CHCF

Medical Care at Home Comes of Age

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About the Foundation

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Over the last 30 years, a variety of home-based medical care models have been developed and implemented to address important gaps in health care delivery, especially for people with multiple chronic conditions and functional impairments. These models are becoming increasingly important as patients seek care that is person-centered and meets their complex needs. This is especially true in the context of the ongoing COVID-19 crisis, which has drawn into sharp focus the need for care models that go beyond the traditional "bricks and mortar" of physician offices and hospitals.

While increasing use of home-based medical models could improve outcomes and lower costs for different types of high-need, high-cost patients, the burgeoning landscape of these models can be difficult to make sense of. This report aims to make it easier for policymakers, health plans, and health systems to understand the why, what, and how of home-based medical care models. It examines how this field has developed, details current home-based medical care models and the patient populations they serve, and describes real-world applications through case studies. Health care stakeholders can use this information to support purposeful program planning and creative implementation, and to identify opportunities to form a full-fledged home- and community-based service delivery ecosystem.

What Is Home-Based Medical Care?

Home-based medical care encompasses a variety of care models that often serve the most medically complex and socially vulnerable people. Medical management, co-management, and oversight by nurse practitioners, physician assistants, and especially physicians — often in collaboration with an interprofessional care team — and the execution of a medical care plan are core components in the care of these patients. Essential care also requires addressing issues related to patients' functional status, cognitive and behavioral concerns, and social determinants of health.

Historical Context — How Did We Get Here?

Medical care delivered in the home used to be a central part of American medicine: In the 1930s, home-based visits comprised 40% of all physician-patient encounters in the United States. But then the numbers fell precipitously — to 10% by 1950, and to less than 1% of all Medicare physician visits in 1993,[1] which is still true today.

While many factors drove the hub of health care to become firmly rooted in hospitals, key among them were the Hill-Burton Act of 1946, which provided federal funding for expansion of hospitals; the development of expensive medical diagnostics and treatment approaches that involved large capital expenditures; and the industrialization of health care more generally. Doctors caring for patients in their homes were largely usurped by the bricks-and-mortar care of office practices and hospitals. For many policymakers and health systems, home-based medical care became regarded as quaint and anachronistic, as well as resource intensive and less efficient, with its required travel time, lack of access to advanced medical technology, and need to provide care in the unstandardized setting of patients' homes.

An exception to the profound drop in home-based medical care visits occurred within the Veterans Health Administration, where home-based primary care was seen as a cost-effective way to provide care to high-cost, high-need veterans. Despite ups and downs in overall numbers of veterans served, comprehensive home-based services, including home-based primary care, have been maintained as standard available services for eligible veterans.[2]

Skilled home health care has also grown over the last several decades. Under the original 1965 Medicare benefit, skilled home health care provided nursing and other rehabilitative services as a benefit for patients who had been recently hospitalized. In 1980, the benefit expanded to provide these services to people who met eligibility criteria even if they had not

been hospitalized. This benefit, however, has never covered the provision of physician services in the home and provides care on only an intermittent basis. While skilled home health care services grew with the increase of the Medicare population, similar growth was not seen in home-based medical care.

Current Drivers of Home-Based Medical Care Models

Even with a lack of appreciation by the mainstream medical establishment and relatively poor reimbursement rates, home-based medical care delivery models have persisted and evolved in recent decades. The "modern era" of home-based medical care has in large part developed in response to changing demographics, gaps in care delivery, and evolving financial incentives; major drivers are described below.

Aging demographics. Surviving into advanced old age has become common only in the past few generations; today, with an average US life expectancy over 78 years old, most Americans live into advanced age and may experience multiple chronic conditions, physical disabilities, and fragile health. An average adult at age 65 can now expect to spend 1.5 to 2.5 years of their remaining life span needing physical help from another person for basic "activities of daily living" like toileting, getting dressed, and moving about, and about 6 months of being significantly homebound.[3] Individuals 85 years and older constitute the most rapidly growing segment of the American population and face the greatest risk of experiencing frailty. The over-85 age group is projected to increase 305% between 2012 and 2050, in contrast to a mere 16.5% increase expected for the under-18 population.[4] With this backdrop, home-based medical care has reappeared as an effective alternative care model to serve the complex needs and priorities of this burgeoning frail older population.

Escalating costs. US national health expenditures as a percentage of gross domestic product have steadily climbed from 5% in 1960 to 17.7% in 2018.[5] These high costs threaten Medicare solvency and have put increasing pressures on federal and state funding of Medicaid. Economic concerns have ushered in an era of "value-based care," with efforts to move away from a payment system that rewards health care providers for the volume of services they provide toward one that rewards them for the value or outcomes of care they provide. The value-based care approach seeks to maximize care quality while being cost-effective or cost-saving. In this context, home-based medical models are viewed as a way of managing the care of high-cost, high-need populations.

