Reimagining the Future of Acute Care: Implementing Home Hospital Care Programs to Achieve the Triple Aim and Reduce Health Disparities

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Executive Summary:

Home Hospital Care is a new and exciting concept that holds the promise of delivering on all three components of the Triple Aim and reducing health disparities. HHC is an innovative care delivery model that substitutes traditional inpatient hospital care with hospital care at home for older patients with certain conditions. Studies have shown evidence of reduced cost of care, improved patient satisfaction, and improved quality and safety of care for patients treated through this model. The steady growth in Medicare Advantage enrollment and the recent expansion of the "Hospitals Without Walls" program to include acute hospital care at home creates an opportunity for hospitals to implement such programs and be financially rewarded for reducing costs. Capacity constraints exacerbated by the COVID-19 pandemic suggest that now is the ideal time for industry leaders to test and advance the concept of HHC in the United States.

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INTRODUCTION

Health systems across the nation are being called upon to dramatically reduce costs, improve health equity, and provide care safely despite the rapid spread of COVID-19. While this is a tall order amid an ongoing national crisis, there is a care delivery model that can sometimes help address each of these issues: Home Hospital Care (HHC). HHC, also sometimes referred to as 'Hospital at Home', is an innovative, technologically advanced care model in which eligible patients can receive hospital-level care at home in lieu of traditional inpatient care. Preliminary studies have demonstrated that HHC can positively impact all three components of the Triple Aim: costs, patient experience of care, and population health outcomes.

What is Home Hospital Care?

Home Hospital Care programs are a substitute for traditional inpatient hospital care for eligible patients. Such programs have the capability to provide respiratory therapies, intravenous medications, blood tests, and remote monitoring of temperature, heart rate, respiratory rate, falls, and movement, all in a patient's home. Participating patients usually still receive daily visits from physicians, nurses, and other care team members. Additionally, HHC patients regularly communicate with their home hospital team through telephone and encrypted video and message services (Levine et al., 2019). Some HHC models include a 30-day post-acute transitional period.

Candidates for HHC programs are generally identified in the emergency room when a physician deems that inpatient-level care is required. If a patient meets condition eligibility criteria and has a stable living arrangement in a specified geographic radius of the hospital, they are offered HHC in lieu of in a traditional hospital admission. At the end of the acute episode, the patient is discharged from HHC care as in the case of traditional hospital care.

Though this model of care has been used internationally since the 1970s, it was first tested in the United States in 1999 by Bruce Leff, a geriatrician at Johns Hopkins University (Hostetter & Klein, 2020). Leff and colleagues conducted a pilot study treating 17 patients ages 65 and older who required hospital-level care for pneumonia, chronic heart failure, chronic obstructive airways disease, or cellulitis with hospital care in the home setting. They found evidence to suggest that the treatment model, which they titled 'Hospital at Home', was safe, feasible, and cost effective (1999). The success of the initial study spawned confidence in the care delivery model and led to extensive further testing and development over the next two decades.

Who is using Home Hospital Care programs?

Home Hospital Care programs are gaining popularity nationwide due to technological advances and the range of potential benefits of such programs. The Veterans Affairs (VA) health system was an early adopter of home-based hospital programs, as the structure of the VA aligns both financial incentives and quality care delivery (Cai et al., 2017). Private organizations such as Mount Sinai, Brigham and Women's, Tufts Medical Center, and Presbyterian Healthcare Services now offer HHC programs too. Presbyterian, an integrated care delivery system in New Mexico, launched its version of an HHC program in 2008 for members of its health plan. The program has been popular among patients: 92% of those offered this form of care accept it (Klein, Hostetter, & McCarthy, 2016). Accelerated by the pandemic, Mayo Clinic, Intermountain Healthcare, and MetroHealth announced plans to launch or expand HHC in 2020, with the latter providing home care to COVID-19 patients specifically (Kacik, 2020; Bryant, 2020; Hostetter & Klein, 2020).

