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# SEARCH PRESENTATIONS



## 1. Telemedicine Vs In-Person: A Cost Comparison

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**Background:** Healthcare institutions experienced an increase in telemedicine utilization brought on by the onset of the COVID-19 pandemic. As the effects of the pandemic receded and in-person physician visits returned, coupled with mounting financial pressures facing healthcare providers, organizations were challenged with determining the optimal operational mix between service offerings for patient care. Without a clear line-of-sight into the financial burden of supporting telemedicine capabilities, organizations struggle to develop and implement strategy to optimize care delivery. This analysis reviewed the costs associated with supporting both in-person and virtual care to develop a cost metric aimed at providing transparency into the high-level cost to support both in-person and virtual visits. By developing a clear cost review, leaders can have visibility into the costs associated with supporting telemedicine in order to pursue an optimization strategy within their organization.

**Methods:** The approach for this analysis focused on facilities, amenities, and staffing, for points of the patient journey. The neurology department was used for a pilot study (general neurology and epilepsy appointment types) of both in-person and telemedicine visits. Costs tied to administrative functions not requiring patient interaction, were excluded from this analysis (e.g. human resources, legal). To capture the touch points, the team followed a patient visit and measured the steps for each type of visit. For an in-person visit, the team began in the parking garage, navigated the facility check-in requirements and elevator banks, and included the various provider-facing components of the appointment. For a telemedicine visit, the team gathered the patient steps from patient log-in, provider interaction, to patient follow-up. For each step of both types of visits, costs were gathered for infrastructure (real estate, software, utilities, supplies) and staff (check-in personnel, support staff, medical providers) and applied to associated appointments to calculate a per-appointment support cost.

**Results:** This analysis found a significant difference in the financial burden to support telemedicine visits in comparison to traditional in-person ones. Based upon the analysis of the neurology visits, the team determined the cost to support telemedicine visits is 18 percent less than comparable in-person ones. The drivers of these savings are primarily related to infrastructure and support staff. The costs to provide, outfit, and staff brick-and-mortar facilities far surpass the costs to provide and staff a telemedicine visit. In addition to financial savings, the team also captured data to support the finding of significant time savings for patients in a virtual setting. Through analyzing the duration of each step in the patient journey for both in-person and telemedicine appointments, it was found that telemedicine visits could save 90 minutes of patient time. These savings came primarily from patient travel time to and from the appointment facility. The actual visit time itself was also shorter, potentially allowing for more patient throughput in a physician outpatient clinic session.

**Discussion:** Early impressions suggest that telemedicine will offer time savings for the patient and lower cost for the organization. This analysis provides organizations with a way to quantify the costs associated with both in-person and telemedicine visits. By quantifying and comparing the costs of telemedicine and in-person appointments across specialties within a healthcare organization, leaders can implement a strategy to optimize telemedicine. Optimization of virtual care can address multiple stress points within organizations. By shifting select visit types to virtual care, organizations can free up in-person capacity and increase access for higher acuity cases. Simultaneously, organizations can lessen financial burden for low acuity cases by converting those appointments to a virtual setting. With the current financial stresses facing health systems, optimizing virtual care can improve efficiency and costs.

## 2. Measurement of Access to Care in Telehealth: A Review of the PCORI Research Portfolio

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**Background:** The COVID-19 pandemic initiated a substantial expansion in the use of telehealth modalities for care delivery. Telehealth has the potential to increase access to care among populations at risk of experiencing disparities by mitigating barriers to healthcare services. However, there is no "gold standard" measure of access to care and measures that have been used in previous research are frequently inconsistent with conceptual frameworks of access to care. This analysis of the Patient Centered Outcomes Research Institute (PCORI)-funded comparative effectiveness research (CER) portfolio aims to investigate which measures have been used to characterize access to care across PCORI-funded telehealth studies and to synthesize these data to inform future research focused on measuring the impact of telehealth use for care delivery on domains of access to care.

**Methods:** In total, PCORI's portfolio of CER examining telehealth includes 123 studies funded between 2015 and 2021. Prior literature has used many methodological approaches, including self-report scales, healthcare utilization data, and qualitative analyses to examine access to care in telehealth. One framework of access to care that has been widely used in prior literature is Levesque's healthcare systems dimensions (including approachability, acceptability, availability/accommodation, affordability, and appropriateness) and healthcare user abilities (ability to perceive, seek, reach, pay for, and engage with care) of access to care. The authors reviewed the research plans for these studies and coded them based on several criteria: 1) patient-centered outcomes (e.g., access to care), 2) populations at risk of experiencing disparities, and 3) measures used to operationalize access to care (e.g., self-report, healthcare utilization, qualitative). Among studies that used self-report scales to measure access to care, we subsequently evaluated the extent to which these scales addressed Levesque's healthcare systems dimensions and healthcare user abilities.

**Results:** Of the 123 studies in PCORI's telehealth portfolio, 31 (25%) stated that improving access to care was a goal of the study. Among these 31 studies, 19 (61%) aimed to increase access to care among populations at risk of experiencing disparities. The most common population groups targeted by studies in the telehealth portfolio were members of racial/ethnic minority groups (8 studies, 26%), individuals living in rural areas (6 studies, 19%), and individuals with a low-income status (5 studies, 16%). Twenty-five (20%) studies in PCORI's telehealth portfolio aimed to measure access to care as a study outcome. Among these 25 studies, 10 (40%) used self-report scales to assess access to care, 8 (32%) used qualitative methods, and 7 (28%) used objective measures of healthcare utilization (e.g., number of health visits, uptake of screening). Of the 10 studies that used self-report scales, 5 (50%)

addressed at least one of Levesque's dimensions of access to care. Appropriateness (4 studies, 40%) and availability/accommodation (3 studies, 30%) were the most well-represented dimensions, while affordability was the only dimension of access to care not represented.

**Discussion:** Though increasing access to care is a potential advantage of telehealth, a limited proportion (20%) of studies in PCORI's telehealth portfolio examined access to care. Of these studies, more than half used qualitative methods and self-report scales that address one of Levesque's dimensions of access. The remaining studies used either healthcare utilization data only or self-report scales that did not align with Levesque's dimensions. Our recommendations to future telehealth researchers are to consider ways to 1) measure both realized and potential access to care, 2) align measures of access to care with conceptual models, and 3) tailor telehealth interventions toward populations at risk of experiencing disparities (i.e., aim to address barriers to care that impact specific groups and actively recruit individuals from these groups). Conducting rigorous CER that examines the impact of telehealth modality use on access to healthcare services is a critical area for future research.

### 3. Telehealth enhances adolescents' access to pediatric specialty care

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**Background:** Pediatric subspecialists are in short supply across the United States, including adolescent medicine specialists who care for teenagers with eating disorders, mental health concerns, and reproductive and gender health concerns in addition to providing primary care. Telehealth has extended access to pediatric subspecialists via telehealth during the COVID pandemic and the associated public health emergency, and many pediatric and adolescent patients established care with specialists via telehealth during this time. It is unclear which pediatric patients might be at risk of losing access to care if and when regulations on limiting telehealth to established patients go into effect.

**Methods:** We reviewed an existing dataset of healthcare visits scheduled with an adolescent medicine clinic from March 2020 to December 2021; we limited the analysis to initial visits. Some patients had more than one initial visit scheduled because they did not attend the first appointment, the earliest initial visit scheduled for each individual was considered the initial visit. We used descriptive statistics including frequency tabulation, mean, and standard deviation, to describe the population of patients who initiated care during the pandemic and what kind of visit they scheduled. Because travel time was skewed, we used a Wilcoxon Mann-Whitney test to compare travel time between visit types.

**Results:** During the study time frame, 929 unique patients scheduled a non-procedural initial visit. Of those, the majority were female (75%), under 18 years old (70%), and white (57%). About 3% of patients reported they identified as transgender or nonbinary. Twenty-five percent of visits were for eating disorders, compared with 71% for primary care, and 8% for gender health. Of all visits, 17% (158) were scheduled as telemedicine.

Our previous findings showed that gender health patients were especially likely to attend visits via telemedicine. This study shows that this is also true for initial visits for gender health – which was the only visit type for which the majority (80%) of initial visits were scheduled as telemedicine. Initial primary care visits (18%) and eating disorder visits (6%) were less likely to be scheduled as telemedicine.

There was no significant difference in telemedicine use between rural and urban youth; however, there was a significant association between visit type and travel time from home to the clinic: 70.7 minutes (95% CI 61.9 – 79.5) for those using telemedicine and 35.7 minutes (95% CI 33.2 – 38.2) for in-person visits ($p < 0.001$).

**Discussion:** Youth who had greater travel time and youth with gender concerns were more likely to schedule initial visits via telemedicine at this adolescent medicine clinic during the public health emergency. Regulations that limit telemedicine to established patients may limit access to pediatric subspecialty care for patients outside the vicinity of academic medical centers. Very few patients with eating disorders established care via telemedicine. Given the steep increase in the prevalence of eating disorders and ongoing shortage of pediatric subspecialists, new care models that can be implemented via telehealth (e.g. remote patient monitoring) may be needed to increase access to care for adolescents with eating disorders.

### 5. The Cost-Effectiveness of Virtual Urgent Care

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**Background:** As the COVID-19 pandemic began to unfold, efforts were made to reduce the number of in-person interactions with the health system. In many cases, telehealth was used to triage care- including COVID-19 infections- to minimize in-person encounters for those whose conditions could be managed remotely. This form of care delivery, in which physician-patient interaction is mediated through a website that offers synchronous (live) consultation, offers timely care for acute problems that may not require an unscheduled visit to a doctor or emergency department. By providing a means for patients to receive health care from any location at all hours, the use of telehealth platforms expanded patient access to medical care while reducing the burden on already over-extended medical professionals

**Methods:** An independent study examined data from two distinct assets. The first was a national, all-payer collection of telehealth encounters from March through September 2020. The other was a deidentified, synthetic claims set from the Agency for Healthcare Research and Quality (AHRQ). The model focused on low-acuity, non-chronic conditions in which telehealth services were available. The telehealth modality was a video visit lasting anywhere from 25 to 45 minutes, based on the condition, reimbursed by Medicaid, Medicare, or commercial insurance. A retrospective, cross-sectional study design compared the value of each VC encounter with up to two claims for visits in the other care settings. For example, a claim in which a patient sought virtual care for a urinary tract infection (UTI) was matched to a claim in three other settings: urgent care, primary care, or the emergency room. If a VC encounter could be matched to two other settings, it was included in the analysis. If it could not be matched, then it was discarded. Each claim was stratified by age (adult vs. pediatric), primary diagnosis category, and month of service.

**Results:** In our analysis, the highest percentage of patients seeking virtual care fell between 18-34, while those seeking care in an urgent care facility, primary care practice, or emergency room were in the older age brackets. All patients within each setting were more likely to have a history of hypertension or pulmonary disease. Sinusitis accounted for 36.8% of all virtual care visits but only 8.2% within the ER, whereas URIs comprised 25.1% of all ER visits but only 11.3% within virtual care settings. There was a higher percentage of UTIs in the ER.

**Discussion:** A retrospective analysis of synthetic claims data demonstrated that a virtual visit for low acuity conditions offered significant cost savings compared to the use of a PCP (US - $170), UC (US -$426.19)and, particularly, the ED (US -$2717). These cost savings resulted from the difference in index visit costs, laboratory and imaging services utilization, and follow-up care costs when compared with other care settings. These results are not sur-

prising given the differences in care processes and cost structure of VC versus other settings. In addition to the cost savings described, patients likely experience substantial savings in travel and time costs. A study by Laurel Health Advisors in 2021 estimated travel and time savings of approximately US $51 per visit based on the median wage and the federal mileage reimbursement rate.

### 6. Get Care Now: Reviewing a Virtual Urgent Care Program for Efficacy and Sustainability Post-Pandemic

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**Background:** Throughout the pandemic, various health systems developed and scaled virtual care delivery as a mechanism of effectively maintaining patient access while considering social distancing and contagion minimization protocols. Geisinger's Virtual Urgent Care employed several novel approaches to this model. With an expansion of a vendor chatbot symptom checker, patients could join a virtual waiting room directly where they would be greeted by a non-clinical access team member (VCA) who assessed eligibility, completed check-in processes, and utilized same-day open template slots for primary care or urgent care providers. This allowed patients to be seen within a matter of hours and increased slot utilization metrics across our enterprise without hiring new providers. These decisions served as the foundation for the review conducted in 2022 for the program's ongoing financial and structural sustainability.

**Methods:** With the launch of the Geisinger Virtual Urgent Care program in June 2021, records were kept using electronic health records and vendor data reporting. An evaluation was conducted for program data through June 2022 and the process was replicated a year later for data through June 2023. Data was analyzed to cross reference usage volume, symptom checker usage, chart patient symptoms and interests, and follow the care path of patients to determine downstream impacts. The evaluation examined the overall process and volume of use, marketing opportunities, the volume of new patients to the system, and the downstream impacts of care on those new patients.

**Results:** From June 2021 - June 2022, 1793 patients had virtual urgent care visits with 112 who were new to the system. Of those new patients, 46 patients participated in additional health services beyond virtual urgent care. On average new patients receive over 10 services. Each new patient yielded an average $7670 in charges resulting in a total of $859,000 across 1147 services. Following the initial evaluation, the healthcare system launched marketing and outreach of virtual urgent care services to the communities in central and northeastern Pennsylvania, which facilitated a significant increase in patient traffic. This process also served as the front door to several hundred new patients, further substantiating the need for increased access modalities within our rural footprint. We've seen improvements in slot utilization, new patient growth, and reduction of unnecessary emergency department visits as a part of this process. As of June 2023, we have completed over 6000 additional virtual urgent care visits, 81% of whom indicated that their needs were met by this service. Patients have shared deep appreciation for quick access, great care, convenience, and ease of use, as well as the personal, compassionate connection with our VCAs.

**Discussion:** As we look to the future and undergo the next cycle of program evaluation, we know the demand for this service is beginning to outweigh its designed capacity. As marketing has been a key driver of success to date, we will continue to expand the channels and campaigns we utilize to capture patient traffic. Due to demand realized in a substantial number of incomplete visits initiated by parents seeking pediatric services, the scope of virtual urgent care will expand to serve several pediatric conditions in the coming months. Refining our intake process and adding self-scheduling while adding additional dedicated provider resources will give us a stronger opportunity to prioritize patient urgency and continue to expand access. As our enterprise health plan footprint grows outside of our immediate clinical service area, we see this program continuing to serve as a critical front door to current patients and future patients.

### 7. RPM to Support Pediatric Patients with Asthma after Hospitalization

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**Background:** Asthma is a leading cause of hospitalization in children, and many children experience challenges in the transition from hospital to home. With inconsistent asthma education to support their home management, rates of recurrent emergency department (ED) visits and hospitalization stand to improve. Digital tools are underutilized in pediatrics and can enable innovative approaches to support patients following hospital discharge. We developed and implemented a program delivered through the tethered patient portal (Epic MyChart) to support pediatric patients in the first 30 days after discharge following admission for asthma exacerbation. Our objective is to describe the development and implementation of a remote patient management (RPM) pathway for asthma self-management, leveraging Epic MyChart's Care Companion, and evaluate program adoption.

**Methods:** People, process, and technology tactics are described in the design of a seamless, singular patient experience that allows providers to proactively engage patients in an interactive, individualized plan of longitudinal care via MyChart, supporting transition of care from hospital to home. Data on patient demographics and engagement were collected from the electronic health record. Race-ethnicity data were obtained from the administrative data of the electronic health record, entered by registration clerks or patient/patient proxy. MyChart engagement was defined as completing one or more educational tasks or symptom monitoring questionnaires available at different timepoints in the MyChart companion platform.

**Results:** A team of experts in digital health and pediatric asthma developed a MyChart Care Companion Asthma Post-Acute Care (APAC) Pathway that begins during a child's hospital stay when they are placed on the Asthma Clinical Care Guideline (CCG), and supports them through 30 days after discharge. After discharge, the pathway assigns education, medication reminders, questionnaires for symptom monitoring, and additional tasks to reinforce asthma self-management and monitoring. Patient/caregiver-reported outcomes transfer directly back into the medical record for health providers to see and respond to as needed.

Since program implementation, 344 patients have been placed on the Asthma CCG, of which 302 (87.8%) were enrolled on the APAC Pathway. Of patients enrolled in the APAC Pathway, 195 (64.6%) had public insurance coverage. Of those enrolled, 209 (69.2%) were activated on MyChart and thus able to receive pathway questionnaires and education, of which 65 (31.1%) have been engaged with the care plan. Five patients have completed Virtual Immediate Care visits for follow-up 2 days post-discharge, which is offered as a safety net for when a patient cannot be seen by their primary care provider.

**Discussion:** A remote patient management pathway for pediatric patients with asthma was successfully implemented and provides a framework and path for implementations of similar programs for subsequent patient pop-

ulations who stand to benefit from a digital companion outside of the traditional clinic spaces. In transcending across care settings, the MyChart Care Companion APAC Pathway stands to fill a gap in the patient journey. Analysis on additional outcomes, including missed school, missed workdays, and return to hospital for asthma exacerbations, will be stratified by patient age, race/ethnicity and primary language spoken and included in future reporting. Future efforts to understand best approaches to promote increased engagement are needed.



### 8. Utilizing telehealth to expand access to medications for Opioid Use Disorder in a rural ED

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**Background:** Opioid-involved deaths are continuing to increase across the US, exceeding 100,000 for the first time in 2021. Patients with Opioid Use Disorder (OUD) provided buprenorphine in the Emergency Department (ED) are more likely to remain in treatment and decrease mortality risk compared to patients provided only treatment referral upon discharge. Using a Screening, Brief Intervention, and Referral to Treatment (SBIRT) model, the team implemented ED-initiated buprenorphine (EDIB) at 8 EDs in urban South Carolina (SC) communities whereby screening occurs in triage, patients appropriate for OUD medication treatment (MOUD) are referred to the provider, and on-site Peer Recovery Specialists (PRS) perform a brief intervention (BI) and referal to treatment. Rural ED (R-ED) access to such services is limited due to lower patient volumes and the need for almost constant PRS availability. Delivering PRS via telehealth utilizing existing PRS teams expands MOUD access to patients in vulnerable areas.

**Methods:** This study implements and evaluates a "tele-peer" EDIB model providing clinical services on-site in the ED, with PRS services provided remotely via a telemedicine platform. This study examined individuals who presented to the ED and screened positive for risky substance use between November 1, 2022, and May 31, 2023. Feasibility is assessed by examining the number of times tele-peer PRS services were employed relative to the number of patients who screened positive. These data are compared to an established EDIB program in an urban area utilizing the same team of on-site PRS.

**Results:** From November 1, 2022 – May 31, 2023, 1609 urban ED (U-ED) patients screened positive for risky substance use. Of those, 349 (22%) patients received BIs in-person from PRS. During the same period, 624 R-ED patients screened positive with 18 (12%) receiving BIs remotely from PRS. Of OUD patients clinically and programmatically appropriate for EDIB, 61% of U-ED patients and 75% of rural patients received buprenorphine. The primary reason a BI wasn't conducted in the R-ED was the inability of the PRS to contact ED staff. Other reasons, including the patient being too intoxicated and declining PRS services, were reported at both the U and R-EDs. A majority of completed BIs in the R-ED did not experience technical difficulties. Causes of technical difficulties that did occur include, PRS being flagged and difficulty connecting to the R-ED staff. Surveys conducted post-BI show patients liked and welcomed talking to the PRS, the BI met their approval and was appealing.

**Discussion:** Tele-peer services were implemented into a R-EDIB program. Tele-peer services are more difficult to implement than on-site peer services; however, patient acceptability of services appears high. Data collection is ongoing to determine feasibility.

### 9. Telehealth Training, Collaboration, and Assessment Prior to Rural Mobile Health Unit Deployment

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**Background:** The UTHSC College of Nursing was awarded a Health Resources and Services Administration Nurse Education, Practice, Quality, and Retention grant in July 2022. As a part of this grant, a mobile health unit (MHU) will be deployed to rural Lake and Lauderdale Counties of West Tennessee. Of the 95 counties that comprise TN, Lake and Lauderdale rank among the least healthy counties in the state (1 = Best, 95 = Worst). Lake ranks 86th and Lauderdale 87th in health outcomes, based on how long county residents live and how healthy they feel while alive. In terms of factors that influence the health of a county (health behaviors, clinical care, social and economic, and physical environment), Lake and Lauderdale rank the highest of all counties in TN (95th and 94th, respectively), making them the least healthy among factors driving their future quality of life and well-being.

**Methods:** Training - All faculty, staff, undergraduate, and graduate nursing students that will rotate on the MHU must complete Introduction to Virtual Care for Health Care Providers and Students. The training includes three modules – Introduction to Telehealth, Telehealth Etiquette, Telehealth Legal and Ethical Issues. At the end of the modules, the module completers receive hands-on training in our Telehealth Training Center, a Satellite Training Center of the South Central Telehealth Training Center. Collaboration – The MHU project team has developed collaborations with rural primary care and urban specialty providers prior to deployment. The MHU has two telehealth clinical stations. Assessment – The MHU team traveled to Lake and Lauderdale Counties to test the connectivity in June 2023. Connectivity assessments were conducted in three areas in each county where the MHU will provide services.

**Results:** Training – To date, 29 people have completed the telehealth training modules. Collaboration – In the first year of launch, HIV care and mental health services will be provided by Telehealth. Additional specialty services will be onboarded, in future years, such as Sickle Cell care and management. Assessment - Of the six sites assessed, none had lag time or decreased connectivity when testing three simultaneous virtual visits.

**Discussion:** The Mobile Health Unit will launch in early fall 2023. Nurse practitioners will provide clinical services four days a week – two each in each of the four counties. The MHU will track patient outcomes and other metrics associated with the MHU as well as any technical or telehealth concerns or problems. The MHU will provide much needed services via telehealth for these two rural TN counties.

### 10. Pediatric Dentistry-Focused ECHO Sessions: Data Report and Lessons from One Year of Implementation

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**Background:** Estimates range from 34 million to 51 million school hours lost by children in the US every year because of dental caries. Simply put, dental caries wreaks havoc on children and society. Furthermore, children from

undeserved and rural communities are at much higher risk of caries and the link between caries and socioeconomic status is strong and validated.

To assist in addressing the dental dilemma that children face, providers at The University of Mississippi Medical Center (UMMC) joined Dr. Sanjeev Arora's Project ECHO tele-mentoring model to provide patient case-based information with a pediatric dentistry focus. In a needs assessment survey of rural Mississippi dentists, education in pediatric dentistry was a high priority area of need identified by the participants. Survey participants also noted they would be amenable to live online presentations.

**Methods:** On the last Friday of each month the ECHO HUB team conducted one-hour ECHO sessions via the Zoom© online platform. Marketing for the sessions was done via email blasts to several lists of potential participants. Sessions for the Pediatric Dentistry Project ECHO focused on subjects related to the prevention, treatment or consequences of dental caries. Topics include caries risk assessment, fluorides, tethered tissues, special needs patients, hypomineralization and aesthetic concerns, vital pulp therapy, fixed prosthodontics in adolescents with special needs, vaping, and human papilloma virus. Depending on the session presented, a 16- to 19-question survey was assessed in RedCap capturing demographic data such as zip code of work location, level of education and licensure, years of professional service, types of services provided in work location, chief complaints of pediatric patients, and referral sources. At each Project ECHO session, the presenters asked a series of between 4-6 questions specifically related to the topic that was presented. Data was caputured in RedCap and descriptive statistics were used for interpretation.

**Results:** All nine of the topics (caries risk assessment, fluorides, tethered tissues, special needs patients, hypomineralization and aesthetic concerns, vital pulp therapy, fixed prosthodontics in adolescents with special needs, vaping, and human papilloma virus) have been presented. A total of 382 people attended the sessions with 27 out of the 82 counties in Mississippi (32.9% of the state) represented. Attendees were also from Texas, Louisiana, California, Florida, Michigan, Minnesota, Maryland, New Jersey, Maine, and New York along with Indonesia and from Pusdatin, India. Of the counties in Mississippi that were represented with attendees, 74% (n = 20) were from counties designated as "rural" by the US Department of Health and Human Services.

Results revealed 19.43 average years in provider experience with a range of participants from dentistry including dental assistants, dental hygienists, dentists, and dental public health practitioners. Although the ECHO sessions were marketed to nursing and medical providers, only one LPN attended in the October session and one RN attended the February session.

**Discussion:** The most frequent response to the question "What are reasons that contribute to poor oral health of pediatric patients in your area?" was frequency of visit (n = 157), followed by low education (n-141), and cost (n = 126). Qualitative results to the question "How can we help you in provision of pediatric oral services" led to three themes. The first theme was education-related, with 27 respondents noting their need for more education and for patient education. The second theme was for referral sources with thirteen responses requesting greater access to referral sources at UMMC. The final theme regarded advocacy; 11 responses requested help with advocating for capitation of dental pediatric procedures. This poster was made possible by grant number U6631459 from the Office for the Advancement of Telehealth, Health Resources and Services Administration, DHHS

## 12. Impact of Video Care on ER Use among Type 2 Diabetes Patients at Veterans Health Administration

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**Background:** There is increasing evidence that virtual/remote care is effective for managing care for patients with chronic health conditions such as type 2 diabetes. Although there have been numerous studies, including randomized controlled trials (RCT), assessing the impact of virtual care on health outcomes, the findings have been inconclusive; most studies had small sample sizes. National studies on identifying the impact of video-based care on health outcomes are lacking. This study attempts to fill this knowledge gap by examining the impact of video-based care on emergency room (ER) use among Veterans who were newly diagnosed with type 2 diabetes at the Veterans Health Administration (VA), nationwide between 2021 and 2023. The VA is the ideal place to conduct this study, since the VA has been at the forefront of implementing telehealth services for more than two decades.

**Methods:** This study utilizes a national retrospective cohort design. The study cohort (N = 63,352) was defined as Veterans with one inpatient or two outpatient E11 ICD-10 diagnostic codes during 6/1/21-5/31/22, and no E11 ICD-10 code during the previous five years 6/1/16–5/31/21. For the study cohort of newly diagnosed type 2 diabetes, a cross section of service use data was extracted from 6/1/22-5/31/23. Outpatient encounters were only retained if they were relevant to the management of diabetes care or diabetes-related comorbidities (e.g., primary care, cardiology, endocrinology, diabetes clinic, hypertension, nutrition/dietetics, weight management). Logistic regression was used to examine the effect of any video use (yes/no) on any ER use (yes/no) during the study period. The analysis controlled for patient sociodemographic characteristics (age, gender, race, marital status, disability status, rural/urban residence), patient health conditions [e.g., cardiovascular disease (yes/no), hypertension(yes/no)], and included an interaction term between any video use (yes/no) and four-categories of frequency of outpatient care use (low, moderate, high, very high).

