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Bridging the Gap: Telemedicine and Pediatric Preparedness and Response

Dr. James Marcin (Vice Chair for Pediatric Clinical Research, Director, University of California [UC] Davis Center for Health and Technology, and Professor, Department of Pediatrics) shares how this academic health system uses telemedicine to overcome geographic and distance challenges associated with accessing children's hospitals. Citing examples from everyday readiness and disaster response, Dr. Marcin highlights patient experience, related federal initiatives, and future directions.

Overview

There are several reasons why telemedicine has grown in popularity over the past decade. First, nearly 10% (or 35 million) of U.S. residents live more than 30 minutes from the nearest hospital (e.g., Miller et al., 2020; Nguyen, 2025; and Shepherd, Cox, and Epp, 2025). While we have regionalized systems of care, telemedicine can increase healthcare delivery to those residents. Access to children's hospitals is even more limited, with 16 million children living an hour or more away from a hospital that provides general or advanced pediatric services (e.g., Krugman, 2020 and Chien et al., 2020). Every minute is important for a child with a critical illness or traumatic injury, yet more than half of children (57%) live more than 30 minutes from a pediatric trauma center. Having access to telehealth services can ensure that the sickest patients are treated upon arrival to any emergency department (ED), facilitating transfer to regional children's hospitals while other, less ill children receive near immediate virtual care, allowing them to stay as close to home as possible, saving time and resources.

James Paul Marcin, M.D., M.P.H., Vice Chair for Pediatric Clinical Research and Director, UC Davis Center for Health and Technology and Professor, Department of Pediatrics. Source: UC Davis Health Children's Hospital. Source: UC Davis

Telehealth in Disaster Preparedness and Response

Over the past ten years, telehealth has been implemented nationwide to support disaster response and public health emergencies during various incidents, including:

- 2017: Hurricane Maria – Puerto Rico / NY Presbyterian
- 2017: Hurricane Irma—Florida Keys, particularly to pediatric patients
- 2017: Hurricane Florence—North Carolina, used in shelters
- 2018: Camp Fire – Paradise, CA / UC Davis

- 2020: COVID-19 Pandemic
- 2023: Maui Fire – Mental Health – “Hawai’i UTelehealth”
- Current: LA Fires (WRAP-EM Mental Health)

Telehealth really took off in 2020, to support patients and overwhelmed EDs during the pandemic. It is now a standard model of care and is more being integrated into emergency management disaster preparedness and response across the U.S.

In an article on using telenursing care during disasters, the authors describe how telehealth can be used throughout the entire emergency management continuum—by hospital planners, by pre-hospital providers on the scene of an incident, during response in a shelter, and during recovery, to support survivors’ emotional wellbeing. When patients first report to healthcare facilities, this is where we can shine, using regionalized expertise to deliver virtual support to boost patient care.

Telehealth is particularly valuable if we ever meet the criteria for standard crisis of care when healthcare facilities that may not routinely be capable of caring for ill children can be supported locally if regional children’s hospitals are themselves experiencing a surge. Under these circumstances, telehealth can be used to improve triage, initiate care, and facilitate patient transfer while providers identify the appropriate receiving facilities.