Other countries have adopted HHC models successfully. In Australia, where home-based hospital care is reimbursed by the government, HHC accounts for 5% of all acute bed days (Leff, 2015). Evaluations of existing HHC models, both nationally and abroad, inform our current

understanding of how delivery of hospital care at home affects patient outcomes, patient experience, and costs, though this paper will focus primarily on studies conducted nationally. *Why Now?*

COVID-19 has created an unprecedented capacity crisis for hospitals throughout the United States (Rio & Bogel-Burroughs, 2020). In addition, the U.S. population is growing and aging, which will increase demand for health care services in the years to come. HHC presents an opportunity to raise capacity without constructing additional, expensive infrastructure. Moreover, as a result of rising COVID-19 hospitalizations throughout the country, the Centers for Medicare and Medicaid Services (CMS) recently granted hospitals the unprecedented flexibility to provide hospital care at home and be reimbursed for it (Centers for Medicare & Medicaid Services, 2020). Together, the COVID-19 capacity crisis, the resulting expansion of regulatory flexibility by CMS, and a steady increase in Medicare Advantage enrollment create the perfect opportunity for industry leaders to implement, test and advance the concept of HHC in the United States.

COST OF CARE

Health care in the United States is becoming increasingly unaffordable for many Americans. The typical non-elderly family in the U.S. spends \$8,200 per year, or 11% of their income, on health care. For households in which at least one member of the family reports worse health, household health spending increases to 15% of their income (*The Real Cost of Healthcare*, 2019). Health care expenses are one of the leading causes of bankruptcy in the United States, and over a quarter of Americans say that medical bills have impacted their long-term planning such as saving for retirement (Leonhardt, 2019). Health systems have a responsibility to address the affordability issue and rein in costs to ensure that Americans continue to have access to health care, as hospital care accounts for one third of total health care expenditures (Levine et al., 2019). Fortunately, Home Hospital Care programs have been shown to radically decrease the cost of care and thus serve as one way for health systems to meaningfully address the cost issue.

Evidence of Cost Reduction

Reduced total cost of care is a consistent finding among Home Hospital Care program evaluations in the United States. A recent randomized controlled trial (RCT) of 91 patients at Brigham and Women's Hospital found that the adjusted mean cost of the acute care episode was 38% lower for home patients than control patients in the traditional hospital setting (Levine et al., 2019). Retrospective studies of veterans in both Hawaii and Cincinnati have similarly found statistically significant decreases in total cost of care of 30-40% for those receiving acute hospital care at home (Cai et al., 2017; Cai et al., 2018). At Presbyterian Healthcare Services, mean patient costs for at-home patients are 19% lower than mean costs of hospitalized patients.

Cost reductions for HHC participants are primarily driven by lower levels of health care utilization and decreased length of stay (Cryer, Shannon, Van Amsterdam, & Leff, 2012). An observational study at Mount Sinai found that the average length of stay for HHC patients was 3.2 days compared to 5.5 for the control group (Federman, Soones, DeCherrie, Leff, & Siu, 2018). The Brigham and Women's RCT found that home care patients received less imaging and fewer lab orders, hours of nursing, and consultations than hospital patients (Levine et al., 2019).

Evaluations of cost reduction depend heavily on the country of the program, as the U.S. spends far more on health care than the rest of the world (Tikkanen & Abrams, 2020). A 2016 meta-analysis of HHC programs did not find conclusive evidence of cost reductions, but this analysis included studies from six countries in addition to the U.S. (Shepperd et al., 2016).

Transition to Value-Based Care

As payment models transition from fee-for-service to value-based models, it will become increasingly important for health systems to implement cost-saving delivery models. Value-based models reward health care providers based on the quality of care they provide to patients. The use of alternative payment models by CMS has risen over the last decade under the ACA, shifting various levels of risk to providers (Chernew, Conway, & Frakt, 2020). Private payers have been introducing value-based models at an even faster rate than public payers and will likely continue to do so to slow cost inflation (Sokol, 2020). To stay financially secure in the future under valuebased care contracts, hospitals will need to aggressively pursue cost-saving innovations.

PATIENT EXPERIENCE OF CARE: PATIENT SATISFACTION

Home Hospital Care programs have the opportunity to yield a remarkable positive impact on patient satisfaction. Patients enrolled in an HHC program can be surrounded by their family and friends, eat their own food, move around in their own home, and sleep in their own bed as they recover. Furthermore, HHC programs may be able to improve patient satisfaction by reducing the amount of time that older adults spend in a hospital setting.