**Results:** The newly diagnosed type 2 diabetes study cohort was: 92% male, 8% female; mean age 64.2 (SD = 12.97); race/ethnicity: 59% White, 23% Black, 8% Hispanic, 3% Other, 6% Unknown; and location of residence: 66% urban and 34% rural. Regarding use of healthcare services, 32% had 0-2 visits (low), 22% 3-4 visits (moderate), 23% 5-8 visits (high), 24% 9+ visits (very high). Regarding video use, 19% had at least one video visit, while 81% had no video visit. For the study outcome, 32% had at least one ER visit, while 68% had no ER visit at the VA during the study period. Results from the logistic regression analysis and predicted margins/probability illustrate that after controlling for sociodemographic and patient health conditions, the predicted probability of ER use among newly diagnosed type 2 diabetes Veterans who were low users of outpatient care was 2.4% (95% CI:0.9%-3.9%) lower for those who used video-based care compared to those who did not use video-based care. Consequently, the same figure was 3.0% (95% CI:1.4%-4.6%), 5.3% (for 95% CI:3.7%-6.8%) and 7.2% (95% CI:5.6%-8.8%) lower for those who used video compared to those who did not use video among moderate, high, and very high users of outpatient care, respectively.

**Discussion:** The study results indicate that there is a statistically significant positive impact of video-based care on reducing the likelihood of ER use among Veterans with type 2 diabetes. The results also highlight the greater impact of video-based care in reducing ER use among moderate and high frequency users of outpatient care compared to lower frequency users of outpatient care. These findings allude to the possibility that telehealth services, especially video-based care, can be successfully used for chronic care management among type 2 diabetic patients, including among higher users of care. Additional research, including RCT studies and studies on patient reported outcomes, are needed to better understand how video-based care can be incorporated into hybrid care models to better meet the healthcare needs of type 2 diabetes patients and help improve patient health outcomes.

### 13. Payment Parity for Telehealth: why does it matter?

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**Background:** In December, 2021, New Jersey amended its telemedicine laws to continue reimbursement of telehealth at the same rate as in-person care, pending a statewide assessment of the impact of telehealth policies and payment on quality, utilization, access and costs. Findings from this assessment would inform future Medicaid rates for telehealth as well as the types of services and modalities of care approved for reimbursement.

**Methods:** Using a mixed methods approach, the research team analyzed multiple factors to inform future reimbursement for telehealth. These included clinical efficacy, alignment with standards of care, cost effectiveness, utilization management, access, and sustainability. The analysis was informed by key informant interviews and focus groups, a provider survey, statistical analysis of data, and economic modeling.

**Results:** The study is underway with a final report to be delivered to the State Department of Health in October 2023. Preliminary findings strongly indicate that telehealth has positively impacted quality of care, confirmed that care provided via telehealth follows accepted standards of care, and access. Qualitative analysis indicate that payment parity is essential to continued use of telehealth. These findings have a direct impact on the health of New Jersey residents, particularly Medicaid recipients.

**Discussion:** The report that will be submitted to the state legislature will directly affect Medicaid reimbursement for telehealth. This has significant implications on health care outcomes. Providers and payers using traditional payment models confirm that lower reimbursement rates for telehealth will significantly impact continued use of telehealth as well as investments in telehealth such as equipment and staff that are essential to optimize telehealth use. Study findings will also inform scalability and sustainability by identifying programs and opportunities to optimize the use of telehealth, particularly for Medicaid recipients who face greater barriers to timely, high quality care.

### 14. Digital Health Equity Current Practices and Approaches of Academic Medical Centers Summary

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**Background:** Digital tools such as patient portals, telehealth, and mobile apps have become an integral aspect of the delivery of health care. The COVID-19 pandemic prompted academic medical centers (AMCs) to extend the use of telehealth and other digital tools to all patients, with the goal of improving access to care, patient and clinician experience, health outcomes and cost, and health equity. However, AMCs have had to confront preexisting disparities in who has access to and uses digital tools. Digital health equity has become central to the future of digitally powered health care delivery. While AMCs will not, by themselves, solve all barriers to digital equity, they have a responsibility to understand these barriers and then to study and design innovative and culturally appropriate solutions to overcome them. In this report, we highlight the roles AMCs are playing to improve digital health equity and identify opportunities and evolving approaches AMCs can adapt, implement, and scale.

**Methods:** To access digital health equity strategy, we interviewed 11 AMCs across the United States. We interviewed leaders from digital health, telehealth, virtual care, and health equity at each institution. This initiative is part of the AAMC's efforts to improve health care access, collaborate with communities, and advance health equity. A key part of this work is to create tools and promote resources that support partnerships throughout the country between AMCs and their communities to engage with patients, parents, caregivers, and schools, and to support culturally sensitive approaches to improve digital literacy and overcome the digital divide.

The goal of the interviews was to understand AMCs' current and future strategies and activities focused on digital health equity and identify emerging best practices. The interviews covered the following domains: defining digital health equity, current and future digital health equity activities, the role of digital health equity data, COVID-19 vaccination and digital health, and future directions for digital health equity. Through the interviews, we identified key activities for digital health equity that are currently being undertaken by AMCs.

**Results:** Key activities were identified and focused on assessing digital needs, supporting digital literacy, adapting the design and implementation of digital tools, contributing to policy initiatives, ensuring digital tools are a standard part of care, and establishing digital health equity leadership and mission. Key elements and current approaches to each activity were identified.

**Discussion:** AMCs are in the early stages of developing digital health equity strategies and missions. Future directions for AMCs include determining the sustainability and scalability of digital health equity programs, extending and evaluating technology as a tool for equity, and continuing advocacy efforts to ensure reimbursement by public and private payers for care delivered using digital tools. Digital health equity will continue to present opportunities and challenges for AMCs. Through a patient-centered approach to digital health equity, AMCs can ensure that technology aligns with improving the health of patients and communities.

### 15. Acceptance of Telemedicine: A survey of adults and older adults on their telemedicine interests

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**Background:** Throughout their lifespan, people require health services to manage their health conditions. However, they may experience barriers to accessing health services such as living in rural areas, lack of transportation, mobility challenges, cost of childcare during visits, and more. Telemedicine is effective in addressing these barriers to care by providing services in the home environment and in clinics. With an increasing population of older adults and individuals with chronic conditions living in rural communities, it is crucial to identify primary areas of need and interest to inform the development and evolution of telemedicine programs. A survey was administered about the telemedicine interests of adults in rural Pennsylvania to provide insight into the needs of adults in rural communities and to guide the evolution of telemedicine programs.

**Methods:** Geisinger Clinic initiated a 3-phased process to assess existing telehealth programs within the healthcare system. Phase 1 involved conducting a health survey of general consumers aged 18 and older within the Geisinger Clinic and health plan service areas in June 2021. The survey included questions on interest in medical home specialties offered through telemedicine, concerns about telemedicine, and preferences for in-person visits and telemedicine. The Phase 1 survey responses were categorized in frequency counts according to their age group. Findings from the survey informed Phase 2 and Phase 3 evaluations of programs as immediate need or designated for future evaluation, respectively.

**Results:** Of the 245 survey respondents, 118 persons were aged 65 or greater, and 127 persons were less than 65 years. 117 reported having chronic conditions requiring care. 55% of respondents reported interest in video visits for the future. When asked about any concerns with using telemedicine services, 63% indicated concern that examinations may not be as complete as in-person visits. Regarding interest in telemedicine services, 77% indicated interest in using telemedicine for medication reviews and prescription refill services (87% of respondents under 65 years and 66% who were 65 and older). 56% reported interest in follow-ups for surgery or other procedures (65% of respondents under 65 years and 46% who were 65 and older). 54% reported interest for ongoing care for chronic conditions (71% of respondents under 65 years and 36% who were 65 and older). 44% indicated interest for sick visits (65% of respondents under 65 years and 23% who were 65 and older) and for behavioral or mental health services (68% of respondents under 65 years and 19% who were 65 and older). The final area of telemedicine services was annual or routine services and checkups with 43% interested (68% of respondents under 65 years and 16% who were 65 and older).

**Discussion:** Findings from this survey indicate a widespread acceptance of telemedicine for certain types of visits with remaining hesitancy for sick visits and routine checkups, particularly among respondents over 65 years of age. Areas for potential education of the benefits of telemedicine for older adults should detail physicians' input into which services are offered via telemedicine so that patients are reassured that telemedicine is only offered for clinically appropriate conditions. Additionally, data used to determine which visits to offer through telemedicine and which visits are not offered through this modality should be openly shared with the patient population, in addition to policy makers.

### 16. Pre-Hospital Stroke Management: Utilization of EMS units and telemedicine in rural communities

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**Background:** With stroke incidences in this country contributing to long-term disability or death, early management including pre-hospital services, is crucial to supporting improved outcomes for stroke patients. However, in rural communities, patients may have long travel times to primary stroke centers, and stroke neurologists may not be available at each hospital or clinic. There is potential to address these barriers using pre-hospital tele-stroke consults during ambulance transport in rural communities. The purpose of this program is to evaluate the effectiveness of implementing pre-hospital tele-stroke consults in rural communities in Pennsylvania.

**Methods:** One distant hospital (central hub) and three originating hospital sites servicing rural central and northeastern Pennsylvania were included in this program. Emergency Medical Services (EMS) partners, stroke neurologists, stroke coordinators, and emergency department staff underwent training on the workflow for the tele-stroke consults. EMS partners received and trained with telemedicine equipment for their ambulance units. Stroke coordinators from the participating hospitals provided additional training and community education on pre-hospital stroke support benefits, in addition to collecting and entering tele-stroke consult data into the RedCAP database. Data was collected on door-to-imaging times, door-to-needle times for tissue plasminogen activator (tPA) administration, door-to-lab times, and findings on averted transfers. Quality assurance of data was conducted, and descriptive analysis was completed.

**Results:** 17 pre-hospital tele-stroke consults successfully occurred. The median door-to-lab time was 33 minutes, and the mean time was 34 minutes (SD, 19.96 minutes). The median door-to-imaging time was 6 minutes, and mean time was 18 minutes (SD, 39.32 minutes). 3 patients qualified for tPA with a median time for door-to-needle of 36 minutes, and a mean time of 38 minutes (SD, 14.11 minutes). 41% of the successful tele-stroke consults resulted in averted transfers saving a total of 382 miles for patients.

**Discussion:** Implementing pre-hospital tele-stroke consults can assist in meeting nationally recommended door-to-imaging and door-to-needle times supporting better outcomes for stroke patients. These initial program findings support the growing evidence for conducting tele-stroke consults in ambulances to support the early management of stroke patients in rural communities. Additional research on patient and provider satisfaction and perceptions of tele-stroke consults in rural communities and on longitudinal outcomes for stroke patients who received tele-stroke consults are needed.

### 17. Virtual-first Comprehensive Care for Children with Medical Complexity Under Population-based Payment

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**Background:** Children with medical complexity (CMC) represent fewer than 1 percent of children and more than 30 percent of pediatric health care costs. 1 CMC experience fragmented, uncoordinated, or unavailable outpatient health care 2; inadequate home health services 3; high admission and readmission rates 4; and large health care costs. Several comprehensive care pilot programs for CMC have been shown to reduce ED visits, hospitalizations, and mortality rates, and improve patient/family satisfaction measures. 5,6 However, no program within the US has scaled beyond a few hundred patients nor used a population-based payment model to finance the program.

**Methods:** We established a multidisciplinary virtual-first comprehensive care program for CMC, providing care coordination, education, parental support, behavioral health care, and acute medical care virtually. Medicaid status and an adapted version of the pediatric complex chronic condition classification system determines eligibility. A pediatrician leads comprehensive care alongside a multidisciplinary care team of nurse practitioners, nurses, licensed clinical social workers, and care team assistants. Following a 12-week onboarding process, patients graduate to daily digital touchpoints and quarterly provider visits. We identify care gaps through daily digital touchpoints or direct digital outreach to the provider team and triage to the appropriate care-team member based on the content of the care gap – e.g., medical, behavioral, or acute social need. For patients requiring in-person assessment, we deploy a mobile-integrated care team of paramedics, community health workers, and nurse practitioners to the patient's home in geographically dense regions (Figure 1). We tracked enrollment, diagnosis, and healthcare utilization diversion. The program is financed through a population-based payment model arranged with UnitedHealthcare.

**Results:** Over 6,000 patients were assigned to our program under the population-based payment model. Since enrollment began on 1/1/2023, over 681 patients have been formally engaged and enrolled in the program. The program is projected to obtain a 40% enrollment rate (2,400 patients) by the end of the calendar year. Patients assigned to the program have an average of 4 complex chronic conditions with a standard deviation of 2.6 chronic conditions. The most common complex chronic conditions include behavioral health disorders (47.5%), respiratory diseases (46.0%), neurologic diseases (27.6%), cardiovascular diseases (25.9%), technology dependence (20.0%), gastrointestinal diseases (21.5%), developmental delay (19.0%), and genetic/congenital disorders (15.4%) (Figure 2). Since establishment of utilization diversion tracking in late January, patients in the program avoided a total of 35 urgent care visits, 15 emergency department visits, and 2 inpatient admissions.

**Discussion:** While early in its operations, this novel virtual care-coordination program financed by a population-based payment model shows promising engagement and utilization prevention for children with medical complexity. Further enrollment and evaluation will be completed prior to the conference.

### 19. The Quest to Measure and Compare Telehealth Utilization and Changes Across US Hospitals

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**Background:** Telehealth utilization measurement has received renewed attention as healthcare organizations rapidly adopted and deployed telehealth programs during the COVID-19 pandemic. Despite the interaction between hospital-level financial performance and telehealth utilization characteristics, few studies have examined those relationships. The objective of this study was to determine national hospital-level telehealth provision measures. This study examines national hospital-level financial performance and telehealth utilization with measures from Medicare Cost Reports and health information technology (HIT) capital spending, from the American Hospital Association Annual Survey (AHAAS). Further, associations of COVID-19 public health emergency (PHE) funds were evaluated and telehealth utilization characteristics were described by respondent and non-respondent status of hospitals from Medicare Cost Reports and the American Hospital Association Annual Survey (AHAAS).

**Methods:** The study population included short-term general acute care hospitals reporting Cost Reports to Medicare and responding to the AHAAS for 2017-2021. Telehealth measures were evaluated from the AHAAS to assess whether a hospital reported providing any telehealth services; how many telehealth visits a hospital reported; and whether a hospital was a high or low telehealth visit provider using the number of telehealth visits reported compared to total inpatient discharges and outpatient visits. Cost Report Health Information Technology (HIT) capital purchases and COVID-19 PHE funds were evaluated. To evaluate missingness, utilization measures were stratified by hospital characteristics. Separately, measures were stratified by reported telehealth service provision status (e.g., responding "no" to all AHAAS categorical telehealth questions or reporting zero telehealth visits/patients). Descriptive statistics were then evaluated by stratified samples for financial and operational hospital-level characteristics to describe data missingness and to improve data quality for policy-relevant evaluations. Logistic regressions were used to test associations between missing telehealth responses and hospital characteristics.

**Results:** Of hospitals matching Cost Reports and the AHAAS, 52% did not report a number value for telehealth visits. An additional 9.6% reported zero as the number of telehealth visits. Hospitals that reported providing any telehealth visits (yes/no) increased from 43.6% in 2020 to 52.8% in 2021. Across various AHAAS measures, hospitals more likely to respond to the AHAAS were smaller (measured by discharges, beds, and revenue), more rural, in the South and West regions, for-profit, non-major teaching hospitals, which maintained lower occupancy rates, and received a higher proportion of COVID-19 funds relative to all forms of non-operating revenue. Hospitals that reported the highest ratio of telehealth-to-total visits were more likely to be larger, urban, not-for-profit, in the northeast and Midwest, major teaching hospitals, with higher case mix index (CMI), higher occupancy, and lower profits and current ratio.

**Discussion:** Our findings inform approaches to quantify and analyze telehealth cost and utilization measures using a nationally representative organizational-level dataset. These quantitative results will be juxtaposed with forthcoming key informant interview findings in a manuscript that will include recommendations to improve future surveying measures and response attentiveness to improve data quality and telehealth utilization measurement. Moreover, results from this study seek to inform policy and practitioner financial decision-making at federal, state, and local levels.

### 20. Use of Cellular-Enabled Glucometer for Diabetes Management in High-Risk Pregnancy

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**Background:** Type 1 and Type 2 diabetes mellitus during pregnancy requires intensive glucose monitoring to ensure optimal health outcomes for mothers and infants. Complications due to glycemic variability during pregnancy includes hypertension, C-section, preterm birth, stillbirth, cholestasis, neonatal hypoglycemia, macrosomia, and birth defects. Optimizing glycemic stability during the first and second trimester can help prevent complications. Standard practice includes patients monitoring their glucose 4-6 times a day using a standard glucometer and paper diary. Keeping an accurate diary is a challenge for many patients and remote patient monitoring offers an alternative method for diabetes management. This study aimed to measure feasibility, clinical impact, and patient satisfaction with using a cellular-enabled glucometer, iGlucose, for glucose management in pregnancies complicated by Type 1 and Type 2 Diabetes.

**Methods:** This study was a mixed methods pilot study utilizing a pre-post survey design and semi-structured qualitative interview to assess the feasibility and acceptability of using iGlucose to manage diabetes during pregnancy. Fifty-nine pregnant women with Type 1 or Type 2 diabetes were invited to participate in the study. Participants were provided with iGlucose, a cellular enabled glucometer, for home use in accordance with their healthcare provider's recommendation. Because iGlucose is equipped with cellular transmission capabilities, patients do not need Wi-Fi or Bluetooth to operate the device. This eliminates the need for a smart phone providing greater access for those in underserved or rural areas. Participants were asked to complete a baseline survey, use iGlucose for one month, and then complete an exit survey and semi-structured interview. Maternal clinical outcomes were obtained from EPIC. Participants were able to continue using the device after the study, if desired. Participants included women ≥18 years of age with a pregnancy complicated by Type 1 or Type 2 Diabetes, who received prenatal care at the University of Arkansas for Medical Sciences (UAMS) Women's Health Clinic.

**Results:** Participants were divided into two groups based on duration of device use: high-use >50 days and low-Use ≤50 days. A significant difference ($p < .0001$) in Appraisal of Diabetes scores was seen in pre-post scores for both groups, indicating that using iGlucose significantly improved participants' appraisal of their diabetes. There was a significant difference ($p = 0.0409$) in pre-post General Life Satisfaction in the high-use group, which indicates that iGlucose glucometer significantly improved participants' life satisfaction when used for an extended amount of time. Participants scored high on system usability for all groups. There was no significant difference between the groups in healthcare utilization, likely due to the small sample size as this was a pilot study. Participants reported an overall positive experience using iGlucose, stating that the automatic transmittal of readings to a physician portal led to better care. Participants felt the device was convenient, easy to use, and increased their own self-awareness, allowing for better management of their diabetes. A few participants stated concern over difficulties with the uploading of their readings and the accuracy of their glucose readings when using iGlucose.

**Discussion:** The use of cellular-enabled remote patient monitoring glucometers is a valuable tool for the management of Type 1 and Type 2 diabetes during pregnancy. Participants who used iGlucose demonstrated increased positive appraisal of diabetes and general life satisfaction. In addition, participants scored the device high on system usability and satisfaction, and overall feedback on the device was positive. Participants cited many benefits, including automatic data upload, reduced number of clinic visits, perceived better care, increased accuracy of results, increased self-awareness, and that the device was convenient and easy to use. Although some disadvantages such as inaccurate readings and difficulty with automatic data upload were reported, the overall positive feedback and positive results of this study indicate cellular-enabled remote patient monitoring glucometers should be considered for the use of managing diabetes during pregnancy.

### 21. Pediatric patient telehealth experiences: A comparison to in-person in 2020 and 2022

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**Background:** Before COVID-19, telehealth was sparingly used, and early adopting patients and providers expressed satisfaction. In March 2020, ambulatory visits rapidly shifted to telehealth to limit patient exposure to the healthcare setting. Many providers and patients utilized telehealth for the first time during this period, and their experiences varied. Telehealth ambulatory volumes have stabilized, and utilization remains higher than pre-2020 volumes. But little is known about the differences in patient experience and expectations between in-person and telehealth video visits in this new paradigm where patients or providers can choose the type of visit. We compare patient experience survey data for in-person and telehealth video visits, including quantitative and open-ended items, to explore the similarities and differences at two time periods for pediatric patients.

**Methods:** We used a concurrent convergent parallel mixed methods design to examine the patient experiences of pediatric in-person and video-visit telehealth patients. The qualitative and quantitative components were collected simultaneously using the Medical Practice Telemedicine Survey and the Medical Practice Pediatric Survey. Data were merged during interpretation using a triangulation design. We also examined the Natural Language Processing codes, provided by the survey vendor, which labeled each comment positive, negative, neutral, or mixed.

Pediatric patients who returned an in-person or video-visit survey for ambulatory services between 10/1/2020-10/31/2020 or 10/1/2022-10/31/2022 were included. We chose October for both years as October 2020 telehealth volumes were relatively more stable during the COVID-19 pandemic after the initial visit surges. Qualitative data was analyzed using a directed content analysis approach. Codes were based on the Institute of Medicine's Six Domains of healthcare quality and developed/applied in an iterative fashion by two researchers. Quantitative analysis utilized descriptive statistics, including t-tests and chi-squared as appropriate.

**Results:** The analysis included 236 in-person and 37 telehealth patients. There were no significant differences between in-person and telehealth patients' sex, age, payor, or survey format. However, the telehealth group does have statistically significant differences in race/ethnicity. Most notably, telehealth patients had higher percentages of reporting race as other or unknown ($p < 0.0001$). There were no significant differences in the responses for the Care Provider or Practice questions in either period (e.g. ease of scheduling). There was a significantly higher percentage of negative telehealth comments (52%) compared to in-person (26%) ($p = 0.005$) in 2020. But by 2022, there were no significant differences in the percentage of positive or negative comments. Across both periods, most telehealth comments were related to the technical efficiency of the service (e.g. dropped connections or time saved), while in-person comments were most often discussing patient-centeredness (e.g. provider was rude or the provider listened). Given the differences in negative comments and types of comments, there were no significant differences in the likelihood of recommending the provider or the practice.

**Discussion:** This study found no differences in any patient experience survey measure top-box scores between telehealth and in-person visits in either year. This illustrates that categorical satisfaction scores are minimally sensitive to the care delivery method if the cohort of providers and the organizational policies are the same. Therefore, qualitative remarks are important for identifying care process issues, especially when processes change, the learning curve matures, and categorical measures become less sensitive.

These findings have implications for practice, as it is important not to review quantitative survey results in isolation. The patients' comments provide rich detail on improving the quality of the patients' experiences. In addition, we found that patient issues differ across visit types; in-person triggers are related to personal interactions, while video visits trigger technical annoyances.

### 22. Supporting Caregivers of Medically Complex Infants with Remote Patient Management Programs

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**Background:** Emergency room (ED) visits and Hospital readmission for premature NICU graduates has been reported to be high as 50% and 30% within the first 3 months after hospital discharge (1). The highest risk of readmission is within the first 2 weeks after discharge. While close follow up with telemedicine programs have shown benefits (2), not all patients require this degree of monitoring. Remote digital monitoring offers a way for telemedicine programs to monitor more infants simultaneously and efficiently triage those who require closer follow ups (3). While use of the RE-AIM implementation science framework (4) in telemedicine have mostly reported around evaluation strategie, few have described its use for implementation planning and execution. We describe applying the RE-AIM approach to launch a post discharge patient management program for medically complex NICU graduates using telemedicine and remote monitoring.

**Methods:** Planning process for the CATCH program began with the RE-AIM Framework, using the Interactive RE-AIM planning tool (5) to clearly identify the end-users and other stakeholders involved with the approval processes, measures and methods for ascertaining success, system components needed for the program's implementation and maintenance. A multi, interdisciplinary team representing executive sponsors, digital health, clinicians and nurses, health support services, hospital information and electronic medical record (EMR) systems, legal counsel and key members of the remote monitoring platform vendor team met regularly and ad-hoc over 6 months to plan, develop and implement the Neonatal CATCH Program - including program specific processes and tools. These tools underwent iterative refinements using stakeholder interviews, considering important factors identified using the RE-AIM planning tool. The team utilized the STEM framework to identify a comprehensive set of measures relevant to the various stakeholders (6). Data capture methods, including EMR tools, and data dashboards were developed within 3 months to enable real time monitoring of the program at "go-live." The team used rapid cycle methods to improve the program.

**Results:** Insights learned from stakeholder meetings and information gathered from the RE-AIM planning tool helped create three implementation tools specific to the CATCH program: a system map, a key drivers diagram, and workflow processes. Under guidance from the clinical team, the technology team codified a "CATCH specific" triage decision tree into the remote patient monitoring platform designed to help clinicians identify patients who needed attention. Using the robust data acquisition, analysis, and visualization system, the following information was learned and used - from 2-28-2023 to 6/20/23. 60% of 91 eligible patients were successfully enrolled. 30-day same hospital readmission and ED revisit rates were 11% and 23% respectively. First chat responder rate was 37%vs.64%, respectively for patients with high vs. lowest Social Vulnerability Indices. The CATCH program prevented unscheduled visits/calls to subspecialists, or primary care (22%), visits to emergency or urgent care (3%), facilitated sooner unscheduled visits by detecting unanticipated complications (2%), addressed potential equipment and medication errors (4%), and provided education (48% of the televisits). In reaction, several program changes were made in real time.

**Discussion:** The RE-AIM framework helped Implement a remote patient management program using the RE-AIM framework with the necessary infrastructure and systems. These features allowed the team to recognize program flaws and address opportunities for improvement quickly using rapid cycle quality improvement methods. Further study on the value of using implementation frameworks to launch and maintain telehealth service programs is needed.

### 23. Remote Patient Monitoring for Hypertension: Feasibility and Outcomes of a Clinic-Based Pilot

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**Background:** Primary hypertension (HTN) is a widespread public health issue, with a prevalence of 48% in adults, and $130 billion per year in direct costs. Hypertension tends to disproportionately affect minority patients and those with lower socioeconomic status.

Remote patient monitoring (RPM) of blood pressure (BP) by physicians has been proposed as a novel intervention to improve hypertension management. This modality allows providers to more closely follow patient BP trends while lowering administrative costs and errors of in-office BP care. Previous trials have demonstrated that RPM is accessible to a variety of patient populations, can be non-inferior or even superior in controlling BP as compared to in-office care, and can lead to cost savings for healthcare systems. The cost-effectiveness and sustainability of this approach has not been well-explored, especially in populations with lower socio-economic status.

**Methods:** In this prospective cohort pilot study, patients with uncontrolled primary HTN were randomly selected from a primary care clinic. Uncontrolled HTN was defined as BP over 140/90 mmHg per Joint National Commission 8 (JNC8) guidelines. Patients were enrolled on a continuous basis for 90 days. Intervention group inclusion criteria were patients over 18 years old with a HTN diagnosis and at least two most recent clinic readings of uncontrolled HTN. Exclusion criteria were patients with an initial home BP less than 140/90 mmHg. A total of 75 patients meeting inclusion criteria were selected based on EMR review, 18 of whom consented to enrollment. Patients were given BP cuffs and transmission hubs and asked to take daily BPs that were automatically uploaded to an online dashboard. Patients were called weekly by research assistants to discuss compliance and adverse events such as medication side effects or machine errors. Any concerns were escalated to the primary care physician. The control group included 299 uncontrolled HTN patients from the same clinic analyzed via retrospective chart review. The primary outcome was BP control. Secondary outcomes were relative improvement in systolic pressure, direct costs, and financial feasibility.

