Physician-Focused Payment Model Technical Advisory Committee
LOI: Environmental Scan & Relevant Literature

Icahn School of Medicine at Mount Sinai (ISMMS)
Letter Dated: 2/16/2017
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The Icahn School of Medicine propose a 30-day care and payment bundle called the "HaH-Plus" (Hospital at Home Plus) Provider Focused Payment Model. This bundle is initiated with the acute care episode and continues through a total of 30 days with services to complete recovery and to ensure safe transition to the beneficiary's primary care clinician.

HaH-Plus will transform the clinical and financial model for physicians and other professionals providing care for individuals with selected acute illnesses by offering acute hospital-level care in a patient's home, instead of the hospital. Providing acute hospital-level care in a patient's home for carefully selected patients via HaH has been shown in multiple randomized controlled trials and systematic reviews to improve patient safety, reduce mortality, enhance quality, increase efficiency, reduce variations in practice, and reduce the costs of providing acute care for medical illness to Medicare beneficiaries.

The core HaH-Plus team includes a) physician and nurse practitioner services in the home and 24/7 coverage; b) registered nurse services in the home; c) social work/care coordination/transitional care services during and after the acute care episode; d) community paramedics for urgent assessments in the home; e) physician therapy, occupational therapy and speech therapy as needed to preserve functional status; f) home health aids for activities of daily living support; and g) administrative support and program oversight. ISMMS estimates that approximately 7,000 physicians could be involved full time; this number is even higher if physicians are involved part time in this initiative.

Key Search Terms

Mount Sinai Health System; Mobile Acute Care Team; CMS Mobile Acute Care Team; Hospital at Home Trial; Johns Hopkins Hospital at Home; Hospital at Home Programs; Hospital at Home Trial; Hospital at Home Acute Care; COPD Hospital at Home; HF Hospital at Home

Research Task	Section	Contents
Environmental Scan	Section 1	Key documents, timely reports, grey literature, and other materials gathered from internet searches (5).
Relevant Literature	Section 2	Relevant literature materials (7).
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Section 1. Environmental Scan

Environmental Scan		
Key words: Mount Sinai Health System; Mobile Acute Care Team; CMS Mobile Acute Care Team; Hospital at Home Programs; Hospital at Home Trial; Johns Hopkins Hospital at Home		
Organization	**Title**	**Date**
Mount Sinai Health System	About the Mount Sinai Visiting Doctors Program: Patient Services	3/6/2017
Purpose/Abstract		
Background: Since 1995, the Mount Sinai Visiting Doctors Program has been fulfilling the need to provide quality, compassionate health care to frail, elderly, or ailing adults who are unable to leave their homes. Today, serving as both a health care service and a teaching platform, Mount Sinai Visiting Doctors Program stands as a flagship clinical initiative—the largest academic home-visit program in the nation. ***Summary:*** The Mobile Acute Care Team (MACT) provides health care through a joint collaboration between physicians primarily from the Mount Sinai Visiting Doctors Program. This website provides a brief description about the Mount Sinai Visiting Doctors Program and the patient services provided.		
Additional Notes/Comments		

Environmental Scan

Key words: Mount Sinai Health System; Mobile Acute Care Team; CMS Mobile Acute Care Team; Hospital at Home Programs; Hospital at Home Trial; Johns Hopkins Hospital at Home

Organization	Title	Date
Mathematica Policy Research	Evaluation of the Round Two Health Care Innovation Awards (HCIA R2): First Annual Report	8/1/2016

Purpose/Abstract

Background: On September 1, 2014, the Center for Medicare & Medicaid Innovation (CMMI) in the Centers for Medicare & Medicaid Services (CMS) awarded the second round of cooperative agreements, known as Round Two of the Health Care Innovation Awards (HCIA R2). Thirty-nine organizations were awarded three-year cooperative agreements to implement their proposed innovative models for improving the quality of both care and health, and for lowering the cost of care for Medicare, Medicaid, and Children's Health Insurance Program (CHIP) beneficiaries. Mathematica Policy Research evaluated the extent to which awardees have been successful in implementing their programs and in accomplishing these goals.