Evidence of Improved Patient Satisfaction

Repeated studies show that patients enjoy receiving hospital care at home. The Mount Sinai study including over 500 patients in New York City found that 69% of patients receiving HHC with post-acute transitional care gave the highest rating to their overall hospital care compared to only 45% of patients in the traditional setting (Federman et al., 2018). At Presbyterian, the 'Hospital at Home' overall patient satisfaction mean score of 90.7 exceeded the hospital score of 83.9 for comparable patients (Cryer et al., 2012). Evidence of improved patient experience is consistent with global studies as well. The 2016 meta-analysis of HHC studies across seven countries found that participants allocated to home hospital care reported higher levels of patient satisfaction across a range of different conditions (Shepperd et al., 2016).

Time Spent at the Hospital for Older Adults

Home Hospital Care programs generally target older adults. The average age of participants in the Mount Sinai program was 74.6, and the average age of HHC participants at Presbyterian was 77 (Federman et al., 2018; Klein et al., 2016). Older adults in the United States spend a lot of time in the hospital, particularly as they near end of life. Data collected through the Health and Retirement study found that 75% of Americans who died between 1992-2006 visited the emergency department in the last six months of life, with the majority being admitted to the hospital as a result (Smith et al., 2012). Congestive heart failure, pneumonia, chronic obstructive pulmonary disease, and urinary tract infections, conditions which can all be treated via HHC programs, were among the top reasons for admission. The option of HHC would allow older adults to spend more time at home with their families during the final months, years, or decades of their life.

Increasing acute care options for older adults is particularly important right now as we battle a global pandemic that is disproportionately affecting older populations. COVID-19 protocols include strict visitor restrictions that increase the likelihood of dying alone in a hospital without family members, which undoubtedly complicates decisions about when and whether to seek care. Elderly Americans should no longer need to face excruciating decisions like this in an age where technological advances make home-based hospital care a possibility.

PATIENT EXPERIENCE OF CARE: QUALITY AND SAFETY

Home Hospital Care programs can also have a positive impact on quality and safety of patient care. Studies have found evidence of improved patient outcomes, including lower readmission rates. Additionally, patients treated in a hospital setting are always at risk of hospitalacquired infections. HHC programs may be able to reduce this risk, which is especially important now as the United States deals with the ongoing COVID-19 pandemic.

Evidence of Improved Quality Outcomes

Studies have demonstrated that substituting inpatient hospital care with home-based hospital care can have a neutral or positive impact on the quality of patient care. An analysis of the 323 Presbyterian patients who received hospital care at home in 2009-2010 found that quality-of-care metrics were met with 100% consistency (Cryer et al., 2012). Another study found that there were no differences in rates of adverse events between those treated at home compared with those treated in the hospital setting (Federman et al., 2018).

Studies of HHC in the United States have found that patients treated at home had fewer important clinical complications, including use of sedative medications, use of chemical restraints, and incident delirium than those treated at the hospital (Leff et al., 2005). Others have found an increase in physical activity, with patients treated at home reporting a significant reduction in time spent sedentary and lying down (Levine et al., 2019). This is noteworthy, as time spent sedentary in the hospital puts older patients at risk for blood clots, pressure ulcers, and confusion and reduces their ability to care for themselves following discharge (Gorman, 2018).

Additionally, providing care in the home setting allows providers to see the problems patients face coping with their disease, including managing their medications and maintaining a healthy diet (Klein et al., 2016). This insight may allow members of a patient's care team to more adequately address the individual's social determinants of health, leading to improved care.

Quality: Reduced Readmissions

Hospital readmission rates are an important quality metric for hospitals. Unfortunately, almost 20% of Medicare patients are readmitted to the hospital within 30 days of discharge. In order to incentivize coordination of care and discharge planning, CMS now financially penalizes hospitals for readmissions within 30 days related to six conditions (*Hospital Readmissions*, 2020). As a result, the readmission rate is a key metric for both quality and financial performance.

Evidence suggests that Home Hospital Care programs may reduce 30-day readmissions. Brigham and Women's Hospital found a reduction in 30-day readmissions among HHC patients compared to the control group (7% vs. 23%). The authors speculated that improved discharge planning may have been a factor, as discharge planning for HHC participants occurs in the actual setting where patients and caregivers will be carrying out post discharge tasks and can be tailored to the home environment (Levine et al., 2019). Mount Sinai found a similar reduction in 30-day readmissions: 8.6% for patients receiving hospital care at home paired with 30 days of post-acute transitional care as compared to 15.6% of hospitalized patients (Federman et al., 2018).

