was limited or unavailable and socioeconomically disadvantaged persons. The telemedicine referral program operated every day for the second and third pandemic waves from September 4, 2021, to October 31, 2021, and December 20, 2021, to February 11, 2022.

The objective of this study is to assess if the patients utilizing the telemedicine referral program and RICs were the intended population of persons with limited access to medical care.

Methods

The study received an institutional review board’s exempt status. Basic demographic data were collected anonymously on all patients utilizing the telemedicine program and RICs. Utilizing uniform data system mapper and aggregate 5-digit zip code data, patients were identified as being in a medically underserved area/population (MUA/P).² If the 5-digit zip code crossed MUA/P and non-MUA/P (a mixed region), then they were designated as “unknown.” In the second half of the program, further data were collected on provider referral counts, including information on the number of patients screened, referred, and ultimately infused by each provider. Data were collected and analyzed utilizing Excel with descriptive statistics. The datasets generated during and analyzed during the current study are available from the corresponding author upon reasonable request.

Results

A total of 6,031 patients were referred to RICs using telemedicine screening and referrals. Of these, 1,723 (29%) lived in MUA/P zones and 1,042 (17%) lived in mixed zones (Fig. 1). Using provider referral counts from the second half of the program, 36 providers virtually screened 3,531 patients with 1,890 patients (53.5%) receiving the infusion. Though it was not required for the process, 97% of patients had a smartphone. Of those screened, 2,753 (45%) patients were unvaccinated (Table 1).

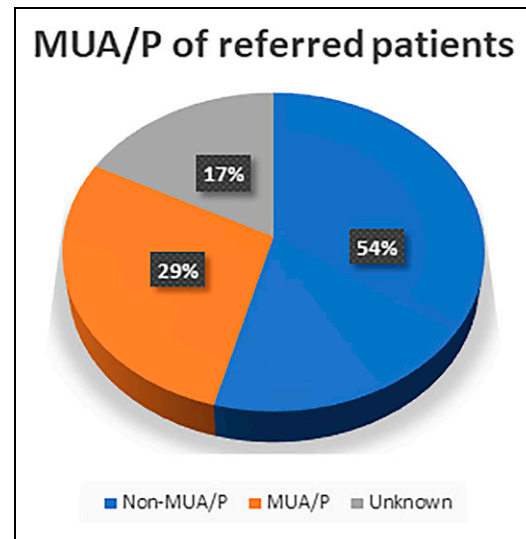


Fig. 1. Proportion of referred patients in medically underserved areas or populations.

Discussion

Monoclonal antibody therapy infusions, particularly with bamlanivimab, were shown to significantly reduce symptoms and hospitalization risk in Delta variant COVID-19-positive patients.³⁻⁵ In 2021, patients were treated with monoclonal antibodies either through outpatient infusion centers after a referral from a physician or within the emergency department (ED). Although many Americans have access to a consistent source of medical care, many barriers exist to timely access to health care, including long wait times, appointment delays, transportation issues, and limited outpatient hours.⁶ As a result, many patients rely on EDs for nonemergent conditions, resulting in an overcrowding of EDs, less effective preventative care and chronic disease management, and increased costs.⁷

This was especially apparent during the COVID-19 pandemic when the length of stay for ED patients was significantly prolonged compared to prepandemic times (13 h vs

Table 1. Patient Demographics for All Patients Referred to Regional Infusion Centers

	SMARTPHONE	VACCINATION STATUS	MUA/P
No	161	2,753	3,266
Yes	5,870	2,794	1,723
Unknown		484	1,042
Total	6,031	6,031	6,031

MUA/P, medically underserved areas or populations.

9.8 h, $p < 0.001$).⁸ This presented a significant barrier to patients receiving monoclonal antibody infusions for COVID-19, as patients could only receive an infusion with a physician referral. It became necessary to implement a system that could circumvent the need for EDs or in-person referrals for outpatient monoclonal antibody infusion centers.

