During the 2020 Covid-19 pandemic, academic medical centers needed to rapidly develop systems to assure patient and staff safety. Video visits provided a method of offering care while maintaining social distancing. Stanford Primary Care scaled a nascent video visit program in their two Express Care urgent care centers to cover more than 80% of clinic visits within 2 weeks. The following week, they scaled their primary care clinics to more than 75% video visits. They created new training/scheduling systems, “physician-directed patient self-exam” checklists/videos, and other resources to facilitate video visit adoption.

**Introduction**

The rapid evolution of the Covid-19 pandemic has fundamentally challenged our health care delivery system, as the need for social distancing to curb disease spread is critical to public and health-care provider safety. In most health care organizations, a majority of ambulatory clinic appointments have been in-person visits, with person-to-person connection and physical examination as central elements of the diagnostic and therapeutic relationship.

Telephone and video visits are convenient for patients because they don’t require taking time off work, finding childcare/eldercare, or driving to a clinic appointment. Health care systems can...
use telemedicine to increase overall access, scale provider services by allowing care to happen from many locations, prevent exposure, and direct patients to appropriate levels of care. With technological advances, video visits have become much more convenient for patients and providers. However, until just recently academic medical centers (AMCs) have been slow to adopt video visits. There has been no clear consensus on the quality of clinical care delivered via such visits and patients have not demanded them.

In March 2020, the number of SARS-CoV-2 infected patients began to escalate, making it crucial to find methods to provide high-quality medical care without exposing the clinic staff or other patients to the virus. With much of the country implementing “shelter-in-place” rules, AMCs have had to quickly adapt to these new public health concerns about nosocomial Covid-19 infections.

Patient demand for video visits quickly surpassed available appointments. On week 2, as the pandemic spread, we enlisted the help of providers from the other Stanford Primary Care clinics.

Stanford Primary Care is part of the Division of Primary Care and Population Health in the Department of Medicine of Stanford University. Stanford Primary Care consists of nine Stanford Primary Care (PC) and Express Care clinics, at six sites in northern California, with 81 providers, 123 staff, and 97,614 visits in 2019. In February 2020, anticipating that Covid-19 would force transformation in the way we work, we committed to rapidly transitioning almost all patient encounters to video visits within 3 weeks in six of the nine clinics. The remaining three clinics transitioned to video visits 1 week later. All staff are now trained to do video visits.

We had already laid some of the groundwork for this effort. Stanford Express Care, a same-day primary care clinic, had implemented a limited number of video visits in November 2019 for about 5% of all encounters, and as a result it had the requisite technology and had trained its providers. Finding a way to scale video visits throughout all of Primary Care, however, proved to be challenging.

Program Description

To facilitate the quick scaling of video visits, we created educational materials, including patient care tools, virtual town halls, and mandatory video visit training (see Appendix). We also designed new nursing schedules and intake protocols, worked with our technologists, nursing, Facilities and Operations, and obtained additional personnel, funding, and resources for rapid scaling.

Stanford used the Epic electronic medical record system, and Express Care used Vidyo as a video vendor. All clinic workstations already had audio-video capabilities, previously used for video translators, and the clinics had a large technology/Epic support team.
Express Care

Express Care offers same-day (urgent care) appointments from 9 a.m. to 9 p.m. 7 days a week with visits scheduled either online or by phone. Since November 2019, 5% of all visits had been offered as video visits. When scheduling their appointment in Express Care, patients were given the choice between an in-person visit and a video visit. Most of these video visits were scheduled for patients with symptoms of upper respiratory infections (URI) (about 60%), but they were also used for patients with other complaints such as urinary tract infections, rashes, and musculoskeletal problems. During the pilot phase there were eight video visit slots available per day, and patients with URI or other conditions appropriate for video consultation were offered a choice until the video slots were filled.

When it became obvious that the SARS-CoV-2 virus was spreading rapidly during the first week of March, we were able to create a new primary care call center and triage system within 1 week. When patients called for an appointment, they were initially assessed by the ambulatory call center with basic Covid-19 screening questions, such as the presence of a sore throat, shortness of breath, a cough, or a fever. If the patient screened positive for possible SARS-CoV-2 infection, they were transferred to a Primary Covid Response Team of five experienced triage nurses.

