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Advanced Practice Provider-led COVID-19 Telemedicine and Vaccination at UC San Diego Health's Owen Clinic

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The Owen Clinic is UC San Diego Health's (UCSDH) medical home for patients with HIV. In March 2020, the clinic adapted its health delivery systems to the emerging COVID-19 pandemic by ensuring continuity of HIV primary care through virtual medicine platforms. Advanced Practice Providers (APPs) include physician assistants and nurse practitioners. Owen Clinic APPs Ryan Anson, Will Toperoff, and Aaron Willcott, along with several physicians, developed an Owen COVID-19 Telemedicine Clinic to provide dedicated telemedicine to Owen Clinic patients with or at risk for SARS-CoV-2 infection. Rapid diagnostic testing, telephone evaluation, home pulse oximetry, monoclonal antibody treatment, and intensive follow-up for patients through video assessments contributed to overall successful health outcomes for our 272 patients diagnosed with this life-threatening virus. Despite the highly vulnerable patient population, only 25 (9%) patients were hospitalized, and 3 died (1%). Owen Clinic was also the first ambulatory clinic within UCSDH to implement on-site COVID-19 vaccines. As a result of these efforts, over 84% of patients at Owen Clinic have been vaccinated to date.

About Owen Clinic

Owen Clinic is the largest and most comprehensive HIV medicine clinic in San Diego, serving over 3,100 patients. In addition to HIV primary care, Owen Clinic provides social work services, HIV prevention resources, substance use disorder treatment, hepatitis C treatment, and gender health care. Owen's clinicians include 14 physicians, most of whom are board-certified infectious disease specialists, 1 physician assistant, 5 nurse practitioners, 2 psychiatrists, 3 clinical pharmacists, and 2 licensed clinical social workers. A full-time behavioral/substance abuse counselor, 3 registered nurses (RNs), and 6 licensed vocational nurses (LVNs) also work at the clinic. Our clinicians collaborate closely to deliver full-spectrum HIV specialty care, internal medicine, multi-modal interventions for substance use disorders, hepatitis C treatment, and pre-exposure prophylaxis (PrEP) for patients at high risk for HIV acquisition. Owen Clinic is a unique, interdisciplinary team that supports a diverse and vulnerable safety-net population.

COVID-19 and Adoption of Telemedicine

When SARS-CoV-2 first spread across China, Europe, and then the United States, its impact on people with HIV (PWH) was not fully known. Experts initially observed that COVID-19 did not lead to higher rates of hospitalization, need for mechanical ventilation, or death in PWH compared to people without HIV¹⁻². Subsequent research led to equivocal conclusions, with some studies suggesting worse outcomes for PWH depending on their immune status or comorbid medical

conditions³⁻⁷. It is clear, however, that the unparalleled disruption of comprehensive services beginning in March 2020 presented unique challenges to a population already often struggling with homelessness, mental illness, food insecurity, and substance use⁸. In an anonymous survey of 781 PWH in San Diego, 37% of respondents reported chronic mental illness, 41% reported active substance use, and 25% reported being unstably housed or homeless⁹.

Prior to the start of the pandemic, Owen Clinic had not been routinely using telemedicine. Telemedicine functioned as an effective clinical intervention that addressed many of these gaps in care and psychosocial concerns¹⁰. Telemedicine, the use of information and communications technology to deliver digital healthcare services, was quickly embraced by clinics, hospitals, and insurance payers as COVID-19 began aggressively circulating around the world^{11,12,13}.

As cases in San Diego rose in the summer of 2020, several Advanced Practice Providers (APPs) at Owen Clinic took the lead in utilizing this nascent technology to deliver both COVID-19 care and HIV primary care. Billable virtual encounters allowed clinicians to evaluate and treat their patients remotely. Providers called patients or logged into MyChart video sessions through Epic (the electronic health record utilized at UCSDH) on a daily basis to assess individuals with worsening cough, fatigue, shortness of breath or who were otherwise suspected of having COVID-19 complications. APPs partnered with Owen triage nurses to implement PCR testing for patients who reported symptoms



Ryan Anson, NP-c is a board-certified nurse practitioner who provides primary care and sexual health services at the Owen Clinic for PWH or who are at risk for HIV infection. He earned his master's degree in adult-gerontology advance practice nursing in 2015, with minors in HIV/AIDS and psychiatric care at UC San Francisco. Anson is certified by the American Association of Nurse Practitioners (AANP) and the American Academy of HIV Medicine (AAHIVS). Prior to becoming a NP, he traveled the world as a freelance photojournalist for eleven years, covering political, cultural and social issues in North America, Southeast Asia and sub-Saharan Africa for TIME, The New York Times, The Washington Post, Bloomberg News, the Pulitzer Center, and Agence-France Presse.



