



# Bringing acute inpatient care home with well-coordinated, accurate communication

Hospital stays can yield unintended consequences, especially in older patients. 20% of older patients will suffer delirium<sup>1</sup>, one third will lose a functional status they will never regain, and 5-10% of older patients will contract a hospital-acquired condition<sup>2</sup> or fall while admitted to the hospital. To help mitigate these risks, Dr. David Levine, MD, MA is leading Brigham and Women's home hospital program in Boston, MA to bring acute care into the home for patients. By leveraging highly monitored and coordinated communication – enabled by Everbridge CareConverge – between physicians, in-home caregivers and patients, the program is proving beneficial for both the healthcare system and patients.

## Highlights

- Reduced costs by 52%
- 33% reduction in post-acute care (+30 days) costs
- Decreased readmissions (11% vs 36%)
- Patients had 2.7 times more physical activity

1 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3065676/>

2 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3021207/>



# Challenges

## Proving the Value of a Home Hospital Care Model

Interest in home hospital programs – focused on community-based provision of services, usually associated with acute in-patient care – is on the rise for a few reasons.

In addition to patients sometimes suffering unintended consequences during their hospital stays, those stays can be quite expensive. Plus, the general medical ward at hospitals in many metropolitan areas is often over 100% capacity, according to Dr. Levine.

As Dr. Levine explains, there will always be a need for the traditional hospital. However, Dr. Levine has been searching for ways to change the dynamic and shrink the need for the traditional hospitalization for internal medicine patients. Along a continuum of acuity, a home hospital aims to provide acute care at home to patients who would normally require an acute level of care on the general medical floor.

The theory is that a home hospital program can deliver at least the same level of care at lower costs for the hospital while increasing patient comfort and satisfaction. Specifically, Dr. Levine believed such a program could reduce costs by 20% while maintaining safety and quality of care and improving the quality of life in the patient experience at Brigham & Women's Hospital. In Dr. Levine's view, such models are essential in order for hospitals to thrive in a globally budgeted system or even a fee-for-service system.

## Launching a pilot program

To understand the potential impact at Brigham & Women's Hospital and compare the cost, quality, safety and experience of hospital-level care at home to traditional hospitalization, Dr. Levine launched a pilot program. The focus was the substitutive care model where patients present to the emergency department, then return home for treatment and monitoring.



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**Dr. David Levine, MD, MA**  
Brigham and Women's Hospital

As Dr. Levine explains, the program is innovative, essentially creating a hospital that goes to the patient's home. To recruit patients for the pilot, the program's team asked patients who were admitted to internal medicine through the emergency department if they were interested in receiving acute care at home. The patient then needed to meet the inclusion-exclusion criteria: the program accepted patients with any infectious process (for example, cellulitis, pneumonia, and complicated UTI), and those with exacerbation of heart failure, COPD or asthma. For patients that met the criteria and agreed to enroll, the team then randomized by selecting 50% to participate and admitting the other 50% to the hospital.

The home hospital program would bring all necessary parts of the hospital to patients in their homes the physician, a registered nurse, IV medicines, imaging, lab tests, monitoring, and communications.

# Solutions

CareConverge clinical communications platform, enabling HIPAA-secure collaboration between patients and remote care team members.

## Equipping the program

Essentially, the home hospital program would bring all necessary parts of the hospital to patients in their homes: the physician, a registered nurse, IV medicines, imaging, lab tests, monitoring, and communications. This was all augmented with a flexible home health team – including a home health aide, a physical therapist, occupational therapist, and social worker – that could be called upon depending on the patient needs.

The first order of business was creating a limited mobile lab so home clinicians could handle blood work, ultrasounds, and X-rays, and order echoes. “We were able to MedRec in the home, which is incredibly powerful and therefore we’re able to really organize patients’ chronic meds and keep them involved in taking them, and then supplement the acute meds,” explains Dr. Levine. The mobile lab also included a tackle box filled with medication so new medication could be substituted or adjusted as necessary.

Dr. Levine chose to use an ambulatory infusion pump that sits on the patient’s shoulder or waist, which could be patient controlled as well as clinician controlled. These were complemented by peripheral IVs that work well in the home. The team was able to supply oxygen via oxygen concentrators for patients such as those with heart failure or pneumonia.

For monitoring, the team applied a monitoring patch to each patient. “We had continuous heart rate, respiratory rate, skin temperature, and continuous telemetry. We also had sleep detection, fall detection, posture, and step counts in near real time for patients,” continues Dr. Levine. This allowed the team to test its hypothesis that patients move and sleep more when they are at home<sup>3</sup>.

To enable HIPAA-secure communication with the patient and the clinical care team, Dr. Levine used HipaaBridge by Everbridge. “We were able to communicate clinician-to-clinician and with our patients in a HIPAA-encrypted manner. Every patient received a tablet as part of the program, allowing them to directly communicate with their care team any time of day. Patients could send text messages and photos in a secure manner if they were worried about anything at all. Clinicians in the home used HipaaBridge’s support for encrypted video to enable in-person consultations with the physician.

<sup>3</sup> <https://bwhclinicalandresearchnews.org/2017/02/01/feeling-right-at-home-brigham-pilot-brings-the-hospital-home/>

## Proving the model

According to Levine, the pilot was successful, helping demonstrate the benefits the program had set out to measure. “We believe receiving care at home puts the patient first, improves patient experience and reduces costs. Patients can sleep in their own bed, eat their own food and spend more time with family and friends. For many conditions, a home hospital will transform our concept of safe, high-quality and cost-effective care;”<sup>4</sup> he explains.

In fact, data collected during the pilot showed that home hospital care lowered costs, improved patient experience, maintained quality and safety, and improved sleep and activity. “Patients were in an ideal setting to receive education and coaching from their care team, empowering them to take care of themselves once their health improved;”<sup>5</sup> continues Levine. One patient in the pilot was Dr. William Terry, an administrator in the Center for

Interdisciplinary Cardiovascular Sciences at Brigham & Women’s Hospital. “The pilot converts care from a one-size-fits-all model to a more personalized approach,” says Terry, who believes he was able to recover more quickly at home. “It was a terrific project to be a part of, and I hope it is expanded in the future. It’s a big step forward in terms of the delivery of patient care.”<sup>6</sup>

Another patient had an unclear infectious process, possibly a UTI, and a possible pneumonia cold. The team put him on an IV and antibiotics at home, and he improved drastically in the space of a few days. His wife found it comforting to be with her husband during his home hospital experience.

According to Dr. Levine, many patients were surrounded by family while receiving home care, contributing to reduced anxiety and feelings of greater self-control for those compared to patients in the hospital.

## Next steps

While the initial pilot included 21 patients, it paved the way for a more extensive randomized control trial featuring a larger sample of patients with a broader range of conditions. The goal of that study is to demonstrate even more of the secondary and exploratory outcomes to a greater degree. Dr. Levine continues to use Everbridge for this study and plans to use it at Brigham & Women’s Hospital in general, and will better integrate the pilot with Partners eCare, Brigham Women’s & Health’s Epic-based electronic health record system.

“It has been an enormous privilege to work on this project with forward-thinking colleagues. It impacts every part of the hospital, from the Emergency Department to billing to Radiology, and has allowed us to push the boundaries of how we care for patients,” concludes Dr. Levine.

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4,5,6 <https://bwhclinicalandresearchnews.org/2017/02/01/feeling-right-at-home-brigham-pilot-brings-the-hospital-home/>