Financial incentives. In some cases, home-based care models have developed in response to particular care delivery and associated financial "pain points" for health systems. For example, many home-based transitional care programs, which typically provide coaching and support to patients as they are discharged from the hospital back to their homes, were created to reduce rehospitalization rates in light of Medicare's financial penalties related to readmissions starting in 2012.[6]

Gaps in care. The clinic- and hospital-centric model does not work equally well for all populations. Home-based primary care programs have developed in recognition of the difficulty some people have with "usual care." Specifically, this model was developed to provide care primarily to homebound older adults with multiple chronic conditions, functional impairments, and often challenges related to social determinants of health who had difficulty accessing traditional office-based primary care.[7] The model known as Hospital at Home was developed to provide acute hospital-level care in the home as a substitute for traditional inpatient care to improve patient and family care experience, reduce the rate of common hospital-associated complications, and reduce the costs of acute care.[8]

As research studies and program evaluations have demonstrated cost savings and increased patient and caregiver satisfaction with these types of models, more health systems and payers are considering these programs as viable parts of their overall service delivery strategy. However, because home-based medical care models tend to run counter to the prevailing culture of facility-based care, they have been scaled with varying success. For example, transitional care models supporting patients upon discharge from hospital to home have scaled broadly because this model can be relatively easily implemented by hospitals and focuses on an outcome of significant interest to them: preventing readmissions. In contrast, a model such as Hospital at Home has not scaled at such a level due, in part, to the lack of a permanent payment model among Medicare and commercial fee-for-service payers.[9]

Most recently, the COVID-19 pandemic has put wind in the sails of home-based medical care, where some models have struggled for broad attention for years despite strong evidence of effectiveness and safety. The pandemic has clearly accelerated a large-scale shift in attitudes on the safety of facility-based care and has unmasked the dangers of linking health care services to bricks-and-mortar health care settings — hospitals, ambulatory clinics, nursing homes, rehabilitation facilities, and skilled nursing facilities — when these settings serve as sources of greater COVID-19 transmission risk (see box below).

The Opportunity

While different types of home-based medical care models can serve a variety of people, one of the core high-need, high-cost populations served by these models is homebound older adults. Completely or partially homebound older adults represent almost 21% of people age 65 and older and are among the costliest to care for.[10] They have higher rates of hospitalization, more social vulnerabilities, and poorer overall health than non-homebound older adults. Evidence from numerous studies has demonstrated the benefit of home-based care for this population, both in cost savings and in patient and caregiver experience.[11,12] Additionally, recent studies suggest value for other high-need, high-cost populations.[13–15]

The opportunity to care for such patients in the home is increasingly recognized by health plans and health systems as they respond to the shift to value-based care. Health care entrepreneurs are also seeing the opportunity, and many investor-funded health care start-ups are focusing their work in the home and on this high-need patient population because they recognize the opportunity to reduce health care expenditures and improve the quality of care delivery. These companies are willing to engage with health systems and payers and take financial risk to do so. See pages 12–14 for three case studies of such companies.

Why Is Home-Based Medical Care Important in the Context of COVID-19?

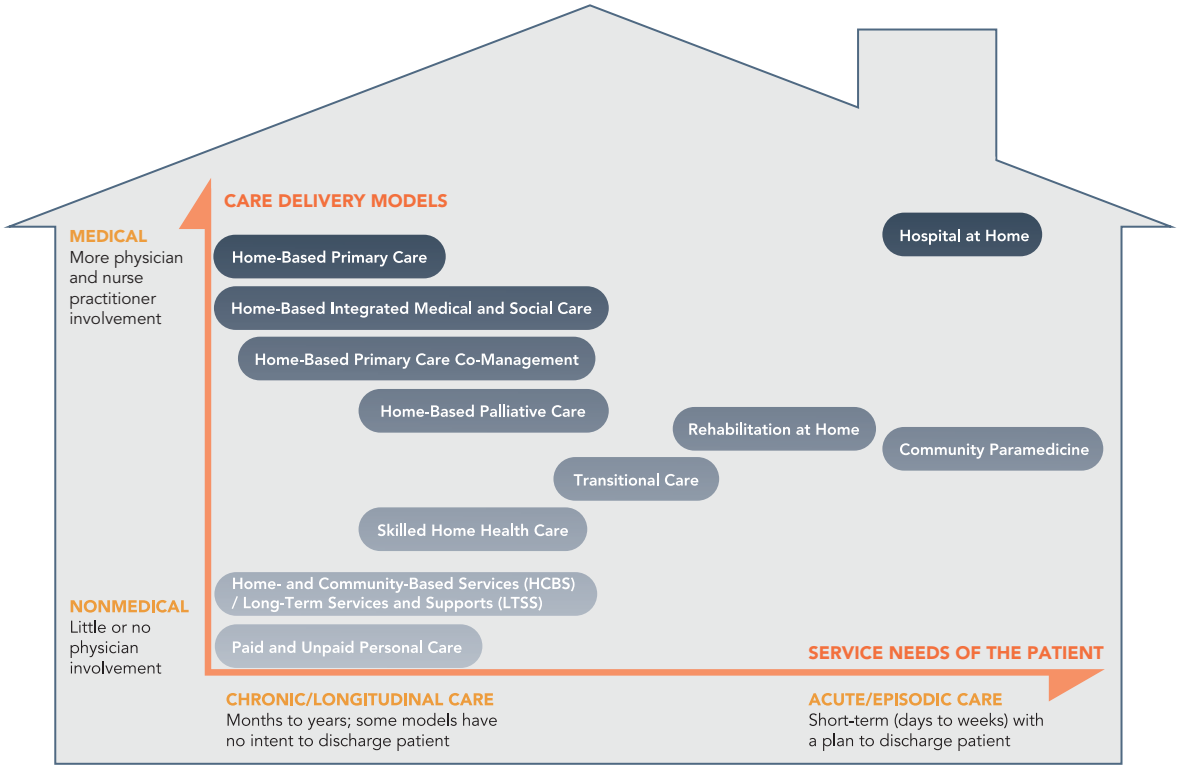
ISSUE	SOLUTION
Telemedicine does not provide sufficient reach or assessment capabilities in certain complex care situations.	Home-based care can optimize assessment and management and help people access telemedicine (i.e., if they don't have broadband, video, etc.).
Health systems need a relief valve to create surge capacity for acute care to respond to COVID-19 outbreaks.	Home-based medical care can prevent admissions or facilitate earlier discharges.
Many patients without COVID-19 are wary of accessing facility-based care.	Home-based care ensures that high-risk patients with non-COVID-19 illnesses get needed care.

