

Hospital at Home? Care Reduces Costs, Readmissions, and Complications and Enhances Satisfaction for Elderly Patients.

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Summary

The Hospital at Homesm program provides hospital-level care (including daily physician and nurse visits, diagnostic testing, treatment, and other support) in a patient's home as a full substitute for acute hospital care for selected conditions that are common among seniors. Studies have shown that the Hospital at Home program results in lower length of stay, costs, readmission rates, and complications than does traditional inpatient care, and surveys indicate higher levels of patient and family member satisfaction than with traditional care.

Disclaimer

This innovation was identified by the AHRQ PSNet Editorial Team from the [AHRQ Health Care Innovations Exchange](#). That resource, established by AHRQ in 2008, was retired in March 2021; AHRQ now offers select content from the Innovations Exchange, including its [downloadable databases](#), through a [microsite](#). This particular innovation was identified by the Editorial Team as one of continued interest and importance to AHRQ PSNet users and therefore was selected to be updated and included in this new section of the AHRQ PSNet website. To prepare this updated summary, the Editorial Team worked closely with representatives associated with the innovation. Updates include expanded use by other organizations, additional results, revisions to innovation description, considerations for planning and development, and ensuring accurate contact information.

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Problem Addressed

Hospitalization for older patients can result in complications such as nosocomial infections and medical errors, as well as functional decline and delirium. Home-based hospital-level care has the potential to reduce these adverse outcomes, but it is seldom available.

- **Many potential complications due to hospitalization:** Hospitalization results in a number of factors that can cause complications in seniors; these factors include enforced immobilization, reduction of plasma volume, accelerated bone loss, and sensory deprivation. As a result, hospitalized seniors often experience morbidity including bedsores, muscular degeneration, and weakness resulting from extended immobilization. In addition, hospitalized seniors are at risk of falls, fractures, and medical/medication errors.² Older adults are also at increased risk for nosocomial and other health care-associated infections.³
- **Potential for functional decline and delirium as well:** A study of 2,293 patients aged 70 years and older found that 35 percent of hospitalized patients suffered declines in functional status, as measured by activities of daily living (ADLs); the oldest patients were at highest risk of functional decline, with ADL declines between baseline and discharge of 23 to 63percent depending on the age range in question (not surprisingly, larger declines tended to occur in older patients).⁴ A study of 852 patients aged 70 years and older who had been admitted to the general medicine service at a teaching hospital found that delirium developed in 15 percent of patients who received usual care, lasting for an average of 161 days.⁵
- **Traditional models of home-based care often cannot substitute for hospitalization:** Several Hospital at Home models have been implemented in countries with single payer systems. Some are “early discharge” models and do not substitute entirely for acute care hospitalization.

Description of the Innovative Activity

The *Hospital at Home*sm program provides complete substitution of an acute hospital stay in the patient's home. Patient eligibility for in-home hospital care is assessed in the health care setting; eligible patients are transported home by ambulance and receive initial and daily in-person or televideo visits by a physician, continuous nursing support, home health equipment and services, diagnostic testing, and other services. Features of the program include:

- **Patient eligibility and consent:** Patients who present in an emergency department (ED) or ambulatory site are assessed by clinicians for eligibility. Eligible patients include those who require hospitalization for a condition such as community-acquired pneumonia, exacerbation of chronic heart failure (CHF), exacerbation of chronic obstructive pulmonary disease (COPD), or cellulitis, and who meet other general and disease-specific criteria. Common reasons for medical ineligibility include uncorrectable hypoxemia (insufficient oxygen in the bloodstream), suspected myocardial ischemia (heart attack), or presence of an acute illness (other than the target illness) that requires hospitalization. Patients deemed eligible for the program and who provide their consent to participate are transported home. Mode of transportation home depends on acuity level and can vary from ambulance to the patient's own vehicle.
- **In-home physician care:** The patient receives an initial evaluation at home by a physician; this physician also provides subsequent daily in-home or televideo visits and is available 24 hours a day for urgent or emergent visits. Diagnostic studies, such as electrocardiography and radiography, and intravenous (IV) treatment, are provided at home.
- **Nursing support:** Initial one-on-one continuous nursing support is provided to the patient; the patient is visited at least daily by a nurse once continuous support is no longer required. Nurses use illness-specific, hospital-at-home care maps and clinical outcome evaluations to determine what care is needed.
- **Home health care support:** Home health care services and equipment, including blood tests, intravenous medications or fluids, durable medical equipment, oxygen or other respiratory therapy, basic x-rays and ultrasounds, skilled therapies, and pharmacy support, are provided by a home health agency, and pharmacy support is provided by a hospital or home health agency.
- **Emergency access:** Hospital at Home programs provide a method of emergency response that can be used to contact a clinical staff member for patients without a family member or other caregiver living in the home.
- **Discharge:** After the patient stabilizes, he or she is discharged from the program (discharge criteria are used to make this determination). The Hospital at Home physician orders any follow-up care required (e.g., physical therapy) and contacts the patient's primary care physician by phone, fax, or via electronic medical record (EMR) messaging to provide an update on patient status and schedule followup for the patient. The Hospital at Home physician may also do a follow-up phone call to the patient within 48 to 72 hours post-discharge to check on the patient.
- **Transition to primary care:** The patient is treated until stable for discharge from the program, at which point the team transitions care to the patient's primary care physician. Some programs provide post-acute care monitoring after discharge from the acute phase of care.