Although some studies have found reductions in 30-day readmissions, others have found no statistically significant differences (Cai et al., 2017). Results from the international metaanalysis by Shepperd et al. indicated that hospital care at home may make little to no difference for hospital readmission rates (2016). The mixed evidence is likely a result of having few randomized controlled trials of limited size and scope, particularly in the United States.

Safety: Reduction in Nosocomial Infections and COVID-19

Even in non-pandemic times, hospital-acquired infections are a huge cause of concern for health care providers and patients. The Centers for Disease Control and Prevention estimate that nearly 1.7 million patients each year acquire a nosocomial infection while being treated for other health issues (Haque, Sartelli, McKimm, & Abu Bakar, 2018). Tragically, nearly 100,000 patients die from these infections, making hospital-acquired infection a top 10 leading cause of death in the United States (*Health Care-Associated Infections, 2012*). While the evidence presented here does not draw specific conclusions about changes in hospital-acquired infection rates for HHC programs, any innovations that have the potential to mitigate this issue should be explored.

The importance of innovations that reduce nosocomial infections has been underscored in recent months by COVID-19. Moving hospital care outside of the hospital setting may reduce the

spread of COVID-19, which was one of the reasons that CMS launched the temporary "Hospitals Without Walls" initiative (Hostetter & Klein, 2020). Moreover, moving hospital care outside of the hospital setting may encourage individuals to seek the care that they need despite the ongoing national crisis and fear of infection. Emergency department visits declined 42% in April 2020, suggesting that people avoided medical care out of fear of catching COVID-19 (Hartnett, 2020).

POPULATION HEALTH OUTCOMES

As shown, hospital care can be provided in the home setting with similar or better health outcomes as care provided in the hospital setting for some conditions. Over time, HHC programs are likely to benefit population health by improving access to high-quality, low-cost hospital care.

HHC may also improve population health outcomes by reducing mortality rates. In 2012, a meta-analysis of randomized controlled trials found that care provided in HHC programs was associated with a 38% reduction in mortality at six months compared with hospital-based treatment (Leff, 2015). However, a retrospective cohort study of veterans in Hawaii found no statistically significant difference in mortality for those treated at home (Cai et al., 2017). Further research is needed to better understand the impact of HHC on mortality in U.S. populations.

HEALTH EQUITY

Finally, Home Hospital Care programs may have an impact on another pressing concern for U.S. health systems: health equity. Like all major U.S. institutions, health care is plagued by systematic racism. The implications of this have been brought to national attention recently by the glaringly uneven impact of COVID-19 across different racial groups. People of color suffer from higher rates of infection, hospitalization, and mortality than white individuals (CDC, 2020), due to longstanding issues such as differing occupational hazards, living conditions, underlying health conditions, and access to care as well as chronic stress caused by racial discrimination (Sze et al., 2020). Health systems have a moral obligation to respond by pursuing innovations with the

potential to reduce health disparities. Although more research is needed, HHC may improve health equity by improving health outcomes and patient experience for non-white individuals. This alternative care delivery model may also improve equity for non-English speaking patients.

Evidence of Implicit Bias in Health Care

In 2015, Hall et al. reviewed evidence on implicit racial and ethnic bias among health care professionals and explored the relationships between health care professionals' implicit attitudes about racial and ethnic groups and health care outcomes. Of the 15 reviewed studies, 14 found evidence of low to moderate levels of implicit bias against people of color among health care professionals, which is similar to the level of implicit bias found in the general population. The results also showed that implicit bias was significantly related to patient–provider interactions, treatment decisions, treatment adherence, and patient health outcomes (Hall et al., 2015). Clearly, implicit bias is pervasive in health care, and it is underpinned by racism.

Implications of Implicit Bias and Racism in Health Care

Racism in health care warrants immediate attention, as it leads to health disparities that cause racial minorities to bear a disproportionate burden of morbidity and mortality (Gee & Ford, 2011). Racial minorities have lower trust in the US health care system than non-Latino whites, and a recent study of almost 40,000 adults in California showed that patients who perceive racial discrimination in health care are less likely to seek needed treatment (Alcalá & Cook, 2018). Moreover, long-term exposure to racism can cause racial trauma among minority groups, which leads to symptoms like those experienced with post-traumatic stress disorder (Carter, 2007).

