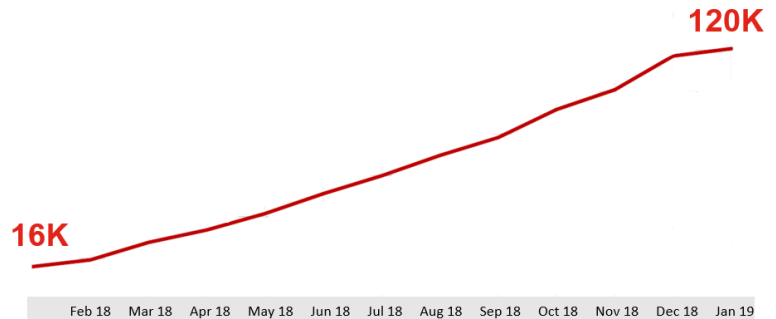


Digital Health at NewYork-Presbyterian

Daniel Barchi, Chief Information Officer

A television celebrity. A painter. A finance technology manager.

These are three of the thousands of patients whose lives have been impacted by telemedicine at NewYork-Presbyterian. As a national leader in virtual care, NYP has invested in the people, process, and technology to bring care to patients wherever and whenever they need it. In the last four years, NewYork-Presbyterian has tested numerous ways of using technology to deliver medical care inside and outside city and state lines. In collaboration with the physicians of Columbia and Weill Cornell Medicine, we continue to deliver world class medicine through more than 120,000 telemedicine encounters.



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| <p>120K+ PATIENT VISITS</p> | <p>50+ TELEHEALTH PROGRAMS</p> | <p>700+ PROVIDERS ON PLATFORM</p> |
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What drives the organization to prioritize and invest in telemedicine? Our commitment stems from the belief that telemedicine can expedite access, improve patient satisfaction, and create a more efficient care delivery process. Ultimately, we see telemedicine as simply medicine—care that is delivered where and when patients need it. To realize these aims, NewYork-Presbyterian has built an enterprise-wide telehealth strategy that recognizes the importance of scale, coordination, and innovation in delivery and experience.

The Birth of Telehealth at NYP

In 2016, we began thinking about ways that telehealth could improve care in our emergency departments. EDs can be chaotic—unfamiliar beds, loud noises, intrusive clinician visits, and the potential for hospital-acquired infections all make recovery difficult. For the sickest patients, hospital stays are unavoidable. However, for patients that have less severe conditions, an opportunity to receive care at home can be a win for patient safety and an opportunity to provide less expensive care without the risks of hospitalization.

To move patients safely and quickly through the system, we created a private telehealth room where patients could see board-certified emergency medicine physicians from Weill Cornell Medicine or Columbia virtually (right). Patients who might have a simple sprain, abrasion, or minor illness are given a choice of waiting for an emergency room bed, a process that can take two to three hours, or having a virtual visit through the ExpressCare program. By replacing an in-person visit with a virtual one, we have been able to reduce wait times to 30 minutes while improving patient satisfaction and making a physician’s shift more efficient.

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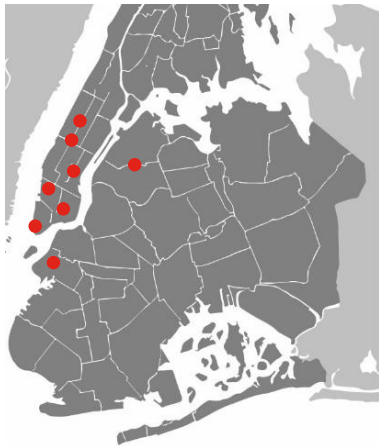


ED Express Care Patient Room

Expanding Our Presence in the Community

While we successfully triage patients in the Emergency Department using virtual care, we knew that we also had an opportunity to reach patients before they enter an NYP facility. Through a partnership with Walgreens, we leveraged existing in-store space to install telehealth kiosks at select Duane Reade locations. These kiosks allow us to deliver virtual care through physical outposts, building on our commitment to expanding our presence in the community and giving patients a convenient place to access care.

The kiosks give patients instant access to a board-certified emergency medicine physician. Patients are shown how to take their blood pressure, measure their temperature, determine their blood oxygen content, and listen to their heart rate so that they can share this information with their provider in real-time.



NewYork-Presbyterian has partnered with Duane Reed to expand the kiosks to other stores in Manhattan, Brooklyn, and Queens (left). To date, NYP has installed 8 kiosks throughout the city, and will continue to expand their kiosk presence as patient demand grows.