The Spectrum of Home-Based Medical Care Models

Models spanning the home- and community-based care continuum deliver a broad spectrum of services across primary, urgent, acute hospital, and post-acute levels of care. Some models provide *longitudinal care* (continuous over an extended period of time), such as home-based primary care, home-based medical co-management models, integrated medical/social models, and (at times) home-based palliative care. Some models provide *episodic care* (primarily confined to a single incidence or time-limited episode of care over days to weeks), such as community paramedicine, Hospital at Home, transitional care models, and rehabilitation at home. Given the diverse and often complex needs of the patients served, certain home-based medical models such as home-based palliative care may provide both longitudinal and episodic home-based medical care. Figure 1 depicts these medical models alongside other models that primarily provide nursing care, personal care, or other non-medical supportive services.

To help policymakers, health plans, and health systems assess the ways various home-based medical models support different populations, Tables 1 and 2 (starting on page 7) provide a framework for understanding these models and describe the most common models and their underlying evidence base. Following those tables, three case studies (starting on page 12) of innovative approaches illustrate how some of these models work.

FIGURE 1. Home-Based Care Models



Notes: The relative size of the model labels does not reflect the numbers of patients served by or practices/systems using the model. *Community Paramedicine* refers to Mobile Integrated Health-Community Paramedicine.

TABLE 1. Longitudinal Home-Based Medical Care Models*

HOME-BASED PRIMARY CARE	HOME-BASED MEDICAL CO-MANAGEMENT	HOME-BASED INTEGRATED MEDICAL/SOCIAL CARE	HOME-BASED PALLIATIVE CARE
Model Definition			
Provides primary care in the home to homebound adults.	Provides patient assessment, coordination, and wraparound services in the home in collaboration with patients' office-based PCP.	Provides multifaceted, wraparound medical and social services in the home.	Provides basic or specialist palliative care in the home to alleviate physical symptoms and emotional distress.
Target Population			
Homebound, community-dwelling adults; mainly older adults, but also younger adults with disabilities.	High-need, high-cost populations with complex care needs (primarily medical and social needs).	High-need, high-cost populations with complex medical, behavioral health, and social needs; may or may not be homebound; commonly eligible for both Medicaid and Medicare.	Patients with serious illness(es), typically (but not exclusively) in advanced stages and with high illness or symptom burden.
Core Components			
▸ Longitudinal primary care. ▸ Routine preventive care and urgent care. ▸ Medical management. ▸ Many programs use interprofessional teams. ▸ Most programs provide round-the-clock staff availability, usually by phone.	▸ Longitudinal or episodic primary care co-management with interprofessional team (team sees patient in the home and collaborates with office-based PCP). ▸ Interprofessional team may include physicians, NPs, community health workers, home health aides, and social workers.	▸ Longitudinal primary care, behavioral, and social care (such as adult day care), and case management. ▸ Comprehensive assessment of medical, social, behavioral, and support needs. ▸ Round-the-clock staff availability, usually by phone.	▸ Longitudinal or episodic basic or specialist palliative care. ▸ Clarify goals of care and work with other providers to ensure care plan aligns with goals. ▸ Assess and manage physical, psychological, emotional, and spiritual suffering and distress of patients and families.
Staffing			
PCPs are physician, NP, and/or PA. Other staff varies across practices but may include administrative support, care coordinator, nurse, social worker, and skilled therapists. May collaborate with skilled home health agency. No set ratio of staff to patients.	Physician-supervised NP and/or nurse. Other team members may include a social worker, community health worker, and/or nurse's aide.	Interprofessional team is headed by prescribing/billing clinician, and may include geriatric social worker, community health worker, behavioral health, physical therapy, and sometimes palliative care.	Interprofessional team typically includes a palliative medicine physician and/or NP, nurse, chaplain, and social worker, along with other disciplines based on patient need.
Evidence and Outcomes†			
Strength of evidence: *Moderate.* Two systematic reviews: ▸ 19 studies (2 RCTs, 17 observational studies; AHRQ review) ▸ 9 observational studies; some with matched cohorts (PMID: 25371236) *Outcomes* Some inconsistencies across studies but evidence of reductions in ED visits, hospitalizations, hospital bed days, long-term care admissions, and total costs, and improvements in patient and caregiver quality of life and satisfaction with care. CMMI Independence at Home Demonstration shows substantial cost savings (PMID: 29473945, Year Four Evaluation).	*Strength of evidence:* *Moderate to strong.* RCT and multiple observational studies. *Outcomes* ▸ RCT of a geriatric co-management model in high-risk patients shows improved general health, vitality, social functioning, and mental health, and reduced 2-year ED utilization (PMID: 18073358). ▸ GRACE, Geri-PACT, and dementia co-management models show reduced ED visits, increased care coordination, and improved patient/caregiver satisfaction (PMIDs: 16866688, 29743228, and 31466897; AHRQ evidence synthesis).	*Strength of evidence:* *Weak.* Observational studies; no RCTs. *Outcomes* Case-control and pre-post comparisons show reduced inpatient bed days, reduced nursing facility admissions, and high consumer ratings for quality and access (PMID: 21383354); and lower costs, higher institutionalization-free survival, and longer community residence (PMID: 31074846).	*Strength of evidence:* *Moderate to strong.* ▸ Systematic reviews (PMIDs: 24292156, 28376681, and 23744578) ▸ Small RCTs (PMIDs: 28801001 and 26603186) ▸ Matched cohort observational studies (PMIDs: 27574868, 25375663, 27590922, 30830695, and 24747224) *Outcomes* Evidence of reductions in hospital and ED visits, reduced acute care costs, and improvements in care continuity, quality of life, and survival outcomes.