**Results:** Of the 18 patients enrolled into the intervention group, one was dropped due to subsequent refusal to participate, and 4 were dropped because initial BP readings on home cuffs were less than 140/90 mmHg. Of the 13 patients analyzed, 54% were female, 100% African American, 62% obese, and 77% with Medicaid. The intervention group had an average age of 49. When assessed via intention-to-treat analysis at 90 days, patients in the intervention group had non-inferior BP control per JNC8 guidelines (46% experimental vs 31% control, $p = 0.33$) and greater reduction in systolic BP (13.5 vs 3.7 mmHg, $p = 0.174$), while experiencing a significant reduction in office-based visits (1.5 vs 5.9, $p < 0.001$) compared to control. In the intervention group, 12 (92%) patients had medication adjustments over the course of the follow-up period, none of which required in-person office visits. Results on per-protocol analysis also showed non-inferior BP control (63% vs 31%, $p = 0.135$). Financially, revenues included an average reimbursement of $190 per patient per 90 days, which factored in a 30% denial rate and an additional 27% patient non-adherence rate. The program generated a margin of $29 per patient at 90 days.

**Discussion:** This study showed the non-inferiority and financial feasibility of RPM for BP control in a minority, primarily Medicaid population at a primary care clinic, but was under-powered to detect a statistically significant difference in BP control. Notably, this study did show that RPM detected a significant proportion of patients actually presenting with white coat hypertension (28%) and was also able to have a statistically significant reduction in office-based visits despite non-inferior care. Our study importantly adds to the literature by showing the efficacy of this intervention in an under-studied population, which tends to have poorer outcomes in a traditional office-based setting. Further study is needed to improve and reduce barriers such as up-front costs, administrative constraints, compliance, and payor denial, and to validate effect size of our findings with larger datasets in minority populations.

### 24. Adapting telehealth to meet the needs of vulnerable patients: a qualitative study

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**Background:** Telehealth has the potential to increase access to care for the most vulnerable patients. However, there has been limited research on the strategies used by primary care clinics to reach these patients with telehealth services. In response to the pandemic, the California Telehealth Resource center (CTRC) conducted interviews with primary care clinicians and staff in partnership with eight other telehealth resource centers (TRCs) around the country to inform the development of resources. We conducted a secondary qualitative data analysis of clinician interviews with the goal of identifying practices adopted by primary care clinics to meet the needs of patients experiencing homelessness, patients with disabilities, and patients with limited English proficiency.

**Methods:** During the pandemic, the CTRC conducted 140 in-depth interviews with providers, administrators, and IT staff at federally qualified health centers (FQHCs) around the country. These interviews probed respondents on how each center had adopted telehealth, practices that had worked well, and barriers faced and how they were addressed. We conducted a secondary analysis of the interviews done with clinicians (N = 47). Five coders trained in

qualitative methods double-coded each transcript using line-by-line coding. Coders worked together to continuously refine the codebook and wrote memos after coding each transcript. We used the constant comparative approach, wherein each new line is compared to previous codes. Final codes were excerpted and organized by major themes. A larger team comprising telehealth experts, researchers, and primary care clinicians reviewed findings and discussed implications.

**Results:** Prompted by the pandemic, FQHCs developed new strategies for ensuring access to care for unhoused patients, including setting up telehealth in shelters or community-based organizations that serve unhoused people, setting up telehealth capacity in vans doing outreach activities, and providing free smartphones or tablets with telehealth capabilities. There was wide variation in providers' experience serving patients with limited English proficiency; some workflows allowed for seamless integration of interpreter services while others acted as a barrier to care. Telehealth services increased access to care for patients with disabilities and mobility issues and their families by reducing the burden of transportation. Providers also reported that telehealth substantially increased access to care and reduced no-show rates for patients receiving mental and behavioral health services. Mental and behavioral health providers found new ways to conduct group therapy visits utilizing features such as break-out rooms and waiting rooms. Numerous providers felt that telehealth allowed them to see more patients than they otherwise might have been able to in person, thus increasing access to care.

**Discussion:** Our study identified strategies employed by FQHCs to meet the needs of patients during the COVID pandemic. Given that these clinics are often under-resourced, it is unsurprising that they identified creative solutions to meet the needs of the most vulnerable. Our findings highlight the importance of developing long-term strategies that will ensure access to care for all patients and work towards health equity. Combining telehealth with outreach strategies (e.g., such as testing, needle exchange, services for unhoused persons, services for refugee populations) may be an effective way to improve access to care. More research on these strategies is warranted. Developing resources to educate and train patients on telehealth resources could also help to improve telehealth visits. Finally, dissemination strategies that focus on vulnerable populations and under-resourced clinics are needed to improve adoption of effective strategies.

### 25. Sociodemographic Factors Associated with No-Shows in Tele-Mental Health Services

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**Background:** Each no-show appointment signifies a missed opportunity for patient care, representing not only a squandered resource but also a reduction in the cost-effectiveness of the healthcare system. Given the COVID-19 pandemic exacerbation of pre-existing gaps in mental health services, increased demand outstripped available resources. This resulted in severe service shortages, especially in rural, resource-limited areas. Tele-mental health (TMH) services emerged as a pivotal tool, enabling the delivery of mental health services to patients in isolated locations. Studies have shown that non-surgical specialties utilizing telehealth experienced lower no-show rates compared to in-person care. However, the sociodemographic factors contributing to no-shows in TMH services remain unclear. This study seeks to explore these factors, with a focus on rural areas, aiming to highlight potential disparities and identify systematic barriers that need to be addressed to ensure equitable access to care.

**Methods:** In this retrospective cohort study, we analyzed data from patients who had completed, canceled, or were a no-show for TMH appointments at the Department of Psychiatry ad Human Behavior at the University of Mississippi Medical Center (UMMC), between March 2020 and June 2022. Study subjects were divided into two cohorts, those who had at least one no-show appointment during the study period and those who did not. Sociodemographic characteristics of the first TMH appointment were extracted. Recognizing the differing reasons that may have accounted for no-show appointments in adults and pediatrics, analyses were conducted separately for these two populations. A subgroup analysis specifically targeted rural residents to investigate the unique challenges this demographic may have encountered with regard to TMH service utilization.

**Results:** Our study encompassed 5430 adults, with 1725 having no-shows, and 4029 pediatric patients, with 1139 having no-shows. Results showed that adult no-shows were associated with younger age (mean (SD): 42 (15) vs 45 (16) years, $p < .001$), female (72% vs. 68%, $p = 0.005$), Black instead of White (odds ratio (OR) (95% CI): 1.6 (1.5, 1.9)), Medicaid coverage instead of Medicare (OR (95% CI): 1.9 (1.6, 2.3)), urban residency (73% vs 52%, $p < .001$), and household income over $42,000 (85% vs 76%, $p < .001$). Among pediatric patients, no-shows were more likely to occur among younger patients (mean (SD): 11 (4) vs 12 (4), $p = 0.034$), those with Medicaid insurance (53% vs 33, $p < .001$), and those residing in urban areas (56% vs. 46%, $p < .001$). Subgroup analysis showed that among adults in rural areas, no-shows were more prevalent with younger age (mean (SD): 41 (15) vs 43 (15) years, $p = 0.032$), Black instead of White (OR (95% CI): 1.8 (1.4, 2.3)), Medicaid coverage instead of Medicare (OR (95% CI): 1.7 (1.2, 2.5)), and household income below $42,000 instead of over $50,000 (OR (95% CI): 0.4 (0.3, 0.6)). Among rural pediatric patients, no-shows were associated with Medicaid coverage (54% vs 30%) and household income below $42,000 (52% vs 43%).

**Discussion:** This study illuminates the sociodemographic factors associated with no-show appointments in TMH services. Notably, both adult and pediatric cohorts saw a higher prevalence of no-shows among younger ages, urban residents, and Medicaid coverage, indicating unique challenges for these demographics. Additional disparities were observed among adults, with a higher prevalence of no-shows among females, Black patients, and those with a higher household income. In rural areas, greater barriers to access were reflected in a higher prevalence of no-shows among younger, Black adults with Medicaid coverage, pediatric patients with Medicaid coverage, and lower household incomes. These findings underscore the necessity of addressing socioeconomic, racial, and geographic disparities in TMH services, and emphasize the need for future research to better understand and address the underlying causes of these disparities, to help ensure equitable mental healthcare access.

### 26. Initial Outcomes of Statewide Implementation of a tSBHP in Mississippi's K-12 Public Schools

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**Background:** School-Based Telehealth Programs (tSBHPs) leverage innovative digital healthcare technologies to increase access to care, connecting students to essential health services especially in rural and underserved areas. tSBHPs address a variety of acute and chronic mental and physical health conditions, aiming to advance health equity, while fostering academic success through improved school attendance. tSBHPs offer integrative approaches for preventive and curative medical treatments, therapy, and health education. These authors present initial outcomes of the statewide implementation of a tSBHP in Mississippi public and charter schools for students in grades K-12. The program is supported by a grant from the MDE and

is administered by the Center for Telehealth (CFT) at the UMMC. Mississippi is a predominantly rural and medically underserved state that faces immense healthcare challenges. Included in this report are tSBHP utilization, demographics, and other health related measures.

**Methods:** In response to an RFP, the CFT at UMMC was awarded a grant by MDE in March 2022. MDE is using American Rescue Plan ESSER III funds to cover the grant. The grant period is from July 1, 2022, through Sept. 30, 2024. The tSBHP creates a telehealth delivery system within K-12 schools for remote access to health care, providing education on health maintenance and disease prevention to students, families, and school personnel. The grant covers all costs related to program implementation and telehealth visits excluding any prescription and diagnostic services.

All K-12 public and charter schools were invited by MDE to enroll in the program. UMMC delivered HIPAA-compliant tSBHP laptops, software, and compatible digital otoscopes and stethoscopes to participating schools. School nurses were trained to use this equipment, and students were referred to the program by school nurses and counselors. Behavioral health and urgent care services were provided by the UMMC CFT's counselors and NPs. Data collected from the initial 9 months of tSBHP visits were analyzed using UMMC's EMR and research platform. The researchers examined program utilization by demographics, payor information, medical diagnoses, prescribed meds, and session outcomes.

**Results:** From Aug. 1, 2022, through May 31, 2023, the tSBHP completed 550 urgent care and 262 behavioral health visits for a total of 812 visits. 67 of 140 eligible school districts enrolled, giving access to 387 schools with 174,633 students. 5 districts (7.5%) accounted for 343 visits (42.2%) with 35 districts (52.2%) having at least 1 visit. Out of 568 patients who had data available on gender, 51.4% were female and 48.6% were male. Of the 262 patients who had data on race, 105 (40.1%) were African American, 148 (56.5%) were Caucasian, and 9 (3.4%) were listed as "Other". The most common primary diagnoses for urgent care visits were RTI-related (348 patients, 94.6%). The most prevalent primary diagnoses for behavioral care visits were depression (85, 35.9%), anxiety (46, 19.4%), and ADHD (25, 10.5%). Notably, 213 of the 699 prescriptions (30.5%) were antibiotic treatments. Providers recommended 54 patients seek further evaluation (9.8%), 256 be sent home (46.5%), and 240 return to school the same day (43.6%). Insurance data revealed that most patients had MS Medicaid-sponsored plans (21.1%), and 17.4% had other insurance/payment methods. 61.4% of patients were designated "self-pay", which included patients with unknown insurance status.

**Discussion:** This report highlights the effectiveness of tSBHPs in improving access to care for school-aged children. These results can inform tSBHP expansions in states facing similar healthcare issues. Barriers to implementation were variations in school nurse staffing, digital literacy, stakeholder attitudes toward telehealth, community buy-in, and marketing challenges. Limitations of this study included incomplete patient demographic and insurance/payment information and variations in utilization amongst schools. Findings may not completely reflect long-term impacts from tSBHP implementation due to the short duration of the program. Future research should explore program wait times, generalizability for other states and nations, student attitudes, and how to best reduce barriers to program implementation. Furthermore, guidelines should be established to nurture more culturally sensitive tSBHP services easily adapted to meet constituents' needs.

### 27. With Telehealth You Save $Money and Stay Local

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**Background:** Telehealth has the capability of providing advanced care in rural areas. Data from a large in-state telestroke program was investigated for cost-savings when rural patients stayed on site. Typically, most rural small hospitals prefer to transfer all patients to secondary destination hospitals for the post-acute phase of stroke. A pilot study investigated the capability of keeping low deficit patients in their local rural hospitals and during the Pandemic; this became the norm due to staffing issues. This study examined the cost savings from avoided transports and outcomes for patients staying on-site.

**Methods:** In 2019, the University of Arkansas for Medical Sciences (UAMS) IDHI –teleStroke Program consults treated with thrombolytics were transferred to advanced care destination hospitals. During the height of the pandemic in 2020, many hospitals were lacked bed availability and nursing care. Many of the low deficit patients (baseline NIHSS <10) without cortical signs and negative computerized tomography angiograms (CTA) exams for Large Vessel Occlusion (LVO) were not transferred. Estimates of cost savings from non-transfers were based on national assessments for EMS ground transports. The outcome of the non-transfers and their cost savings were examined.

**Results:** In 2019, n = 123 (20% of consults) were not transferred from local hospitals. The non-transferred rate increased in subsequent years to 27% in 2020 (n = 130), 34% in 2021 (n = 118), and 35% in 2022 (n = 167). Combined minimum cost savings from avoiding transfer for calendar years 2019 through 2022 is approximately $687,026 accounting for 28% of treated consults. In 2022, among 167 treated patients who stayed on-site 67% were discharged home, 23% discharged to rehabilitative services and 5% to skilled nursing facilities.

**Discussion:** This study shows there is a cumulative cost savings to treat select patients in locally rural hospitals. Non-transferred patients because of telehealth selection criteria, can serve as revenue streams for rural hospitals.

### 28. 1-year cost of anxiety/depression treatment: telehealth vs. face-to-face in nationwide adult cohort

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**Background:** The trajectory of telehealth adoption was exponential following the COVID public health declaration. It is believed that telehealth can decrease costs for both health systems and patients. The diagnosis groups that experienced the most explosive growth in the proportion of visits in the initial pandemic period of 2020 were, in order (most to least), anxiety, depression, upper-respiratory tract infection, and urinary tract infection. Therefore, we aim to understand the cost, treatment patterns, and episode of care duration differences between patients who utilized telehealth vs. traditional face-to-face for anxiety or depression.

**Methods:** Utilizing 2020-2021 Meridian MarketScan® nationwide commercial payer data we identified all adults (18+) with a primary diagnosis of anxiety or depression, ensuring they had 3 months of coverage prior to initial treatment and 12 months post. The 12-month post period was utilized to measure treatment intensity and costs. The 3-month lookback period was utilized to measure both comorbid burden utilizing Charlson (inpatient files) and Elixhauser (outpatient files) comorbid indices. We excluded patients with renal failure, solid tumors, and metastatic cancer. We removed patients who crossed over from one arm to the other. We then calculated diagnosis-specific treatment costs and treatment intensity—as measured by the number of E&M, MTM, & talk visits. Comparisons for costs were made using a gamma-distributed log-linked generalized linear model, adjusting for age,

sex, Charlson score & Elixhauser score. Visits were counted as those with a primary diagnosis of anxiety or depression, with the primary procedure code (CPT) visit type {E&M, MTM, talk therapy, other}.

**Results:** Of the 587,772 subjects in the dataset who met the inclusion criteria—272,384 were treated solely via face-to-face (F2F) and 315,388 solely via telehealth (TH) for anxiety or depression. The average episode of care duration (last appointment in 12 months minus first appointment) was 249.0 vs. 207.3 days (TH vs. F2F).The average number of appointments for E&M in the 12 months following the index was 1.9±3.7 vs. 1.0±2.6 (TH vs. F2F), with an average interval between appointments (in days) of 17.5±28.3 vs. 10.4±24.8 (TH vs. F2F). The average number of talk therapy appointments in the 12 months following index was 6.5±12.1 vs. 2.4±7.9 (TH vs. F2F). The adjusted costs of anxiety/depression-specific care were markedly higher ($p < 0.0001$) among the telehealth group ($1,703, 95% CI: $1,691-1,714) than the face-to-face group ($745, 95% CI: $740-750). However, when modelling the costs per visit for anxiety or depression—adjusting for the same covariates—unsurprisingly we find smaller cost differences, comparing telehealth ($223, 95% CI: $221-224) to face-to-face ($192, 95% CI: $191-194).

**Discussion:** In comparison to traditional face-to-face, telehealth treated anxiety or depression was associated with greater costs in the 12-month period post-diagnosis. However, much of these costs are attributable to the greater number of visits and talk therapy among patients treated via a telehealth modality. Moreover, as the patients in the telehealth cohort had a longer episode of care it is possible there are unobserved differences in symptom severity between patients in the cohorts, unmeasurable due to non-report of anxiety/depression instrument results (e.g. HAM-D, GAD-7, Sheehan disability scale) in billing data. Further research prior to presentation at the SEARCH conference will examine these groups using quasi-experimental design (propensity score weighting) as well as examine SSRI/SNRI utilization and costs by group.

### 29. The Cost Effectiveness of Telemonitoring for Older Patients with Congestive Heart Failure

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**Background:** Using home telemonitoring equipment to provide care to adults 65 years or older with congestive heart failure (CHF) could be a useful solution to address the anticipated increasing rates of CHF in the future. Home telemonitoring allows remote daily monitoring of patients' vital signs and enables the detection of clinical deterioration to initiate early clinical interventions. A 2018 Center for Cardiovascular Telemedicine study compared the efficacy of telemedical intervention management for CHF patients with usual care (hybrid in-person and virtual care using remote patient monitoring technology) versus usual care (in-person) only. The study's results demonstrated that the structured telemonitoring-based management program reduced the days lost to unplanned cardiovascular admission and all-cause death (6.64% to 4.88%) and lowered the all-cause mortality rate (11.34% to 7.86%).

**Methods:** A Markov decision-analytic model was designed to estimate the potential outcomes of CHF with and without telemonitoring in a hypothetical cohort of older patients with HF (age 65 years or above). The outcomes were simulated for a time frame of 35 years or until death, whichever occurred first. The two strategies examined in this study were (1) Usual care plus telemonitoring (telemonitoring group) and (2) Usual care alone. The hypothetical cohort had a diagnosis of CHF classified as class I-IV based on the criteria established by the New York Heart Association (NYHA). The patient's health status progressed based on a corresponding probability in each monthly cycle. The model outcome measures were direct medical cost, quality-adjusted life-years (QALYs), and incremental cost-effectiveness ratio (ICER). Within each cycle, every patient was at risk for readmission for a CHF-related hospitalization and/or expiration from any cause. Those that survived might remain in the same NYHA classification or transition (improve or progress) to another NYHA classification.

**Results:** Each month over 35 years, the expected direct medical cost and QALYs of the Usual Care group were US $22,890 and 1.59 QALYs, respectively. The expected cost and QALYs of usual care plus telemonitoring over the same period were US $11,773 and 2.53 QALYs, respectively. Compared with hybrid telehealth, the increased cost was US $11,117, with a loss of -0.54 QALYs. The ICER for the usual care group was -20,426, which indicates that the use of telemonitoring with usual care was more cost-effective and gained higher QALYs at a lower cost. The analysis controlled for the avoidance of usual care in both scenarios during the COVID-19 pandemic. One-way deterministic sensitivity analyses were conducted for all model inputs. In examining the impact of the inputs on the overall effectiveness of care, the dominant inputs were transitions between NYHA classes, the overall utility of those with advanced CHF, and the overall mortality rate. Across parameters, the probability of HF-related hospitalization for an individual 65 years or older in NYHA Class II and the utility of an individual in NYHA Class IV had the highest impact.

**Discussion:** The model results indicate that adding telemonitoring to the usual care for managing patients over 65 with CHF is a cost-effective strategy, with an ICER that is significantly higher than that of usual care alone but below the WTP threshold ($50,000/QALY). The high probability of the telemonitoring group being accepted as the preferred strategy throughout a wide WTP range in the probabilistic sensitivity analysis further supports the finding that adding telemonitoring for CHF management is a highly cost-effective strategy.

### 30. Provider-to-provider sepsis telehealth use in rural emergency departments in Medicare beneficiaries

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**Background:** Sepsis is a life-threatening, time-sensitive condition that affects 1.7 million Americans annually, and sepsis mortality in low-volume hospitals is 38% higher than in higher volume hospitals. Provider-to-provider telehealth has been proposed as one strategy to improve sepsis care in rural emergency departments (EDs). The objective of this study was to measure the association between use of tele-emergency care (tele-ED) and sepsis healthcare costs, hospital length-of-stay (LOS), in-hospital mortality, and 30-day readmissions.

**Methods:** Multicenter comparative effectiveness cohort study of on-demand real-time video tele-ED care in a single Midwestern tele-ED network, using tele-ED capable hospitals vs. matched non-tele-ED control hospitals. We conducted an analysis of sepsis patients in a sample of participating rural EDs between 2017 and 2019 using fee-for-service Medicare data. In our hospital-level cohort analysis, our exposure was treatment within a tele-ED-capable hospital, and in our propensity-matched patient-level cohort analysis, the exposure of interest was treatment with tele-ED, compared with treatment in a matched cohort of patients treated in non-tele-ED capable

hospitals. Our primary outcome in both analyses was 30-day total healthcare Medicare costs, and secondary outcomes included LOS, in-hospital mortality, and readmissions. Multivariable generalized estimating equations were constructed in both analyses, using conditional log-transformed linear and logistic regression.

**Results:** We included data from 501 hospitals that treated 55,772 sepsis patients during the study period. Of those, 13,615 (24.4%) patients were seen in tele-ED-capable hospitals and 950 (7.0%) of those had tele-ED used. A total of 3,317 (5.9%) patients died in the hospital, 7,968 (14.3%) patients were transferred between hospitals, and median total 30-day healthcare costs were $16,789 (interquartile range [IQR] $9,821–$28,841). In the hospital-level analysis, adjusted total healthcare costs were 7% higher (95% confidence interval [CI] 2–12%) in patients treated in tele-ED-capable hospitals. Adjusted LOS (1% shorter, 95%CI [-3]–1%) and mortality (adjusted odds ratio [aOR] 1.04, 95%CI 0.91–1.19) were similar, while readmissions were lower (aOR 0.93, 95%CI 0.86–0.99). In the patient-level analysis, healthcare costs were 23% higher (95%CI 17–30%) in those treated with tele-ED vs. matched patients in non-tele-ED hospitals, while mortality (aOR 1.26, 95%CI 0.97–1.63), LOS (2% longer, 95%CI [-3]–7%) and readmissions (aOR 0.92, 95%CI 0.73–1.16) were similar.

**Discussion:** Tele-ED was used for a minority of sepsis patients in tele-ED capable hospitals. Care in a tele-ED-capable hospital was not associated with reduced LOS or healthcare costs, but tele-ED-capable hospitals may have had fewer readmissions. Future work should focus on identifying ways in which tele-ED can most effectively supplement local sepsis care.

### 31. College students' attitudes, beliefs, and intention to use telehealth for primary care

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**Background:** College students are less likely than the general population to have a regular primary care provider and engage in routine health visits. Some recent work has suggested that telehealth may be a potential solution for mitigating this disparity, as it provides a convenient alternative to in-person primary care that college students are comfortable engaging with. However, most of this work has examined students' attitudes, beliefs, and intention to use telehealth in the context of mental healthcare rather than primary care. In the present research, we report attitudes toward telehealth, beliefs about how telehealth compares to in-person care, and intention to use telehealth for primary care in a large, diverse sample of college students. These findings provide a greater understanding of the perceptions of telehealth in primary care settings and may aid in the development of telehealth interventions that target college students.

**Methods:** The participants in this study were undergraduate students at Virginia Commonwealth University (VCU). Participants were recruited between September and December 2022 and, following consenting procedures, completed an online questionnaire. Participants responded to items assessing comfort using telehealth, preferences for and perceptions of telehealth compared to in-person care, and concerns about use of telehealth. Participants additionally answered a single-item question assessing their likelihood of using telehealth. After completing the questionnaire, participants were compensated with credit towards a class research requirement. This study reports descriptive statistics and one-sample t-tests comparing sample means to the midpoints of each scale. The analyses reported in this study were conducted using SPSS Version 28.0.

**Results:** The sample included 621 students. Participants' levels of comfort using telehealth when ill ($M = 3.32$, $SD = 1.06$), $t(619) = 7.61$, $p < .01$, or for a routine checkup ($M = 3.21$, $SD = 1.19$), $t(618) = 4.37$, $p < .01$, were significantly greater than the scale midpoint. Though participants preferred in-person care over telehealth in general ($M = 3.97$, $SD = 1.07$), $t(619) = 22.52$, $p < .01$, participants were more likely to use telehealth to save a one- ($M = 3.73$, $SD = 1.18$), $t(618) = 15.27$, $p < .01$, or two-hour drive ($M = 4.21$, $SD = 1.09$), $t(618) = 27.62$, $p < .01$. More than half of participants expressed concern that telehealth would not be as effective as in-person care (86.8%) or help their problems (57.7%). Participants perceived that telehealth is more confidential ($M = 1.66$, $SD = 0.55$), $t(619) = 7.27$, $p < .01$, and takes less time ($M = 1.43$, $SD = 0.61$), $t(620) = -2.95$, $p < .01$, than in-person care. Students preferred to see their regular provider, compared to a new provider, via telehealth ($M = 1.28$, $SD = 0.55$), $t(620) = -10.05$, $p < .01$. Finally, participants' willingness to use telehealth services if offered by their primary care provider ($M = 3.32$, $SD = 1.12$) was greater than the midpoint, $t(620) = 7.17$, $p < .01$.

**Discussion:** In general, our findings suggest college students are willing to use telehealth and report neutral-to-positive attitudes toward telehealth. While participants indicated a preference for in-person primary care, telehealth was preferred when it would reduce the burdens of time and distance. Participants also expressed concern over the effectiveness of telehealth relative to in-person primary care. Finally, participants indicated that they would prefer to use telehealth with a known primary care provider. These findings highlight several directions for future research designed to promote primary care utilization in college students. Such future work should examine attitudes, beliefs, and intention to use telehealth in contexts where in-person services are difficult to access (e.g., rural areas), identify which services (e.g., prescription refills) can be delivered most effectively via telehealth, and identify best practices for establishing care with new patients via telehealth.

### 32. Virtual Nursing: A new model of quality care

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**Background:** Virtual nursing provides the potential to support acute, direct care nursing by leveraging remote staff thought technology to enhance patient care, safety, and outcomes. The purpose of a virtual nurse care program is to reduce care inefficiencies, impact patient care quality and satisfaction, and create flexibility for nurses to engage in innovative care while creating balance in their day-to-day lives. There is little comparative data on the success of these types of programs.