Taking Telemedicine on the Road

As we built out our kiosk system, we recognized that there were certain conditions for which patients like Ron would not be able to get to a physical kiosk in time to be treated effectively. In stroke, for example, patients can lose millions of brain cells in seconds—the faster patients can access treatment, the more likely they are to survive and avoid permanent disabilities. Telemedicine presents opportunities to speed the time to treatment, and NYP is the first health system on the East Coast to develop and deploy a fleet of three mobile stroke ambulances. These vehicles look like a standard ambulance from the outside, but inside they carry a small CT scanner that can rapidly image a patient's brain in a case of suspected stroke.

When New York City's 911 system receives a report of someone having stroke symptoms, the New York City Fire Department sends both a regular ambulance and NYP's stroke ambulance to the location. A technician will send the CT image of the patient's brain wirelessly to an NYP neurologist to determine if the stroke is ischemic (caused by a blockage), or hemorrhagic (caused by bleeding). Strokes caused by blockage can be treated by the neurologist remotely directing the technician to inject TPA, a clot-busting drug thinner, in the stroke ambulance. Under standard care, patients would wait much longer before having access to the same care at a hospital. On average, patients treated by the mobile stroke unit receive care 36 minutes faster than those who are first transported to an emergency department. Telemedicine makes this entire process possible, as one physician remotely diagnoses and directs the treatment for all three ambulances, sometimes simultaneously in three of New York's five boroughs.

Saved by Doctor Kiosk



Ron Wuaten, 37, found himself gasping for air and struggling to climb the Subway stairs on his way to work one morning. Concerned, he managed to make it to a Duane Reade on Wall Street and was directed to the NewYork-Presbyterian OnDemand telehealth kiosk in the store. Ron was able to follow on-screen instructions to use medical devices attached to the kiosk to measure his vital signs. The kiosk connected Ron to Dr. Rahul Sharma, emergency physician-in-chief at NewYork-Presbyterian/Weill Cornell Medical Center. Dr. Sharma spoke with Ron and recognized that Ron was in cardiac distress, advising him to head immediately to the NewYork-Presbyterian Lower Manhattan Hospital emergency room. Dr. Sharma called ahead to let the physicians know Ron was on his way—upon arrival, Ron was diagnosed with congestive heart failure, hypertension, and tachycardia. He spent the next three days in the hospital to stabilize his condition. The NYP OnDemand kiosk connected Ron to a provider when he most needed it, and was a major contributor to his ultimate recovery.

Convenient Care, Delivered at Home



Our kiosk system and mobile stroke units built upon the notion that telehealth could be used to reach patients before they enter a healthcare facility, but we knew we were missing one very important site of care—the patient’s home. That’s where NYP OnDemand, a comprehensive suite of digital health services, comes in.

Patients with an established physician can download the NYP OnDemand app for Apple and Android devices. On the app, patients can choose to have video visit from wherever they are in New York, New Jersey, Connecticut, or Florida. After a quick online registration, patients are placed in a virtual waiting room to see a board-certified physician on-screen within minutes. By seeing the patient, talking with them about their condition, and even having the patient palpitate symptomatic areas of their bodies, physicians are able to provide clinical recommendations, send prescriptions directly to the patient’s pharmacy, or recommend that the patient come in to the emergency department for more extensive care. In the past six months, physicians on the NYP app identified acute appendicitis in three patients that led the patient directly from their virtual at-home exam into the operating room for an appendectomy.

Although the notion of virtualizing the standard physician office visit seems to be the most straightforward use-case for telemedicine, it requires a significant shift in the workflow of the standard physician practice. It is not efficient for a cardiologist, for instance, to see a new patient, then a follow-up patient, then go to her office for a video visit, then move back to office visits. We have found that physicians who are efficient and who enjoy practicing telemedicine are those who dedicate a block of time to those visits. By stacking ten-minute follow-up visits back to back for a two to four hour session, for instance, the cardiologist meets the needs of many follow-up patients and clears other time on his or her schedule for in-office visits of new or complex patients. To be able to scale telemedicine effectively, we have taken considerable guidance from our providers and learned how to fit telehealth within their workflows, preferences, and expectations.

NewYork-Presbyterian has also embarked on a care at home model whereby patients who present to the emergency room with congestive heart failure (CHF) are given monitoring devices to help patients manage their health from home. A dedicated nursing care team monitors vital signs remotely and escalates any concerning results to the patient’s NYP physician. We are now expanding this care at home model for expectant mothers with hypertension and for patients with congestive heart failure. By sending these patients home with real-time monitoring devices, these patients will be able to quickly manage any adverse effects after being discharged.