Tyler Lonergan, MD is a graduate UCSD's internal medicine residency program and member of the Owen Clinic faculty since 1997.

consistent with COVID-19. Virtual visits, combined with the test-based approach from nursing triage, likely reduced the risk of viral transmission within the healthcare setting and the broader community because it prevented patients from needing to enter the clinic for care ^{13,14}.

Owen Clinic's digital healthcare modality evolved as a highly effective clinical management tool during subsequent COVID-19 case surges in late 2020 and through 2021. Nurse Practitioner Ryan Anson expanded the effort to deliver COVID-19 telehealth to hundreds more patients as new diagnoses quickly grew over the 2020 winter holiday season. Outreach involved daily phone check-ins by LVNs and MyChart video visits with providers. The most acute patients received weekend telephone check-ins by on-call physician and at least two or three detailed, virtual appointments within the first one to seven days of symptom-onset. With the introduction of home-based pulse oximetry by August 2020 using CARES Act funds, Owen Clinic APPs obtained objective data through which to assess adequate oxygen saturation. Access to this data greatly enhanced clinical decision-making during telemedicine visits, particularly when triaging to an emergency level of care ¹⁵.

For patients diagnosed with COVID-19 in the outpatient setting, intravenous monoclonal antibody (mAb) therapy had become the standard of care by November 2020. APPs initially referred patients to UCSDH's Infectious Diseases Clinic which ordered mAbs for patients not requiring hospitalization or supplemental oxygen. However, during the summer 2021 COVID-19 surge, Infectious Diseases physicians trained Nurse Practitioners Ryan Anson and Will Toperoff on protocols to order and coordinate mAb infusion for Owen Clinic patients. Both APPs are now the only providers at Owen Clinic routinely ordering this highly effective treatment for their patient population. The dual-agent monoclonal antibodies such as casirivimab/imdevimab have been found in clinical trials to greatly reduce the risk of COVID-related hospitalization and death ¹⁶.

COVID-19 prevalence as well as COVID-19-related morbidity

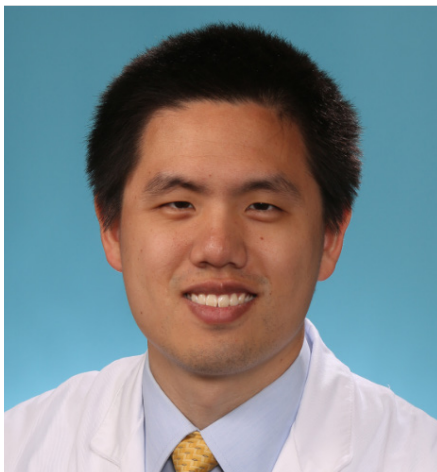


Laura Bamford, MD, MSCE is an Associate Professor of Medicine in the Division of Infectious Diseases and Global Public Health at UCSD. She is the Medical Director of the UCSDH Owen Clinic and the Co-Director of the Clinical Investigation Core for the San Diego Center for AIDS Research. Her clinical and research interests include HIV and HCV treatment and prevention in individuals with a history substance use and injection drug use. She is passionate about the delivery of patient-centered care with a harm reduction approach. Her interests outside of work include spending time with her family learning to surf, biking, hiking, skiing, and traveling.

and mortality at Owen Clinic have remained low. Between March 1, 2020 and November 30, 2021, 272 out of 3,177 patients (9%) had a positive COVID-19 PCR test. More than 2,291 (72%) unique patients have been screened during that same timeframe. From March 2020 through February 2021, 25 Owen patients were admitted (9% of all positive cases), and 3 (1% of all positive cases) died. While rates of hospitalization and death were not higher among PWH, this patient population was more than three times as likely to test positive for COVID-19 than individuals without diagnosed HIV at UCSDH and may be at an ongoing, higher risk for coronavirus infection ¹⁷. Although Owen sample of COVID-19-infected patients was small and no comparison group was studied, dedicated telemedicine, along with home pulse oximetry monitoring and direct access to monoclonal antibody therapies may have prevented higher morbidity and mortality among the clinic's patients.