**Methods:** We performed a prospective nonrandomized comparative trial of a virtual nurse program in two medical-surgical units at a large community teaching hospital in the suburbs of Philadelphia. These two units share the same manager and staff and generally care for patients in observation status, although patients converted to inpatient status will often remain on the unit. Twenty-three mobile, two-way audiovisual cameras were stationed in patient rooms and utilized throughout the patient's stay. Any patient admitted to a monitored room was included. Patients unable to participate due to language barriers and patients who refused were excluded. Primary virtual nurse interventions were admission and discharge education and documentation, purposeful rounding, and ad-hoc activities such as scribing and MRI checklists assigned by unit nursing staff. Virtual nurse (VRN) tasks and other information were communicated using secure messaging and work list task assignment through the electronic health record. The main data points that were collected included the average discharge

order to event for both observation patients and inpatients and the length of stay for inpatients and observation patients. Data is presented with descriptive techniques.

**Results:** Over the 3-month period, 391 patients were monitored by a virtual nurse Monday-Friday, 9am-9pm. Of the four main data points, the average discharge order to event for inpatients saw the biggest difference between Non-VRN and VRN. In March, the average number of hours for non-VRN was 4.5, whereas for VRN the average number of hours was 1.6. In April, the average number of hours was 3.4 (non-VRN) vs 3 (VRN). In May, the average number of hours was 4 (non-VRN) vs 2.5 (VRN). VRN had an improvement over non-VRN, but that data was too close to be considered statistically significant over the 3-month period (95% CI, [-0.6228,-0.5728], $p = 0.05$). The data points of average discharge event time for observation patients were not significant ($p > 0.05$). The length of stay for inpatients showed improvement but was not statistically significant (95% CI, [-0.3682, -0.3518], $p = 0.05$). However, the length of stay for observation patients showed no improvement and did not have a significant value ($p > 0.05$).

**Discussion:** In this study of virtual nursing, in an acute care observation and short stay unit, benefits were limited to reduced time from order to discharge. We are now expanding study of virtual nursing to med-surgical units that have longer lengths of stay as we believe there is more opportunity to demonstrate impact on length of stay in those units.

### 33. Identifying Optimal Strategies for the Implementation of Telemedicine in the Global Surgical Period

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**Background:** The implementation of telemedicine by healthcare providers was accelerated by the COVID-19 pandemic and in most health systems has reached a lower but steady percentage of total visits. As health systems navigate the integration of telemedicine modalities into care delivery models, understanding the way each discipline can optimally utilize this technology has become increasingly important. The purpose of this study was to determine how specialists who perform surgical procedures as part of their practice want to implement telemedicine into their practice and when they believe it can be most effectively used within their work schedule.

**Methods:** A survey regarding opinions about the use of telemedicine in the postoperative period was conducted in late 2019 prior to the onset of the COVID-19 pandemic and re-administered about one year later. The respondents were identified by department and division as physicians who perform at least some surgical procedures. All respondents practice as part of a single urban, academic, multispecialty group across the DC-Maryland-Virginia area. These healthcare professionals were asked about their experiences in telemedicine, willingness to incorporate telemedicine into their practice for postoperative visits during their global surgical period, and their opinions on how accepting patients in general may be of telemedicine. The follow-up survey provided an opportunity to examine how opinions evolved after having obligatory telehealth experience during the pandemic. Survey responses were analyzed and descriptive statistics are presented in this study.

**Results:** A total of 77 unique respondents participated in the surveys, and we evaluated the responses of the 75 participants who had any telemedicine (TM) experience. Respondents were 74.7% male, 66.7% were aged 36-55, and 46% had between 1-10 years of practice experience while the rest reported >11 years of experience. Additionally, specialties included traditional surgical specialties, interventional radiology, ophthalmology, and dermatology. Of those who completed the second survey, 77.1% expressed that the COVID-19 exposure to TM increased their interest in video TM follow-ups for postoperative visits. Respondents further believed that 93.6% of patients in general also express a similar sentiment. However, just 46.7% believe TM would increase their productivity even if the technological infrastructure was perfect. When asked about preferences for when they would perform TM visits, 40.0% said they would want to conduct them as a part of regular hours and 41.3% said they would want these visits during a dedicated time within working hours. If given the chance to offer TM outside regular hours or during the weekend, the majority of respondents was against it or unsure, 77.4% and 88.0%, respectively.

**Discussion:** Although a majority of the respondents surveyed think patients are interested in telemedicine and are themselves interested in using telemedicine follow-ups in the post-surgical period, less than half believe that telemedicine would increase productivity. Also, there is great variability in preference for dedicated timeblocks for telemedicine versus integration into traditional clinic schedules. As health systems continue to iterate on optimal models to integrate telehealth into efficient care delivery, it is important to better understand how physicians performing surgical procedures consider the value proposition of telemedicine for post operative care. Further study is required to understand the barriers to utilizing telehealth and how its implementation could impact reimbursement, work hours, the future of work as well as patient access, patient convenience, and patient satisfaction.

### 34. Addressing Health Care Inequity Among Pediatric Patients with ADHD in a Primary Care Network

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**Background:** Attention deficit hyperactivity disorder (ADHD) is one of the most common disorders of childhood, affecting 9-15% of school-aged children. Optimal care of ADHD requires frequent healthcare visits for medical management and behavioral interventions. Office visits disproportionately challenge our most vulnerable Medicaid patients who experience more transportation concerns thus questioning how well we are achieving healthy equity in the management of ADHD. Telemedicine provides one solution by providing efficient quality care and alleviating concerns about transportation. However, disparities in use of telemedicine mandates efforts to break down barriers to telemedicine amongst our most vulnerable pediatric patients so that equitable access to care is truly achieved.

**Methods:** We designed and implemented a pilot project to address the most identified barriers to telemedicine with a goal of enhancing access to care for ADHD patients. Specifically, these included providing high quality internet service, access to a device with appropriate apps, technical support for digital health and education on how telemedicine could support care of their child. In July 2022, a pediatric primary care network distributed 76 ipads with paid internet service and pre-loaded apps for one year to patients with ADHD aged 6-12 years with a goal of enhancing remote access to care through telemedicine. Education and IT support were provided to the families to ensure digital literacy.

This pilot project concluded June, 2023. Outcomes from one year before (July 2021 – June 2022) will be compared to the intervention year (July 2022 – June 2023). We will evaluate volume of completed ADHD visits, types of visits (telehealth vs office based), and medication adherence by reviewing

pharmacy data of filled stimulant prescriptions. Finally, through pre and post questionnaires we will assess family experience with telemedicine to identify themes, barriers, areas for improvement and areas of value

**Results:** Initial baseline data of the pre-intervention year reveals our patients represent a vulnerable population as 100% are publicly insured and the majority having either a very low (64.1%) or low (15.4%) nationally normed Child Opportunity Index. The patients are racially diverse with more than half identifying as either Black (39.7%) or Mixed races (23.1%). In the pre-program year, patients completed 397 ADHD related encounters, of which 18.9% were telehealth and 81.1% were office-based visits. Within departments, behavioral health had a relatively higher percentage of telehealth related ADHD visits as compared to primary care (25.3% and 17.0%, respectively). Baseline medication adherence data is being analyzed. Prior to the project, 75% families had previous experience with telehealth. Families have identified top reasons to use telehealth: reduced travel, no need to pay for gas, less time off school, and less time off work. The intervention year completed June,2023. Analyses are currently underway to report metrics and compare to the prior year.

**Discussion:** ADHD is a common pediatric chronic health condition which requires significant medical and behavioral support for optimization. Families experiencing poverty and a low Child Opportunity Index are disproportionately at risk for transportation challenges leading to gaps in care. While our families are already using telehealth for a small subset of their ADHD visits, we hypothesize that providing a device and stable internet service will enable them to increase their telehealth usage further, strength their medical home further and improve medication adherence thus lessening disparities in care. Such findings would provide a scalable solution for broader implementation. Alternatively, if no difference is identified, community efforts can appropriately focus on other solutions to access to care.

### 35. Assessing Attitudes Towards Telehealth in an Underserved, Uninsured Patient Population

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**Background:** Telehealth has the untapped potential to improve healthcare for underserved communities. It is an asset that can improve healthcare access in underserved communities, provide continuity of care, reduce strain on clinic resources, decrease travel time, costs, and lost wages from work absenteeism. However, the COVID-19 pandemic revealed a striking disparity in which patient demographics face barriers to using this modality. Providers from areas of high SVI have reported greater barriers to telemedicine versus those from low SVI. Without addressing these barriers, telehealth will remain underutilized and healthcare inequities will persist in these communities. This pilot study was conducted at Stony Brook HOME, Renaissance School of Medicine's primary care free health clinic for the underserved, uninsured patient demographic in Suffolk County, NY. It aims to investigate barriers to telehealth in this population.

**Methods:** Surveys (n = 92) were administered bimonthly from August 2022 to July of 2023. They were administered in both English (40.2%) and Spanish (59.8%), leveraging patient time spent in the waiting room. Translators were on-site to clarify questions as needed. Surveys collected information on patient demographics, attitude toward telehealth, and perceived patient barriers to telehealth. Descriptive statistics were applied to the patient responses.

**Results:** Most patients were Hispanic/Latino (67.4%), female (54.3%), and 40 to 60 years old (53.3%). In general, there was both a lack of awareness of telehealth (29.4%) and utilization (23.6%). Most Spanish-speakers came from zip codes with high social vulnerability indices (Brentwood, 11717). There was a baseline literacy level in the population with 79% having completed high school or higher. English-speakers were more likely to have reliable internet access (1.6x), own a smartphone (1.4x), computer (3.1x) and tablet (4.8x) than Spanish speakers. English-speakers were also more comfortable using smartphones or tablets than Spanish-speakers ($\bar{x} = 4.5$ vs. 3.4, Likert scale).

**Discussion:** Results demonstrate a lack of telehealth awareness, utilization and buy-in for its ability to replace in-person visits. This was compounded by barriers disproportionately felt by Spanish-speakers, including smartphone ownership, reliable internet access and technological comfort. Addressing telehealth barriers through survey-directed interventions may improve continuity of care and patient outcomes.

### 36. Inpatient Teleneurology Consultation Service in a Rural Hospital Following Physician Shortage

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**Background:** The COVID-19 pandemic has prompted a rapid transformation in healthcare delivery and increasing telehealth services in the United States. However, significant disparities were found in geographic access to Neurologists, where 11% of the physicians served 20% of Americans in rural areas. Moreover, specialists like Neurologists tend to settle in urban areas. Audio-video consultations can bridge the gap in the availability of specialists and improve healthcare access. The University of Mississippi Medical Center collaborated with the South Central Regional Medical Center in implementing a hybrid care model among rural Neurology inpatients in Laurel, Mississippi. We presented the design and results from our project, which aims to overcome the geographic barriers and disparities in neurology care as well as alleviate the inconvenience and stress associated with care-seeking behavior, mitigate challenges to transportation, and time constraints, while providing adequate quality care.

**Methods:** UMMC Department of Neurology and Telehealth Center of Excellence provided equipment and support to SCRMC, enabling Teleneurology consultations by a remote Teleneurology team at UMMC to all inpatient Neurology patients admitted to SCRMC. We conducted a retrospective observational quality improvement study to evaluate the telehealth utilization among inpatient Neurology patients between January 18, 2023, and June 30, 2023. Eight Neurologists participated in the hybrid care model, where patients received telehealth care from the remote team when no specialist was available in SCRMC, and patients received in-person care by Neurologists when specialists were present. Data were collected on patient demographics, diagnoses, service types, and care utilizations. Descriptive statistics were employed to assess the volume, visit types and geographic attributes of virtual Neurology visits.

**Results:** Of the total number of inpatient Neurology encounters, which totaled 251 initial and follow-up visits, 138 total distinct patients were identified through Teleneurology care and would not have received specialty care otherwise. The average age of the Teleneurology patients was 67 years, of which 67 (49%) were females and 71 (51%) were males. Most patients were White (64%), followed by Black (36%). Four patients required transfer to a higher level of care, while 61% of patients who received Teleneurology consultation were discharged home with self-care or home health care. The number of visits per month was 52.6 for virtual care, where the number of

initial visits per month was 22.3, and the number of follow-up visits per month was 27.3. In addition, the most common diagnoses for telehealth encounters were cerebral infarction (30%), epilepsy (10%), and encephalopathy (4%).

**Discussion:** Our implementation of an inpatient hybrid Neurology service demonstrates the potential of Teleneurology services to provide access to specialty care that the underserved population would otherwise not have. Our study also highlights the capability of Teleneurology services to provide comparable diagnoses in rural and resource-limited settings. Teleneurology service is valuable to patients, providers, and the hospital, as it provides the community an avenue for access to specialist care without the need to transfer to higher care facilities. Future research is necessary to evaluate the long-term clinical outcomes and patient satisfaction with Teleneurology services, with the aim of improving access to Neurologists for rural and vulnerable populations. Through telehealth services, we can help bridge the geographical gap, integrate the care infrastructures, and ensure Neurology specialist care is accessible to individuals residing in underserved areas.

### 37. Successful Implementation of a Novel Telemedicine Program in a Rural Child Advocacy Center

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**Background:** Pike County, located in rural Pennsylvania, has no local healthcare system. Access to specialized pediatric healthcare, especially for victims of suspected child sexual abuse (CSA), is limited. The National Children's Alliance accreditation standards for children's advocacy centers (CAC) includes that all suspected victims of CSA are entitled to a medical evaluation by a health care provider with specialized training and expertise; yet, this care was not accessible in this county. Telemedicine offers opportunity to improve access to forensic medical care for victims of CSA. Children's Hospital of Philadelphia (CHOP) and Dickson House CAC collaborated to establish a telemedicine program to deliver high-quality, timely medical evaluations for child victims of CSA. The goals of the program were 1) to evaluate the feasibility of an on-site telemedicine program at a rural CAC; and 2) implement a sustainable model that could be expanded and/or replicated in other rural counties.

**Methods:** A quality improvement framework was utilized to guide methods, decisions on technology solutions, and implementation. Initial stakeholder engagement between CHOP and Dickson House CAC established the goals of a full-service telemedicine clinic in a co-located medical suite at the CAC. An on-site health care professional (HCP) was identified locally and hired by Pike County to provide P-SANE-informed patient care support at the originating site. An agreement was developed with a local lab to support on-site specimen collection for sexually transmitted infection and pregnancy testing. Given existing on-site forensic interviews, a process map was established to include synchronous, real-time telemedicine evaluations integrated in the CHOP Epic electronic health record. The originating site HCP facilitates the visit with a remote, CHOP child abuse pediatrician (CAP). Use of Epic Canto and a Tytocare device allow for gathering history and general physical examination. For the ano-genital examination, a customized CHOP telemedicine cart was developed to provide telecolposcopy via Epic Canto. The originating site HCP positions the patient and the CAP provides direct examination including photodocumentation and guidance to the HCP.

**Results:** There were 46 unique patients (total 47 patient encounters) who received high-quality forensic medical evaluations for suspected CSA at Pike County CARE Clinic. Age range was 2 to 17 years with median age 10 years. Most patients were female (80%, n = 37). Seven patients declined ano-genital examination. Of those patients who agreed to ano-genital examination (n = 39), thirty-six patients had diagnostic quality ano-genital examinations, which allows for 92% diagnostic quality. For the three patients for whom diagnostic quality examination was not achieved, one female patient had discomfort; one female patient could not maintain optimal positioning; and one male patient had difficulty with cooperation. Variants of normal ano-genital anatomy were identified in multiple patients. Testing for sexually transmitted infections was sent in 65% of patients (n = 30). Medical concerns unrelated to sexual abuse were identified in several patients requiring further follow up including concern for mental health, food allergies, skin findings, elevated blood pressure, heart murmur and premature pubarche. Additional child physical abuse concerns were identified in one patient warranting a new report to child protective services agency.

**Discussion:** We were able to demonstrate feasibility of a successful and sustainable partnership through a unique, telemedicine program for evaluation of suspected child sexual abuse. Specialized forensic medical evaluations with photo-documentation, including testing for sexually transmitted infections as indicated, are achieved with demonstrable, high-quality outcomes. Accessible, comprehensive, trauma-informed telemedicine care is feasible in the rural setting, and provides a crucial medical service for this population. Current priorities include testing the expansion of the clinical service to child physical abuse evaluations, as well as expansion and replication in other rural counties. The success of this telemedicine program may inform policies to improve access to specialized pediatric healthcare for victims of suspected child maltreatment in rural areas.

### 38. Telehealth for children with medical complexity during the COVID pandemic: A qualitative study

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**Background:** Children with medical complexity (CMC) are a group of children with heterogeneous health conditions that involve multiple organ systems, have high needs for health services long-term from multiple providers. Although models of telehealth exist, telehealth services have not been widely available until the COVID-19 pandemic. In response to the COVID-19 pandemic, telehealth has become more ubiquitous for outpatient pediatric care. Presently, health insurance programs are evaluating whether telehealth flexibilities need to be continued. Understanding caregivers' perspectives is important when making policy decisions about telehealth in the healthcare delivery for children. The objectives of our study are to understand the benefits and challenges of telehealth from the perspectives of caregivers of CMC.

**Methods:** This qualitative study conducted between February and April 2022 at Brenner Children's Hospital in Atrium Health Wake Forest Baptist in North Carolina. The study involved semi-structured interviews with 23 caregivers of CMC (15 English; 8 Spanish) about their perspectives on the benefits and challenges of telehealth for their children. We purposively sampled children in 6 subgroups (Black race, rural residence, age >10 years, telehealth nonuser, ≥10 appointments/year, and Spanish caregiver language). Qualitative data were audio recorded, transcribed, coded, and analyzed using thematic content analysis. A survey prior to the interview elicited caregivers' experiences with telehealth and included Telehealth Usability Questionnaire (TUQ). Child-level (age, race, ethnicity, health insurance status and address) and encounter-level data (number of clinic and telehealth appointments) were obtained from the electronic health record.

**Results:** Characteristics of children: median age 11 years; 61% non-White; 35% Hispanic; 43% rural; median distance to the hospital 22 miles. Of the

caregivers, 96% had smartphones and 57% preferred smartphones for telehealth. Caregivers' comfort levels for using computers, smartphones, or patient portal was high. The median overall score for TUQ was 6.3; the reliability subscale score was the lowest (5.6).

Five qualitative themes emerged: (1) Telehealth allayed caregivers' fears about their children's exposure to COVID-19 and mitigated the challenges with in-person visits during the pandemic. (2) The benefits of telehealth extended beyond the pandemic and helped address the many disruptions for the child and caregiver associated with in-person visits. (3) Telehealth presented technological (e.g. internet problems) and logistical challenges (e.g. not being offered by providers). (4) There were clinical limitations to telehealth, including inadequate evaluation of the child and caregiver-provider communication. (5) Caregivers were satisfied with telehealth and wished it remained an option beyond the pandemic. There were no subgroup differences in themes, except that three Spanish-speaking caregivers did not use patient portal.

**Discussion:** Caregivers of CMC were satisfied with telehealth and were comfortable using telehealth for their children's care. Caregivers valued telehealth for the care of CMC during the pandemic and believed it should continue as an option post-pandemic. In addition to pandemic-related challenges, telehealth addressed the logistical challenges associated with in-person visits for CMC and reduced caregiver stress. There are many challenges with telehealth, especially telehealth not being offered consistently by providers. These challenges need to be addressed systematically to improve access to telehealth. As telehealth is implemented widely, it is important to remember that systems developed primarily for English-speaking families may perpetuate disparities in healthcare access. Implementation of telehealth in clinical practice and policies to make telehealth permanent could improve access to care for CMC.

### 39. A hybrid model (In person followed by Telehealth visit) of ambulatory care leads to improved outcome

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**Background:** The COVID-19 pandemic saw a significant surge in Telehealth visits bolstered by relaxation in regulatory restrictions and payment parity for audio-video and audio-only visits. However, with the end of the Public Health Emergency (PHE) on May 11, 2023, flexibilities diminished and payors including State Medicaid stopped reimbursing for audio-only visits. Furthermore, questions persist surrounding adequacy of clinical information captured during Telehealth visits. These uncertainties raise concerns about long-term sustainability of Telehealth, especially audio-only visits. Thus, health systems have developed hybrid models using both in-person and Telehealth visits to offer the best outcomes for all stakeholders. However, there is scarce research to support the hybrid model of care. In this study, we demonstrate how combining an initial in-person visit with a subsequent follow-up visit (or multiple), either by audio-video or audio-only, provides improved clinical outcomes at lower cost.

**Methods:** The study conducted at Waianae Coast Comprehensive Health Center (WCCHC), a Federally Qualified Health Center (FQHC) on the island of Oahu, Hawaii, evaluated 3 primary care visit modalities: in-person, initial in-person followed by audio-video visit (in-person/AV), and audio-only (in-person/Aud). Patient volume and visit counts were recorded over a 1-year period from April 2020 to March 2021. Cost comparison involved risk adjustment for patient groups equivalently sick, except for visitation type. Raw costs were adjusted using the CMS-HCC Risk Adjustment Model, which considers diagnostic and basic demographic factors. To enhance accuracy, Foresight Health Solutions utilized an AI-based risk model incorporating diagnostic risk, demographic factors, and Social Determinants of Health (SDoH). This model produced more precise predictive cost and risk estimates compared to models excluding SDoH. Health outcomes for visit modalities and study groups were quantitatively assessed using patient health quality metrics (HQM). HQMs were calculated by dividing the total number of met/performed during the study period by the number of quality indicators the patient was eligible for at the study's onset, based on their diagnostic and demographic profile.

**Results:** During the pandemic peak (April 2020-March 2021), 14,706 patients studied received medical care at WCCHC. Distribution of unique patients and average visits per month across 3 primary care modalities: in-person (4811, 4.55), in-person/AV (582, 4.06), in-person/Aud (248, 4.04). Unadjusted average per member per month (PMPM) cost: in-person ($234), in-person/AV ($190), in-person/Aud ($266). Patient groups displayed varying degrees of chronic illnesses and SDoH factors, with the in-person/AV group healthiest and in-person/Aud group most challenged. An AI-driven risk score incorporating diagnostic risk, SDoH, and demographic factors was utilized addressing modality disparities. The adjustment reduced PMPM cost for initial visits followed by Telehealth visits: in-person ($234), in-person/AV ($169), in-person/Aud ($183). Moreover, compared to patients receiving only in-person visits, the Telehealth groups exhibited improved HQMs across most indicators, except for cervical cancer screening. Compared to other specialties, primary care providers (PCP) accounted for in-person (44.3), in-person/AV (60.8), in-person/Aud (53.8). Barriers to AV visits: lack of internet access, poor connectivity, camera-less devices, and limited digital literacy

**Discussion:** In conclusion, we demonstrate a hybrid model of care that integrates in-person visits allowing for a comprehensive physical assessment combined with audio-video or audio-only visits may reduce costs and improve health quality metrics compared to in-person visits only. Payors should be cognizant of the value provided by not only audio-video visits but also audio-only visits for a more equitable access to healthcare and continue to support reimbursement in the post-pandemic era with equal parity.

### 40. Jefferson Health's E-Consult Program: A formalized "curbside" consult between providers

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**Background:** E-consults are an outpatient asynchronous tool that allows for a formalized "curbside" consult between a primary care provider and a specialty provider. Providers are able to seek guidance from a colleague to help them make an informed decision. Additionally, e-consults advance the system in moving toward value-based care and improve specialist access. For patients, e-consults eliminate unnecessary visits to see a specialist in person, which creates a more seamless and patient-centered experience.

**Methods:** We performed a prospective observational study of a cohort of patients receiving an e-consult within our health system. The program was launched in psychiatry, based on high demand for medication and diagnosis assistance. We targeted patients with general psychiatry and addiction related concerns.

The e-consult workflow was initiated when, the primary care provider placed an order in EPIC. The order contained a combination of structured and unstructured fields balancing triage of complaints with free text. The provider documented verbal consent from the patient and confirmed that the e-consult is for non-emergent reasons. After submitting the e-consult, it

went to a specialist In-Basket pool. Providers would be notified, and they were then able to open the encounter, review the details, and document the consult using a standardized template.

The specialty providers were able to document the billing code. After the specialist completes the recommendations, it automatically routes back to the primary care provider who contacts the patient with recommendations and documents the conversation.

**Results:** In the first 6 months of the program, 170 consults were completed resulting in an average of 28.3 consults per month with a turnaround time of less than 48 hours in >95% of cases. Assessment of provider experience through qualitative data showed extremely high rates of satisfaction. Institutional assessment of this program has resulted in expansion to other specialties.

**Discussion:** We successfully report the implementation of a psychiatry e-consult program that had rapid growth, rapid turn around and high degrees of provider satisfaction.

### 43. Insights on Telehealth Use and Program Integrity Risks in Medicare

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**Background:** The Office of Inspector General (OIG) developed a series of reports to determine the impact of the dramatic increase in telehealth during the pandemic on the Medicare program. Our work addresses two critical questions:

(1) What are the characteristics of beneficiaries who used telehealth during the first year of the pandemic?

(2) What, if any, safeguards are needed to protect the program and beneficiaries against fraud, waste, and abuse related to telehealth?

These reports are designed to shed light on how the temporary expansion of telehealth affected different groups of beneficiaries and identify ways to safeguard the Medicare program. Notably, as the independent oversight organization for the Department of Health and Human Services (HHS), OIG has a unique role in driving change by making recommendations to improve the efficiency and effectiveness of HHS programs.

**Methods:** These reports are based on extensive analysis of Medicare fee-for-service claims data and Medicare Advantage encounter data for the first year of the pandemic from March 2020 through February 2021.

To examine the characteristics of beneficiaries who used telehealth during the first year of the pandemic, we analyzed data from the Medicare Enrollment Database. Using these data, we compared the likelihood of beneficiaries to use telehealth across different characteristics, such as age, sex, race and ethnicity, geographic location, and dual eligibility status.

To assess program integrity concerns related to telehealth services, we worked with OIG investigators to develop seven program integrity measures that focus on different types of billing for telehealth services that may indicate fraud, waste, or abuse. For each of these measures, we set very high thresholds to identify providers whose billing poses a high risk to Medicare.

**Results:** We found that beneficiaries in urban areas were more likely than those in rural areas to use telehealth. Further, dually eligible beneficiaries, Hispanic beneficiaries, younger beneficiaries, and female beneficiaries were also more likely than others to use telehealth. For each group, we found that their likelihood of using telehealth was not impacted by their likelihood of using any health care service. This was particularly notable for Hispanic beneficiaries, who were less likely than others to use health care services overall but were actually more likely to use telehealth services. Additionally, we found that almost one-fifth of beneficiaries used certain audio-only telehealth services, with the vast majority using these services exclusively. We found that older beneficiaries were more likely than others to use these audio-only services, as were dually eligible and Hispanic beneficiaries.

At the same time, we identified 1,714 providers whose billing for telehealth services poses a high risk to Medicare. Although these high-risk providers represent a small proportion of all providers who billed for a telehealth service, these findings demonstrate the importance of strong, targeted oversight of telehealth services.

**Discussion:** Our findings demonstrate how the temporary expansions to telehealth improved access for Medicare beneficiaries. Beneficiaries in urban areas—who have not historically had access to telehealth—were more likely than those in rural areas to use telehealth. Telehealth particularly improved access for those who are medically underserved, such as Hispanic beneficiaries. Further, as many beneficiaries who used audio-only services did so exclusively, this may suggest that these beneficiaries face barriers to using audio-video telehealth services. We recommended that CMS use telehealth to advance health care equity.