When patients at home need more than simple remote monitoring, NewYork-Presbyterian connects with its Emergency Management Services team, who visit patients in their homes through the tele-paramedics program. If the EMT identifies a specific issue or need, they connect to the required specialist and coordinate the patient/physician interaction in real time during the home visit. We see the home as the next locus of patient care. Helping patients avoid the time, cost, and inconvenience of traveling to a healthcare facility is one of the biggest benefits of telemedicine.

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DIGITAL SECOND OPINIONS

Patients can receive another perspective on their symptoms, diagnosis, or treatment plan from more than 400 expert physicians at NewYork-Presbyterian in over 80 specialties.



VIRTUAL FOLLOW UP VISITS

Established patients can conduct virtual follow-up visits with their doctor eliminating the need to travel for an office visit. More than 1400 physicians across NYP provide virtual visits to date.



URGENT CARE

For non-threatening illnesses and injuries, patients can access the urgent care services to be rapidly assessed and treated by an NYP Emergency Medicine physician.



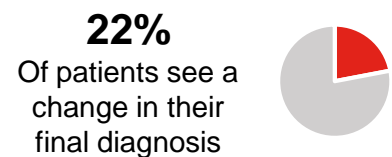
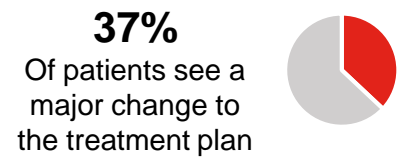
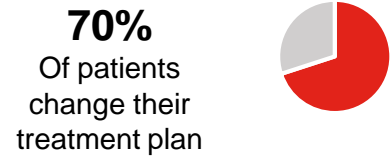
REMOTE MONITORING

Patients with congestive heart failure, diabetes, and maternal health needs can have their conditions monitored remotely by a care team of nurses and physicians.

Get a second opinion, digitally

While most of our telemedicine efforts available to patients are related to emergent conditions, not all telemedicine care is emergency-related. Having access to world class physicians is only helpful if you can gain their insight and, if you are a patient with a challenging diagnosis, traveling to New York for a second opinion is not always an accessible and convenient option. In 2017, we began offering NYP OnDemand Second Opinions, a service which allows patients across America to connect with a specialist for a full review of their clinical case and issuance of a second opinion. The digital interaction between the patient's local physician and the NYP specialist allows for sharing of lab results, biopsies, and imaging studies. Within 48 hours, the Columbia or Weill Cornell physician can share their diagnosis with the patient through their local physician, and the team can plan next steps locally or at a NewYork-Presbyterian hospital. In the past three years, NewYork-Presbyterian has provided over 1400 second opinions, many which have led to improved patient outcomes. Preliminary results show that the second opinions have had a significant impact on clinical care—over 70% of patients changed their treatment plan as a result of the second opinion, and 37% of those patients saw major changes to their treatment plan. In 22% of cases, a digital second opinion resulted in a change to a patient's ultimate diagnosis.

Digital Second Opinions Statistics



Delivering the right drugs at the right time

Despite our best efforts to keep patients out of the hospital, there are many patients with complex conditions for whom admission is inevitable. These patients often have multiple underlying diseases and complicated histories, making understanding their medication regime critical to safeguarding against adverse drug reactions. These patients require a full drug medication reconciliation—MedRec, as it is known to the residents, fellows, and physicians who perform it, is a tedious process of determining the full list and dosage of a patient's current medications based on the drugs listed in the patient's medical record, their recollection, and in some cases, a thorough examination of the bags or boxes of medicines that they bring in to the hospital. The process can take more than 45 minutes and does not always result in a fully accurate list. Physicians acknowledge that pharmacists know the drug formulary better and produce a more accurate MedRec, but pharmacists are generally in the pharmacy and removed from the direct clinical care process. In mid-2018, NYP moved pharmacists and pharmacy technicians to the patient bedside virtually so that they could perform MedRec directly with the assistance of the patient and their family members. Using a mobile kiosk wheeled to the patient, our pharmacists now perform more than 2,800 medication reconciliations monthly, produce a safer, more accurate outcome, and save an estimated 365 hours of clinical time in the process annually.

Future of Telemedicine and the Case for Scale

Telemedicine today is a mile wide and an inch deep. It holds promise for moving health care from a formal environment that is often difficult for patients to navigate to a consumer-oriented experience. The move requires greater change for hospitals and physicians than it does for patients, who are accustomed to consumer-oriented technology in all other aspects of their lives. The move from early, promising applications to telemedicine at scale offers one of the greatest near-term opportunities for the advancement of American medicine. While NewYork-Presbyterian is a leader in this field, we will continue to invest in telemedicine development for the benefit of our patients and for the broad growth of telemedicine as a foundation for modern clinical access.