Based on nursing assessment, patients were referred to the emergency department if urgent in-person evaluation was crucial, or given the option for an Express Care video visit appointment with a medical provider (MD, DO, PA, NP) as available. For important but nonurgent appointments, the contact information of those patients who wanted to proceed with a video visit was sent to Express Care Medical Assistants, who then called patients to schedule appointments. After the demand for video visits doubled due to screening for Covid, this model of triaging the patient proved too time-consuming as it took too long for the patients to go through the decision tree (Figure 1). We changed the workflow in such a way that the call center was able to directly make a video visit appointment in Primary Care or Express Care.
Patients who screened negative for Covid-19 symptoms and needed a same-day in-person visit (e.g., acute musculoskeletal problems, lacerations, procedures) were given the option of seeing a provider in clinic. After 1 week we had increased our video visits to 80% of all clinic visits. In addition, the number of video appointments available more than doubled in the first 2 weeks (Figure 2).
Patient demand for video visits quickly surpassed available appointments. On week 2, as the pandemic spread, we enlisted the help of providers from the other Stanford Primary Care clinics. We created an intranet “clinical gaps” calendar and online sign-up system with video visit shifts in 4-hour increments using a scheduling tool called SmartSheets. Two master schedulers managed the schedule including provider requests, notifications, and changes. Thanks to the additional help we were able to schedule all patients who requested a video visit within a few days of their appointment request.

“As the pandemic progressed, there were significant delays in video visit scheduling. Patients had to wait for appointments for more than 2 days. To help meet the demand, same-day video visits were rolled out to additional Primary Care clinics."

Prior to their first video visit, providers underwent mandatory video visit training of 1 to 2 hours, which taught the core elements of conducting successful video visits, with special emphasis on physical exam and medical decision-making for Covid-19 patients under investigation. Providers were often surprised at the number of physical exam maneuvers possible with a provider-directed
patient self-exam. We posted one-page checklists and flow sheets in every clinic room with key information on successfully conducting video visits.

The Express Care clinic was able to set up the first drive-through Covid-19 testing center in the Bay Area, with appointments scheduled only for those patients who had been evaluated by a video visit provider. Due to supply chain issues such as viral test kit media, swab, and reagents shortages we applied strict clinical decision criteria on who qualified for testing.

During the video visit, medical providers decided whether a given patient needed further diagnostic evaluation for Covid-19, informed by Centers for Disease Control and Prevention (CDC) guidelines, Stanford Infection Control guidelines, and their clinical judgement. If patients required testing, they were scheduled for a drive-through Covid-19 nasopharyngeal swab. Within 1 week of starting the drive-through center, we were quickly able to increase the number of drive-through tests from 8 to more than 150 tests per day due to improving the efficiency of the drive-through workflow, and had enough capacity to meet demand.

For assurance of high-quality patient care, a video visit provider who had done at least 12 hours of video visits reviewed five charts of each new video visit provider and gave direct feedback within 2 days. Initially, the training was done by Express Care providers, but other Primary Care providers quickly gained experience in taking care of patients via video visits and were able to train their colleagues on how to do video visits. We distributed HIPAA-compliant Stanford laptops to video visit providers who needed to work from home due to childcare issues or because they were in quarantine. We created Epic templates for patients’ frequently asked questions, and for the video visit itself. These templates addressed general questions and Covid-19 specific issues.

After 2 weeks we were able to offer more than 150 video visits per day, but still could not keep up with the demand for virtual care. As the pandemic progressed, there were significant delays in video visit scheduling. Patients had to wait for appointments for more than 2 days. To help meet the demand, same-day video visits were rolled out to additional Primary Care clinics.

**Primary Care**

On week 3, seven additional Stanford PC clinics, with a total of more than 47 providers, converted most of their appointments to video visits. In the primary care setting, appointments are usually booked months in advance for chronic disease management follow-up. Very few appointments are held for same-day needs because most appointments had already been scheduled for in-person visits; therefore the Primary Care Medical Assistants had to call patients to reschedule appointments.

> With the help from providers in the PC clinics, we were able to reach our highest volume of video visits at 232 a day by week 3, which equated to 90% of our appointments being video visits.
Appointments were converted to video visits with medical providers or pharmacists, or patients were offered the opportunity to be placed on a wait list for in-person visits at a later date. Medical assistants used a script to help with these phone calls. Because of the pandemic, patients were very receptive to video visits and generally grateful about Stanford Primary Care protecting their health while still taking care of their medical needs. With the help from providers in the PC clinics, we were able to reach our highest volume of video visits at 232 a day by week 3, which equated to 90% of our appointments being video visits.

**Rising Covid-19 Rates**

Stanford was at the epicenter of the Covid cases in Santa Clara County. We routinely provide care for a large portion Santa Clara country population. As the number of Covid-19 cases rose, and our capacity scaled, Stanford was a major provider of Covid-related care in the region. As of April 2, 2020, Santa Clara County had 9,218 tests performed, the majority tested at Stanford (90%), with 1,019 (11%) Covid-19 positive. As of April 8, 245 Santa Clara patients were hospitalized due to Covid-19, including 92 ICU patients.7

The Covid-19 pandemic has foundationally shifted health care, forcing innovation to protect the public’s health. Especially in ambulatory care settings, we believe many of these changes will persist. At Stanford, we have demonstrated that AMCs can rapidly adapt to these challenges and meet the needs of an entire population in real time, while maintaining high-quality patient care.