TABLE 1. Longitudinal Home-Based Medical Care Models*, *continued*

HOME-BASED PRIMARY CARE	HOME-BASED MEDICAL CO-MANAGEMENT	HOME-BASED INTEGRATED MEDICAL/SOCIAL CARE	HOME-BASED PALLIATIVE CARE
Reimbursement			
FFS payment models are most common but often do not cover costs necessary to treat medically complex patients. One successful home-based primary care-only ACO exists. Value-based models focused on improving outcomes are becoming more common.	Some FFS, but mainly subsidized by health systems or risk arrangements between home-based co-management providers and health plans.	Capitated payments from Medicare and Medicaid foster creative partnerships; a Medicare shared savings model (e.g., Medicare ACO) can be coordinated with MLTSS (or Medicaid managed care) programs, or state agencies administering Medicaid may choose to offer home-based medical care through partnered Medicare Advantage and other SNP programs.	Medicare FFS for provider services; some Medicare Advantage, Medicaid managed care, or commercial plans use per-member per-month payments and shared savings arrangements.
Telehealth			
Yes, in some programs	Yes, in some programs	Not described	Yes, in many programs

*Models presented in this table are primarily longitudinal models, but some can also be episodic and are noted as such. This table contains links to some journal articles examining the impact of these models. To make it easier for readers to find articles associated with specific models or outcomes, the PubMed Identification (PMID) number is provided with a link to that article. PubMed is the National Library of Medicine's database of biomedical literature.

†In considering hierarchy of strength of evidence, systematic reviews of randomized controlled trials are considered to be the highest level, followed by randomized controlled trials, nonrandomized trials (e.g., pre-post comparisons), observational studies (e.g., case-control), and then descriptive studies.

Abbreviations: *ACO*, accountable care organization; *AHRQ*, Agency for Healthcare Research and Quality; *CMMI*, Center for Medicare & Medicaid Innovation; *ED*, emergency department; *FFS*, fee-for-service; *Geri-PACT*, Geriatric Patient Aligned Care Team; *GRACE*, Geriatric Resources for Assessment and Care of Elders; *MLTSS*, Managed Long Term Services and Supports; *NP*, nurse practitioner; *PA*, physician assistant; *PCP*, primary care provider; *RCT*, randomized controlled trial; *SNP*, special needs plan.

TABLE 2. Episodic Home-Based Medical Care Models

HOSPITAL AT HOME (HAH)	MOBILE INTEGRATED HEALTH–COMMUNITY PARAMEDICINE (MIH-CP)	REHABILITATION AT HOME	TRANSITIONAL CARE
Model Definition			
Episodic hospital-level care in a patient's home. Two main models: (1) Substitution/admission avoidance — HaH as a full substitute for acute hospital admission; patient usually admitted from ED to their home; and (2) Transfer/reduced length of hospital stay/early discharge — for patients admitted to traditional hospital care who require ongoing hospital-level care; patient is transferred to complete hospital care at home.	Episodic community-based care delivery via EMS in expanded clinical roles. Two main models: (1) Urgent, unplanned pre-hospital triage and care to avoid unnecessary ED or hospital use; and (2) Nonurgent, planned posthospital discharge care to prevent readmissions.	Episodic care for individuals needing posthospitalization subacute care, usually for patients requiring skilled therapy as a substitute for SNF admission.	Episodic care for patients requiring a change from one site of care and/or provider to another throughout an acute illness episode. Three main models, for patients transitioning between: (1) Hospital and home; (2) ED and home; and (3) Hospital and post-acute care SNF.
Target Population			
Adults who require acute hospital admission for certain qualifying conditions and levels of illness acuity; may or may not be homebound.	High-need, high-cost community-dwelling adults who are often frequent users of avoidable ED or inpatient services; may or may not be homebound.	Older hospitalized adults who require post-acute SNF care at time of hospital discharge; may or may not be homebound.	Hospitalized adults who are at risk for poor posthospitalization outcomes, including readmission within 30 days of hospital discharge; may or may not be homebound.
Core Components			
▸ Models vary in this rapidly evolving space. ▸ Most models involve physician and nurse visits at least daily, with nurse visits usually occurring more than daily, depending on the needs of the patient. ▸ In most models, physician visits are in-person. In others, physician provides care via biometrically enhanced telemedicine with nurses and/or NPs in the home. ▸ Patient receives hospital-level services in the home: medical care, intravenous therapies, blood tests, radiography, ultrasound, echocardiography, oxygen, and other respiratory therapies.	▸ Models vary in this rapidly evolving space. ▸ Urgent, unplanned care typically consists of paramedics delivering services to patients; physicians required to provide synchronous consultation to the paramedic by radio, telephone, or virtually following previously developed medical protocols. ▸ Nonurgent, planned care typically consists of paramedics delivering in-home services to patients as part of a wider interprofessional team. Most models provide round-the-clock availability by phone only.	▸ Model is early in development. ▸ Components vary but tend to include interprofessional team members providing rehabilitation services in the home (see Staffing row below).	▸ Models vary in this rapidly evolving space. ▸ Most models deliver a bundle of services incorporating varying degrees of the following components: Coordination and continuity of care with the patient's primary team; structured post-discharge telephone support; in-person home visits; outpatient, clinic-based follow-up; educational support (brochures, videos, motivational interviewing, and one-on-one coaching); and pharmacist-led medication management. ▸ Specific components associated with better outcomes include follow-up phone visits, round-the-clock availability by phone, pharmacist involvement, and interventions that address multiple components.
Staffing			
Usually an interprofessional team including physician, nurse, home health aide, skilled therapists, social worker, care coordinator, community health worker, and community paramedicine.	Urgent/unplanned care staffing described in Core Components row. Nonurgent/planned care interprofessional team includes paramedic responsible for delivering on-site services, physician for online medical direction, and depending on the specific program, NP/PA, triage personnel, nurse, social worker, care coordinator, or community health worker.	Usually an interprofessional team including home health aide, nurse, physical therapist, occupational therapist, and social worker, with physician oversight and availability for ad hoc visits.	Usually an interprofessional team led by a nurse, NP/PA, or pharmacist with physician oversight; may also include a social worker and home care aide.

