Medical News & Perspectives

Pandemic Boosts an Old Idea—Bringing Acute Care to the Patient

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After several days in a hospital with COVID-19 pneumonia, Tim Shain of Lincolnton, North Carolina, didn't hesitate when a registered nurse told him he was well enough to complete his recovery at home. "Let's go," he replied.

But he wasn't being discharged. The 54-year-old Marine still needed a moderate flow of supplemental oxygen and close monitoring of his respiratory symptoms but not round-the-clock nursing. So Charlotte, North Carolina–based Atrium Health transferred him to a program that provides hospital-level care in patients' homes.

For the hospital system, the move freed up a bed as COVID-19 cases surged last fall. There were upsides for Shain, too. Being reunited with his wife, his dogs, and his infant grandson elevated his mood and motivated him to ease back into his routine. His lungs healed faster, he believes, because he could walk around and climb stairs to go to bed. And he developed a close rapport with the paramedics who visited each day.

After 11 days of sleeping in his own bed and eating home-cooked meals, Shain was discharged 2 days before Christmas. "Being at home is a much more conducive environment to healing," he told *JAMA*.

Once rare, acute care at home is available to a growing number of patients with severe illness. During the COVID-19 pandemic, dozens of hospitals launched or expanded hospital-at-home programs, which typically use remote monitoring and a combination of virtual and in-person visits to provide care that is equivalent to what a patient receives in a brick-and-mortar hospital.

The ability to treat patients at home for common conditions—heart failure, chronic obstructive pulmonary disease (COPD), asthma, and uncomplicated infections such as cellulitis, for example—has been a tool to expand capacity during the pandemic. But research also suggests that providing acute care at home increases patient satisfaction, reduces costs, and improves quality metrics such as readmissions—benefits that some experts say could make it a fixture in patient care.

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Running a Bad Hotel

Long before COVID-19 took root, emerging interest in acute care at home had little to do with bed shortages.

In the early 1990s, Bruce Leff, MD, a second-year resident at what's now called Johns Hopkins Bayview Medical Center, was making house calls in southeast Baltimore when he encountered acutely ill older patients who refused to go to the hospital. Previous inpatient ordeals of loneliness, confusion, and treatment delays had left them traumatized.

Leff, a Johns Hopkins geriatrician who pioneered hospital at home in the US, likes to share a story about a man named Walter who wouldn't budge from a row house he shared with his cat despite a case of community-acquired pneumonia. He told Leff and his fellow trainee: "You guys are great doctors, but you run a crappy hotel."

"And you know," Leff said in an interview, "he was entirely right."

Such experiences opened Leff's eyes to the hazards of inpatient care for older patients: delirium, hospital-acquired infections, adverse drug reactions, and loss of function. "Now you see it written about as hospital-acquired disability syndrome, but we just always knew that our patients had their share of trouble in the hospital," he said. As a result, weighing whether to admit an older patient is "often a really tough decision calculus."

Leff focused on developing a model to treat patients who were sick enough to be hospitalized but unlikely to have complications such as chest pain that require immediate attention at a hospital. In the early 2000s, he led a 455-patient demonstration study with patients aged 65 years or older who had pneumonia, heart failure, COPD, or cellulitis.

The study, in 3 Medicare managed care plans and a US Department of Veterans Affairs (VA) medical center, found hospital at home provided at least comparable quality at lower cost compared with traditional acute care. Yet back then, few hospitals ran with the idea. Under fee-for-service, most lacked financial incentives; the Centers for Medicare & Medicaid Services (CMS) had no payment mechanism for hospital at home.

Early adopters were VA hospitals and hospitals with their own Medicare managed care plans, such as New Mexico's Presbyterian Healthcare Services. Its program started in 2008, driven partly by frequent bed shortages, particularly during flu season, Nancy Guinn, MD, the medical director of clinical transformation for Presbyterian's population health department, said in an interview. She also credited

the system's "generous spirit of adventurousness and innovation" with getting the program off the ground.

Patients embraced it, and Presbyterian expanded in-home services in 2015 to provide primary care and urgent care for patients with advanced illnesses.

Home visits have afforded insight into factors that influence patients' health—what they eat, what medications they actually take, whether they have family support. "It's priceless what you can learn," Elizabeth De Pirro, MD, the lead physician of Presbyterian's program, told *JAMA*. In conversation, patients aren't always forthcoming with information, she observed. Once, a microwave oven fire tipped her off that a patient and her sister may have dementia.

The model also saved money. A 2012 study showed Presbyterian spent 19% less to provide hospital-at-home care than traditional acute care, partly because patients received fewer tests. Guinn said the savings have grown to 40% due to staff efficiencies from the home care expansion.

Home Is Where the Hospital Is

Inspired by such successes, a handful of other forward-thinking health systems took up the model in recent years to provide value-based care, differentiate themselves in the market, and ease capacity issues.

The Affordable Care Act also encouraged payment innovations; in 2014 CMS gave the Icahn School of Medicine at Mount Sinai in New York City a grant to test a hospital-at-home program bundled with 30 days of postacute care in which nurses and social workers coordinated follow-up care. A case-control analysis of 295 patients showed they had shorter stays, fewer emergency department visits, and fewer readmissions than with regular inpatient care. An independent advisory committee endorsed the model, although CMS never acted on it.