Home Hospital Care as a Strategy to Improve Racial Equity

Health systems must actively explore and test ways to improve the health care experience of racial minorities and close gaps in health equity. Improving representation in health care professions is an essential part of reducing health disparities and ensuring that all populations feel safe in health care delivery settings (Flores & Combs, 2013). However, given the extensive training required to enter the medical profession, efforts to improve representation may take years or decades to come to fruition. Introducing the option of moving acute care from the hospital to the home setting may be one way to lessen the burden of racism during the health care experience for minority patients by reducing their overall exposure to implicit bias and by altering the power dynamic that exists between patients and providers. This may be a meaningful action that hospitals can take while larger health equity reforms are underway. This option may also encourage individuals to seek care for acute conditions who would otherwise avoid the hospital. *Home Hospital Care as a Strategy to Improve Equity for Non-English Speakers*

Home Hospital Care also has the potential to reduce health equity gaps by improving care for populations that have trouble communicating with hospital staff due to a language barrier. Recovering from injury or illness at home with family members who speak their native language may aid in the recovery process, though further research on this topic as it relates to HHC is needed. During COVID-19, language barriers are an added burden for patients and their loved ones. Though hospitals offer interpretation services, patients who do not speak English often rely on multi-lingual family members to advocate for them. Family involvement has been hindered throughout the pandemic by visitor restrictions, which may be negatively impacting quality of care and health outcomes for non-English speaking patients (Presa & Bowen, 2020).

Potential Concerns Regarding Health Equity for Low-Income Individuals

Though Home Hospital Care programs seem promising in their ability to improve health equity through increased access to high-quality care in a comfortable setting, there are limitations that may disproportionately impact low-income individuals that must be taken into consideration. In order to be eligible for HHC, patients must have a stable home with reliable utilities. Patients or their family members must also possess a telephone and a basic level of technological competence. For example, in order to participate in the Presbyterian HHC program, patients need a telephone landline and the ability to use the telehealth unit, which consists of a blood pressure monitor, stethoscope, oximeter, glucometer, and video connection (Cryer et al., 2012). Patients who struggle with housing security will likely be excluded from the benefits that HHC programs offer. Further research is warranted to determine the true overall impact of HHC on health equity.

POTENTIAL BARRIERS TO IMPLEMENTATION

Despite the known advantages of providing hospital care in the home setting, hospitals in the United States have been slow to implement HHC programs due to the associated financial risk. Hospitals depend on reimbursement from payers for financial sustainability, and at present there is no permanent payment structure for hospital care provided at home under traditional Medicare (Hostetter & Klein, 2020). To compound this issue, shifting some patients to a home setting may increase the number of empty beds in the hospital, creating the potential for revenue loss. However, the surge in demand for hospital services driven by COVID-19 and growth in favorable reimbursement policies should mitigate these concerns for many health systems.

Uncertain Payment Models

Hospitals may consider Home Hospital Care a risky endeavor to pursue because currently there is no long-term payment model to support such programs under traditional Medicare. Of the nearly 60 million Medicare beneficiaries, about two-thirds are covered by traditional Medicare, meaning that a payment model is key to the success of HHC (*An Overview of Medicare*, 2019).

However, the percent of Medicare beneficiaries enrolled in a private Medicare Advantage plan has increased steadily from 13 to 34% over the last 15 years. The Congressional Budget Office projects this share to grow to 51% by 2030 (*A Dozen Facts*, 2020). The steady growth in MA enrollment presents an excellent opportunity for hospitals to implement HHC programs. MA plans have an incentive to keep costs down because they receive capitated payments from CMS to provide all Medicare-covered services to plan enrollees. Therefore, MA plans would likely be willing to negotiate payment arrangements for HHC programs that demonstrate cost savings, because those plans make money by covering care for their beneficiaries at a lower cost.