Summary: The report presents the findings for each of the 39 awardee programs individually. Please find an evaluation of the Mount Sinai Health System's Mobile Acute Care Team (MACT) program in appendix B.18 of the report. Included in this appendix is a general description of the MACT program, findings from qualitative analyses, implementation effectiveness, implementation challenges and the strategies developed to address those challenges, awardee level decision making towards program-related changes, and the extent to which the awardee has begun to plan/implement payment reforms.

Additional Notes/Comments

For a brief summary of the MACT program, please follow this link to CMS' site: https://innovation.cms.gov/initiatives/Participant/Health-Care-Innovation-Awards-Round-Two/Icahn-School-Of-Medicine-At-Mount-Sinai.html

Environmental Scan

Key words: Mount Sinai Health System; Mobile Acute Care Team; CMS Mobile Acute Care Team; Hospital at Home Programs; Hospital at Home Trial; Johns Hopkins Hospital at Home

Organization	Title	Date
Mount Sinai: Brookdale Department of Geriatrics and Palliative Medicine	Chair's report: Building the Hospital of the Future	Fall 2016

Purpose/Abstract

Background: In 2014, Mount Sinai received a $9.6 million Health Care Innovation Award from the Centers for Medicare & Medicaid Services (CMS) for their three-year Mobile Acute Care Team (MACT) program. Since the award the MACT Service has been caring for Medicare patients at home who would otherwise be admitted to the hospital for conditions like chronic obstructive pulmonary disease (COPD), congestive heart failure, community acquired pneumonia, and diabetes.
Summary: This report provides a brief update on the MACT program's performance. The program's initial success in treating select hospital conditions has led to expanding care beyond hospital at home. The additional care options include observation at home, palliative care at home, "hospital averse" at home, sub-acute care at home, and "MACT at Night", which allows patient admission after hours. Since its beginning in 2014, the MACT program has shown reductions in average length of stay and readmission rates compared to those patients not participating in the program.

Additional Notes/Comments

Environmental Scan

Key words: Mount Sinai Health System; Mobile Acute Care Team; CMS Mobile Acute Care Team; Hospital at Home Programs; Hospital at Home Trial; Johns Hopkins Hospital at Home

Organization	Title	Date
Harvard Business Review	A Vision for "Hospital at Home" Programs	12/21/2015

Purpose/Abstract

Background: Bruce Leff, MD, the author of this article, is one of the originators of John Hopkin's Hospital at Home (HaH) Program and spear headed an early pilot study of HaH in 1997.
Summary: In this article, Dr. Leff explains how HaH works, the various research and initiatives surrounding HaH, and the obstacles and opportunities facing future implementation of HaH. In general, a candidate for HaH is usually identified in the emergency department (ED) where a physician determines that the patient requires hospital admission; thus, making the individual eligible for HaH. The physician will then evaluate the patient and mobilize the necessary HaH services before transferred to their home. Over the course of a few days, nurses and the physician will visit the patient until deemed fit for discharge. Since the earliest pilot study of HaH in 1997, the aforementioned process has been one of the most studied innovations in health care. There are obstacles to implementing HaHs, the greatest one being the lack of payment mechanism in fee-for-service Medicare; however, if supported by systems that have visionary leaders and the will to align the hospital, the providers (including ED personnel), and the payer, HaH can prove to be a successful alternative to hospital care.

Additional Notes/Comments

For more information on Dr. Leff's Hospital at Home at Johns Hopkins, please use the following link to their website: http://www.hospitalathome.org/

Environmental Scan

Key words: Mount Sinai Health System; Mobile Acute Care Team; CMS Mobile Acute Care Team; Hospital at Home Programs; Hospital at Home Trial; Johns Hopkins Hospital at Home

Organization	Title	Date
Health Affairs	Costs For 'Hospital At Home' Patients Were 19 Percent Lower, With Equal Or Better Outcomes Compared To Similar Inpatients	6/1/2012

Purpose/Abstract

Background: In 2008, Albuquerque, New Mexico-based Presbyterian Healthcare Services adapted the Hospital at Home® model developed by the Johns Hopkins University Schools of Medicine and Public Health to provide acute hospital-level care within patients' homes. The program expanded its coverage in November 2010 to include commercial health-plan members through a bundled-payment rate reimbursing for the total care provided.