These findings also offer insight on how to protect Medicare against fraud, waste, and abuse. We recommended that CMS strengthen monitoring and targeted oversight of telehealth services. The findings in both reports provided timely information to decisionmakers as they considered future Medicare telehealth policies, including whether to extend certain temporary flexibilities.

### 45. A pragmatic telemedicine program for unhoused, vulnerable patients to drive primary care outcomes

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**Background:** Unhoused individuals (UI) are more likely to have poor health outcomes and experience a myriad of barriers to healthcare access, resulting in high ED utilization and insufficient primary care. This population is also disproportionately comprised of racial and ethnic minorities, compounding health disparities. Telemedicine has improved access to care, but the digital divide has prevented UI from benefitting. Innovative models to deliver care to the unhoused are needed to achieve health equity. Here we describe the iterative development and implementation of a multimodal clinical program to deliver primary care to UI in a mid-size urban setting.

**Methods:** We conducted interviews and focus groups with 22 key stakeholders to identify preferred settings and methods of primary care delivery (7 patients, 5 physicians, 7 medical students, and 5 community organization members). After initial program development, electronic health record (EHR) integration was attempted to improve healthcare system continuity and data collection.

**Results:** The importance of 1) establishing trust, 2) providing easy access, and 3) having no associated financial burden for patients was noted by all stakeholders. Consequently, we implemented a program with three arms: 1) in-person visits at a community organization, 2) video visits at a community organization, and 3) street medicine outreach with community partners. In the initial 3 months of EHR integration, we had 118 visits with 63 unique patients. Most identified as male (81.7%) over the age of 45 (64.3%). More identified as Black or African American (32.2%) than in Charleston County as a whole (24%). In the six months prior, our patients had 172 ED visits and 20 hospitalizations, but only 20 outpatient visits. Patients identifying as Black or African American were more likely to be seen in the ED than those identifying as white (49% vs 32% of visits), but less likely to be seen in the outpatient setting (0.5% vs 8.7%).

**Discussion:** Stakeholder guided development and implementation of a hybrid in-person and telemedicine program tailored for UI can provide primary care to this vulnerable, hard to reach population that traditionally receives care in acute hospital-based settings. Current utilization patterns suggest special consideration of minority populations is imperative to achieve equity.

### 46. Changes in Pediatric Provider Perceptions of Telehealth Use during the COVID-19 Pandemic

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**Background:** Prior to the COVID-19 pandemic, the healthcare community was generally reluctant to accept telehealth as a way of delivering high quality healthcare. Stringent regulatory laws impeded broader adoption of telehealth to deliver care even at the expense of longer patient wait times and poorer access to care. With patients unable to receive face-to-face care in outpatient settings during the COVID-19 Pandemic, providers and health systems, from primary care to specialties, were forced to adopt telehealth practices quickly. From March to August of 2020, the number of video visits at a large academic institution increased to 7500/day. Providers had to adapt quickly to minimize the disruption of their patients' medical care and regardless of their experience and preference towards telehealth care, were required to use telehealth technology. Understanding usability and adoptability by primary and subspecialty providers are important as we create hybrid high quality health delivery models.

**Methods:** Providers in an urban pediatric academic center included physicians, psychologists, physician assistants, and nurse practitioners practicing primary care, a medical subspecialty or behavioral health completed electronic surveys sent in March ("early implementation period") and August ("late implementation period"). Participants completed one or both surveys within 4-6 weeks. Respondents indicated their practice area and role, demographics, and rated level of agreement on five statements about telehealth implementation in their clinical practice (acceptability, appropriateness, feasibility, ease of use, and openness to using telehealth in the context of COVID). Using descriptive and Chi-Square analyses, we compared telehealth usability measures amongst pediatric primary care (PCP), subspecialty, and mental health providers during the pandemic. Providers rated their assessment of telehealth compared to in-person practice on eight domains (patient engagement, parent/caregiver engagement, provider engagement, quality of patient/provider relationship and communication, convenience for families, efficiency for providers, difficulties with technology, privacy and confidentiality, and patient safety) using a Likert scale.

**Results:** Analyses found overall agreement for telehealth appropriateness, especially later into the pandemic, with highest appropriateness ratings from mental health providers, followed by subspecialists, and then primary care. However, significant differences became apparent between the three provider groups in terms of comparing telehealth vs. in-person practices and between early and late COVID-19 pandemic. Favorability for telehealth in terms of acceptability, appropriateness, feasibility, and ease of use trended in opposite directions from early to late pandemic between primary care and mental health providers. Amongst the three groups, PCPs had the least favorability ratings for telehealth even after five months of use.

**Discussion:** Providers' experiences with telehealth during the Pandemic gave them valuable insights and added to our understanding of telehealth's advantages, limitations, and harm. Previous usability and adoptability perceptions and opinions changed, mostly in the positive direction, depending on the provider's role. Such insights provide critical knowledge as we engineer tomorrow's hybrid healthcare model that seeks to optimize technology supported value driven healthcare delivery.

### 47. Choosing or Losing in Behavioral Health: A Study of Patient Experiences Selecting Telehealth vs In-p

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**Background:** Patient choice is a key dimension of patient-centered care and a core domain of health care quality, and supporting choice is consistent with shared decision-making. However, little research has explored whether patients perceive that they have access to both in-person and telehealth visits and how the decision to use a particular modality is made. The impact of telehealth's enduring growth on patient modality choice (telehealth vs. in-person) is unknown. We aimed to explore patient experiences with selecting telehealth vs. in-person visits for behavioral health care and perceptions about their agency in the decision.

**Methods:** We applied a concurrent mixed-methods design that included a nationally representative survey and interviews with adults with depression and bipolar disorder. The survey was fielded in February-March 2023 with a nationally representative sample of 2,071 adults (including 571 who used behavioral health services) using the RAND American Life Panel (ALP) omnibus survey. Interviews were conducted in December 2022-March 2023 with 26 individuals recruited through the Depression and Bipolar Support Alliance (DBSA), a national nonprofit peer support and patient advocacy organization. We also worked with DBSA to convene a peer council comprised of ten individuals with lived experience receiving treatment for depression or bipolar disorder. Council members provided feedback on survey and interview questions and interpretation of findings. We analyzed quantitative and qualitative data separately and integrated findings using a contiguous approach.

**Results:** Many patients did not have a choice of visit modality. Among survey respondents, 31% of those receiving therapy and 33% of those receiving medication visits reported that their clinicians did not offer both in-person and telehealth visits. Further, 32% of respondents reported they did not typically receive their preferred visit modality, and 45% did not believe their clinician had considered their modality preferences most of the time. Interview findings revealed that some clinicians did not elicit patient preferences regarding visit modality. Even in cases where interviewees reported that they did have a choice, they often needed to advocate for their preferred modality to their clinician. Perceived lack of choice impacted satisfaction and rapport with clinicians and encouraged some individuals to seek care elsewhere.

**Discussion:** Findings reveal that patient modality preferences need to be a greater consideration in both clinical discussions and policy decisions. For telehealth to achieve its potential to increase access to quality, patient-centered care, it is important to implement it in a manner that expands, rather than contracts, behavioral health access and options for patients.

### 48. Tele-Mental Health Service Usage and Impact on Healthcare Utilization and Costs in Mississippi

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**Background:** The prolonged duration of the COVID-19 pandemic, coupled with the associated stressors, disruptions to daily life, and limited access to healthcare, worsened mental health issues. Tele-mental health (TMH) emerged as a viable approach to providing accessible mental health care during the COVID-19 pandemic. Mississippi, a predominantly rural and economically disadvantaged state, faces grave disparities and shortages of mental health services. While studies demonstrated the feasibility and efficacy of TMH in diagnosing and managing mental illness conditions, there is a need for research on the associated healthcare resource utilization (HCRU) and costs. This study aimed to examine the sociodemographic disparities in TMH utilization and assess its impact on HCRU and medical costs during the COVID-19 pandemic. By focusing on a specific population in Mississippi, this study provides insights into the potential benefits of TMH services in an underserved, resource-limited setting.

**Methods:** A retrospective cohort study was conducted to compare sociodemographic characteristics, HCRU, and medical costs among patients who used TMH and those who did not at the University of Mississippi Medical Center between March 1st, 2020 and June 30th, 2022. UMMC, Mississippi's only academic medical center, transitioned its vast majority of mental health services to TMH within a week, demonstrating its commitment to maintaining healthcare access during the pandemic. As patients may seek healthcare services from multiple institutions, to minimize the potential bias, the study cohort consisted of insured patients who regularly sought healthcare from UMMC. Specifically, patients who met the following criteria were included in the study: (1) had at least one mental health service that was primarily paid by insurance, (2) had at least three scheduled visits per year for two years during the study period, and (3) completed at least two visits. Patients were categorized into two cohorts, based on their utilization of TMH services throughout the study period. A subgroup analysis focused on patients residing in rural areas.

**Results:** The study included 3,697 subjects, with 2,354 utilizing TMH services and 1,343 not utilizing them. Sociodemographic disparities observed between TMH and non-TMH cohorts indicated that the TMH cohort was more likely to be younger (mean (SD): 45.6 (16.4) vs 49.7 (16.4); $p < .001$), female (71.9% vs 66.4%, $p < .001$), White or Caucasian (52.6% vs 35.9%, $p < .001$), and residing in rural areas (23.1% vs 19.7%, $p = 0.015$), compared to the non-TMH cohort. After adjusting for sociodemographic characteristics, results showed that TMH utilization was associated with 219% increased mental health-related outpatient visits ($p < .001$), 42% increased mental health-related medical costs ($p < .001$), 7% increased all-cause outpatient visits ($p = 0.012$), but 11% decreased all-cause medical costs ($p < .001$). The subgroup analysis of rural residents identified that TMH utilization was associated with a higher proportion of White or Caucasian subjects ($p = 0.002$), 244% increased mental health-related outpatient visits ($p < .001$), 63% increased mental health-related medical costs ($p < .001$), but 18% decreased all-cause medical costs ($p = 0.002$).

**Discussion:** Our study highlights sociodemographic disparities between TMH and non-TMH cohorts, with younger patients, females, and those residing in rural areas being more likely to utilize TMH services. The higher proportion of White or Caucasian patients in the TMH cohort, observed in all subjects and the rural subgroup, emphasizes the need to address the awareness and accessibility, along with the consideration of cultural acceptability of TMH services, among underrepresented racial groups. The study also demonstrates the positive impact of TMH on mental health-related outpatient visits and medical costs, suggesting its value in enhancing mental healthcare access and reducing overall medical costs. Moreover, this study underscores the crucial role of TMH in addressing the mental health needs among geographically isolated, underserved rural communities. Future research should target uninsured populations, including those without access to healthcare services.

### 49. Tele-Mental Health Utilization Trend with Rural-Urban Differences in Mississippi 2020 – 2022

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**Background:** Mental illnesses, affecting over 20% of U.S. adults in 2021, pose a significant public health and economic burden, especially in underserved rural areas. Tele-mental health (TMH) services have played a crucial role in meeting mental health needs, transcending geographical boundaries and socioeconomic barriers to reach patients residing in isolated rural communities. In response to the COVID-19 Public Health Emergency, the Centers for Medicare and Medicaid Services (CMS) and private payers expanded coverage policies for TMH services. This policy adaptation, coupled with the necessity for physical distancing, dramatically accelerated TMH adoption across the U.S. healthcare sector. This study explores the TMH utilization trend in Mississippi from 2020 to 2022, investigating patient sociodemographic characteristics associated with TMH usage. The findings contribute to understanding the impact of the pandemic and policy changes, and can inform future policymaking.

**Methods:** We conducted a retrospective analysis of patients seeking healthcare from the Department of Psychiatry and Human Behavior at the University of Mississippi Medical Center (UMMC) from January 2020 to June 2022. UMMC, located in the Jackson metropolitan area, serves a diverse patient population with varied sociodemographic backgrounds, including economically disadvantaged and underserved populations from rural areas. We collected data on completed encounters, investigating the volume trend of TMH and in-person care during the study period. Given the potential differences in TMH adoption and specific mental health needs between adults and pediatric populations, analyses were conducted separately. To capture the impact of the COVID-19 pandemic and associated policy changes on TMH usage, we compare sociodemographic characteristics of patients who utilized TMH services during the COVID-19 outbreak (January – June 2020) and those who did so after the initial wave (January – June 2022), stratified by rural-urban residency.

**Results:** Between Quarter 1 (Q1) 2020 and Q2 2022, there was a marked shift in the mode of mental health services utilization, with a surge in TMH usage noted in Q2 2020 for both adult (Q1 TMH vs in-person: 710 vs 3,230; Q2 TMH vs in-person: 3,667 vs 846) and pediatric patients (Q1 TMH vs in-person: 734 vs 1,744; Q2 TMH vs in-person: 1,729 vs 829), surpassing in-person visits. Over time, in-person services gradually regained their predominance, particularly in 2022. It's noteworthy that the pediatric population consistently exhibited a higher proportion of in-person to telehealth visits compared to adults throughout the study period. In terms of the sociodemographic characteristics of patients who had TMH visits, there was a significant increase in TMH use among rural patients from 2020 to 2022 in both adults (36.46 vs 40.38%, $p < .001$) and pediatrics (43.57% vs 56.79%, $p < .001$). In addition, rural adult TMH users had lower household income in

2022 ($p < .001$), while urban adult TMH patients were more likely female ($p = 0.032$). Furthermore, both rural and urban pediatric TMH users increasingly relied on self-pay in 2022 with a standard difference of 0.36 and 0.55, respectively (both $p < .001$).

**Discussion:** This study reveals the transformative impact of the COVID-19 pandemic on TMH utilization and highlights how health policies influenced TMH uptake across sociodemographic strata in Mississippi. The surge in TMH during the pandemic affirms its potential as a flexible and accessible modality, especially beneficial for vulnerable populations. However, the return to in-person services dominance by 2022 raises concerns about the long-term sustainability of TMH post-pandemic. This trend was especially pronounced among pediatrics, possibly due to unique barriers such as parental involvement requirements that could complicate TMH implementation. The amplified TMH use among rural and lower-income groups, coupled with a higher proportion of self-pay users in 2022, suggests potential unmet needs and barriers to conventional healthcare access. Further research is imperative to understand these disparities and optimize TMH use beyond crisis periods, ensuring equitable mental health access for all.

## 50. Building an Equity Focused Digital Health Navigator Program

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**Background:** At the peak of the COVID 19 pandemic, more than 50% of CHOP's outpatient appointments switched to video visits. Families who met the following indicators were at a higher risk of incomplete video visits: English as a secondary language, High Social Vulnerability Index score, Enrolled in public insurance. Families who met these indicators had a greater potential to need more assistance logging on to their appointments, which at the time became the responsibility of the providers and the medical team. In August 2021, the Digital Health QI team formed the Digital Health Navigator Program under Family & Visitor Services to address the needs of this patient population in a pilot. A SMART aim was created to reduce the no-show rate for telehealth video visits for the identified cohort population by 50% by December 2022.

**Methods:** The Digital Health Navigator intervention was implemented over a 10-month period. 10 specialty care clinics and 2 care network sites were included in the pilot. A team of two full time Digital Health Navigators was deployed with the sole purpose of identifying needs and barriers to successfully completing video visits for the cohort population. This team later grew to a team of 4. Digital Health Navigators utilized a customized DAR (Department Appointments Report) to sort patients by cohort criteria. Digital Health Navigators proactively contacted patients in the cohort 24-48 hours prior to their scheduled appointment to provide:

Video Visit education, help with portal account activation, and troubleshooting portal access issues. A dashboard was used to analyze the impact of the intervention and determine which risk factor(s) had the most influence over successful video visit completion. Digital Health Navigators documented their telephone encounters in our electronic health record using a smart form to aid with collecting data to inform future PDSA cycles (see right) and inform a weighted score system to generate a customized DAR to help Digital Health Navigators prioritize families with the greatest risk/need.

**Results:** Due to the Digital Health Navigator intervention, the pilot clinics saw a decrease in video visits cancelled within 48 hours and no-shows. This reduced the loss of revenue for the organization. The cohort population improved its video visit completion rate by a sustained average of 5% over a 6-month period. The No Show rate was decreased from 21% to 10%, therefore meeting the goal of a 50% reduction.

**Discussion:** The Digital Health Navigator (DHN) role increases the likelihood of video visit completion for groups facing digital health barriers. The intervention narrowed but did not close the disparity gaps. The DHN role is most impactful when telehealth visit volumes are high. It is important to track the impact of new methods of care delivery on health equity, as doing so can help identify and remediate widening gaps early. Next steps for our organization include further expanding the DHN program, embedding health equity impact assessment into new digital health interventions and projects, and including equity as a filter for organizational wide dashboards and other analytic tools.

## 51. Virtual Nursing

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**Background:** UNC Health searched for hybrid models that bring resources to the bedside to mitigate challenges such as nursing shortages, rising costs, and the growing experience complexity gap. Virtual nursing (VN) is the delivery of expert nursing care from a remote location using technology like audio/video communication, remote monitoring devices, and access to Epic for clinical decision support to deploy resources more efficiently. The VN program includes support for admissions, patient education, discharges, and reviewing medication histories, all aimed at improving efficiency by accelerating the speed of clinical interventions. We focused on implementing workflows that take the most tasks off the bedside nurse's plate. The VN performs any aspect of the admission, discharge, or education session, that does not require physical touch. In this model, the bedside nurse completes and documents any portion of the physical assessment and follows up on any concerns identified by the VN.

**Methods:** The first UNC Health VN pilot started on August 9, 2022. For the pilot, they utilized nurses on light duty, nurses in quality clinical positions, and nurses in non-clinical areas. The pilot team developed criteria for identifying admissions best fit for virtual nursing and created a process for escalation of assessment findings. UNC Health is working on a best practices document to share with other entities interested in offering VN. The pilot team targeted experienced nurses nearing retirement or those who may have shown interest in other opportunities. We are developing a nurse satisfaction survey that will include feedback from the virtual and bedside nurses. Patients have relayed that they appreciate the opportunity to have an experienced nurse available to them in a one-on-one setting, free of interruptions. When the virtual session takes place while a patient is held in the ED, patients have reported that they feel their course of care is progressing, and again appreciate the opportunity to ask questions of a nurse they feel is dedicated to them. Unit nurses appreciate the time saved by VN which can then be redirected to patient care activities, scheduled breaks, and improved time management.

**Results:** Within the first 3 weeks of the pilot, it expanded to 5 units and then to all units in that hospital and the hospital's sister location by the following month. The VN team at these 2 hospitals averages over 600 admissions, discharges, and education sessions per month. Translating to almost 700 hours (about 4 weeks) of time saved for the unit nurses in January and February of 2023. Since the pilot's start, we expanded VN to all units in another UNC Health hospital on January 31, 2023. We're currently in the planning stages of expanding VN in 8 other UNC Health hospitals. Each hospital will have fully operational VN programs by the end

of 2023. We see patient satisfaction rates increase in hospitals with VN using our HCAHPS scores. Other positive feedback from patients and nurses has been unsolicited. Of note, the in-depth admission assessment afforded by VN captures more data and health information than the traditional method allows. This is of particular importance regarding social determinants of health, considering the coming CMS mandate for its collection, and the importance of such information for community health support beyond discharge. 24/7 coverage remains the goal as volumes and opportunities to reduce workload increase.

**Discussion:** UNC Health is reviewing opportunities for telemonitoring, where the VN remotely monitors and reviews patient charts to identify signs of decompensation to intervene quickly to prevent complications; telementoring and precepting for training and educational purposes; medication second signature when the bedside nurse gives a high-risk medication or blood product; partnered with the Sepsis Program to improve first-dose antibiotic times in the ED; working to incorporate 3-way virtual sessions with in-house language translators and lactation consultants; exploring a partnership with our hospital at home service to improve patient catchment; and are discharging same-day surgery patients directly from the PACU. Overall, there are many variations of VN, and it offers a spectrum of benefits. From connecting clinical care team members to minimizing patient risks and enhancing the care experience for patients, and their family members and caregivers, the use cases are vast.

## 52. Telemedicine workflow characterization and experience of pediatric clinicians: A qualitative study

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**Background:** The sudden shift to telemedicine in March 2020 required small, independent pediatric practices to adopt telemedicine at a rapid pace. Telemedicine systems add new layers of technologies and workflow changes compared to in-person care. Engaging pediatric patients over telemedicine, environmental factors, and patient technology interactions can raise additional workflow challenges. Knowledge of pediatric workflows and clinician experience at an intersection of telemedicine and other health IT technology use could help in understanding the nature and efficiency of telemedicine care delivery. In this quality improvement study, we aim to characterize pediatric telemedicine workflows, gain insights on experience delivering telemedicine care, understand clinician perspectives on efficiency, quality of care and virtual physical exams, and patient safety as well as identify the need for solutions to streamline clinician workflows and enhance telemedicine technology.

**Methods:** We recruited 10 pediatric clinicians (7 board-certified physicians; 3 nurse practitioners (NPs)) from an independent pediatric practice in Texas. We aimed to observe clinicians in their natural environment via 5 clinical observation sessions with each to map telemedicine workflow and care delivery. After obtaining verbal consent from patients, one researcher unobtrusively observed telemedicine calls and took open-ended notes about care delivery, communication, virtual physical exam (VPE), documentation, and technology navigation including description of activities and timestamps. Open-coding qualitative approach is used for analysis. Quantitative analysis is used to quantify call times and activities. To visualize the observed workflows, fragmentation of tasks, and multitasking activities, we use belt representations and pathway analyses. Follow-up interviews were conducted with eight clinicians (two unavailable) to better understand experience with telemedicine calls, focusing on demographics, workflow, efficiency, quality and safety of care, success of conducting VPEs, and technology needs. Thematic analysis is used for analysis. Analysis is ongoing.

**Results:** Observations: We conducted 46 observations in Fall 2022. The mean call length was 12.7 min and delay was 9.8 min. Over 61% calls included VPEs. Clinicians relied on parent judgment and assistance to complete VPEs. About 60% of patients joined calls via mobile devices. Unsteady devices and movements (46 codes) caused shaking and movements, which was distracting for clinicians.From 9.5 hours of observed calls, 4.2 were spent on direct care; 1.4 on documentation and review; 1.45 on multitasking. Clinician gaze was often situated on EHRs limiting eye contact. Documentation was completed at a later time.

Interviews: Clinician experience with telemedicine was 2.9 years and reported seeing 5-10% caseload via telemedicine. Reported benefits were access to care and convenience. Challenges were technology issues and inability to conduct VPEs for certain medical conditions. Clinicians rated patient safety (8.6/10), care quality (8/10), and care efficiency (7.4/10) via telemedicine. Reported challenges impacted efficiency. Clinicians reported the need for support to troubleshoot technology issues. Switching back and forth between in-person and telemedicine appointments is tedious although with lower caseload, patient convenience was a priority.

**Discussion:** Our findings reveal opportunities to enhance clinician experience and workflows. Environmental factors (physical space, lighting, etc.), technology setup and availability restrict clinicians' ability to conduct VPEs and communicate during telemedicine calls. Access to low-cost, efficient, direct-to-patient medical solutions can increase quality and safety of connected care. Targeted resources focusing on technology and physical arrangements, use of mobile devices, and VPEs can prepare parents and improve clinician experience and care communication. Technical support burden may result in poor care and workflow fragmentation. After over two years of widespread telemedicine adoption, these challenges affect clinical workflows and care delivery. Outcomes of this quality improvement study will support dissemination of solutions to enhance clinician and patient experience of telemedicine in small and independent practice settings.

## 53. Interstate Compacts for Healthcare Licensure: A Systematic Analysis of State Legislation

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**Background:** Cross-state licensure remains a barrier to telehealth adoption and utilization. Interstate healthcare compacts provide an innovative solution to this problem, facilitating interstate licensure portability among many healthcare specialties, allowing states to maintain their autonomy, and providing additional oversight for out-of-state providers to governing/disciplinary bodies. These compacts are also well-suited to facilitate telehealth services when providers and patients are located in different states. However, healthcare compact models vary considerably among healthcare specialties, and the context supporting/influencing compacts has changed significantly, particularly following the COVID-19 public health emergency. Our study aimed to describe the current state of the interstate healthcare compact landscape and identify facilitators and barriers to interstate healthcare compact implementation in three phases: exploration/preparation, early implementation, and sustainment.

**Methods:** We conducted a mixed methods study, analyzing both primary and secondary data sources. We analyzed existing compact and legislative websites to determine state-level healthcare licensure compact participation over time. Additionally, we conducted semi-structured qualitative interviews with key healthcare compact stakeholders to explore influences on compact implementation in exploration/preparation, early implementation, and sustainment phases.

**Results:** Overall, we observed an increase in healthcare compact bills passed over time, as established compacts recruit new states as participants and new compacts emerge and begin passing state-specific legislation. Through the analysis of semi-structured qualitative interviews, we found both facilitators and barriers to successful compact implementation, including challenges reaching consensus among a diverse set of stakeholders in the draft legislative process, responding to myths and rumors about healthcare compacts, a lack of accessible centralized data systems, a lack of streamlined processes for criminal background checks, variation in malpractice definitions at the state level, and a lack of funding to innovate, sustain, and expand compacts.

**Discussion:** Interstate healthcare compact models have increased and expanded over the past several years. However, several challenges to widespread or even universal adoption amongst all states and territories in the United States remain. Based on our qualitative analysis, we summarize several recommendations for interstate healthcare compact implementation to facilitate interstate healthcare licensure portability, telehealth utilization, and healthcare access more broadly.

### 54. Willingness to Pay for Internet Services

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**Background:** The rapid expansion of telehealth in recent years has made internet access a staple of healthcare delivery. While telehealth use hinges on fast and reliable internet connection, little is known about consumer willingness to pay (WTP) for internet services and its characteristics. To address this gap, we developed a novel technique and systematically estimated the WTP for internet services.

**Methods:** We developed and deployed a unique survey and collected the responses of 5,200 Americans about their WTP for internet speed and quality. Then we used conjoint analysis to estimate the utility associated with each level of internet speed and quality. Then, using a novel curve-fitting model that our team has developed, we estimated WTP both using the conventional point-estimation approach and our novel method.

**Results:** Internet users are willing to pay an extra $1.13 per month for 1Mbps faster speed and $45.52 per month for improved connection quality. The curve-fitting approach revealed a strong non-linear behavior: a given internet speed boost generates the most value for users with the slowest internet, whereas the same speed boost confers negligible value on users with the fastest internet. Specifically, assisting a user to improve their speed from 1Mbps to 25Mbps creates 2.32 times more value than assisting a user to improve their speed from 25Mbps to 100Mbps. A similar non-linearity arises in terms of internet quality.

**Discussion:** The results have important policy implications. Internet policy makers, who want to generate the most value for consumers, should focus subsidies on assisting users with poorest internet access before assisting other users. In this sense, offering internet subsidies to the right population (distributive efficiency) could be as important as – if not more important than – raising funds to subsidize internet access.