TABLE 2. Episodic Home-Based Medical Care Models, *continued*

HOSPITAL AT HOME (HAH)	MOBILE INTEGRATED HEALTH–COMMUNITY PARAMEDICINE (MIH-CP)	REHABILITATION AT HOME	TRANSITIONAL CARE
Evidence and Outcomes*			
Strength of evidence: Strong Multiple RCTs, meta-analyses, systematic reviews. *Outcomes* ▸ Better patient and caregiver experience and satisfaction with care (PMID: 23121588). ▸ Lower rates of complications; lower mortality (admission avoidance model); lower readmission and costs (PMIDs: 29946693 and 31842232). ▸ Better outcomes in specific conditions, e.g., CHF (PMID: 26052944), COPD (PMID: 26854816), and end-of-life care (PMID: 26887902).	*Strength of evidence:* Moderate One systematic review of matched observational studies (PMID: 30614761). *Outcomes* ▸ Better patient activation and satisfaction measures as well as lower ED and inpatient utilization. ▸ Cost savings were inferred from utilization reduction outcomes in a few of the studies but never quantified.	*Strength of evidence:* Moderate RCTs, matched cohort studies, and case series. *Outcomes* ▸ Improvement in pain and functional outcomes (PMID: 18676897). ▸ Better improvement in walking (PMID: 24833680) for specific populations. ▸ Achievement of functional goals (PMID: 32343401); similar health outcomes at reduced costs at 12 months (PMIDs: 10914863 and 17152453). ▸ Equal functional outcomes at lower cost for ortho-geriatric services (PMID: 28578883); lower costs for post-stroke patients (PMID: 29631453).	*Strength of evidence:* Strong Multiple RCTs, meta-analyses, and systematic reviews. *Outcomes* ▸ Reduced mortality, lower rates of ED utilization and hospital readmissions. ▸ No significant differences in quality of life or functional measures (PMIDs: 29419621, 28793893, 28403508, 27845805, 27207303, 26551918, 26625898, and 26312362).
Reimbursement			
Not currently reimbursed under Medicare FFS. COVID-19-related CMS "Hospital Without Walls" waivers may provide payment relief. Most implementations have been in Medicare Advantage and the Veterans Affairs health system. Commercial insurers are starting to create payment mechanisms.	Not currently reimbursed under Medicare FFS.	Not currently reimbursed under Medicare FFS.	CMS Transitional Care Management Part B professional billing codes allow for billing services that assist with transitions of care after discharge from inpatient hospital. CMS CMMI Next Gen ACOs post-discharge home visit waivers allow auxiliary licensed clinicians to bill for up to two home visits under general (rather than direct) supervision of an ACO physician within 30 days of hospital discharge.
Telehealth			
Remote patient monitoring-enhanced telemedicine increasingly used as a tool for physician component of HaH.	Limited mostly to phone consultation via a secure technology platform with a physician, social worker, or pharmacist.	Has been employed but not a significant component of the model at this time.	Mostly by phone. Limited use of biometric telemonitoring for patients with certain conditions, such as CHF patients; impact on outcomes has been negligible to modest to date.

*In considering hierarchy of strength of evidence, systematic reviews of randomized controlled trials are considered to be the highest level, followed by randomized controlled trials, nonrandomized trials (e.g., pre-post comparisons), observational studies (e.g., case-control), and then descriptive studies.

Note: This table contains links to some journal articles examining the impact of these models. To make it easier for readers to find articles associated with specific models or outcomes, the PubMed Identification (PMID) number is provided with a link to that article. PubMed is the National Library of Medicine's database of biomedical literature.

Abbreviations: *ACO*, accountable care organization; *CHF*, congestive heart failure; *CMMI*, Center for Medicare & Medicaid Innovation; *CMS*, Centers for Medicare & Medicaid Services; *COPD*, chronic obstructive pulmonary disease; *COVID-19*, coronavirus disease; *ED*, emergency department; *EMS*, emergency medical services; *FFS*, fee-for-service; *HaH*, Hospital at Home; *MIH-CP*, Mobile Integrated Health–Community Paramedicine; *NP*, nurse practitioner; *PA*, physician assistant; *RCT*, randomized controlled trial; *SNF*, skilled nursing facility.