- **Medical record keeping:** For this implementation of the program, the innovator used paper medical records maintained at the patients' homes. Some Hospital at Home sites have integrated use of EMRs—the hospital at home serves as a virtual unit of the hospital and is identified as such in the hospital's EMR, ordering system, laboratory reporting, and other systems. All interactions with the electronic systems are done using laptops with secure remote connections.

Context of the Innovation

Johns Hopkins Bayview Medical Center, an urban hospital located in Baltimore, MD, has approximately 350 beds and has an average daily census of 250 patients and an average length of stay of 4.3 days. In the mid-1990s, approximately 20% of admissions to the medical center's medical wards (excluding the intensive care unit) were accounted for by CHF, COPD, pneumonia, and cellulitis. Johns Hopkins geriatricians who provided ongoing care to homebound seniors by making house calls observed that many of their patients requiring hospitalization expressed a desire to receive care at home instead. Patients were reluctant to be admitted because they had experienced adverse events during prior hospitalizations or because previous hospitalizations were otherwise difficult or unpleasant for them in some way. When patients refused to be admitted, the physicians found themselves patching together a care plan that might not have been optimally effective or efficient. To address this issue, the *Hospital at Home* sm program was designed and piloted at Johns Hopkins, and then implemented in a three-site national evaluation study in Buffalo, NY, Worcester, MA, and Portland, OR.

Results

Several studies have shown that the Hospital at Home program results in shorter length of stay and lower costs, readmission rates, and less complications than does traditional inpatient care, whereas surveys also indicate higher levels of patient and family member satisfaction than with traditional care. The evidence in support of Hospital at Home consists of multiple randomized studies, in both the U.S. and international literature. A Cochrane review of Hospital at Home showed reductions in clinical complications and mortality, better patient and family satisfaction, better functional outcomes, less caregiver stress, and lower costs when compared with traditional inpatient care.[1](#)

Shorter length of stay:

- A prospective study conducted in 3 cities and including 455 community-dwelling seniors who required admission to an acute care hospital for 1 of 4 conditions (community-acquired pneumonia, exacerbation of CHF or COPD, or cellulitis) found that patients receiving Hospital at Home care experienced shorter average lengths of stay (3.2 vs. 4.9 days) than patients receiving usual hospital care.[6](#)

- A case-control study of hospital at home patients (n=295) with a concurrent control group of hospital inpatients recruited from the EDs (n=212) at Mount Sinai Health System found patients receiving Hospital at Home care experienced shorter length of stay (3.2 vs. 5.5 days).[7](#)

Lower hospital readmission:

- A small randomized controlled trial (104 elderly patients with COPD) found that 6 months after discharge from the program or hospital, readmission rates were 42 percent for Hospital at Home patients compared to 87 percent of hospital inpatients.[8](#)
- A randomized trial (91 elderly patients admitted via the ED with an infection, heart failure exacerbation, COPD, or asthma) found 30-day hospital readmission rates among Hospital at Home patients were lower compared to hospital inpatients (7% vs. 23%).[9](#)
- A case-control study of hospital at home patients (n=295) with a concurrent control group of hospital inpatients recruitment from the EDs (n=212) at Mount Sinai Health System found that hospital readmission rates were lower for Hospital at Home patients compared to hospital inpatients (8.6% vs. 15.6%).[7](#)

Fewer ED visits: A case-control study of hospital at home patients (n=295) with a concurrent control group of hospital inpatients recruitment from the EDs (n=212) at Mount Sinai Health System found that emergency department visit rates were lower for Hospital at Home patients compared to hospital inpatients (5.8% vs. 11.7%).[7](#)