Aaron Willcott, PA-C has been a Physician Assistant for 12 years, spending the past 10 as a primary care provider at Owen Clinic. He has clinical experience in global public health initiatives across the United States, Haiti, Kenya and delivers binational support for people living with HIV in Mexico through Agencia Familiar Binacional (AFABI). He is the Population Health lead for Owen Clinic and participates in the PRIME and Wellness Primary Prevention Quality Committees helping to prevent disease for thousands of patients at UCSD. Mr. Willcott sits on the board of directors for Being Alive, the Interdisciplinary Practice Committee, the UCSD PrEP Taskforce and guest lectures for the UCSD School Of Medicine and PAs For Global Public Health.



Michael Tang MD came to UC San Diego for his Infectious Diseases Fellowship training in 2018. Since 2019, he has been working at the Owen Clinic for his HIV continuity clinic. Outside of his clinical work, he is interested in HIV epidemiology, methods for estimating incidence and the impact of HIV status on COVID-19 outcomes.

In addition to COVID-19 care, virtual medical services enhanced appointment access for this marginalized population and cut down on missed appointments, a trend noted across literature on telemedicine in HIV clinics¹⁸. Before the emergence of virtual healthcare at Owen, the no-show rate averaged 20% in any month, and was 30% immediately prior to the pandemic's onset. Before March 15, 2020, no phone or video appointments had ever been scheduled. From March 16 through May 20, 2020, more than 85% of visits were conducted through a telemedicine platform. On July 10, 2020, just 11% of patients no-showed to either an in-person, phone, or video appointment. The appointment attendance pattern suggests telemedicine increased access to care during the first five months of the COVID-19 pandemic. The Owen Clinic team is making sustained efforts to close technological barriers for patients who struggle with device- or EHR-navigation.

The move to virtual care also did not substantially impact the proportion of PWH who maintained a suppressed viral load on their antiretroviral therapy (ART). In March 2020, 93% of patients were virally suppressed. Five months into the pandemic, viral suppression remained 93%. By November 2021, 94% of PWH at Owen still had viral loads below the level of detection. Other institutions experienced mixed results in terms of longitudinal viral suppression data during COVID-19. An urban safety-net clinic in San Francisco serving publicly insured patients found 31% higher odds of viral non-suppression, whereas a community health center in Boston saw no change in viral load levels following its transition to telemedicine.^{19,20}

COVID-19 Vaccination at Owen Clinic

In-clinic delivery of COVID-19 vaccinations was a second, important COVID-19 -related initiative. UCSDH first began administering COVID-19 vaccines in December 2020 to the San Diego community in a rapid, efficient, and organized fashion through the rollout of vaccination superstations such as the Petco Park site. This approach allowed for the fast dissemination of vaccines to thousands of high-risk

individuals. In the ensuing months, resources for outpatient clinics to connect patients with vaccinations grew. Nurses were able to easily schedule patients at superstation locations and a vaccination tent was erected directly across the street from Owen Clinic on UCSDH's Hillcrest campus.

Despite these efforts, preliminary vaccination rates at Owen Clinic remained low. By the end of June 2021, 45% of Owen Clinic patients had not received their COVID-19 vaccine. Many of these patients were also considered moderately or severely immunocompromised because of low CD4 counts or uncontrolled HIV, putting them at increased risk for worse COVID-19 outcomes. In addition, many patients who received a first dose earlier in the year at other county sites did not follow up at these locations for their second dose.

Owen APPs and the clinic leadership recognized having access to COVID-19 vaccines onsite was critical for this patient population. Owen Clinic operates as a medical home for its vulnerable patients. The clinic has worked hard over the years to decrease psychosocial and physical barriers to care. Many PWH have experienced, and continue to face, HIV-related stigma within the healthcare setting and some are hesitant to access care outside of Owen Clinic. Providers felt that they would be able to leverage the trust and relationships that they had built with patients over the years to provide a safe and supportive environment in which they could answer patients' questions and provide the vaccine.