Meanwhile, researchers at Brigham and Women's Hospital in Boston conducted the first US randomized controlled trials. The largest, with 91 patients, found lower costs, more physical activity, and lower readmission rates with patients treated at home.

Then came the pandemic's crush of patients. Some hospital-at-home programs "decanted" patients after they had spent a few days in a hospital bed. Mount Sinai Health System, for example, moved more than 100 COVID-19 patients to their homes once they no longer required services that must be provided in a hospital, such as high levels of oxygen or the antiviral drug remdesivir, Linda DeCherrie, MD, the clinical director of Mount Sinai's program, said in an interview.

"After 3 or 4 days of being hospitalized, we can finish that hospital episode at home. That is a very good example of something that we can take care of," DeCherrie explained.

Atrium Health, which operates in 3 states, quickly ramped up its program in March 2020 using the infrastructure of a transitional care program that provides paramedicine and virtual visits to patients who are at risk of readmission. During the pandemic it has cared for as many as 100 patients a day, most of them with COVID-19, program director Stephanie Murphy, DO, said in an interview.

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Some programs expanded to accept more non-COVID patients. Presbyterian went from treating 5 patients at a time to as many as 14. Many older patients and their families had "tremendous fear" of SARS-CoV-2 exposure in the hospital, Guinn noted.

Pandemic Brings a Push

These efforts had limited financial support until November 2020, when CMS announced a temporary waiver to let hospitals treat fee-for-service Medicare patients in their homes. Although limited to the pandemic, the waiver marked a huge shift. Existing hospital-at-home programs could be paid for treating *all* Medicare patients, not just those in managed care plans.

It was also the push many health systems needed to start a program. As of April 5, CMS had approved waivers for 116 hospitals in 53 health systems spanning 29 states. At least 6 health systems received expedited waivers based on having treated at least 25 patients with the model.

The Cleveland Clinic Health System had been eyeing the model, and the waiver program "gave us a chance of getting it off the ground quicker," Nirav Vakharia, MD, president of its Medicare accountable care organization, said in an interview. But it will still take some time. The system slated a March launch with 15 patients, gradually expanding to hundreds. "Ultimately," Nirav said, "we see this [becoming] another one of the Cleveland Clinic hospitals, the Cleveland Clinic virtual hospital."

Atrium Health's Murphy anticipates maintaining an ongoing capacity of about 50 patients after the pandemic. She sees an opportunity to help patients with chronic illness who require frequent hospitalization for conditions such as heart failure, COPD, or community-acquired pneumonia. "They're frustrated and they don't want to have to come back" to the hospital, she said, "but they don't always understand how to manage their medical problems, or they don't have the support in the home. Maybe their disease is just progressing over time."

Given the copious interest, experts expect CMS to strongly consider a permanent payment mechanism. For now, the waiver program is something of a road test. Although Leff calls hospital at home "one of the most studied health service delivery innovations of the last 50 years," CMS wants performance data for Medicare and

Medicaid patients. It's collecting weekly (or monthly, for experienced health systems) tallies of the number of patients treated and how many die or transfer to a traditional hospital.

Also, some CMS parameters are stricter than those of established programs. For example, patients may be admitted only from an emergency department or a traditional inpatient bed, not from their own homes, and a registered nurse or a paramedic must visit at least twice daily to check vital signs, rather than once as in some programs.

Riding a Backward Bicycle

For many clinicians, hospital at home is an opportunity to return care to the home as it was nearly a century ago. As a report by the California Health Care Foundation points out, COVID-19 has "put wind in the sails of home-based medical care" by unmasking the shortcomings of clinics and hospitals. The model aligns with growing demand for home-based services that use technology to provide more convenient care at lower cost.

Yet establishing a program is far from simple. Bringing care to the patient requires administrators and clinicians to change their mindset, a challenge Leff equates to learning to ride a backwards bicycle. To assist, a hospital-at-home users' group has run webinars covering topics such as establishing inclusion and exclusion criteria, investing in telehealth and remote monitoring, organizing logistics, delivering ancillary services such as physical therapy and imaging, and monitoring safety.

Patients, too, must adjust. At Mount Sinai, care coordinators explain to patients how the process will work. Most want the comfort of home, being close to family, pets, and things to keep them occupied. Yet DeCherrie said they may need reassurance: "When someone's never had this experience before and they're in their crisis in the emergency room, sometimes the concept of it can be overwhelming."

Once a patient is admitted, a logistical dance begins. Remote monitoring devices including blood pressure cuffs, pulse oximeters, and thermometers may be delivered to his or her home along with oxygen tanks, intravenous fluids, and antibiotics. Clinicians visit to conduct physical examinations and log in to telehealth appointments. At Mount Sinai, if a patient needs blood drawn, a phlebotomist drops by.

Portable equipment can perform diagnostic procedures such as x-rays and ultrasounds, although a patient might have to go to a medical facility for a computed tomography scan or a blood transfusion.

The coming and going may seem disruptive, so managing expectations is key. "Our biggest complaint," DeCherrie said, "is that we knock on their door too often." ■

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