Summary: This article summarizes the results of Presbyterian Healthcare Services' adaption of Hospital at Home covering topics such as the designated program population, program components, program results, and implementation considerations. The program has shown patients with comparable or better clinical outcomes compared with similar inpatients, and they show higher satisfaction levels. Available to Medicare Advantage and Medicaid patients with common acute care diagnoses, this program achieved savings of 19 percent over costs for similar inpatients. These savings were predominantly derived from lower average length-of-stay and use of fewer lab and diagnostic tests.

Additional Notes/Comments

Section 2. Relevant Literature

Relevant Literature		
Key words: Mobile Acute Care Team; Hospital at Home Programs; Hospital at Home Trial; Johns Hopkins Hospital at Home; Hospital at Home Acute Care; COPD Hospital at Home; HF Hospital at Home		
Journal	**Title**	**Date**
The Cochrane Database of Systematic Reviews	Admission avoidance hospital at home (Review)	9/1/2016

Purpose/Abstract

Objective: To determine the effectiveness and cost of managing patients with admission avoidance hospital at home compared with inpatient hospital care. This is the third update of the original review.
Methods and Analysis: Authors searched the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, EMBASE, two other databases, and two trials registers on 2 March 2016. The authors checked the reference lists of eligible articles and sought unpublished studies by contacting providers and researchers who were known to be involved in the field. Randomized controlled trials recruiting participants aged 18 years and over. Studies comparing admission avoidance hospital at home with acute hospital inpatient care. The authors performed meta-analysis for trials that compared similar interventions and reported comparable outcomes with sufficient data, requested individual patient data from trialists, and relied on published data when this was not available. The GRADE approach was used to assess the certainty of the body of evidence for the most important outcomes.
Results: Research included 16 randomized controlled trials with a total of 1,814 participants; three trials recruited participants with chronic obstructive pulmonary disease, two trials recruited participants recovering from a stroke, six trials recruited participants with an acute medical condition who were mainly elderly, and the remaining trials recruited participants with a mix of conditions. The authors assessed the majority of the included studies as at low risk of selection, detection, and attrition bias, and unclear for selective reporting and performance bias. Admission avoidance hospital at home probably makes little or no difference on mortality at six months' follow-up (risk ratio (RR) 0.77, 95% confidence interval (CI) 0.60 to 0.99; P = 0.04; I2 = 0%; 912 participants; moderate-certainty evidence), little or no difference on the likelihood of being transferred (or readmitted) to hospital (RR 0.98, 95% CI 0.77 to 1.23; P = 0.84; I2 = 28%; 834 participants; moderate-certainty evidence), and may reduce the likelihood of living in residential care at six months' follow-up (RR 0.35, 95% CI 0.22 to 0.57; P < 0.0001; I2 = 78%; 727 participants; low-certainty evidence). Satisfaction with healthcare received may be improved with admission avoidance hospital at home (646 participants, low-certainty evidence); few studies reported the effect on caregivers. When the costs of informal care were excluded, admission avoidance hospital at home may be less expensive than admission to an acute hospital ward (287 participants, low-certainty evidence); there was variation in the reduction of hospital length of stay, estimates ranged from a mean difference of -8.09 days (95% CI -14.34 to -1.85) in a trial recruiting older people with varied health problems, to a mean increase of 15.90 days (95% CI 8.10 to 23.70) in a study that recruited patients recovering from a stroke.
Conclusions: Admission avoidance hospital at home, with the option of transfer to hospital, may provide an effective alternative to inpatient care for a select group of elderly patients requiring hospital admission. However, the evidence is limited by the small randomized controlled trials included in the review, which adds a degree of imprecision to the results for the main outcomes.

Additional Notes/Comments

Relevant Literature

Key words: Mobile Acute Care Team; Hospital at Home Programs; Hospital at Home Trial; Johns Hopkins Hospital at Home; Hospital at Home Acute Care; COPD Hospital at Home; HF Hospital at Home

Journal	Title	Date
Public Library of Science (PLoS) One	Efficacy of Hospital at Home in Patients with Heart Failure: A Systematic Review and Meta-Analysis	6/8/2015

Purpose/Abstract

Background: Heart failure (HF) is the commonest cause of hospitalization in older adults. Compared to routine hospitalization (RH), hospital at home (HaH)—substitutive hospital-level care in the patient's home—improves outcomes and reduces costs in patients with general medical conditions. The efficacy of HaH in HF is unknown.