Stanford’s rapid and successful video visit implementation was built on cooperation, respect, and teamwork, with every stakeholder having decision-making input into the clinical redesign process — including triage nurses, the call center, schedulers, facilities, clinic management, medical assistants, medical providers, and administrative leadership. The singular focus on this public health crisis brought together the university, community, and resources in a creative and unprecedented manner.

**Challenges and Solutions**

**Rapid system evolution and collaboration:** Prior to the Covid-19 pandemic, stakeholders from different departments would sometimes have difficulty making quick decisions. When Stanford Primary Care developed a centralized response to Covid-19 under the umbrella of Express Care, we committed to having every stakeholder group present at relevant decision meetings. With a single goal of reducing patient harm from the pandemic, teams worked smoothly together to achieve this goal. For instance, the Stanford facilities department helped us to design safe protocols for drive-through testing by providing tents, signage, collection of biohazard waste, etc. All of Stanford stepped up with providers, nurses, medical assistants, and administrators taking extra shifts to serve the public.

**Funding:** Emergency funding was allocated by the health system and university to absorb any unreimbursed cost of rapid expansion and deployment. Because several insurance companies did not initially reimburse video visits, Stanford decided to absorb all additional unreimbursed costs. Now all insurers reimburse video visits at parity with in-person visits in the setting of Covid-19.
Ensuring patient care quality: Rapid workforce expansion can potentially diminish care quality or lead to errors. We noticed that providers who were new to video visits and specifically Covid-19 related video visits struggled with certain areas of the video visit (e.g., physical exam documentation) or had difficulties following the test-ordering workflow. To address this challenge, we created standardized training material and systematic audits of new Covid-19 providers with direct person-to-person feedback.

"Stanford’s rapid and successful video visit implementation was built on cooperation, respect, and teamwork, with every stakeholder having decision-making input into the clinical redesign process."

Workplace flexibility: Providers were sometime unable to come to work because they lacked childcare, or were quarantined after being exposed to SARS-CoV-2. Stanford IT Services repurposed and redistributed hundreds of HIPAA-compliant laptops so that providers were able to work from home. Video visits became location agnostic.

Provider scheduling: The rapid Express Care workforce expansion led to instances of miscommunication, in which providers didn’t know their schedule. We built a SmartSheet sign-up document that was used by providers to sign up for shifts. However, initially this document was not coordinated with the clinic’s needs and thus, resources were not used in an efficient way. We then created a “needs calendar” that clearly depicted the clinic’s need for providers for a given shift. This calendar updated in real time when a provider was scheduled for a shift and helped significantly to streamline the scheduling process.

Resourcing staff: To meet our increased need, nursing administration pulled medical assistants and other staff from our ambulatory clinic pool. Since medical assistants were not needed for their usual job duties, they were free to perform these new duties. Nursing supervisors and lead medical assistants rapidly trained staff into their new roles.

Staff role evolution: With video visits, medical assistants were not needed to room patients. Medical assistants became frontline care coordinators and patients’ point of contact. The medical assistant’s role was crucial in connecting patients to video visit providers and scheduling them into the drive-through as demand for video visits and Covid testing increased. Medical assistants also helped with the drive-through by labeling vials and preparing collected samples for lab pick-up. The medical assistants went through video visit training that mainly addressed logistics such as scheduling a video visit for the patient, making sure that patients had a myHealth account, and explaining how to access the video visit.

Centralized communication: With the increasing size of the Express Care provider workforce, it became more difficult to have a clear line of communication. It was important that everyone was familiar with Express Care’s workflows and clinical decision-making tools (for example, how and when to order a test for SARS-CoV₂, and what to do when the provider felt that a patient seen on a video visit needed to come in for an in-person visit for further evaluation). Clinical guidelines for
Covid-19 testing changed daily, as the science evolved and resource availability shifted. Providers were overwhelmed with the deluge of daily emails and recommendations. We streamlined communication through a centralized Primary Care Daily Digest (Figure 3) with all critical information from new templates, workflows, frequently asked questions, and research updates.