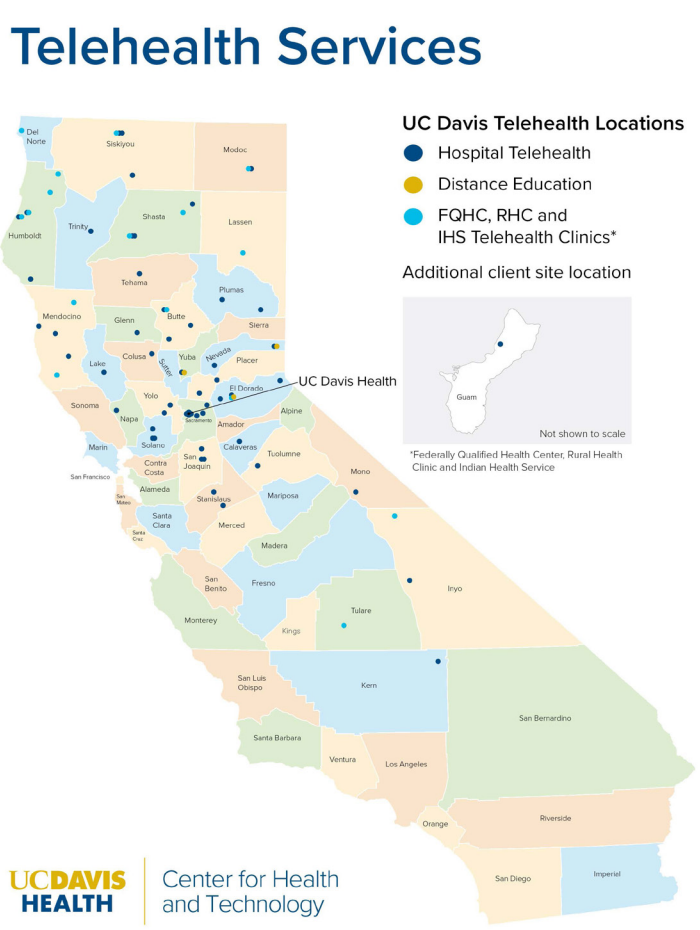

Figure 1. Map of UC Davis Telehealth Services

Related Resources

Impact of Tele-Emergency Consultations on Pediatric Interfacility Transfers: A Cluster-Randomized Crossover Trial

Pediatric Pandemic Network

Providing Telenursing Care for Victims: A Simulated Study for Introducing of Possibility Nursing Interventions in Disasters

Telehealth for Emergency Preparedness

UC Davis Center for Health and Technology

Western Regional Alliance Pediatric Emergency Management

Related ASPR TRACIE Resources

Lessons Learned from the Pediatric Tripledemic-Systems, Staff, Space, and Supplies (Roundtable)

Managing a Pediatric Tripledemic: Lessons Learned from 2022

Pediatric/Children Topic Collection

Telehealth in Disaster Preparedness and Response

Many hospitals in California (CA) have their own telehealth network, and in 2023, we led a mini drill with six hospitals across the state. We very quickly realized that our hospitals’ telehealth infrastructures were not compatible; we were unable to communicate in real time. In every instance, addressing these connectivity and other issues would have taken at least one day of IT support.

Since then, we have improved our connectivity and overall telehealth program at UC Davis. As illustrated in **Figure 1**, our services span CA (with a concentration in more rural areas in the northern half of the state). Our ambulatory telehealth program is comprised of e-Consultation, a scheduled and unscheduled video visit program, remote patient monitoring, and provider-to-provider consultations. We also provide these services to 18 federally qualified health clinics, Indian Health Service sites, and select corrections facilities across the state. Our inpatient telehealth program boosts service agreements with over 40

hospitals and provides EDs and inpatient wards with tele-pediatrics, tele-stroke, tele-trauma, tele-nephrology, and tele-ICU patient care.

Telehealth in Pediatric Disaster Preparedness and Response

Figure 2 illustrates the 32 sites from which UC Davis can provide telehealth consultations from pediatric hospitalists, pediatric critical care physicians, and neonatologists. While we offer these services throughout Northern CA, we do focus on our more rural areas. And though we do not use these services every day, it is reassuring to know that if we need these services (e.g., during a critical incident or public health emergency), they exist.

Research findings specific to our pediatric tele-emergency consultations reveal:

- Higher parent satisfaction
- Higher ED physician satisfaction (they feel they are receiving more support)
- Higher quality
- Lower rate of medication errors with telehealth versus standard telephone
- Improved communication while performing CPR on critically ill patients
- Improved triage – placement of patient
- Fewer (inappropriate) transfers
- Overall cost savings

With regards to transfers, I worked with a team to measure the Impact of Tele-Emergency Consultations on Pediatric Interfacility Transfers. We conducted a randomized trial of 629 children aged 14 years and younger presenting to 15 EDs and found that we significantly lowered the rate of inappropriate transfers to our tertiary quaternary center using telemedicine versus standard methods. If a patient can be safely, virtually cared for in their local community with the use of a video, we want to support that while continuously monitoring them for any change in status.