Methods and Results: The authors searched MEDLINE, Embase, CINAHL, and CENTRAL, for publications from January 1990 to October 2014. Research included prospective studies comparing substitutive models of hospitalization to RH in HF. At least 2 reviewers independently selected studies, abstracted data, and assessed quality. Authors meta-analyzed results from 3 RCTs (n = 203) and narratively synthesized results from 3 observational studies (n = 329). Study quality was modest. In RCTs, HaH increased time to first readmission (mean difference (MD) 14.13 days [95% CI 10.36 to 17.91]), and improved health-related quality of life (HrQOL) at both, 6 months (standardized MD (SMD) -0.31 [-0.45 to -0.18]) and 12 months (SMD -0.17 [-0.31 to -0.02]). In RCTs, HaH demonstrated a trend to decreased readmissions (risk ratio (RR) 0.68 [0.42 to 1.09]), and had no effect on all-cause mortality (RR 0.94 [0.67 to 1.32]). HaH decreased costs of index hospitalization in all RCTs. HaH reduced readmissions and emergency department visits per patient in all 3 observational studies.

Conclusions: In the context of a limited number of modest-quality studies, HaH appears to increase time to readmission, reduce index costs, and improve HrQOL among patients requiring hospital-level care for HF. Larger RCTs are necessary to assess the effect of HaH on readmissions, mortality, and long-term costs.

Additional Notes/Comments

Relevant Literature

Key words: Mobile Acute Care Team; Hospital at Home Programs; Hospital at Home Trial; Johns Hopkins Hospital at Home; Hospital at Home Acute Care; COPD Hospital at Home; HF Hospital at Home

Journal	Title	Date
Journal of Chronic Obstructive Pulmonary Disease	Early Supported Discharge/Hospital At Home For Acute Exacerbation of Chronic Obstructive Pulmonary Disease: A Review and Meta-Analysis	3/28/2015

Purpose/Abstract

Introduction: A systematic review and meta-analysis was performed to assess the safety, efficacy and cost of Early Supported Discharge (ESD) and Hospital at Home (HAH) compared to Usual Care (UC) for patients with acute exacerbation of COPD (AECOPD). The structure of ESD/HAH schemes was reviewed, and analyses performed assuming return to hospital during the acute period (prior to discharge from home treatment) was, and was not, considered a readmission.
Search Strategy: The pre-defined search strategy completed in November 2014 included electronic databases (Medline, Embase, Amed, BNI, Cinahl and HMIC), libraries, current trials registers, national organizations, key respiratory journals, key author contact and grey literature. Randomized controlled trials (RCTs) comparing ESD/HAH to UC in patients admitted with AECOPD, or attending the emergency department and triaged for admission, were included.
Results: Outcome measures were mortality, all-cause readmissions to 6 months and cost. Eight RCTs were identified; seven reported mortality and readmissions. The structure of ESD/HAH schemes, particularly selection criteria applied and level of support provided, varied considerably. Compared to UC, ESD/HAH showed a trend towards lower mortality (RRMH = 0.66; 95% CI 0.40–1.09, p = 0.10). If return to hospital during the acute period was not considered a readmission, ESD/HAH was associated with fewer readmissions (RRMH = 0.74, 95% CI: 0.60–0.90, p = 0.003), but if considered a readmission, the benefit was lost (RRMH = 0.84; 95% CI 0.69–1.01, p = 0.07).
Conclusions: Costs were lower for ESD/HAH than UC. ESD/HAH is safe in selected patients with an AECOPD. Further research is required to define optimal criteria to guide patient selection and models of care.