### 57. Telehealth Utilization for Primary Care Services by Substance Use Disorder Diagnosis at the VA

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**Background:** The number of US Military Veterans with substance use disorder (SUD) continues to increase, with 2.4 million diagnosed as of 2022. Primary care serves as one of the gateways to initiate and engage SUD patients for treatment of substance abuse and overall care. Within the Veterans Health Administration (VA), however, there are disparities in preventive care quality, lower satisfaction with access to care, communication, and comprehensiveness for primary care services among Veterans with SUD. With the rapid expansion of telehealth in primary care during the COVID-19 pandemic, it is unclear how telehealth has impacted access and use of primary care services among Veterans with SUD compared to non-SUD patients. More specifically, this study examined patterns of telehealth use before and after the onset of COVID-19 by SUD diagnosis at the VA.

**Methods:** The study included a nationwide retrospective cohort study of Veteran patients in primary care during 3/16/19-3/15/22. The study cohort consisted of Veterans with at least one primary care visit (either outpatient regular primary care or mental health integrated primary care visits) and a SUD diagnosis between 3/16/18-3/15/19. Identified primary care visits were categorized by mutually exclusive modalities: in-person, video-to-home visits, phone, and secure message visits. Telehealth visits included video-to-home, video-to-clinic, phone, and secure message visits. Based on the distinct pattern in monthly telehealth use, the study period was divided into four segments: 1) Pre-pandemic period (3/16/19-2/15/20), 2) early pandemic period (2/16/20–7/15/20), 3) intermediate pandemic period (7/16/20–12/15/20), and 4) late pandemic period (12/16/20–3/15/22). Adjusted analyses were conducted using multivariable negative binomial regression models, where the outcome was person-level visit counts for each segment. These analyses examined the association between SUD diagnosis and telehealth use.

**Results:** The study included 5,249,930 Veterans, where 466,013 Veterans were diagnosed with SUD in 2018-2019. Veterans with SUD were predominantly younger [mean (SD) = 57.1 (14.1) vs 63.4 (16.4)], male (92.3% vs 91.2%), Black (24.1% vs 16.6%), less likely to be married (36.6% vs 58.6%), and less likely to have non-VA insurance (58.7% vs 72.8%) (all p's<.001). After controlling for patient demographic and clinical characteristics, telehealth visit rates were 1.09 times higher for SUD patients compared to non-SUD patients in the pre-pandemic period (95% CI:1.08-1.09). However, after the pandemic onset, the difference decreased to 0.97 (95% CI:0.95-0.97) immediately after the pandemic onset but increased to 1.04 (95% CI:1.01-1.04) two-years after the pandemic onset. According to additional multivariate results, among SUD patients the rate of telehealth visits increased by 2.39 times immediately after pandemic onset compared to pre-pandemic period (95% CI:2.36-2.39), followed by 1.40 times more visits two years after pandemic onset (95% CI:1.39-1.41).

**Discussion:** This study contributes to the understanding of the telehealth use for primary care services among Veterans with substance use disorder. For both

SUD and non-SUD patient groups, the use of telehealth modalities increased immediately after the pandemic but gradually decreased to a new normal substantially above pre-pandemic levels. Therefore, like non-SUD patients, use of telehealth services in primary care continued to provide a viable modality for Veterans with SUD. This highlights the need for sustaining accessibility of telehealth services for all patients, including patients diagnosed with SUD. Additional research is needed to better understand the effect of telehealth use on care quality, patient experience, and outcomes among Veterans with SUD.



### 58. Projected Patient Volume For Tele-EMS In Rural Georgia: A Cross-Sectional Study

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**Background:** Access to emergency departments is limited in low-resource rural areas. EMS becomes burdened by lower acuity demands that compromise its primary critical care responsibilities. Integrating telehealth with EMS dispatch could improve access to appropriate alternatives.

**Methods:** This is a population-based cross-sectional study to estimate the number and of patients who are eligible for 911 dispatch call-directed telehealth visits as in lieu of EMS transport to an emergency department. The setting was 15 federally designated underserved rural counties in Georgia, served by Atlanta-based Grady EMS. The target population was residents in these counties, approximately 182,920 people. Grady EMS dispatch data from 2019 and 2020 was sourced.

**Results:** Selected counties represented 2.3% of the state and 10% of the state's geographical area. 26% of the target population was below the federal poverty level, compared to 16% for Georgia, and 14% for the US. The target population is more likely to be uninsured (16.4%) than Georgia (13.8%) and the US (9.4%).

The Grady EMS 9-1-1 call center dispatched 34,620 calls within 14 of these counties in 2019, representing 152 calls/1000 people, and 100 calls/day. Of these calls, 1,431 were time-sensitive, high acuity conditions. On EMS scene evaluation, 1,337 patients refused hospital transport after treatment. 4,258 refused medical assistance (RMA).

In a subset analysis of two counties, in 2020, there were 9,517 calls with EMS arrival. Of these 841 calls were low acuity and telehealth-appropriate (based on established EMS protocols). Extrapolating this to all 15 counties (total population 182,920) would yield an additional 2,858 such calls. This results in a projected annual volume of 3,699 low acuity telehealth eligible calls to 9-1-1 dispatch for all 15 counties.

In a separate subset analysis of the two counties, 2,934 (2,480 + 454) EMS calls involved ambulance dispatch without patient transport: a non-transport rate of 31% and 29% resp.

**Discussion:** There is a significant volume of patients in the RMA, non-transport and low acuity categories of 911 dispatch calls in underserved rural counties. These patients might be better served by direct to consumer acute unscheduled telehealth visits. Further investigation of this opportunity is warranted.

Limitations of the study: Extrapolation of data from two counties to estimate rates for 15 counties might not account for regional differences. There are also limitations associated with the inclusion of 2020 data due to the impact of the COVID-19 pandemic.

### 60. Traditional and telehealth primary care costs at the Veterans Health Administration during COVID-19

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**Background:** A recent (2020) scoping review of the literature on the economic evaluation of telehealth suggests that there are potential cost savings when telehealth services are used, such as reduced travel time and expenses for patients and providers. However, research findings on determining whether telehealth services in primary care can reduce healthcare system costs are inconclusive and perhaps difficult to capture. This study compares preliminary cost data for outpatient primary care services between in-person/traditional care and telehealth modalities at the Veterans Health Administration (VA) during a three-year period before and after the COVID-19 pandemic (March 2019 through September 2022).

**Methods:** We used data extracts from the VA Health Economics Resource Center to examine total cost and frequency of primary care encounters for a nationwide sample of 129 VA sites. Primary care encounter data were retrieved beginning one year prior to the onset of the COVID-19 pandemic (i.e., 3/3/2019) through two and a half years after its onset (9/24/2022). All encounters were separated by visit modality: face to face primary care, telephone primary care, and video primary care. Total encounters (n = 69,963,221) included 34,802,604 face to face encounters, 32,452,871 telephone encounters, and 2,702,246 video encounters. Total costs and encounters were summed by week for each modality, which enabled evaluation of weekly average cost per encounter for face to face, telephone, and video.

**Results:** Prior to COVID-19, most VA primary care encounters (67.76%) were face to face, and had a weekly average cost per encounter of $414, with 31.34% delivered via telephone and less than 1% of encounters delivered through video. Prior to March 2020, the average cost of telephone encounters was no more than $205 and video encounters ranged from $409 to $609. During the initial year of the COVID-19 pandemic, there was a rapid shift in the VA's primary care delivery modality which reduced face-to-face encounters to 30.49% and increased telehealth encounters to 69.51% (64.06% telephone, 5.45% video visits). By March 2021, modalities and costs partially reverted back to pre-COVID-19 levels, but the percentage of telehealth delivery remained higher than it was before March 2020. Throughout the timeframe of this analysis, the average weekly cost per encounter for the telephone delivery modality was lower compared to face-to-face visits ($243 for telephone and $441 for face-to-face) .

**Discussion:** This descriptive analysis of costs of telehealth vs. face-to-face visits at the VA represents an initial examination of the fluctuations in average weekly costs. These shifts reflect both the changing volume and resources required to support various modalities of primary care delivery, with lower average costs observed for telehealth when it became a preferred option for assuring care continuity during the acute phases of the pandemic response. Future studies should examine both patient and system level factors to help expand our understanding of telehealth economics at the VA. VA primary care delivered via telephone has maintained a larger of the share of encounters compared with the period before COVID-19, and had a lower average cost compared to face-to face visits, indicating potentially increased efficiency and access to care for some veterans.

### 62. Advances in Pediatric Telehealth Education and Training: Past, Present, and Future

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**Background:** The COVID-19 pandemic has accelerated the formal integration of telehealth into education curricula and training programs nationally, prompting the need to re-evaluate the current landscape, with the goal of elucidating opportunities and gaps in the delivery of telehealth education and training to inform a research agenda. Using results of the 2020 survey, Telehealth Utilization in Response to the COVID-19 Pandemic (1), as a starting point, we developed a survey to assess the current state of telehealth education and training across pediatric medical facilities, including curriculum content, training competencies, certification modalities, and research.

**Methods:** In the Spring of 2023, members of the Supporting Pediatric Research on Outcomes and Utilization of Telehealth (SPROUT) and American Academy of Pediatrics Section on Telehealth (SOTC) listservs received email invitations to participate in a survey. Emails included the purpose of the voluntary survey, participation requirements, estimated time for participation, contact information, and consent language for voluntariness, anonymity, and risks. Survey questions were derived from expertise in the SPROUT Telehealth Education Working Group. The questionnaire review was completed by pre-test with a round of 3 reviewers completing the initial draft and a second round reviewing the updated version incorporating iterative and consolidated feedback. Upon completion of revisions, IRB was obtained through the Children's Hospital of Philadelphia (IRB 22-019909), and the survey was distributed to the SPROUT and SOTC listservs (> 126 organizations) through REDCap. A total of 35 survey responses from 18 U.S. States and one Canadian province were received. Analyses include descriptive statistics using percentages and bivariate statistics using Chi-square tests.

**Results:** Thirty-two respondents (91.4%) indicate that they are providing some combination of telehealth education and training. The majority of education and training provided are internally developed didactic (78.6%) and experiential (64.3%) learnings. Externally developed learnings were significantly fewer with only 42.9% didactic and 11.5% experiential. Differences were demonstrated between the types of learners and the provision of either telehealth education or training provided. Redundant responses from the same institutions were evaluated and accounted for through data management and statistical evaluation. Survey responses were cross-tabulated across demographic data with statistical significance demonstrated between the type of responsible educator (Clinical/Provider Educator 82.8%) and the provision of Telehealth Training and/or Education (n = 24 yes) (chi = 6.4732, p = .01). The 20 respondents who include education/training in telehealth research protocols and who also conduct telehealth research (74%) reported requiring or providing optional training in research. A majority of respondents (69%) currently provide or would like to provide a certificate of attendance, completion, education credits, and/or competencies.

**Discussion:** Overall, respondents measured the impact of the education and training primarily on the individual experience of the learner (59.3%) followed by implementation progress (48.2%) and quality in effectiveness (40.7%). Valuable future research topics were identified as access and equity (88.9%), telehealth service integration (88.9%), physical exam skills (81.5%), and quality improvement (81.5%). Respondents indicated that telehealth education and training are key factors within current and future service development, provision, and research in order to demonstrate competencies and positively impact patient care. The limitations of this study include a small sample size of primarily academic health centers in non-rural settings, though these align with previous surveys. Future direction includes establishing best practices and a repository of resources along with a process for instituting national accreditations, training standards and competency guidelines for workforce preparedness.

References

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## 63. Individual and Community-Level Predictors of Hospital-at-Home Patient Outcomes

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**Background:** Hospital-at-home (HaH) programs in the United States quickly launched during the COVID-19 pandemic, increasing hospital capacity and an avenue for patients to receive hospital services in the comfort of their home. Advanced Care at Home (ACH) is a Mayo Clinic HaH program that launched in 2020 and cared for patients in three different U.S. states. As more systems adopt HaH, we must understand individual and community factors influencing patient outcomes.

**Methods:** Using a retrospective quantitative approach, we collected data from three Mayo Clinic centers: Eau Claire, Wisconsin (W.I.), Jacksonville, Florida (FLA), and Phoenix, Arizona (ARZ). Community-level data were from the U.S. Federal Department of Health and Human Services Agency for Healthcare Research and Quality. We conducted binary logistic regression analyses of odds ratio associations among patient characteristics (individual-level and community-level) and three dependent variables: readmission to Mayo Clinic within 30 days of discharge from ACH, mortality within 30 days of discharge from ACH, and escalation of the patient from ACH back to the brick-and-mortar hospital.

**Results:** Data from 1,435 patients who participated in ACH from July 2020 to December 2022 were compiled from electronic health records. Patient characteristics include male (53%), non-Hispanic White (95.5%), and Married (68.2%). The mortality rate was 2.8%, 30-day readmission 11.4%, and 8.7% escalated back to brick-and-mortar hospitals. Older adults have statistically significant higher odds of readmission (p-value = 0.04). Neither race nor ethnicity significantly predicted readmission, mortality, or escalations (p-value >0.05). However, the severity of illness was a statistically significant predictor for readmission, mortality, and escalation back to the brick-and-mortar hospital (p-values = 0.01, 0.00, and 0.00, respectively). Patients with COVID-19 were significantly less likely to be readmitted, die, or require escalation (p-value = 0.00, 0.04, 0.03, respectively). Finally, the male gender predicted increased mortality (p-value = 0.00). At the community (zip code) level, the Gini Index, a measure of income inequality, was a significant predictor of mortality (p-value = 0.03); the percentage of households without internet was a significant predictor for readmission (p-value = 0.01).

**Discussion:** These findings suggest that patients with higher severity of illness were more likely to experience adverse outcomes. Those with COVID-19 were less likely to experience adverse outcomes, perhaps due to standardized treatment protocols used by the ACH team. Older adults were more likely to experience adverse outcomes, reflecting studies showing that the prevalence of chronic disease and illness severity increases concurrently with age. At the community level, surrogates of socio-economic status, internet access, and income inequality, were associated with readmission and mortality. HaH leaders should prioritize examining program outcomes using predictors of social determinants of health. HaH programs may support

patients at increased risk for adverse events through early identification of decompensation, leveraging existing predictive analytics. Concerted efforts should be made to ensure that HaH does not perpetuate equity gaps that may exist in brick-and-mortar hospital systems.

### 64. Gaze Fixation and Visual Searching Behaviors during an Immersive Virtual Reality Social Skills Training

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**Background:** Youth with Autism Spectrum Disorder (ASD) display difficulties recognizingand interacting with behavioral expressions of emotion, a deficit that makes social interaction problematic. Social skills training is foundational to the treatment of ASD, yet this intervention is costly, time-consuming, lacks objectivity, and is difficult to deliver in real-world settings.

**Methods:** This pilot project investigated the use of an immersive virtual reality (IVR) headset to simulate real-world social interactions for youth with ASD. The primary objective was to describe gaze fixation and visual search behaviors during the simulated activity. Ten participants were enrolled and completed one social-skills training session in the IVR.

**Results:** The results demonstrate differential patterns between participants with mild, moderate, and severe ASD in the location and duration of gaze fixation as well as the patterns of visual searching.

**Discussion:** The results demonstrate differential patterns between participants with mild, moderate, and severe ASD in the location and duration of gaze fixation as well as the patterns of visual searching. Although the results are preliminary, these differences may shed light on phenotypes within the continuum of ASD. Additionally, there may be value in quantifying gaze and visual search behaviors as an objective metric of interventional effectiveness for social-skills training therapy.

### 65. Launching a Remote Maternal Blood Pressure Monitoring into an Established Telehealth System

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**Background:** Severe maternal hypertension is a leading cause of maternal death in the United States with delays in diagnosis and treatment acting as significant contributors. Remote home blood pressure (BP) monitoring shows promise in maternal health, but requires integrated resources, accessible staff and patient engagement. This study aims to demonstrate the feasibility, acceptability and safety of integrating a home BP monitoring program for pregnant patients at elevated risk of hypertensive disorders through 8 weeks postpartum into an established nurse-monitored telehealth system.

**Methods:** This was prospective pilot cohort study was conducted at the University of Mississippi Medical Center from July 2021 to February 2023. 98 Pregnant individuals with an elevated risk for maternal hypertensive disorders were enrolled, mailed a wireless blood pressure cuff and electronic tablet, education about correct blood pressure measurement, parameters and symptoms of preeclampsia. They were asked to monitor pressures at least twice weekly during pregnancy, daily for 7 days postpartum and then weekly through 8 weeks postpartum. Measurements were monitored by trained telehealth nurses and followed-up by phone if elevated. The tablet system also provided prompts for elevated pressures for seeking medical attention. Each participant was asked to complete a post enrollment survey. Medical record data was reviewed for outcomes and blood pressure logs captured for utilization. Where applicable we compared experiences and outcomes of active participants to those who consented but did not use the telemonitoring system.

**Results:** 100 pregnant patients were approached and 98 consented to participate. Among the 98 who consented, 77 active participants enrolled and used telemonitoring. The remaining 21 (21.43%) did not use telemonitoring, including 17 individuals who were unreachable by the nurse or device vendor for onboarding. Active participants were 80% Black, on average 30 years old, 90% insured by Medicaid, 58% lived in a rural area and 78% were classified as obese. 63% had chronic hypertension and 54% had a history of gestational hypertension and 20.7% had a history of preeclampsia. Participation in remote monitoring varied with 21 patients recording pressures weekly during the prenatal period, 35 measuring BPs for at least half of the prenatal weeks of enrollment, and 21 measuring less than half of the weeks. 54% of participants developed preeclampsia or gestational hypertension during the study period compared to 47% of non-participants. Participants were more likely to attend a postpartum visit (95%) than non-participants (52%). There were no maternal deaths or ICU admissions during the study period. 38 people completed the follow-up survey and 86% or higher were highly satisfied with the education, equipment, and nurse communication.

**Discussion:** This prospective cohort study demonstrated the feasibility of implementing a remote maternal hypertension monitoring program into an existing nurse-monitored telehealth system. Distribution and onboarding to the RPM program created challenges with 17% of those consenting not completing onboarding. On-site distribution of blood pressure cuffs and tablets may be more successful than shipping for future programs. A high proportion of participants did develop hypertensive disorders (54%) demonstrating a need in this population for close monitoring. Participation in remote monitoring may positively impact care engagement as participants were more likely to attend timely postpartum visits. Positive feedback and high patient satisfaction from survey participants demonstrate an interest in ongoing remote monitoring services for maternal populations. One participant stated: "I would not have known the severity of my health and having pre-eclampsia without this program!

### 66. Jefferson Health's Virtual First Program: A novel telemedicine approach for accessibility to patient

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**Background:** Patients and healthcare systems alike face challenges with appointment availability, leaving new to practice patients to wait months at times to get an appointment. With the increased use of connected care technologies made more common during the COVID-19 pandemic, hospitals and ambulatory practices needed to leverage telehealth resources to facilitate patient care and develop new organizational models. To address the issue of delayed new patient visits and long wait times, the Virtual First program was developed to facilitate virtual care within 24-48 hours before seeing a physician in person. The goal is to create a friction free "virtual first" pathway for new patient acquisition in prioritized strategic growth areas.

**Methods:** Five specialties including Bariatrics Surgery, Medical Oncology, Neurosurgery, Plastic Surgery, and Thoracic Surgery were targeted to participate in the Virtual First program. These departments were targeted based on high demand and length of time for a patient to be scheduled an appointment. The Virtual First program leveraged clinical and operational departments to ensure a seamless transition and expedite specialty care visits. New patient access points were created via phone, web and directly with the practice to enable scheduling. Clinical practice staff evaluated and scheduled patients for a virtual first visit based on presentation and need. To facilitate the most beneficial initial encounter, clinical practice staff collated data that will allow for the specialist to make an informed evaluation. Data such as lab results, radiographic information, and a review of past medical history are needed to help identify the next best steps in the patient's care. Engagement of the health system marketing team to develop an enhanced website allowed to greater reach to the community in search of specific specialty care. A marketing campaign was launched which leveraged search engine optimization, patient newsletters, and social media.

**Results:** We will present the results of the program, including engagement through the various channels, time from engagement to appointment, number of appointments scheduled, appointment cancellations, visits completed, and downstream health system utilization, including the number of procedures that followed these virtual appointments. We will also provide feedback from patients, providers and staff that includes positive and negative experiences from launching this new program. Additionally, we will analyze the surgical conversion rate and revenue from the initial visit through the end of the procedural visit (bundled care).

**Discussion:** While patients desire to have reduced wait times for appointment availability with a specialist, the challenge is physician slot availability. The Virtual First program creates an opportunity for physicians to fill their open slots with quick new patient visits in a short period of time with telemedicine. Leveraging this program is valuable as a pathway for new patient acquisition and to optimize resource allocations.

## 67. Digital health coaching for residents of the Washington DC Metropolitan Area aged 50 and above

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**Background:** Evidence has supported the use of digital health resources (DHR) such as patient portals in primary care as tools to increase patient engagement and improve the management of chronic health conditions such as diabetes and hypertension. Still, disparities in patient portal adoption exist for adults over 50 compared to their younger counterparts. This disparity has been linked to low digital health literacy (DHL), or the ability to find, understand, and use health information from electronic sources. While there have been several interventions to increase DHR use among groups with low uptake, very few in the literature directly address improving DHL. We hypothesize that digital health coaching will improve DHL and increase telehealth usage for seniors.

**Methods:** The study population is composed of patients of a Federally Qualified Health Center in Washington DC aged 50 and above or who have chronic health conditions, are fluent in English, and have at least one device with access to the internet. The first phase of the study collected qualitative data through interviews and focus groups to understand perceptions of DHR, barriers to utilization, and perspectives on health coaching. In the ongoing second phase participants receive DHR and DHL education through in-person coaching. Both phases utilize a questionnaire containing two previously validated instruments, the eHealth Literacy Scale (eHEALS) and the Digital Health Literacy Scale (DHLS), to measure pre-post participant DHL at first contact and 60-90 days after coaching. Our final analysis will evaluate patient portal utilization and telehealth visits from electronic health record reports.

**Results:** As of writing, 95% of participants enrolled (n = 83) are non-Hispanic African Americans with an average age of 61.04 (SD 10.45), eHeals score of 28.74 (SD 6.79) out of 40, and DHLS score of 10.30 (SD 3.36) out of 15. Over 80% of participants reported interest in learning more about patient portals, >50% were interested in finding reliable health information online, using their phone to manage their health, and for communications (text/video). The majority of the participants interviewed (n = 15) had never used DHR such as patient portals and had a limited understanding of its use and functionality. Reported barriers to use included disinterest in new processes, preferring routine, and perception of technology as difficult to learn. Participants that had used the portal felt it was helpful for health self-management, however difficulties such as site navigation and password management led to decreased confidence in their ability to navigate technology and discontinued use. All participants supported the use of coaching to help others understand patient portals.

**Discussion:** Our preliminary analysis suggests varying levels of familiarity with DHR use, and many patients had feelings of frustration and defeat after attempting to use digital tools. While eHEALS and DHLS cut-offs have not been validated, lower scores may help identify patients who could benefit from coaching. However, in our cohort qualitative interviews did not reflect the relatively high mean score on eHEALS and DHLS. This discrepancy suggests that alternative methods to identify low DHL and gaps in knowledge related to digital navigation should be explored.

Our experience validates interest in digital health coaching as a tool to improve DHL and further demonstrates that coaching sessions should first establish the priorities of the patient. This will generate interest in DHR use as a solution to patient concerns. Our coaches have learned that sessions should focus on building confidence with DHR skills by demonstration and independent navigation, as well as troubleshooting guidance.

## 68. Navigating Telehealth and In-Person Care for Behavioral Health Services: A Secret Shopper Study

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**Background:** Although healthcare organizations are required to provide meaningful access to patients with limited English proficiency (LEP), patients with LEP face numerous barriers accessing care, including when scheduling appointments. The recent growth of telehealth may be impacting access to behavioral health care for patients with LEP. We aimed to compare experiences of Spanish and English-speaking patients in obtaining care from specialty behavioral health clinicians and assess whether wait times and modality options differ based on language.

**Methods:** Using a secret shopper design, simulated patients contacted Federally Qualified Health Centers and specialty behavioral health clinics serving low-income patients in California. Callers contacted 386 organizations in both Spanish and English from February-March 2023. Callers stated that they were new patients seeking medication treatment for depression. Outcomes included call outcome (e.g., reached live scheduler, hung up on),

wait time to a visit with a prescriber, and available visit modalities (telehealth and in-person). Standard $\chi^2$, t, and Mann-Whitney tests were used to examine differences in proportions and means by language. Multinomial logistic regression models examined associations between clinic characteristics and available visit modalities.

**Results:** Among the 239 clinics reached in one or both languages, English-speaking callers were more likely to speak with a scheduler (90% vs. 72%;p = 0.02) and more likely to obtain appointment information (62% vs. 41%;p<0.01). Among Spanish-speaking callers who reached a scheduler, 43 (22%) reached someone who did not engage (e.g., were hung up on). There were 149 English calls and 97 Spanish calls where schedulers provided appointment details. The majority of callers (>64%) were subject to gatekeeping (e.g., required intake visit). The mean estimated time to a prescribing visit was 36 days and did not differ by language (p = 0.50). 64% of clinics offered both telehealth and in-person visits, 14% only offered in-person visits, and 22% only offered telehealth visits.

**Discussion:** More attention and resources are needed to support patients with LEP at the point of scheduling and to ensure choice of visit modality. Some communities may have limited access to in-person appointments, which can pose additional barriers for patients who prefer in-person care.

### 69. Mapping Broadband Infrastructure Over Time in the United States

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**Background:** Broadband is essential for many everyday activities including conducting telehealth visits with providers. Limited mapping currently exists of the current broadband infrastructure. Therefore, the purpose of this initiative was to (1) provide maps of broadband capacity in the United States over time from each of the publicly available broadband data sources and (2) compare the data sources to provide suggestions and guidance for equitable decision-making regarding allocation of broadband funds.

**Methods:** We used five publicly available data sources for broadband in the United States to create a series of maps for this project: Federal Communications Commission Form 477 Data (FCC), Ookla for Good™ (Ookla), Measurement Lab (MLab), Universal Service Administrative Company survey data (USAC), and Microsoft Corporation open data (Microsoft). Tableau 2020.2 was used for mapping of each of the data sources. To display our graphics, we used Tableau Public, which is a free platform through which visualizations and graphics can be displayed to others online.

**Results:** In this initiative, we have provided up-to-date maps of five publicly available data of broadband capacity across the United States. Each dataset has strengths and weaknesses, and the appropriateness of each data source to answer questions about broadband access and the digital divide depends on the question being asked.

**Discussion:** Despite the many publicly available data sources of broadband capacity, there are still many unknowns about true broadband capacity in the United States. Understanding the limitations of each dataset and these unknowns (as discussed above) is important to properly allocate available resources and programmatic outreach under the Infrastructure Investment and Jobs Act.

### 70. Differences in Telehealth Utilzation by State and Type of Parity Law

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**Background:** Historically, providers cited reimbursement as one of the most significant barriers to telehealth utilization. Telehealth parity is a critical health policy issue as the Public Health Emergency (PHE) ends. Prior studies found that states with telehealth parity policies experienced greater use of telehealth services. A major limitation is that all parity laws were treated as equal, which they are not. Telehealth parity laws can have coverage parity, requiring the same services as in-person. To guarantee the same reimbursement, there must be payment parity. This study examines: How telehealth utilization varies across states with and without parity; whether there is a difference in utilization among different levels of telehealth parity (coverage vs payment); whether there are differences in monthly visit rate trends among different levels of telehealth parity; and whether PHE measures impact the monthly visit rate trends in states with different parity levels?