Fewer Skilled Nursing Facility (SNF) admissions: A case-control study of hospital at home patients (n=295) with a concurrent control group of hospital inpatients recruitment from the EDs (n=212) at Mount Sinai Health System found that admissions to skilled nursing facilities were lower for Hospital at Home patients compared to hospital inpatients (1.7% vs. 10.4%).[7](#)

Fewer interventions:

- A prospective study conducted in 3 cities and including 455 community-dwelling seniors who required admission to an acute care hospital for 1 of 4 conditions (community-acquired pneumonia, exacerbation of CHF or COPD, or cellulitis) found that care processes typically associated with inpatient care (e.g., oxygen therapy, IV antibiotics, nebulized bronchodilators) were similar for both inpatients and Hospital at Home patients. However, Hospital at Home patients were less likely to receive IV fluids, sedatives (which can lead to complications such as delirium and falls), urinary catheters, or chemical or physical restraints and were less likely to undergo expensive diagnostic testing (e.g., magnetic resonance imaging, stress test, computerized tomography scans, and endoscopy).[6](#)
- A randomized trial (91 elderly patients admitted via the ED with an infection, heart failure exacerbation, COPD, or asthma) found that Hospital at Home patients had fewer laboratory orders (median per admission, 3 vs. 15), imaging studies (14% vs. 44%), and consultations (2% vs. 31%).[9](#)

Fewer complications: A prospective study conducted in 3 cities and including 455 community-dwelling seniors who required admission to an acute care hospital for 1 of 4 conditions (community-acquired pneumonia, exacerbation of CHF or COPD, or cellulitis) found that the rate of incident delirium was lower for Hospital at Home patients (9 vs. 24%), as were bowel complications (9 vs. 16%) and emergency situations (6 vs. 11%).[6](#)

Better quality of life: A small randomized controlled trial (104 elderly patients with COPD) found that 6 months after discharge from the program or hospital, Hospital at Home patients experienced improvements in depression and quality-of-life scores, while hospital inpatients experienced no such improvements.[8](#)

Lower costs:

- A prospective study conducted in 3 cities and including 455 community-dwelling seniors who required admission to an acute care hospital for 1 of 4 conditions (community-acquired pneumonia, exacerbation of CHF or COPD, or cellulitis) found that costs of care were lower for Hospital at Home patients than for hospital inpatients (\$5,081 vs. \$7,480). The cost per patient day was 32percent lower for Hospital at Home patients than for hospital inpatients.[6](#)
- A randomized trial (91 elderly patients admitted via the ED with an infection, heart failure exacerbation, COPD, or asthma) found that the cost per patient day was 38 percent lower for Hospital at Home patients than for hospital inpatients.[9](#)

Higher satisfaction and lower stress: A survey administered to 214 community-dwelling elderly patients and their families found that Hospital at Home patients had higher satisfaction with their care and families experienced less stress.

- **Higher satisfaction:** A 40-item survey administered to 214 community-dwelling elderly patients and their families found that Hospital at Home patients were 4 times more likely than acute care inpatients to be satisfied with their physician; 6.5 times more likely to be satisfied with the convenience of care; 4 times more likely to be satisfied with the admissions process; and 3 times more likely to be satisfied with the overall care experience. Family members of Hospital at Home patients were also more likely to be satisfied with each of these measures of care.[10](#)

Lower family member stress: A 15-item survey administered to the family members of 214 community-dwelling elderly patients found that the number of experiences that caused stress for family members of Hospital at Home patients was significantly lower than for family members of acute care inpatients (1.7 vs. 4.3).[10](#)

Innovation Patient Safety Focus

The Hospital at Home program provides inpatient-level care to patients in their homes to reduce readmissions and improve health outcomes and quality of life.

Planning and Development Process

When considering this innovation, the Hospital at Home program suggests that sites conduct a readiness assessment to gauge a need for the program (e.g., is the hospital/health system experiencing problems from a lack of hospital capacity, is there a large volume of admissions for common problems such as heart failure or COPD), the capacity to implement the program (does the site have established home healthcare capabilities, physicians with interest and ability to care for patients in their homes), and leadership buy-in (e.g., does the site have success developing and implementing new models or systems of care).

Hospital at Home programs can be configured differently by different systems to meet the needs of their patients and to fit within their systems reimbursement model (fee-for-service, managed care, or Veterans Administration). The program provides an interactive business model spreadsheet that can support interested sites in determining whether to adopt the Hospital at Home model. The program has also developed toolkits to support local adoption and implementation.