**FIGURE 3**

**Excerpt from the Primary Care COVID Daily Digest Used to Centralize Communication**

| **COVID Primary Care Daily Digest** - the ONE email "must read" to keep you informed! |
| Have non-urgent COVID-related information, questions or resources to share with PCPH? Please contact your site-specific COVID Primary Care Point Person (see attached) who will review, collate and send to us - please avoid sending out mass emails unless truly urgent! Partner with us to prevent email-overload-fatigue! |
| Today's most pertinent updates: |
| **STAFFING NEEDS/CURRENT BOTTLENECKS:** |
| • Current Express Care video visit availability: **RED (next available Mon 3/22 PM)**, please sign up [here](https://www.sccgov.org/sites/phd-p/Departments/primary-care-clinic/schedule) if you can help. Given the desperate need for video visits, CAS will now be directly booking patients (Stanford and external) into all primary care clinic schedules. Please reach out to your site-specific COVID Primary Care Point Person who will be sure you have the tools you need and help guide you in clinical decision making for your first several patients. |
| • Current swab/testing availability: **YELLOW (150 slots available for 3/21)**. As our capacity for testing increases, so does the demand, so we continue to have limited capacity. **Please be judicious with ordering COVID testing.** |
| *Per financial services, patients will not be charged for video visits or swabs.* |

**CLINICAL CARE UPDATES** (updated Santa Clara County guidelines):

- Discharging PUIs, test result pending: [https://www.sccgov.org/sites/phd-p/Departments/primary-care-clinic/schedule](https://www.sccgov.org/sites/phd-p/Departments/primary-care-clinic/schedule)

- Discharging Confirmed cases: [https://www.sccgov.org/sites/phd-p/Departments/primary-care-clinic/schedule](https://www.sccgov.org/sites/phd-p/Departments/primary-care-clinic/schedule)

Source: The authors

NEJM Catalyst (catalyst.nejm.org) © Massachusetts Medical Society

The Covid-19 pandemic caused seismic shifts in the traditionally deliberative halls of academic medicine, with a renewed focus on public service and public safety stimulating massive and rapid program evolution. Importantly, trust was quickly built at every level of the institution, and
everyone’s expertise was brought to bear. This centralized, coordinated response to crisis provides a template for cooperation for other important changes needed in health care. At Stanford, we believe that this shift in American health care is foundational, and a hybrid system of virtual and in-person care will be here to stay.

Maja Artandi, MD
Medical Director, Express Care Clinical Associate Professor of Medicine, Stanford University School of Medicine

Samuel Thomas, MD, MS
Population Health and Delivery Science Fellow, Stanford University School of Medicine
Intermountain Delivery Institute, Intermountain Healthcare

Nirav R. Shah, MD, MPH
Senior Scholar, Clinical Excellence Research Center, Stanford University School of Medicine

Malathi Srinivasan, MD
Clinical Professor of Medicine, Stanford University School of Medicine

Appendix: Stanford video visit educational materials

Acknowledgements

The authors would like to recognize the outstanding focus and dedication of our video visit development and implementation team: Sang-ick Chang, Leah Bailey, Linda Barman, Amber Bonema, Heather Filipowicz, Lena Giang, Thanh Khong, Chris Lentz, Megan Mahoney, Timothy Morrison, Leah Rosengaus, Aileen Santos, Christopher Sharp, Victor Cheng, Jennifer Miller, Amelia Sattler, and Laura Vaughan.

Disclosures: Maja Artandi, Samuel Thomas, Nirav Shah, and Malathi Srinivasan have nothing to disclose.

References

1. Hollander JE, Carr BG. Virtually perfect? Telemedicine for Covid-19. N Engl J Med March 11, 2020 [Online ahead of print] https://www.nejm.org/doi/full/10.1056/NEJMp2003539.

2. Duffy S, Lee TH. In-person health care as option B. N Engl J Med. 2018;378(6):104-6

3. Lurie N, Carr BG. The role of telehealth in the medical response to disasters. JAMA Intern Med. 2018;178(6):745-6

4. Call VR, Erickson LD, Dailey NK. Attitudes toward telemedicine in urban, rural, and highly rural communities. Telemed J E Health. 2015;21(6):644-51
5. Maxwell DN, Perl TM, Cutrell JB. "The Art of War" in the era of coronavirus disease 2019 (COVID-19). Clin Infect Dis 2020;ciaa229 March 4, 2020 [Online ahead of print] https://academic.oup.com/cid/article/doi/10.1093/cid/ciaa229/5800048.

6. American Medical Association. AMA quick guide to telemedicine in practice. Accessed March 24, 2020. Updated April 15, 2020. https://www.ama-assn.org/practice-management/digital/ama-quick-guide-telemedicine-practice.

7. Santa Clara County Public Health Department. Coronavirus (COVID-19) Data Dashboard. Accessed April 2, 2020. https://www.sccgov.org/sites/phd/DiseaseInformation/novel-coronavirus/Pages/dashboard.aspx#testing.