The Bottom Line

Longitudinal Home-Based Medical Care Models

Home-based primary care. Provides longitudinal primary care to vulnerable homebound older adults with multiple chronic conditions, functional limitations, and limited social capital. Medical care is a core component, and interprofessional care is a common feature. Systematic reviews demonstrate reductions in emergency department (ED) visits, hospitalizations, long-term care admissions, and costs of care, and improvements in patient and caregiver quality of life and satisfaction with care.

Home-based medical co-management. Provides longitudinal or episodic wraparound care to high-cost populations identified to have high needs. In collaboration with the primary care provider, an interprofessional team targets and addresses all aspects of an individual's complex care needs. Reimbursement is mainly through shared risk arrangements between co-management providers and health plans. Randomized controlled trials (RCTs) of some models show reduced health care utilization and increased care coordination and patient/caregiver satisfaction.

Home-based integrated medical/social care. Provides multifaceted, longitudinal, wraparound medical and social services. An interprofessional team led by a provider addresses complex medical, behavioral health, and social needs of the target population. Reimbursement is through shared savings. Observational and case-control studies show lower health care utilization and institutionalization and higher patient satisfaction.

Home-based palliative care. Provides interprofessional, longitudinal or episodic, basic or specialist palliative care in the home to patients with serious illnesses. Aims to clarify goals of care and alleviate physical symptoms and psychological distress of patients and families. Extensive evidence for improved quality of life and reduction in health care utilization and costs.

Episodic Home-Based Medical Care Models

Hospital at Home (HaH). Episodic hospital-level care delivered at home to adults who otherwise would require acute hospital admission. Patients can be transferred home directly from the ED and avoid admission, or a hospital stay can be shortened by early transfer home with ongoing HaH. Interprofessional team with providers and nurses visiting at least daily and others involved as required. Reimbursement mainly through Medicare Advantage and Veterans Affairs health systems.* Strong evidence from multiple RCTs, meta-analyses, and systematic reviews for lower costs, lower complications and mortality, and improved patient/caregiver satisfaction and experience.

Mobile Integrated Health–Community Paramedicine (MIH-CP). Episodic care delivery model targeting high utilizers of ED and inpatient services. Uses emergency medical services to deliver pre-hospital triage and care or posthospital transitional care to those at high risk of hospitalization or readmission. Interprofessional model with paramedic delivering on-site care backed up by providers, social workers, community health workers, and other members of the care team. Evidence limited to systematic review of retrospective observational studies, which show some signals for reduced utilization and improved patient satisfaction.

Rehabilitation at home. Episodic care delivered in the home to people requiring skilled therapy-focused care at time of hospital discharge who otherwise would require facility-based care. Interprofessional team with therapists supported by doctor, nurse, social worker, and other team members as needed. Currently not reimbursed by Medicare. Early evidence shows promise for improving functional outcomes at lower cost.

Transitional care. Episodic care targeted to people at high risk of poor outcomes (e.g., readmissions and frequent hospitalizations) during transitions of care. Elements include care coordination, education, follow-up, and medication management. Interprofessional team, usually nurse-led. High-quality evidence (RCTs, meta-analyses, and systematic reviews) for improving outcomes with lower mortality, and reduced ED visits and repeat hospitalizations. Reimbursable under Medicare Part B.

*In response to the COVID-19 pandemic, the Centers for Medicare & Medicaid Services (CMS) made individual waivers available to hospitals to pay for HaH services in fee-for-service Medicare for the duration of the public health emergency.

Case Studies

The models described in Tables 1 and 2 initially were developed and offered as siloed programs. Some innovative health systems, start-up for-profit health care organizations, and payers have begun to weave these services together into a more integrated continuum. These organizations have adopted core components of many of the models and created services that are often more patient-centered and agile than usual care based in clinic and inpatient settings.

Profiles of three of these organizations follow, including how they have taken key components of several home-based medical care models to offer more holistic, real-time care and reduce care fragmentation and the resulting unnecessary, costly care.

CASE STUDY

Episodic Home-Based Medical Care — Hospital at Home

Contessa Health

Headquarters: Nashville, TN

Overview. Contessa Health's mission is to partner with health systems to scale the Hospital at Home model. Contessa partners with health systems to identify patients that meet the criteria for hospital admission for medical conditions (observation-level care or full inpatient status), and to enable those patients to receive the same level of care they would receive in the hospital in their home instead. Ninety percent of Contessa's patients are admitted to the Hospital at Home program directly from the emergency department. Contessa leverages their health system partners' resources for clinicians, home health capabilities, diagnostics, infusion services, and durable medical equipment (DME). Contessa also provides some virtual and in-person clinical support and manages contracting and payment/reimbursement mechanisms with payers, such as Medicare Advantage plans. Their proprietary technology platform, Care Convergence, helps their partner health systems with care management workflows. Contessa's current partners include Mount Sinai Health System (NY), Highmark Health (PA), Marshfield Clinic Health System (WI), Ascension Saint Thomas (TN), Prisma Health (SC), Gunderson Health System (WI), and Dignity Health (AZ).

Underlying care model chassis. Hospital at Home.

Main goals. Prevent hospital-associated harms commonly experienced by older adults in the traditional acute care hospital, provide a better patient and provider experience, and reduce costs of acute hospital care.

Target patient population. Eligible patients who require hospital admission for acute medical illness — for example, community-acquired pneumonia, exacerbations of heart failure and chronic obstructive pulmonary disease, and others. Patients are in the lower acuity range of those requiring hospital-level care. The majority of patients are over age 65; any patient over the age of 18 is eligible.