Since March 2020, the use of telemedicine has exploded to enable quarantined physicians and patients to continue to practice medicine during the pandemic.⁹ The CARES Act and Centers for Medicare and Medicaid Services' 1135 Waivers lifted many of the restrictions on telemedicine, enabling any type of clinician to bill for Medicare services from anywhere and most platforms, including Zoom and FaceTime.¹⁰ As a result, a national study of 36 million working-age adults with private insurance found that telemedicine encounters increased 766% in the first 3 months of the pandemic, comprising 23.6% of all interactions from March to June 2020 compared with 0.3% of all interactions in March to June 2019.¹¹ Although isolation precautions have relaxed, telemedicine continues to play a role in medicine with some studies showing telemedicine claims at around 5% at the end of 2021.¹²

In this study, a telemedicine approach was utilized to reach patients who are historically lacking access to care. The telehealth platform Pulsara was utilized for patient interactions. Pulsara is a Health Insurance Portability and Accountability Act-compliant medical application that helps facilitate care coordination across interorganizational care teams. Patients (or their family/friends) utilized a widely distributed website to self-refer to the telemedicine program. Once registered, patients were given instruction about how to download the Pulsara application to their personal mobile device. The Pulsara application allowed a telemedicine visit to be performed with physicians or advanced practice providers, who utilized their personal mobile device. During the visit, health care providers completed a referral form with pertinent patient information containing inclusion and exclusion criteria. If patients met criteria, the referral form was signed and uploaded to a shared virtual system, allowing intake specialists to send a link to the patient's phone to schedule the appointment for a nearby RIC. Additionally, some mobile nurse/paramedic teams were available, for those with transportation or mobility issues, to infuse in patients' homes.

This study demonstrates the successful implementation of a telemedicine referral system, facilitating the decentralization of monoclonal antibody infusion therapy from EDs to RICs. A significant number of the patients screened lived within MUA/P regions. This system allowed for the treatment of a greater number of high-risk COVID-19-positive patients

and helped prevent hospital overload with mild to moderately ill patients. This achievement signifies the potential of telehealth technologies to improve access to care, especially in emergency situations where resources are stretched thin and vulnerable populations face significant barriers. The strategic partnership between state and local leadership, public health entities, and medical providers ensured the initiative's sustainability and adaptability, which is vital for improving public health outcomes.

Sustainability of the initiative is dependent on flexibility of the process to adapt to changing circumstances, such as fluctuations in patient volumes, provider and support staff availability, and availability of treatment options. Additionally, engagement and support from relevant strategic partners, such as public health, local political entities, and medical providers, can ensure that adequate resources such as funding, staff, technology, and medications are available.

LIMITATIONS

The primary limitation of this study is the utilization of aggregate anonymous data. This limited how socioeconomic status and access to care are identified. A proxy of geographic location is utilized via 5-digit zip codes. Without a 9-digit zip code or other validated identifier, it is difficult to get a granular evaluation of a person's socioeconomic status or ability to access medical care. This resulted in 17% of the study participants being listed as "unknown." Additionally, it is possible that persons listed within MUA/P may not actually have limited access to medical care; the opposite is also true. Another unique limitation of this study is the patient follow through. Of those patients screened, only 53% received infusions via a RIC. It is unknown if patients within MUA/P zones or non-MUA/P zones made up the 53%. Unfortunately, there is limited information on how patients became aware of the telemedicine initiative. Further analysis of how to best identify potential patients for referral would likely benefit the system.

Conclusions

This study shows a clear value in telemedicine initiatives. Few studies have shown a benefit of telemedicine to individuals with a baseline of limited access to medical care. In this study a significant portion of the telemedicine referrals were identified as within MUA/P regions. This referral program was initiated during one of the most severe resource constrained environments in recent history. Similar systems could be built to scale in other communities across the United States.

Authors' Contributions

R.R.F.: conceptualization, data curation, investigation, methodology, project administration, supervision, validation, writing original draft, A.T.: Data curation, formal analysis, visualization, writing original draft, T.E.: conceptualization, investigation, methodology, writing reviewing and editing, T.R.: conceptualization, investigation, methodology, project administration, resources, writing reviewing and editing, J.S.: Data curation, formal analysis, investigation, resources, validation, writing reviewing and editing, R.R.: conceptualization, methodology, writing reviewing and editing.

Disclosure Statement

No competing financial interests exist.

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