**Methods:** First, we examined state telehealth legislation and telehealth parity policy reports to categorize each state into one of the following categories: 1) no parity; 2) coverage parity only; or 3) coverage and payment parity. We also collected the years that telehealth parity legislations were first enacted. Next, we used 2020-2021 Merative™ MarketScan® Commercial (CCAE) database and employed a quasi-experimental weighted difference-in-differences (DID) model with two-way fixed effects to examine 1) the differences in monthly trends of tele visit rates, defined as tele visits per 100 enrollees in states with no parity, coverage parity only, and coverage and payment parity; and 2) the impact of the interaction between the COVID-19 measures since March 2020 and state laws with coverage and payment parity compared to no parity and coverage parity only. All models adjusted for state unemployment rates. Standard errors were clustered at the state level.

**Results:** 43 states and the District of Columbia (DC) have private insurance telehealth coverage parity. Only 30 states and DC have private insurance telehealth coverage & payment parity laws.

Before COVID-19, there were, on average, per 100 enrollees, 0.38 tele visits in states with coverage & payment parity, 0.31 tele visits in states with coverage only, and 0.34 tele visits in states without parity. Since COVID-19, there were, on average, per 100 enrollees, 9.0 tele visits in states with coverage & payment parity, 6.2 tele visits in states with coverage only, and 5.7 tele visits in states without parity. Compared to coverage-only parity and no parity laws, per 100 enrollees, coverage & payment parity laws were associated with a 3.1 [95% CI,1.3-4.92; P = 0.001] increase in tele visits since the pandemic from the baseline of 6.3. Compared to coverage-only parity laws, per 100 enrollees, coverage & payment parity laws were associated with a 2.8 [95% CI, 0.90-4.71; P = 0.005] increase in tele visits since the pandemic from the baseline of 6.6. Compared to no parity laws, per 100 enrollees, coverage & payment parity laws were associated with a 3.2 [95% CI, 0.79, 5.56; P = 0.010] increase in tele visits since the pandemic from the baseline of 6.3.

**Discussion:** Before the COVID-19 pandemic, the differences in telehealth visits were small among states with parity versus those without parity states. Since the COVID-19 pandemic, states with coverage and payment parity laws have experienced significant increases in telehealth visits. Telehealth may have made health care more accessible during the pandemic, and robust coverage and payment parity laws may be necessary for increasing access to health care post-public health emergency. To ensure telehealth uptake is sustainable, payment parity may also be needed. This will allow healthcare organizations and other stakeholders to plan accordingly and trust that they will be appropriately compensated.

This work can have significant policy implications as many state parity laws expire in 2024 or 2025. The forthcoming work will integrate our parity

categorizations into Medicaid claims analysis to explore if there is a difference in utilization across states with different levels of telehealth parity.

### 71. Tele-Behavioral Health Services by Critical Access Hospitals During the Public Health Emergency

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**Background:** The Coronavirus Aid, Relief, and Economic Security (CARES) Act, in response to the public health emergency (PHE), authorized a variety of providers employed by Critical Access Hospitals (CAHs) to serve as distant site providers for telehealth (TH) services to Medicare beneficiaries. This study documents the extent to which tele-behavioral health (TBH) has been used by CAHs prior to and during the PHE and whether the types of providers billing for TBH changed during that period.

**Methods:** This study used the 2019-2021 Medicare Limited Data Set (LDS) Inpatient, Outpatient and Carrier (5% sample) files for a nationally representative sample of Medicare Fee-for-Service (FFS) Beneficiaries in 2019-2021 to explore the provision of TBH services by CAHs. Additional patient information on dual eligibility status was obtained from the LDS Medicare Beneficiary Summary File.

The Medicare files and the Provider of Service (POS) files were linked using the Medicare provider number under which CAHs bill. Descriptive provider information as well as state and county codes were obtained from the POS and linked to the Rural-Urban Continuum Codes. This enabled analyses by the degree of rurality (4-level), census division, and census region.

Using the Medicare files, we established baseline tele-behavioral health use by CAHs pre-PHE (2019), changes in TBH use during the first year of the PHE (2020) following the passage of the CARES act and the regulatory flexibility provided to CAHs to expand TBH use, and any changes in CAH TBH use as the PHE has continued (2021). We also identified the types of CAH providers who billed for TBH services during the PHE policy flexibilities.

**Results:** . Although the number and percent of visits conducted through telehealth were considerably higher during the pandemic year of 2020 (n = 9,450) compared to 2019 (n = 1,659), they only accounted for 1.6% of all outpatient visits in 2020. The number of telehealth visits dropped significantly in 2021 (n = 5,933) but were still higher than in the pre-pandemic year of 2019. Similarly, the number of tele-behavioral health visits increased during 2020 (n = 2,458) compared to 2019 (n = 678), but dropped in 2021 to levels higher than the pre-pandemic year of 2019 (n = 1,899). Between 26-41% of telehealth visits were for behavioral health issues.

In the pre-pandemic year of 2019, the majority of telehealth visits were coded as an originating site (83.3%). When the flexibilities allowing CAHs to serve as distant site providers were enacted in 2020, the number of telehealth visits increased dramatically and the percent of visits that were accounted for as an originating site dropped to 30% and 38% in 2020 and 2021, respectively. The percent of CAHs serving as an originating site remained fairly consistent over this time period, ranging from 19.7% in 2019 to 22.3% in 2021.

**Discussion:** The flexibilities introduced during the pandemic allowed CAHs to serve as distant site providers, and to facilitate access to behavioral health services through telehealth. While the number of telehealth visits conducted through CAHs was very small (1.6% at the height of the pandemic in 2020), the number more than quadrupled (5.7 times higher in 2020 compared to 2019), and fell by 62% in 2021. Similarly, the number of tele-behavioral health visits nearly quadrupled in 2020, and then fell by 77% in 2021.

Implications for Policy or Practice: This study is the first to document the extent to which CAHs were providing TBH services during the COVID-19 pandemic. Aging rural populations, hospital closures and the pandemic have heightened the public's awareness of the need to ensure access to behavioral health services in rural communities. Telehealth has great potential to close the rural-urban access gaps and reduce rural-urban behavioral health disparities.

### 73. Remote Exam Device Project Leads to Improved Access and Equity for Patients on Medicaid

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**Background:** Patients using Medicaid face increased challenges with social determinants of health leading to decreased access for our most vulnerable families. As a leader in healthcare for pediatric patients, we launched Virtual Urgent Care (VUC) in January 2020 serving patients in our three-state area. In 2021 Cincinnati Children's created a relationship with a managed payer in the State of Ohio. This relationship increased access to 140,000 plus members subscribers. Leadership connected with CincyKids Health Connect to provide VUC for all members to offer virtual visits at no cost to the family from 6am -10pm seven days a week. In fall of 2022, CCHMC began distributing remote exam devices to HealthVine patients to increase symptoms to be treated over virtual visits. A committee was formed to develop the pilot for provider education, device distribution, patient education and evaluation of the project.

**Methods:** Our Key Driver Diagram (KDD) has been the framework of distribution of the remote exam device to patients. Our KDD focused on staff and patient education, motivated parents using the device on visits and timely access to tech support. VUC providers were trained and given the opportunity for mock visits to increase their comfort using the device. We began identifying a small group of families for a pilot including Rising Utilizers. Rising Utilizers are patients who had 3 or more urgent care or ED visits over the past 6 months. These devices were distributed by two Community Health Workers (CHWs) who had established relationships with families. To improve use of the devices, families were provided education including a mock visit. Once the pilot met the established goals, the team expanded distribution to include community groups. The team created partnerships with community groups, like Head Start and community pediatric clinics, who served the same population and had already built trust with families. These groups of patients who left urgent care and ED without being seen because of wait times, patients with a relationship with their community health worker. We have also had referrals from providers.

**Results:** We continue to collect feedback from providers to focus our PDSAs. CHWs were trained next. We have learned much about physical distribution and what it takes to have a CHW feel comfortable setting up the device in the family's home. A combination of in-person training, shadowing visits and having a training device available has proven successful. Since the beginning of the pilot, we have distributed 169 devices, 73% of devices have had a mock visit. The mock visit ensures the device is connected to the patient's account and will be ready to use for a future VUC visit. We have had 37 completed virtual urgent care visits with the device that would have

previously been referred for in person care. The types of visits include ear pain, breathing concerns and skin issues. To date we have not encountered many technical issues but will be monitoring this to ensure support is readily available. In addition, providers and patients report high satisfaction with the devices and other outcomes include adherence and prescribing. The team plans to distribute more than 300 devices by the end of the calendar year.

**Discussion:** While we have been pleased with the results of the project, we continue to monitor as we grow. The distribution of the device will be adding up to 18 CHWs distributing devices to our community. Now that 171 devices have been distributed, patient communication and ongoing education will be the next key driver. We will also be exploring how to distribute devices effectively at health fairs, while updating patient contact information and scheduling mock visits. As we head into fall, the use of the remote exam device will increase, which can bring up technical issues. Ensuring our VUC providers and patients using the device receive quick technical support will be of the utmost importance.

### 75. Outpatient Telemedicine: Evaluating Utilization/Benefits of telemedicine in clinic settings

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**Background:** Telemedicine disparities occur throughout the United States, with broadband barriers in urban and rural settings due to low-income and poor infrastructure limiting telemedicine access in home settings. Socioeconomic and digital literacy barriers can also impact access to healthcare services for populations including pediatrics/youth and older adults. To address these access gaps, hospital systems may utilize in-clinic telemedicine involving mobile or telemedicine carts in outpatient centers to offer outreach to specialists and standard care services for patients. Current research indicates that in-clinic telemedicine increases access to specialty care for patients. An evaluation was conducted with existing outpatient telemedicine programs in Pennsylvania to assess the utilization of in-clinic telemedicine in rural and urban areas.

**Methods:** A retrospective review was conducted on 52 clinics through the Geisinger Clinic health system in central and northeastern Pennsylvania. Data for these clinics was retrieved from Geisinger's electronic medical records using specific visit types and from the telehealth platform to assess prevalence of the in-clinic hubs, number of patient visits, telemedicine services, and patient ages and distance to their service sites. The data sampling included all in-clinic telemedicine visits between January 2020 - November 2022. We reviewed and conducted descriptive analyses on the collected data.

**Results:** From the retrospective review, overall utilization of in-clinic telemedicine included 7,089 visits between January 2020 – November 2022. The largest volume of visits was patients under age 18 (40% of in-clinic telemedicine visits), followed by patients aged 65 years and above (27% of visits). Regarding the prevalence of in-clinic hubs in these service areas, 3 urban areas (Danville, Wilkes-Barre, Scranton) and 1 rural area (Lewistown) had the largest volume of in-clinic hubs with 4 clinics each for the urban sites and 6 clinics for the rural site, respectively. When assessing distance from patient homes to their in-clinic telemedicine visits, the average distance to Danville in-clinic hubs was 21 miles, Wilkes-Barre was 13 miles, Lewistown was 8 miles, and Scranton was 8 miles. Of the specialties offered via telemedicine, the highest volume of visits was for Behavioral Health (4,338 visits) followed by Neurology (2,035 visits).

**Discussion:** Incorporating telemedicine in outpatient in-clinic settings can help bridge gaps in healthcare for pediatric and older adult populations as seen with these two groups being the largest consumers of in-clinic telemedicine throughout the 52 clinics. Disbursing telehealth infrastructure across a wide array of community clinics, resulted in short distances between patient homes and improved access to specialty care for patients in both rural and urban areas, particularly for patients with limited access to broadband in their homes. With Behavioral Health and Neurology being the most utilized specialties, programs should continue to leverage telemedicine to expand access to specialty services for patients. Further research should consider an analysis of additional social determinants of health, such as demographics and payor mix as well as specialty provider shortages leveraging recruitment strategies of telemedicine providers to increase access to care.

### 76. Lessons learned from Early Adopters of an mHealth app to manage pediatric asthma

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**Background:** Asthma is a chronic lung disease affecting millions of children in the US. Using mobile health (mHealth) technologies may help caregivers better manage their child's asthma. This study examined the Nemours app, a multifunctional mHealth application designed to educate, engage, and facilitate access to patient care. The app features include telehealth access, medication reminders, images of asthma medications and videos to demonstrate proper medication use, asthma education resources, digital tracker to record asthma symptoms, interactive asthma action plan, air quality index, and messaging system. The purpose of this study was to examine: 1) the demographic and health characteristics of a group of long-term users of the app ("Early Adopters"), 2) which app features Early Adopters used, and 3) whether app use yielded asthma health benefits for children of Early Adopters.

**Methods:** Eighty caregivers who had a child with asthma aged 5-11 years enrolled in the study. Study participation lasted 6 months, encompassing two time points (pretest and posttest), during which data were recorded on caregiver app access and feature use. A retrospective patient asthma health history (e.g., Childhood Asthma Control Test (C-ACT) scores, telehealth visits, and urgent care visits) was obtained two years prior to study participation. Retrospective app use at least two years prior to study participation also was extracted to inform baseline levels of app logins and feature use. At pretest, caregiver participation involved completing digital surveys about demographic information and app use and participating in a health literacy phone screener. Six months later, at posttest, caregivers completed another digital survey about app use and participated in another health literacy phone screener. The operationalized definition of Early Adopters were caregivers who used the app prior to study launch, and thus were "long-term users."

**Results:** Of the 61% of caregivers who logged into the app at least once during the study (n = 49), 22% were Early Adopters (n = 11). All Early Adopters used the app for over a year and were also frequent app users having logged into the app at least 30 times. Demographic and health characteristics revealed that the majority of Early Adopters were White (73%), employed (91%), with an associate's degree or higher (82%), and their children tended to have a persistent diagnosis of asthma (82%). Positive significant correlations were found between caregiver reports of discussing app data with their child's provider and being an Early Adopter ($r = .46$, $p = .002$). Additionally, positive significant correlations were found for recorded app feature use, between total number of asthma tracker entries and

being an Early Adopter (r = .38, p = .007). Finally, findings revealed a positive correlation between improved asthma control and Early Adopters (r = .47, p = .016).

**Discussion:** Early Adopters reported communicating with their child's provider about app data they entered to help address their child's persistent asthma. Children of Early Adopters tended to show improved asthma control, suggesting possible benefits of long-term app use. As Early Adopters frequently used the asthma tracker, this suggests long-term tracker use may help improve asthma control when shared with the provider. As the findings are correlational, more research is needed. Caregivers tended to be White, employed, and well educated. Tutorials and other supports may help educate caregivers about mHealth benefits to encourage app use, thus limiting potential health disparities. Future studies must engage demographically diverse samples in mHealth research to understand utilization differences and to combat health disparities. Examining feature use among diverse samples and understanding app caregiver-provider communication may illuminate pediatric health benefits attributable to app use.

### 77. Telehealth Outreach Program for Child Traumatic Stress: Strategies for Long Term Sustainability

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**Background:** There are higher documented rates of traumatic events and mental health disorders in undeserved youth, yet there are disparities in access to behavioral health care for this population. Trauma focused cognitive behavioral therapy (TF-CBT) is an evidence-based therapy to treat mental health disorders in children after a traumatic event. Delivery of TF-CBT via telehealth can decrease access to care barriers for children and families. An interdisciplinary clinical team developed a CBT training program, which includes CBT techniques and resources, to guide clinicians to effectively provide TF-CBT via telehealth. The training has been delivered to clinicians across the United States and Puerto Rico. The goal of this study was to describe variation in implementation processes of the telehealth TF-CBT program and identify barriers and facilitators to program implementation post-training, which can be utilized to develop implementation strategies for intervention sustainability.

**Methods:** Using a mixed-methods approach, an evaluation team within the Telehealth Center of Excellence at a medical university created a survey and interview guide to evaluate utilization of telehealth to deliver TF-CBT, after clinician participation in the training program. Data were collected on telehealth implementation processes and facilitators and barriers to delivery of telehealth TF-CBT. The study was guided by an adapted Exploration, Preparation, Implementation, Sustainment (EPIS) model, an implementation science framework that evaluates implementation processes and outcomes through inner (within organization) and outer (external) contextual factors. Interviews (n = 8 clinical sites) and surveys (n = 15 responses) were completed with clinical site leaders who had participated in the telehealth TF-CBT training in the prior two years.

**Results:** Throughout the clinical sites, there was varied adoption and penetration of the telehealth TF-CBT program. Facilitators to implementation included leadership and site staff buy in and available technological resources, while barriers included funding and lack of space and available logistical resources. A strength of providing TF-CBT via telehealth is overcoming patient access and transportation barriers; however, the telehealth modality presented challenges in securing parental support and establishing rapport with younger children. Clinician participants reported that the training and follow-up collaborative group meetings were key tools for program success as they received hands-on clinical knowledge, materials, resources, and support that were utilized to benefit the child patients when integrated with the telehealth sessions.

**Discussion:** Feedback gained from this project will be utilized to improve the telehealth TF-CBT training and assist with the development of implementation strategies for increased adoption and sustainment of TF-CBT delivered via telehealth. Implementation strategies can include ongoing interactive assistance and resource support, enhanced training and education of clinical site stakeholders, and program adaptations tailored to fit individual site and patient needs, with the goal to continue to increase access to high quality behavioral therapy for underserved and vulnerable populations.

### 78. Comparison of TDABC-estimated visit cost for telehealth with centralized support vs in-person visits

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**Background:** The COVID-19 pandemic resulted in a substantial increase of telehealth (TH) visits and a significant proportion of visits have remained virtual. Organizations must now make strategic choices to ensure a streamlined, sustainable TH approach. A major challenge is obtaining valid cost estimates for delivering TH, especially as programs adapt to address provider and patient experience and evolving business needs. In late 2021, we developed a Telehealth Centralized Support (TCS) team to assist patient navigation, patient triage, and provider troubleshooting for all virtual visits across ambulatory care departments. The objective of this project was to compare the average cost of providing a sick visit in family medicine using TH with TCS support versus in person (IP) visits estimated by a standardized modified time-driven activity-based costing (MTDABC) approach and "benchmarked" against a previous assessment of TH without TCS from a pediatric clinic.

**Methods:** We examined TH and IP visits in clinics before and after the implementation of TCS using MTDABC that includes: 1) recorded structured interviews with providers and TCS team, 2) iterative workflow mapping, 3) 2022 standard cost weights for wages, and 5) clinic CPT billing code mix for complexity weights. We examined the variability in estimated time using a decision tree model with Monte Carlo simulations in Excel using Crystal Ball. Sensitivity analysis was conducted for provider and visit type mix between the clinics. Minimally important difference (MID) measured by a well-defined anchor has been identified as a conservative effect size for low-cost studies. The median Medicare medical fee in 2017 was $125 and $184 (a 47% difference), for low and moderate complexity sick visits, respectively, therefore the CPT anchored MID identified as a meaningful cost difference between the two adjacent visit CPT codes is set at 47%.

**Results:** Overall labor costs between IP and TH visits were the same within the respective time points for clinics. The labor time for IP visits were similar across time points, demonstrating a stable process for the same visit regardless of clinic. However, there was a shift in the TH labor minute distribution between actor. Before TCS the majority of the time was by the provider. After TCS, provider time decreased by 33%. Before the implementation of TCS, the mean weighted labor costs for IP and TH were $71.25 and $70.71, respectively, with an average visit mix cost of $71.10. After the implementation of TCS, the mean weighted labor costs for IP and TH were $59.88 and $59.49, respectively, for an average visit mix cost of $59.82. This was a decrease in mean weighted labor costs of 15.9%. Sensitivity analysis was conducted using the provider and visit weights from the

clinic after TCS implementation on the clinic labor before TCS implementation. There was no significant changes in overall mean weighted labor costs ($71.10 vs. $71.06) using after TCS case mix weights.

**Discussion:** As health systems face the challenge of developing cost-efficient methods for delivering TH, our results may inform decision makers about the costs of utilizing a centralized pool of staff to support telehealth visits. Adding TCS decreases labor costs and streamlining may contribute to making the organization more efficient. As such, we anticipate the labor costs associated with TCS visits to decrease even further in the future. Furthermore, preliminary data and anecdotal evidence points toward TCS reducing telehealth cancellation rates, increasing provider satisfaction, and enhancing patient digital navigation. This is especially important given the serious problem of provider "burn-out" and increased focus on patient digital literacy.

### 79. A Qualitative Study of Critical Access Hospital Staff Experiences with Behavioral Telehealth

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**Background:** The COVID-19 pandemic and resulting Public Health Emergency (PHE) contributed to a significant uptake in telehealth for mental health and substance use treatment. For example, one study showed 55% of rural and 35% of urban patients utilizing behavioral telehealth between March and August of 2021. Additionally, federal flexibilities granted to Medicare policies support the expansion of telehealth services. These flexibilities have the potential to reduce barriers to behavioral healthcare provision, specifically the variation in the geographical distribution of mental health workforce, by use of telehealth. However, little is known about how the Medicare flexibilities affected behavioral telehealth utilization among critical access hospitals (CAH). In this study, we examined how CAHs are using behavioral telehealth to meet community need, changes made to staffing to accommodate telehealth, and the support needed to promote effective use of behavioral telehealth beyond the PHE.

**Methods:** We conducted semi-structured interviews with 22 CAH administrators and providers. These participants represented 21 CAHs across 16 states. We used data from the American Hospital Association Annual Survey as well as Medicare claims data to identify CAHs using telehealth for behavioral health. We intentionally recruited CAHs that represented a range of behavioral health service capacity and telehealth utilization. We developed a semi-structured interview guide, which included questions covering such topics as current means of providing behavioral health services and the staffing involved in delivering those services; any changes that were made to the services offered and/or the use of staff due to reimbursement flexibilities; and impact of telehealth on the experiences of both staff and patients. In addition, the interviews sought to identify future challenges and provide recommendations for improving the delivery of behavioral health services through telehealth use.

**Results:** Participants described using both provider-to-provider (n = 8;36%) and provider-to-patient (n = 11; 50%) behavioral telehealth. Some participants described the use of providers otherwise unaffiliated with the hospital (n = 9; 41%), whereas others reported the use of providers affiliated with the health system or CAH clinics for behavioral telehealth services. Several participants expressed the importance of having access to behavioral health specialists as a means of reducing the workload on providers in the emergency room and inpatient units. A majority of participants reported no staff increases or workflow changes to accommodate use of telehealth. Some reported a desire to hire more behavioral health providers and/or administrative staff to support telehealth—expressing a need for more specialists within their community—but were unable to do so due to lack of qualified individuals for these role and insufficient reimbursements for telehealth use. Common concerns also emerged regarding technological requirements (e.g., broadband connectivity for video consultations), community acceptance of telehealth, and patient access barriers including care continuity following a telehealth visit in the emergency department.

**Discussion:** Despite some challenges, CAH executives and providers expressed positive views about telehealth's potential to enhance access, retain patients locally, alleviate provider burden, and facilitate urgent interventions for behavioral health needs. To better understand how telehealth can be used to improve access and continuity of care for behavioral health patients served by CAHs, future research should focus on how to effectively integrate in-person and telehealth services, particularly when care is delivered by providers outside of the organization. Also needed are studies of interventions to increase the level of patients' acceptance of telehealth for behavioral health services. Furthermore, it is important for policymakers to reconsider reimbursement policies and licensing regulations, support efforts to improve communities' acceptance of telehealth, and enhance the behavioral health workforce to reduce the burden on other staff within CAHs and meet the needs of their communities.

### 82. The Cost Effectiveness of Telehealth for Type 2 Diabetes and Depression

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**Background:** There is evidence that the prevalence of depression is moderately increased in prediabetic and undiagnosed diabetic patients and markedly increased in previously diagnosed diabetic patients compared to those with normal glucose metabolism. The prevalence rates of depression could be up to three times higher in patients with type 1 diabetes (DM1) and twice as high in people with type 2 diabetes (DM2) compared with the general population worldwide. Anxiety is an issue for 40% of patients with DM2. The presence of depression and anxiety in diabetic patients worsens the prognosis of diabetes, increases non-compliance to medical treatment, decreases the quality of life, and increases mortality. Depression has a synergistic effect in patients with DM1 and DM2, increasing the risk for complications of both a micro- and macro-vascular nature and increased hyperglycemia, predicting greater mortality. In older adults, comorbidity also predicts an earlier incidence of complications.

**Methods:** This analysis examined the cost-effectiveness of a usual care program treating D2M diabetes and depression and a telehealth model incorporating usual care. A Markov model with patients 18 years and older were used to simulate the progression of depression and cumulative deaths for 75 years with monthly calculations. The analysis followed the cohort, using mutually exclusive and exhaustive health states, throughout their lifetime. The health outcomes of two strategies were studied: in-person care only versus telehealth plus in-person care. The in-person care strategy was characterized by twice-monthly visits with a mental health counselor specializing in chronic health conditions, a meeting with a primary care physician once a quarter, laboratory tests once a quarter, and medications (based on the severity of the conditions). The hybrid approach was characterized by video visits twice a month instead of in-person, automatic uploading of blood glucose levels, and patient monitoring of their own clinical data. In-person visits with a provider for diabetes control were scheduled twice a year, along with quarterly laboratory tests

**Results:** The use of a hybrid approach shows that the overall use of a hybrid-based approach is slightly more cost-effective than usual care. The differences in QALY between the two strategies (1.14 vs. 1.16) are minimal, but the ICER demonstrates that Usual Care costs an additional $14,055 to

achieve the same QALYs as the Hybrid option. The ICER for the Usual Care option is also higher than the Hybrid option but still under the WTP threshold of $50,000. Additionally, the overall NMB for Hybrid is slightly higher than that of the Ususal Care approach.

**Discussion:** This model shows the slight cost-effectiveness of the Hybrid approach and that its use is sustainable over time to increase QALYs. However, the difference between Hybrid and In-Person is minimal, which indicates that both approaches are effective and efficient in providing care for those with Type 2 diabetes and major depressive disorder.



### 83. Integration of Digital Primary Care Training and ECHO in Advancing Rural Dermatology

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**Background:** The ECHO (Extension for Community Healthcare Outcomes) methodology was originally designed to tackle the challenge of providing training for primary care physicians in rural areas. The motivation behind its development arose from the unfortunate deaths of rural New Mexico patients due to hepatitis C, primarily because their physicians lacked knowledge about the latest and highly effective treatments. Subsequently, a subsequent study revealed that the treatment gap between patients receiving care at the University of New Mexico Hepatitis C Clinic and those treated by primary care doctors at ECHO locations had been successfully eliminated. Building on this success, Project ECHO, which originated in Missouri, has been adapted to cater to the field of dermatology.