Recent events signal that traditional Medicare may start to cover hospital care provided at home as well. In 2017, a payment model advisory committee recommended implementation of an APM for a new model of HHC that bundles the acute episode with 30 days of post-acute transitional care. The introduction of an APM for HHC would establish Medicare billing codes, "paving the way for broad-scale adoption of the HHC program in the United States" (Federman et al., 2018). Action has not yet been taken on this idea. However, in light of the pandemic, CMS issued guidance in March 2020 known as "Hospitals Without Walls" that temporarily allows hospitals to be reimbursed for hospital services provided in non-hospital settings (Hostetter & Klein, 2020). In late November 2020, CMS expanded this initiative to explicitly grant hospitals the flexibility to provide acute care at home (Centers for Medicare & Medicaid Services, 2020). Although it is unclear how long this provision will last and whether it will be continued following the pandemic, it does temporarily open the door for hospitals to launch HHC programs.

Lost Revenues

Another financial concern regarding launching an HHC program is that moving patients to an at-home setting may result in a higher percentage of empty beds and lost revenue at the hospital. Empty hospital beds can be expensive and inefficient because health systems still need to cover fixed costs even if inpatient volume drops. Given the financial hardship health systems have incurred from COVID-19, this may be a difficult time to withstand additional drops in volume. However, if hospitals are able to utilize the additional inpatient beds for more critically ill, complex patients, the impact on revenue may be neutral or even positive.

IMPLEMENTATION CONSIDERATIONS

Health systems considering introducing Home Hospital Care will need to determine the best program design for their population, including which disease conditions to include and what team will deliver care in the home setting. Fortunately, there are resources available for making those decisions. A consulting team through Johns Hopkins offers a readiness evaluation as well as a comprehensive toolkit to support the adoption and implementation of their 'Hospital at Home' program, including training for care team members (Johns Hopkins, 2012).

Alternatively, some hospitals and health systems currently offering an HHC program are doing so in partnership with third-party vendors that specialize in home-based care delivery. Contessa Health, Medically Home, and DispatchHealth are all companies that assist health systems with the delivery of hospital care at home by providing some combination of care delivery, care coordination, and administrative services (Hostetter & Klein, 2020).

AREAS FOR FUTURE RESEARCH

Though early findings have been promising, the studies that have been done on Home Hospital Care thus far in the United States have been limited in size and scope. Research should continue on HHC as existing programs grow and new programs are added. As previously mentioned, health equity impacts must be monitored to ensure that HHC does not actually worsen health disparities, as this is a gap in current research. Further consideration should also be given to the impact of HHC on provider experience and outcomes by disease condition.

Provider Experience

In 2014, Bodenheimer and Sinsky suggested that the Triple Aim be expanded to the Quadruple Aim to include the goal of improving the work life of health care providers (2014). They found that 46% of physicians are experiencing burnout, as well as 34% of hospital nurses. There is evidence to suggest that the share of physicians experiencing burnout has risen in the years since their article was published (West, Dyrbye, & Shanafelt, 2018). This is concerning

because burnout among the health care workforce is associated with lower patient satisfaction, increased cost of care, and worse patient outcomes (Bodenheimer & Sinsky, 2014). With this in mind, health systems will need to ensure that any alternative care delivery models they introduce do not increase the burden of providers and contribute to higher rates of burnout if they choose to develop their own program rather than contracting out to a third party.

Condition-Specific Outcomes

As there have been very few randomized controlled trials, we do not know with certainty which conditions can be safety treated at home and which conditions have the best outcomes. The Brigham and Women's RCT enrolled a broad range of patients and therefore was unable to examine condition-specific outcomes (Levine et al., 2019). The Mount Sinai study included 19 conditions representing 65 diagnosis-related groups, but results were aggregated as opposed to broken down by condition (Federman et al., 2018). Further research into outcomes by condition are needed to ensure that hospitals provide the most appropriate options for each patient.

CONCLUSION

Health systems that strive to be industry leaders should take the bold step to implement Home Hospital Care programs despite the lack of a permanent traditional Medicare payment mechanism. An abundance of evidence demonstrates that such programs can decrease costs, improve patient satisfaction, and improve quality of care delivery, and these improvements can be expected to improve population health in the long run. HHC programs also have the potential to reduce health disparities and address capacity issues generated and/or exacerbated by COVID-19. There is a growing consensus in the medical community that "care at a distance" models will not disappear following the pandemic and thus now is an attractive time to invest in this space (Kacik, 2020). Additional payment models will follow as payers, including CMS, recognize the clear benefits that Home Hospital Care programs provide their beneficiaries and their bottom line.

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