On June 25, 2021, Aaron Willcott, PA-C, proposed a pilot program for clinic-based COVID-19 vaccine administration. With support from medical director Dr. Laura Bamford, physician leaders at UCSDH, the hospital pharmacy, and the Owen nursing team, staff began administering Pfizer vaccines on July 8, 2021. Owen Clinic's workflow has been expanded to offer any available COVID-19 vaccine for its patients. The results have been dramatic. Over 84% of patients have now completed a mRNA-based COVID-19 vaccination series, or the one-dose Janssen vaccine as of November 30, 2021. The most at-risk patients with severely compromised immune systems had a 15% increase



Will Toperoff, NP-BC is a board-certified family nurse practitioner (FNP-BC) who provides primary and specialized care for individuals living with HIV/AIDS. He earned his doctorate in nursing/community health from Rush University at Rush Medical Center in Chicago, Ill. He earned a bachelor's degree in nursing from Rush University and a bachelor's degree in psychology from the University of Illinois. He is certified by the American Nurses Credentialing Center and has worked in primary care since 1998 and in HIV specialty care since 2003.

Afsana Karim is a program analyst at UCSDH and member of Owen Clinic's Clinical Quality Improvement (CQI) committee. She has generated and analyzed reports for the Owen Clinic's retention in care and quality care measures efforts.

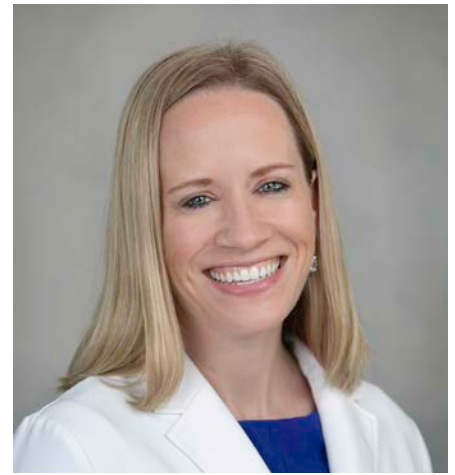
in vaccine uptake as a result of this initiative.

The rapid transmission of the highly infectious Delta variant in early June 2021 in San Diego County added greater urgency to vaccine roll-out efforts and intensified COVID-19 telemedicine. Since the beginning of widespread Delta transmission, 62 patients at Owen have been diagnosed with COVID-19.⁵³ (85%) of these mostly mild cases have been among vaccinated individuals. Only one patient was hospitalized in the summer of 2021, and none died. When compared with the 9% hospitalization rate seen from March 2020 to February 2021, the vaccination program has been beneficial and seems consistent with previous reports demonstrating strong immune responses to COVID-19 vaccines in PWH^{21,22,23,24}. Data on Delta-associated cases, total numbers of tests completed, and positive tests within the larger UCSDH patient population were not available at the time of this article's submission. As new variants appear on the horizon, continued development of vaccination programs to educate and provide vaccination access for vulnerable patients is needed. A vaccine booster effort at Owen Clinic is currently underway.

Conclusion

These two APP-led initiatives demonstrated how innovations in telemedicine, emerging monoclonal antibody therapies, and clinic-based administration of COVID-19 vaccinations within the medical home were effective in treating, monitoring, and preventing complications related to SARS-CoV-2 infection in a high-risk and psychosocially-vulnerable patient population. Routine telemedicine and vaccination services will continue at Owen as long as there is a demand among patients.

These efforts were successful because of the trust and relationships between patients and providers, and maintained the goal of keeping this population safe during a challenging public health crisis. APP advocacy, leadership and patient-centered care are strengths of UC San Diego Health that should be increasingly utilized in all aspects of primary care at Owen Clinic and across the health system.



Darcy Wooten, MD is a 6th generation Californian, a mother to a defiant toddler and a partner to a Bourbon Distiller. She is an Associate Professor of Medicine in Infectious Disease (ID) at UCSD, where she serves as the ID Fellowship Program Director. She is also the Director of Education at UCSDH's HIV Clinic and co-directs the doctoring course and problem-based learning course for 1st and 2nd year medical students in the School of Medicine. Her mom, a high school science teacher, is her primary source of inspiration for teaching and learning.

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Nursing Sensitive Indicators during COVID-19

analyzed based on new guidelines from the National Pressure Injury Advisory Panel (NPIAP), allowing the Wound, Ostomy, and Continence (WOC) nurses to differentiate hospital acquired pressure injuries on normal skin from those related to COVID-19 physiologic changes and not caused by pressure. UCSDH nurses remain dedicated to early identification of wounds and aggressive prevention measures, which are both necessary to decrease our HAPI rate and keep our patients safe.

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