**Methods:** Primary care practitioners participating in the Dermatology Project ECHO at the University of Mississippi Medical Center (UMMC) utilize video-based technology to present recent cases from their own clinics. These cases are reviewed by a lead faculty dermatologist from Project ECHO and additional volunteer faculty members. Following a concise "chalk-talk" presentation by a dermatology faculty member about a specific dermatologic disorder, primary care doctors engage in discussions and share photo-based patient cases. Various diagnoses and recommendations are deliberated upon. In urgent cases requiring immediate consultation or intervention, rapid-access appointments are available for management. The UMMC Project ECHO sessions are conducted monthly. Apart from dedicating 8 hours of administrative support each month, the program is offered free of charge, as the teaching is conducted by volunteer faculty during midday sessions.

Initially, UMMC Dermatology faculty reached out to rural primary care physician groups to recruit participants for the program. However, the program gained popularity as UMMC encouraged medical students to identify potential participants during their mandatory month-long rotation in rural primary care.

**Results:** Based on the feedback received from 29 respondents through questionnaires conducted in June and December 2021, the Project ECHO for Dermatology program received a confidence rating of 6.45 out of 10 in terms of participants' confidence in utilizing new treatment information. The program also received a high satisfaction rating of 4.26 out of 5. Notably, specific items in the survey indicated exceptionally high levels of satisfaction.

Primary Care Physician Participants in UMMC Project ECHO: Dermatology
Year - Primary Care Physician Participants/year
2020 – 86, 2021 – 66, 2022 - 153 in 1st 6 months, (306 when annualized)
Project ECHO Primary Care Physician Survey (n = 29);
*Results (Likert 0-10 scale: 0 = not at all true; 10 = absolutely true)*
Survey Question - Average score (0-10)
"Use what I've learned to treat skin conditions" - 6.45
"Perform skin exams as a routine part of my physical exam" - 7.07
"Detect and make referrals related to skin conditions" - 7.00
"Counsel patients on sun protection" - 7.61
"Counsel patients on sensitive skin and moisturizers" - 7.55

**Discussion:** Overall, primary care doctors in underserved communities in Mississippi have enthusiastically embraced and actively utilized Project ECHO for the Dermatology program. The survey results indicate that the initiative has effectively educated non-dermatologists, many of whom encounter dermatological cases in their practices, about various skin diseases. Anecdotal evidence suggests that doctors who have been connected with UMMC Dermatology faculty through Project ECHO are now referring more patients to the institution. This collaboration between specialists and primary care physicians serves as an effective approach to bridge the access-to-care gap in rural areas of America.

### 84. Consensus guidelines for optimal telehealth care of adults with developmental disabilities

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**Background:** The COVID-19 pandemic prompted a rapid shift to telehealth to fill gaps in in-person care, including for adults with developmental disabilities. Health care providers who specialize in telehealth care of adults with developmental disabilities report successful delivery of telehealth care with this population, but telehealth care is used by all types of health care providers. Adults with developmental disabilities and their supporters have described wide variations in experiences with telehealth care and its potential to improve health care when used safely and appropriately or contribute to poorer health outcomes when not. Despite this, little research has sought to articulate best practices for telehealth care with adults with developmental disabilities.

**Methods:** A modified e-Delphi technique was used to provide consensus on best practices in telehealth care for adults with developmental disabilities. An expert panel consisting of adults with developmental disabilities, family members, direct support professionals, nurses, and health care providers with experience with telehealth care of adults with developmental disabilities in the USA were recruited through professional organizations. Round 1 consisted of 12 open-ended questions about considerations for telehealth care of adult with developmental disabilities. Round 2 contained 12 items based on content analysis of Round 1 findings, with experts rating their level of agreement with each item on a 5-point Likert scale and providing narrative feedback. In Round 3, experts rated their agreement with only the items which were revised from Round 2. Consensus was defined as at least 70% of respondents agreeing or strongly agreeing with each item.

**Results:** Of 69 invitations sent, a total of 44 experts completed Round 1; of those 44, 38 experts (86%) completed Round 2, and 36 experts (82%) completed Round 3. The 44 experts were approximately evenly distributed by expert type, with some experts belonging to more than one category: adult with developmental disability (n = 10), family member (n = 11), direct support professional (n = 9), nurse (n = 8), health care provider (n = 10). All items in Round 2 reached consensus, with narrative feedback suggesting revisions or additional items, resulting in a revised set of guidelines consisting of 9 items with 42 sub-items. In Round 3, all of the 23 revised items/

sub-items surveyed reached consensus. Items with 100% consensus related to anticipatory guidance for telehealth care, following all ethical and legal rules to the same extent as a person without developmental disability, assessing the person's health status and personal needs to determine if telehealth can be used safely and effectively, interacting with support persons, and listening to and valuing the lived expertise of the person with developmental disability and their support person(s).

**Discussion:** Experts agreed that telehealth care for adults with developmental disabilities requires a person-centered approach, seeking to understand and address the person's expressed needs, preferences, and desired outcomes of telehealth care. Experts held different opinions about situations when telehealth care is appropriate but agreed that the person's needs and preferences should inform decision making when possible. Involving people with developmental disabilities in the development, implementation, and evaluation of telehealth care technology and policies, ensuring equitable access to and meaningful communication via telehealth technology, providing reminders about telehealth care, maintaining a safe and private environment for telehealth care, engaging with support persons, and coordinating smooth transitions between in-person and telehealth care were key areas of agreement. Advocacy will be required for health care providers to adopt these guidelines.

### 86. Comparison of Treatment Crossovers in Rural Telehealth & In-Person Behavioral Health Treatment

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**Background:** Treatment crossovers are situations where one treatment is begun and then a different treatment replaces the original one underway. Crossovers can be an important indicator of undesirable aspects of the originally utilized treatment, and thus are routinely tracked in randomized controlled trials (RCT). Outside of RCTs, crossovers may also occur in usual care as an indicator of patient and provider perceived comparability of the available choices. Crossovers have been rarely noted or quantitatively evaluated in usual care treatment studies. The purpose of this analysis is to examine the extent of modality crossovers during behavioral telehealth treatment episodes, compare it to the extent of modality crossovers during in-person behavioral treatment, and examine the effect of the COVID-19 pandemic on both.

**Methods:** This nonrandomized, prospective, multi-site research design involved two active treatment groups. The telehealth cohort included all patients who initiated telehealth treatment during the data collection period. A comparison group included a cohort of patients who initiated in-person treatment. Treatment modality (telehealth or in-person) during each encounter was compared overall and across two time periods (pre- and during- COVID-19 pandemic) between the telehealth cohort and the in-person cohort. Patient enrollment occurred on a rolling basis and data collection extended for three months after treatment initiation for each patient. Crossovers may be permanent or temporary, with multiple switches between modalities, so off-mode encounters may have occurred at any point during the three-month observation period. Encounter treatment modality between the telehealth cohort and the in-person cohort was compared overall and across the two time periods using chi-square statistics.

**Results:** There were 4,780 patients with 15,760 encounters in the telehealth cohort and 6,457 patients with 21,299 encounters in the in-person cohort. A high percentage of encounters (93.7% overall) were on-mode. Crossovers, or off-mode encounters, were relatively uncommon (6.3% overall), but considerably more prevalent ($p < .001$) for the in-person cohort (8.5%) than for the telehealth cohort (3.4%). The occurrence of off-mode encounters was particularly influenced by time period. In particular, off-mode encounters increased slightly for the telehealth cohort (from 2.8% to 3.5%, $p < .006$) but increased dramatically for the in-person cohort (from 0.5% to 10.5%, $p < .001$) across time periods, such that 10% of all encounters for the in-person cohort were delivered via telehealth during the COVID-19 time period. The number of encounters did not differ significantly between time periods for either the telehealth or in-person cohorts and the increased prevalence of off-mode encounters for the in-person cohort was not due to a greater number of encounters. Switching from one modality to another and back again was relatively common in both cohorts among patients who had multiple encounters.

**Discussion:** In this multi-site, usual-care study comparing telehealth and in-person behavioral health treatment, modality crossovers were more common in the in-person cohort than the telehealth cohort, especially during the COVID-19 pandemic. The COVID-19 public health emergency (PHE) and associated policy changes prompted providers and patients to consider telehealth as a specific treatment option to address the need for social distancing and related reasons. Many providers either adopted telehealth for the first time or expanded their telehealth offerings. As telehealth access grows, crossovers between that modality and in-person treatment are likely to increase just because treatment modality options are more available. Future research is needed to examine the relationship between crossovers and clinical outcomes, and whether certain patient populations or provider types are more likely to experience crossovers.

### 87. Investigating the Utility of Object Manipulation in Augmented Reality in Procedural Training

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**Background:** Augmented reality (AR) technology allows for real-time teaching and remote supervision of complex medical procedures. The successful use of AR technologies can address health disparities by extending the reach of medical experts and providing a cost-effective method for healthcare skills training. As virtual teaching in medical education becomes a reality, it is crucial to understand best practices for utilizing the augmented environment to create a productive learning environment and optimize teacher-learner interactions. In prior work, we have demonstrated the feasibility of developing a holographic three-dimensional (3D), real-time representation of the procedural space for a remote instructor. This study examines how AR virtual objects can be deployed in the holographic space during ultrasound-guided central line and peripheral line placement teaching sessions.

**Methods:** After Institutional Review Board approval was obtained, instructors and learners were recruited to participate in recorded ultrasound-

guided central venous catheter (CVC) and peripheral IV training sessions. The trainees completed a survey detailing demographics and prior experience with the procedures and AR/VR technology. Both instructor and learner used HoloLens 2, a head mounted AR display, to conduct the procedural training in AR from remote locations. Teams could interact via audio channels in the headsets, and instructors could observe learner actions via the real-time 3D holographic display and provide visual feedback using virtual hands and procedure-specific virtual objects. Data recorded for each session included the number of unique objects used, the number of times a virtual tool was deployed, the duration of time a tool was used, and the total distance over which a tool was moved. The virtual tools available to use during the training included an ultrasound probe, syringe, guidewire, triple lumen catheter, as well as different colored cylinders and cubes.

**Results:** 24 sessions were conducted with 8 unique instructors and 24 unique learners. Learners ranged from 18 to 51 years old, with 37.5% having up to 2 years of clinical training and the remaining having more. Three sessions were not used in analysis due to technological malfunction. Across the remaining 21 sessions, tools were picked up and used 804 times, with an average of 38 times per session. The object most often manipulated was the ultrasound probe (35%), followed by the syringe (32%). Of the colored cylinders, the blue cylinder, used to represent the jugular vein, was used most (9%). The probe and syringe were also moved over the greatest cumulative distances, as well as the blue cylinder amongst all cylinders. Objects were utilized for an average of 7.9% +4.3% of the total session time. When comparing training practices for novice vs more experienced proceduralists in the CVC procedure, instructors used virtual objects more frequently and for longer durations on average with less-experienced trainees (9.8% of session time, or 4.21 minutes) than for those with more procedural experience (6.3% of session time, or 3.28 minutes).

**Discussion:** Procedure-specific virtual tools are increasingly incorporated into augmented reality remote training, especially for novice learners. In the ultrasound-guided vascular access procedures, tools which must be correctly positioned and moved synchronously were used most often in the teaching process, such as the probe and syringe. This suggests that AR virtual tools can be used to demonstrate complex tool movements, and that these tools should be incorporated for and can assist in understanding complex tasks to improve the training environment. Areas for future study include analysis of whether virtual tools are used for pretraining demonstration, i.e., to demonstrate tool grip and usage technique or during training for specific procedural steps.

## 88. For Whom Technology Enhanced Treatment Works Better: Parent Profiles Moderates Treatment Outcomes

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**Background:** Children from financially disadvantaged families are at greater risk of early-onset Behavior Disorder, but have more difficulty engaging in and benefiting from the standard of care intervention, Behavioral Parent Training (BPT). Given the potential for technology-based tools to improve treatment engagement for families with low income, Technology-Enhancements (TE) to one evidence-based BPT program, Helping the Noncompliant Child (HNC), was developed and tested in a randomized controlled trial (RCT). TE-HNC maintained treatment gains better at follow-up than standard HNC; however, there were no differences between the groups immediately post-treatment raising the question: Can we predict for whom TE treatment has more immediate treatment gains? Thus, the current study aims to create parent-centered profiles among a sample of low-income families and explore for whom TE-HNC predicts better post-treatment outcomes.

**Methods:** Secondary analyses of the RCT were carried out. The project focused on 100 parents of children (Mage = 4.18, 61.3% male, 72.6% White) with clinically significant behavioral problems from low-income households who enrolled in the RCT comparing standard HNC to TE-HNC. All families received standard in person HNC, then TE-HNC additionally included a HIPAA-compliant interactive, connected health system consisting of a parent mobile app and a web portal for clinicians to monitor caregiver activity on the mobile app. Both components were designed to support families between sessions toward a more tailored treatment model. For these analyses, parents were grouped into profiles based on pre-treatment indicators, including parent stress, depressive symptoms, dispositional mindfulness, and co-parent convergence. Parenting practices (i.e., parent-reported positive and negative parenting) were measured at post-treatment as outcomes.

**Results:** Latent profile analyses yielded four distinct profiles: a Conflict Profile characterized by low co-parent convergence (13%); a Mindful Profile characterized by high dispositional mindfulness (10%), a Distressed Profile characterized by elevated stress and depressive symptoms (14%), and a Supported Profile characterized by low stress and high co-parent convergence (63%). Wald tests revealed significant moderation effects of profiles on both positive parenting ($\chi 2(3) = 18.74$, $p < .001$) and negative parenting ($\chi 2(3) = 21.32$, $p < .001$) at post treatment. Follow-up pairwise comparisons presented different patterns across four profiles ($p < .05$). In the Mindful and Distressed Profile, parents randomized to receive TE-HNC endorsed significantly more positive parenting and significantly less negative parenting practices than parents randomized to standard HNC, while the opposite patterns emerged in the Conflict and Supported Profiles. Within profiles, we found parents randomized to TE-HNC endorsed significantly better parenting outcomes than parents randomized to HNC in Mindfulness Profile ($p < .001$); and parents randomized to TE-HNC endorsed significantly worse parenting outcomes than parents randomized to HNC in Conflict Profile ($p < .001$).

**Discussion:** The current study employed a novel statistical approach to examine how parent-centered profiles may impact low-income, treatment-seeking families' heterogeneous responses to technology-enhancements immediately post-treatment. At post-treatment, parents receiving TE-HNC reported better parenting treatment outcomes among the group of parents having higher dispositional mindfulness. In contrast, parents receiving HNC reported better parenting treatment outcomes among the group of parents presenting relatively high level of strain with co-parents. The different patterns highlighted the importance of considering complex family characteristics when providing technology-enhanced services. Findings highlight the importance of future research focusing on improving treatment effectiveness for underserved population via more personalization within connected health systems.

## 89. Telemedicine In A Pediatric Lipid Clinic: Feasibility, Acceptability and Health Care Disparities

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**Background:** Telemedicine (TM) is an appealing care model for Preventative Pediatric Cardiology as care is largely based upon history and laboratory studies without the need for additional cardiac testing at every visit. We hypothesized that telemedicine would provide comparable care to in-person visits, may enhance compliance and address inequities to health care delivery.

**Methods:** We performed a feasibility study at our Lipid Clinic at Children's Hospital of Philadelphia, which is part of a tertiary care center. Data were collected from a TM cohort (3/17/20-7/20/22) and compared to an in-person (IP) cohort (1/1/19-7/20/22). We evaluated 48-hour cancellation rates, non-

high-density lipoprotein (non-HDL) cholesterol levels, travel distance along with travel related costs, and provider satisfaction via monthly surveys. Data were analyzed using standard descriptive summaries and student's t-test.

**Results:** Five providers completed 1377 lipid telemedicine visits, accounting for 58% of total visit volume between 3/17/20-7/20/22. Average age of patients was 13.9 years (+/- 3.9 yrs) and 366 (45.6%) were male. The 48-hour cancellation rate overall decreased from 11.3% to 7.2% (IP and TM cohort, respectively, $P < 0.001$), and from 25.0% to 8.6% for Non-Hispanic Black patients ($P < 0.001$). Non-HDL-cholesterol decreased significantly for TM cohort compared to IP cohort (4.58% vs 0.82%, respectively, $p < 0.001$). Total driving distance saved was 38,224 miles with travel-related savings of $21,034. Providers surveyed rated telemedicine 9.3/10.

**Discussion:** Telemedicine in a pediatric lipid clinic is feasible and associated with travel-related mileage and cost savings. There was a significant decrease in 48-hour cancellation rates overall, most notably for Non-Hispanic Black patients, suggesting improved access to care, especially in certain population subsets. Future studies utilizing telemedicine in our clinic will evaluate the effect on long term cardiovascular risk and health care delivery. There are also potential future implications for telemedicine to bolster accessibility to consistent, high quality health care and impact disparities in access to care.

### 90. A Scoping Review of Telehealth Definitions

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**Background:** The use of telehealth in the U.S. has grown rapidly in recent years. Given this recent growth, the need to define telehealth has become important for various audiences (e.g., practitioners, policymakers, insurers). This scoping review examines the current use of definitions related to telehealth among three different data sources: academic literature, organizations with a relevant telehealth interest, and state/federal legislation.

**Methods:** A scoping review was conducted to answer three key research questions regarding telehealth-related definitions: 1) What issues and challenges exist with current telehealth definitions, especially the terms "telehealth" and "telemedicine" in the U.S.? 2) What are the current telehealth definitions used among U.S. stakeholders and across the healthcare literature? 3) What are key considerations when selecting telehealth definitions that are the right fit for services or programs provided? A conceptual content analysis was conducted for each of the definitions provided by the data sources using the code map. Two coders reviewed 100% of the data sources, which was modified iteratively throughout the coding process. Final codes were reached through discussion and refinement between the coders.

**Results:** We observed key differences in how the academic literature, organizations, and legislation used and defined telehealth and other related terms. "Telehealth" was by far the most common term observed ($n = 3,748$), followed by "telemedicine" ($n = 2,665$), with "digital health" ($n = 294$) and "virtual care" ($n = 135$) trailing. Eighty percent of the scoped entities provided a specific definition for telehealth. Although 100% of all reviewed legislation used the terms "telehealth" and "telemedicine" interchangeably, 60% of academic literature and 76% of organizations defined the two as distinct terms. Fifty percent of those sources that defined telemedicine distinctly from telehealth represented telemedicine as having a clinical care focus, while the other half included activities such as continuing medical education or administrative processes. Additionally these sources differed on whether and how they defined telehealth technology types, service types, and/or purposes.

**Discussion:** Existing telehealth definitions vary considerably across sources due to differences in intended audience and purpose. Overall, clarity and communication will be improved by using the more-encompassing term "telehealth" over the term "telemedicine" and including three key components within telehealth definitions: 1) Service (what is being delivered?), 2) Structure (how is it being delivered?), and 3) Purpose (why is it being delivered?). Consistent and clear use of terminology will help policymakers, legislators, and researchers facilitate and promote increased access to needed telehealth services.

### 92. Good Catch and Safety Rounds Initiative, Utilizing the Virtual ICU to Promote Patient Safety

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**Background:** To optimize quality of care and patient safety for critically ill patients throughout a large health system, A Virtual ICU Good Catch and Safety Rounds Initiative was implemented to assist with identifying risks for eliminating preventable harm. In May 2021, the Virtual ICU began capturing Good Catches; defined as events identified by Virtual ICU nurses and physicians that requrie intervention for quality of care/patient safety. In March 2022, the Good Catch initiative led to the creation and integration of Virtual ICU Safety Rounds which allows for Virtual ICU RN hourly rounding on identified high risk patients. The Virtual ICU Rounds serve as a proactive approach to eliminate preventable harm and reduce negative patient outcomes. The goal is to improve quality of care, decrease bedside burden and promote patient safety by identifying risks and providing timely. Support for escalating patient care, physician orders, fall risk reduction, airway safety, and physiolgic trend monitoring.

**Methods:** The Virtual ICU utilizes an interdisciplinary team approach to reduce potential adverse events, leading to improved patient outcomes. Each event is reviewed by the Virtual ICU leadership and Quality RN; the event is categorized, and prevention efforts are quantified. Categories include airway safety, medication safety, adverse events, and fall risk reduction. Qualitative narratives and quantitative metrics are shared monthly. A survey is shared with site leadership to empower feedback for best practice and quality initiative support. The Virtual ICU workflow supports evidence-based practice; earlier intervention can prevent failure to rescue and delays in care. An internal electronic Safety Round data collection tool specific to each patient encounter including interventions performed, escalations related to patient safety and bedside engagement was created for documentation and input for all Virtual ICU nurses to access. Patient outcome and duration of Virtual ICU support is also measured. This data is shared quarterly by site with a comparative report that includes all Virtual ICU sites. Patient outcome definitions for Safety Rounds and a glossary of terms for Good Catch metrics were created and shared when reporting to sites.

**Results:** From 3/29/22-3/31/23 there were 1,443 patient encounters for Safety Rounds. From March 2022 to March 2023 the number of patient encounters increased from 8 to 503. Patient outcome yields 349 (24.2%) improved and 1,075 (74.5%) stabilized. There were 19 patient encounters (1.3%) with worsening patient outcome with the rationale of worsening physiologic trends or transition to comfort care. There were 247 (17%) patient encounters that required urgent patient safety escalations. Safety Round support and utilization by shift includes 801 (55.5%) patient encounters for day shift and 642 (44.5%) patient encounters for night shift. Bedside engagement in response to Virtual ICU support is 9.7 on a Likert Scale from 1-10; 10 is most engaged and eager to receive Virtual ICU support and 1 is not engaged and/or denies need for support.

From 5/26/21-3/31/23 there were 640 Good Catch collaborations. 334 (52.2%) Good Catch events were identified on day shift and 306(47.8) were

identified on night shift. Good Catch categories included but were not limited to airway safety, falls risk reduction, identification of change in patient status, and collaborations that promote medication safety.

**Discussion:** The increased utilization and positive bedside engagement for Safety Rounds has assisted bedside teams in promoting patient safety while also allowing the bedside nurse to focus on the hands-on needs at the bedside. The Good Catch reports are shared and utilized by each Virtual ICU site for quality-of-care trends, best practice and patient safety support, collaborative care discussions and mock patient safety scenarios for the front-line teams.



### 93. Decreases in inpatient and emergency room use after 1 year with a remote exam device

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**Background:** Children with medical complexity (CMC), defined as children with chronic, functional limitations and technology dependence, represent a significant proportion of health care utilization1. These patients require timely, accessible health care, and telehealth has potential to improve care delivery to this patient population. Patients and families within Cincinnati Children's Medical Center Complex Care Center (CCC) have been using a remote exam device since 2020. The device is FDA approved and allows for the transmission of physical exam findings from the home to the provider. The device includes a thermometer, stethoscope, otoscope, tongue depressor, and built in camera. Several patients have had these devices for over a year. We evaluated their use of emergency department visits, in-person outpatient appointments, and inpatient admissions pre- and post- device acquisition and compared this usage to patients who do not have a device.

**Methods:** Families within the Complex Care clinic at Cincinnati Children's Hospital were offered a device as early as September 2020. Families with the device went through a thorough onboarding process to ensure appropriate usage. We compared health care utilization of patients with the device over a 3 year period: 2 years prior to device, 1 year prior to device, and 1 year post device. We also evaluated the health care utilization of non-device patients over a similar time period. We specifically examined: in person office visits, telehealth visits, inpatient stays (both planned and unplanned), and emergency room encounters (a planned inpatient stay was defined as an inpatient encounter that was created greater than 24 hours prior to the time the patient arrived). We then compared the health care utilization of device and non-device patients. In addition to health care use, we also compared demographic data of device and non-device patients including ethnicity, race, spoken language, and socioeconomic status using a deprivation index.

**Results:** There were 273 patients who had a device for more than a year and 203 patients who did not have a device. In terms of demographic data, device patients were more likely to be non-Hispanic (95% in device group vs 90% in non-device group), white (70% vs 56%), and primarily English speaking (95% vs 84%). Device patients were also more likely to have deprivation indices corresponding to higher socioeconomic status (70% vs 50%). In terms of health care utilization, device patients showed an overall decrease in all inpatient encounters between 2 years pre device to 1 year post device (709 to 658); non-device patients showed an increase (300 to 421) over a similar time period. Device patients also showed a decrease in number of ED visits from 539 pre-device to 478 post device. Non-device patients showed an increase from 234 to 303.

**Discussion:** Patients who have been using a remote exam device for more than 1 year in a complex care pediatrics clinic showed a decrease in inpatient encounters and emergency room encounters from 2 years pre-device acquisition to 1 year post-device acquisition. Non-device patients actually showed an increase in use of both inpatient encounters and emergency room visits over this time period. The purpose of this device is to try to keep families of medically complex children at home rather than bringing them in to the hospital. Patients with the device seem to have decreasing rates of inpatient and emergency room visits (as compared to non-device patients), though it is difficult to definitively prove causality. Additionally, patients with the device tended to be White, non-Hispanic, English-speaking, and from higher socioeconomic neighborhoods compared to non-device patients.

### 94. Telelactation Utilization and Experiences among Minoritized Parents

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**Background:** Telelactation services that connect parents to remotely located lactation consultants via video may help narrow disparities in breastfeeding rates. This research explored utilization patterns and experiences with telelactation services among Black and Latinx parents.

**Methods:** We conducted a mixed methods study that incorporated analysis of 1349 telelactation visits and interviews with 40 users and non-users of telelactation services. The study was conducted within the context of an NIH-funded randomized control trial [Tele-MILC trial] on the effectiveness of telelactation across diverse populations. Analysis of visits explored predictors of any use of telelactation among trial participants given access to telelactation (n = 1012), timing of visits, use patterns, and reasons for visits. Descriptive statistics were calculated, and statistical comparisons were made using t-test and Chi-square tests. Multivariate regressions were also estimated to adjust for maternal characteristics. For the qualitative component, we recruited primiparous Black and Latinx birthing people at 8-12 weeks postpartum to participate in semi-structured Zoom interviews. Interviews occurred from November 2022-March 2023 and addressed birth experiences, use and opinions about telelactation, comparison of telelactation to in-person lactation support, and recommendations to improve telelactation services. The thematic analysis was informed by Sekhon's theoretical framework of acceptability and RAND's Equity-Centered Model.

**Results:** 380 (38%) participants with access used telelactation at least once. In adjusted models, those identifying as "other race" (aOR = 2.67, 95% CI: 1.10-6.45), those who reported speaking a language other than English at home (aOR = 1.47, 95% CI: 0.97, 2.21), and those who were married (OR = 1.76, 95% CI: 1.16,2.67) were more likely to use telelactation services. The likelihood of use also increased with maternal age (aOR = 1.07, 95% CI: 1.03,1.10). The average user completed 4.2 telelactation calls. The average call was 11 minutes in length, and 62% of calls occurred outside of business hours. The most common reasons for calls included breastfeeding schedule/patterns (24%), breast pain (24%), latching (22%), and milk supply (20%). Interviews found that non-users did not engage for various reasons, such as preferring in-person support or not being comfortable with video calls. All users appreciated the convenience of telelactation and reported that lactation consultants were knowledgeable and helpful. Many wanted more options to engage with lactation consultants outside of video consultations (e.g., text messaging). Users who had a lactation consultant of color mentioned that racial alignment improved the experience.

**Discussion:** Minoritized parents found telelactation services to be acceptable, and many were high utilizers who completed multiple, short visits. Several changes could be made to telelactation services to increase their use by minoritized individuals.