Services provided. Through a virtual care center in Nashville, TN, Contessa provides care management oversight and virtual hospitalists if such resources are not available locally, as well as virtual social work services. Contessa also provides Recovery Care Coordinators who are on-site with the patient; they facilitate patient admission and manage the patient's episode of care for up to 30 days.

Most important outcomes. Hospital readmission rates (and associated penalties), patient satisfaction, reduced length of stay, medication reconciliation rates, adherence to Hospital at Home standards to provide key interventions in a timely manner (e.g., oxygen or intravenous medications), and patient care experience.

Technology. Contessa's proprietary Care Convergence platform facilitates care management and makes patient data available to all providers on the Hospital at Home team (which is usually a distinct clinical care team from other teams in the partner health system). Patients are provided with a "telehealth kit" in the home that allows for virtual assessment of vital signs and includes a tablet so that hospitalists can conduct "virtual rounds" on the patient. Nurses visiting in the home bring in e-stethoscopes (stethoscopes that transmit sounds to a remote location), which allow physicians to examine the patient at a distance.

Reimbursement/payment model. The payment model for patient care depends on the health system partner and the local payer environment. Contessa and the partner health system establish a joint venture on a shared savings basis where there is pro rata ownership of the entity. Costs are removed, then earnings are divided between Contessa and the health system partner.

CASE STUDY

Longitudinal Home-Based Medical Care — Home-Based Medical Co-Management

MedZed

Headquarters: Los Angeles, Fresno, and Atlanta

Overview. MedZed provides telemedicine-enabled home-based primary care co-management services to patients who are both medically and socially complex, through partnerships with multiple health plans in California, Washington, New Jersey, and Maryland. MedZed engages patients identified by the health plan, and MedZed clinicians either fully manage or co-manage the patient with the patient's office-based primary care physician. Their team (which includes physicians, nurse practitioners, nurses, social workers, behavioral health providers, palliative care clinicians, and community health workers) provides wraparound services, with a strong emphasis on behavioral health and culturally congruent care whenever possible. They aim for each team member to practice at the top of their license, and to use team members as efficiently as possible — for example, palliative care providers connect with patients by video with nurses or community health workers in person with the patient. Their approach is supported by a robust data platform that manages workflows for each of their clinicians. The platform allows the organization to track all interactions with patients and integrates data from multiple sources. A major goal of care is to stabilize the patient and train them in self-care and effective use of the traditional care delivery system. At that point they "graduate" the patient and transfer them back to full-time traditional ambulatory primary care.

Underlying care model chassis. Home-based longitudinal medical and social care.

Main goals. Improve care for medically and socially complex high-need, high-cost populations, to reduce the need for hospital admissions and emergency department visits, thereby decreasing total costs of care.

Target patient population. Health plans identify the targeted high-risk patients through their own risk stratification process. The criteria used to define high-risk varies across health plans; some focus on total costs of care, others focus on hospitalization rates, and others target patients with complex needs and poor access to primary care. In general, these high-risk patients are high-need, high-cost, usually with multiple chronic conditions, and social, environmental, or behavioral issues. Additional referrals may come from hospital discharge planners, case managers, and inpatient palliative care services. MedZed contracts with health plans on a contact capitation basis, meaning they are only paid for those patients identified by the health plans as high-risk whom they find, engage, enroll, and provide services to. MedZed enrolls about 50% of these identified high-need Medicaid patients, which is higher than industry averages.

Services provided. MedZed provides longitudinal, complex primary care co-management in collaboration with a patient's existing primary care physician. If the patient lacks a primary care physician, MedZed will help the patient find one or fully manage primary care services themselves. Community health workers are used to reach out to prospective patients to engage them to accept MedZed care and to help provide more culturally concordant care. The community health workers also work with patients to assess and then address their social needs. A team composed of a physician, licensed practical nurses, a community health worker, and a care coordinator manages a panel of about 250 patients. Weekly interprofessional team meetings focus on the most active and challenging patients. MedZed provides subspecialist e-consultation, palliative care, and behavioral health services when appropriate. Where possible, MedZed clinician home visits are scheduled to coincide with home health aide visits to include aide input into care plans.

Most important outcomes. The main outcomes of interest are usually determined by MedZed's health plan partners; most commonly these include hospital inpatient admission rates, hospital inpatient costs, and total costs of care. MedZed also assesses rates of patient engagement (i.e., proportion of patients identified by the health plan that MedZed engaged for care), completion rates of MedZed visits, frequency of MedZed home visits, rate of completion of advance directives, rate of successful transitions of patients back to traditional primary care, and patient satisfaction (net promoter score).

Technology. MedZed uses an internally developed data platform that captures multiple data streams (e.g., hospital admissions, electronic health record data, etc.) and turns them into useful management reports (e.g., health service use at patient level) to inform clinical decisions. The platform also links with clinician scheduling functions and care logistics to improve clinician efficiency. A telemedicine platform with video capabilities integrates with their data platform. Video care connects patients to subspecialty consultants.

Reimbursement/payment model. MedZed receives a per-member per-month (PMPM) payment from their health plan partners. They do not provide care on a fee-for-service basis. MedZed aims to engage with health plans in risk-based contracting approaches in the future.