In another study evaluating the use of telemedicine for pediatric trauma patients, parents reported a positive experience with virtual pediatric trauma care provided to 11 hospitals in Northern California. In this study, we enrolled nearly 600 children in this trial and found that telehealth significantly improved the parent-family experience in addition to lowering transfer rates. Our qualitative findings shed more light on the positive parent experience using telehealth; they reported that it eased both parents' and patient's emotions and anxieties, strengthened parent-provider relationships, and helped prepare the parents for the transfer process.

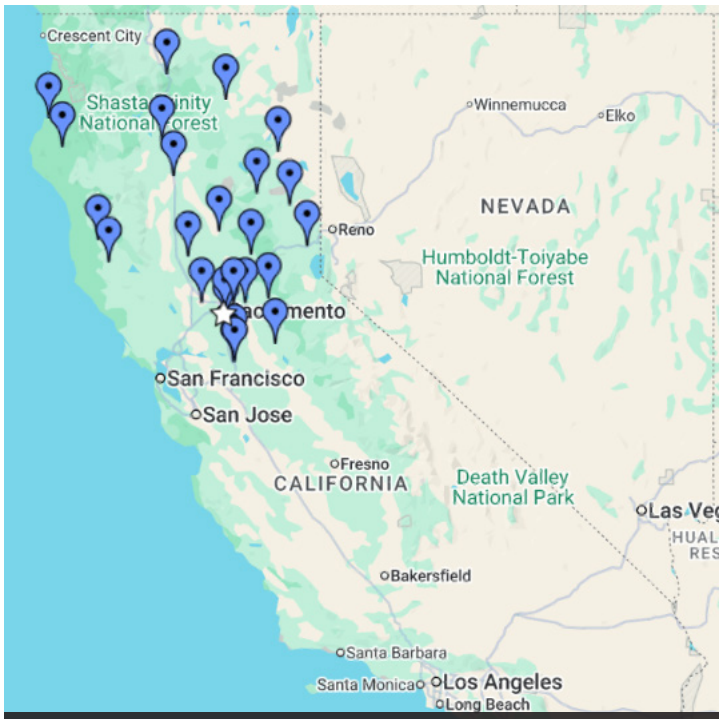

Figure 2. Map of UC Davis Pediatric Telehealth Consultation Sites

During the 2022-2023 "tripledemic," where a significant number of children across the country needed medical care as a result of a surge in three respiratory viruses, telehealth was used for inter-facility telehealth and consultations. This was particularly helpful when the children's hospitals were full and often unable to accept incoming transfers. At UC Davis Children's Hospital, we were able to use telemedicine to support the care of infants and children in other EDs until an inpatient bed became available (Vadlaputi, Jafri, Kohler, et al., 2025).

Identifying and Overcoming Challenges

While telehealth has significant potential to strengthen disaster preparedness and response, several barriers limit its effective integration into disaster systems. Challenges include inadequate and disruptions in the broadband and telecommunications infrastructure (particularly in rural communities). Regulatory and licensure restrictions across jurisdictions can also impede rapid deployment of providers using telehealth during emergencies, while inconsistent reimbursement policies and limited funding reduce long-term sustainability. Additional barriers include cybersecurity and patient privacy concerns, lack of interoperability between telehealth platforms and electronic health records, and insufficient provider planning and training in disaster-specific telehealth workflows. Vulnerable populations, including older adults, low-income communities, and individuals with limited digital literacy, may also face difficulty accessing telehealth services, exacerbating existing health disparities during emergencies. All of these barriers are addressable and should be considered when integrating telehealth resources in planning.

Much of the work I share in this article would not be possible if it weren't for my collaboration with the Western Regional Alliance Pediatric Emergency Management (WRAP-EM), one of the three U.S. Pediatric Disaster Centers of Excellence funded by ASPR, and my colleagues at the Pediatric Pandemic Network, a national coordinated center funded through the Health Resources and Services Administration to support pediatric emergency management and disaster response.

The 2018 Camp Fire in California burned over 150,000 acres, destroyed nearly 19,000 buildings, killed at least 85 people, displaced more than 50,000, and caused approximately $16.5 billion in damage. We used our existing pediatric tele-emergency network of 32 hospitals to connect to impacted hospitals, including the hospital in Paradise, CA. When this hospital burned down, we shifted to providing telehealth care to young patients in the shelters. We learned many lessons (e.g., survivors did not have time to pack their medication when they evacuated) and have since incorporated those into our disaster plans.