Resources Used and Skills Needed

Resources required depend on the size of the program in development. General resources required include:

- **Staffing:** One team can manage a daily census of 5 to 8 patients, depending on disease acuity and geography. Staffing for the program includes the following:
 - **Physician time:** Physician visits are a critical piece of the model. Participating physicians (geriatricians, internists, or family physicians) should be identified who are willing to travel to the patient's home. Physicians can make approximately 7 to 10 visits per day, depending on the program's geography. Televideo physician visits can leverage the physician component of the model to a greater extent.
 - **Nurse staffing:** Nurse care is needed to staff Hospital at Home. The initial patient visit usually lasts 2 to 3 hours. Follow-up visits vary depending on necessary tasks, but typically last 45 minutes to 1 hour.
 - **Home aides:** The program requires the use of aides who can visit Hospital at Home patients who may need help with ADLs.
 - **Program coordinator:** A program coordinator should be hired to run the program. Coordinator responsibilities vary between Hospital at Home program sites.
- **Equipment:** IV infusion capacity is needed so that IVs can be placed in the home. Additional equipment such as that which is required for oxygen therapy and bronchodilator therapy is often required by patients. Additional diagnostic studies that are performed in the home include basic radiography such as chest x-rays, electrocardiograms, ultrasounds, and echocardiography. Some of these diagnostic services may be provided by independent service providers that contract with the Hospital at Home program.
- **Costs:** The costs of adoption depend on program size and include staffing and equipment; the major costs are the labor costs of physicians and nurses.

Funding Sources

Funding from John A. Hartford Foundation ended in 2009.

Some services offered by the program are reimbursed by Medicare.

Getting Started with This Innovation

- **Assess the financial implications:** Given current payment structures, the model is more easily adopted by managed care organizations, integrated delivery systems like the VA, and systems that have a health plan and providers organized under one umbrella organization. The Medicare hospital-based payment waiver provided in the context of the COVID-19-related public health emergency provides a hospital diagnosis-related group (DRG) reimbursement for Hospital at Home care. (See Additional Considerations and Lessons for more information.)
- **Assess current capabilities:** Would-be adopters ideally should care for a large senior population, have some experience with home health care, and have some physicians who are willing to make house calls.
- **Recognize the program as a disruptive technology:** Hospital at Home will disrupt normal patterns of care; organizations that are not willing to embrace and accommodate this type of disruption will have difficulty implementing the model.
- **Elicit leadership support:** Strong support from hospital leadership is essential. The Johns Hopkins Bayview Medical Center hospital administrator had the vision to see Hospital at Home as a logical extension of hospital services, and he understood the need to expand service to older persons and to address future bed shortages.
- **Assess staffing needs, taking geography and scale into account:** Organizations that serve a geographically dispersed patient population will have greater staffing needs due to physician and nurse travel requirements.

Sustaining This Innovation

- **Maintain the commitment of key stakeholders:** Sustaining the program requires ongoing commitment and support from senior leaders, frontline caregivers, and emergency department physicians (who often assess patients for program eligibility).
- **Expand capacity as program grows:** Nurse staffing, physician time and home health capabilities must grow in step with the program.
- **Medical recordkeeping:** Recordkeeping requirements can be complex and will be dictated by the policies and procedures of the adopting organizations. The use of EMRs will facilitate record keeping for a Hospital at Home program.
- **Ongoing Training:** The Hospital at Home user groups provide free, publicly available materials to share resources, disseminate best practices, and expand the reach of programs.

Adoption Considerations Use by Others (Use By Other Organizations)

- The Hospital at Home program has been adopted by 41 hospitals, health systems and intermediaries in the United States and Canada, including Brigham and Women’s Hospital (Massachusetts), Huntsman Cancer Institute (Utah), Massachusetts General Hospital (Massachusetts), Mount Sinai Health System (New York City), Presbyterian Healthcare Services (New Mexico), UnityPoint Health (Iowa), and several Veterans Health Administration sites.
- In November 2020, the Centers for Medicare & Medicaid Services (CMS) announced the Acute Hospital Care At Home program, which expanded on the “Hospitals Without Walls” program implemented in response to the COVID-19 pandemic. The Acute Hospital Care At Home Program supports existing models of at-home hospital care, including those using the Hospital at Home program. As of February 2021, over 100 Hospital at Home sites are approved by the CMS program.

References/Related Articles

Hospital at Home Web site. Available at: <http://www.hospitalathome.org>

Hospital at Home User Groups. Available at: <https://hahusersgroup.org/>

Hospital at Home Technical Assistance Center that is currently being hosted on the CAPC website - <https://www.capc.org/strategies/acute-hospital-home/>

Hospital at Home research library: <https://hahusersgroup.org/research/>

CMS Acute Hospital Care at Home: <https://qualitynet.cms.gov/acute-hospital-care-at-home>

Footnotes

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Evidence Rating Footnote

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