CASE STUDY

Longitudinal Home-Based Medical Care — Home-Based Medical Co-Management

Upward Health

Headquarters: Providence, RI

Overview. Upward Health provides longitudinal home-based medical co-management for patients who lack access to interprofessional high-quality care and whose unique needs are better suited to in-home care. Upward Health's whole-person model of care integrates primary care, behavioral health (including substance use disorders), and supports for social determinants of health. They work with adolescents and adults of all ages and partner with payers to identify high-risk patients. Their interprofessional team consists of primary care providers, psychiatrists, behavioral health specialists, pharmacists, nurses (RNs), social workers (SWs), dieticians, emergency medical technicians (EMTs), medical assistants (MAs), community health workers (CHWs), and peer support specialists (PSSs). They target patients who are unable to effectively access care for reasons such as frailty, disability, mental health needs, substance use disorders, or issues related to social determinants of health such as lack of transportation. Each patient's assigned team is led by the team member with the skill set most aligned with the patient's primary issue. Upward Health is currently active in a half dozen states and rapidly adding new markets.

Underlying care model chassis. Home-based longitudinal medical and social care.

Main goals. Increase access to care and quality of care for high-risk, high-cost individuals who otherwise would not be likely to be engaged in longitudinal care.

Target patient population. Upward Health targets high-risk patients, defined by a pattern of frequent use of health care services and multiple chronic conditions. They often support patients who are frail or have physical disabilities, intellectual and developmental disabilities, mental health needs, substance use disorders, and social determinants of health factors that negatively impact their ability to access high-quality care effectively and reliably. They work with payers who refer high-risk, high-cost patients, based on historical or forecast costs. This typically results in the top 2% to 3% of a Medicaid payer's population, 7% to 8% for Medicare, and 30% to 35% of people who are enrolled in both Medicaid and Medicare (dual-eligible enrollees) as their target populations.

Services provided. Care begins with a 30-day period of evidence-based assessments to determine physical, emotional, and practical needs. The team develops a comprehensive care plan and designates a "team lead" based on patient needs and strengths of team members. For example, EMTs are skilled at dealing with unpredictable triage situations and may be best suited to lead teams caring for people with significant mental health challenges. The program leverages a team of Care Specialists — comprising a variety of backgrounds, including RNs, SWs, EMTs, MAs, PSSs, and CHWs — who do the majority of the actual home visits. While physicians and advanced practice providers do conduct in-person, in-home visits, the care model also leverages video visits with physicians or advanced practice providers, with in-person assistance from other team members. Other services include medication review and reconciliation by a pharmacist for patients with a new diagnosis, round-the-clock on-call access to an RN or EMT, and an engaged model of case management, including accompanying patients to appointments or helping them get adequate services when indicated. Upward Health provides care based on need, not predefined timelines; as patient risk decreases, services are reduced.

Most important outcomes. The three main outcomes tracked are access to and quality of care, health care utilization, and cost. Quality is assessed through both Healthcare Effectiveness Data and Information Set (HEDIS) measures and annual patient satisfaction surveys.

Technology. Upward Health uses virtual visits to bring providers into the home. Care Specialists visit patients in their home in person, and bring all of the technology required to facilitate a virtual care video visit (the patient does not need to have internet access). These Care Specialists stay in the home during the video visits with the provider and assist with the use of diagnostic devices when relevant — for example, digital blood pressure cuffs, thermometers, and stethoscopes.

Reimbursement/payment model. Upward Health engages in both shared savings and shared risk models with payers based on annual total medical expenditures and performance on quality metrics. They can bundle services under a per-member per-month payment model, or can work on a fee-for-service basis.

Looking Ahead: An Integrated Home- and Community-Based Health Care Ecosystem

As noted in Tables 1 and 2, there is a strong evidence base for system- and patient-level benefits of a variety of home-based medical care models. These models were each originally designed to address a specific gap in care, and most have been rigorously evaluated in clinical trials to understand their efficacy and effectiveness.

This diverse array of models has strong potential to converge to form a full-fledged home- and community-based service delivery ecosystem that spans medical and social services, primary to hospital-level care, and pre-acute to post-acute care in the home. Together, these models could provide a comprehensive home-based delivery system for people whose needs are not well met by the status quo.

As demonstrated in the three case studies, core components of many home-based care models can be aggregated and tailored to meet the needs of specific populations. Populations with high levels of medical morbidity may benefit more from paramedicine-based urgent care capabilities and remote monitoring. Other populations with high behavioral and social needs may benefit from more emphasis on behavioral health expertise, social work services to identify and align resources, and community health workers to engage patients in needed care. This creative aggregation and recombining of core components of home-based care based on population-based concerns requires both a strong analytics infrastructure to identify and monitor concerns and a workforce with the appropriate skills to address patient and care partner needs.

The development of an integrated home-based medical care continuum would leverage (1) the continued diffusion of value-based care and value-based payment models and mechanisms throughout the US health care delivery system; (2) the increasing numbers of health systems and health system leaders who understand the potential of home-based medical care to provide high-quality care for our most complex, vulnerable, and costly patients; (3) advances in portable and home-based technology, including remote patient monitoring and other forms of telemedicine such as video visits; and (4) development and maturation of home-based medical care logistics and supply chains.

Among the many reveals of the COVID-19 pandemic is the vulnerability of a health care system that tethers nearly all care delivery to facilities such as ambulatory clinics, hospitals, skilled nursing facilities, assisted living facilities, and nursing homes. The need for flexible, responsive care delivery models has never been more apparent. These models of home-based medical care provide essential tools to create a new way of delivering care that is patient-centered and high-quality, and meets the needs of the current and future health care economy.

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