Additional Notes/Comments

Relevant Literature

Key words: Mobile Acute Care Team; Hospital at Home Programs; Hospital at Home Trial; Johns Hopkins Hospital at Home; Hospital at Home Acute Care; COPD Hospital at Home; HF Hospital at Home

Journal	Title	Date
Journal of the American Medical Association (JAMA) Internal Medicine	Evaluation of a Mobile Acute Care for the Elderly Service	6/10/2013

Purpose/Abstract

Background: Older adults are particularly vulnerable to adverse events during hospitalization. The Mobile Acute Care of the Elderly (MACE) service is a novel model of care designed to deliver specialized interdisciplinary care to hospitalized older adults in order to improve patient outcomes.
Methods: To evaluate the impact of the MACE service, authors conducted a prospective, matched cohort study of patients aged 75 years or older admitted to a tertiary hospital for an acute illness to either the MACE service or medicine service (usual care). Patients were matched using age, diagnosis, and ability to ambulate independently. Patient outcomes included incidence of adverse events including falls, pressure ulcers, restraint use and catheter-associated urinary tract infections, length of stay (LOS), rehospitalization within 30 days, functional status at 30 days, and patient satisfaction during care transitions, measured using the 3-item Care Transition Measure (CTM).
Results: A total of 173 matched-pairs of patients were recruited. Average age was 85.2 (Standard Deviation [SD] 5.3) and 84.7 (SD 5.4) among MACE and usual care patients respectively. After adjusting for potential confounders, patients managed by the MACE service were less likely to experience adverse events (9.5% vs. 17.0%; Adjusted Odds Ratio [OR]: 0.11, 95% Confidence Interval [CI], 0.01-0.88; p=0.04) and had a shorter LOS (0.8 days, 95% CI, 0.7-0.9; p=0.001) when compared with patients receiving usual care. MACE patients were not less likely to have a lower rate of rehospitalization within 30 days when compared with usual care patients (OR 0.91, 95% CI, 0.39-2.10; p=0.83). Functional status was not different between the two groups. CTM-scores were 7.4 points (95% CI, 2.9-11.9; p=0.001) higher among MACE patients.
Conclusion: Admission to the MACE service was associated with lower complication rates, shorter LOS, and better satisfaction. This model has the potential to improve care outcomes among hospitalized older adults.

Additional Notes/Comments

Relevant Literature

Key words: Mobile Acute Care Team; Hospital at Home Programs; Hospital at Home Trial; Johns Hopkins Hospital at Home; Hospital at Home Acute Care; COPD Hospital at Home; HF Hospital at Home

Journal	Title	Date
Journal of the American Geriatrics Society	Comparison of Functional Outcomes Associated with Hospital at Home Care and Traditional Acute Hospital Care	12/11/2009

Purpose/Abstract

Objectives: To compare differences in the functional outcomes experienced by patients cared for in Hospital at Home (HaH) and traditional acute hospital care.
Design: Survey questionnaire of participants in a prospective nonrandomized clinical trial.
Setting: Three Medicare managed care health systems and a Veterans Affairs Medical Center.
Participants: Two hundred fourteen community-dwelling elderly patients who required acute hospital admission for community-acquired pneumonia, exacerbations of chronic heart failure or chronic obstructive pulmonary disease, or cellulitis, 84 of whom were treated in HaH and 130 in an acute care hospital.
Intervention: Treatment in a HaH care model that substitutes for care provided in the traditional acute care hospital.
Measurements: Change in activity of daily living (ADL) and instrumental activity of daily living (IADL) scores from 1 month before admission to 2 weeks post admission to HaH or acute hospital and the proportion of groups that experienced improvement, no change, or decline in ADL and IADL scores.
Results: Patients treated in HaH experienced modest improvements in performance scores, whereas those treated in the acute care hospital declined (ADL, 0.39 vs −0.60, P=.10, range −12.0 to 7.0; IADL 0.74 vs −0.70, P=.007, range −5.0 to 10.0); a greater proportion of HaH patients improved in function and smaller proportions declined or had no change in ADLs (44% vs 25%, P=.10) or IADLs (46% vs 17%, P=.04).
Conclusion: HaH care is associated with modestly better improvements in IADL status and trends toward more improvement in ADL status than traditional acute hospital care.

Additional Notes/Comments

Relevant Literature

Key words: Mobile Acute Care Team; Hospital at Home Programs; Hospital at Home Trial; Johns Hopkins Hospital at Home; Hospital at Home Acute Care; COPD Hospital at Home; HF Hospital at Home

Journal	Title	Date
Medical Care	Health Care Provider Evaluation of a Substitutive Model of Hospital at Home	9/1/2009

Purpose/Abstract

Objective: To evaluate Hospital at Home (HaH), a substitute for inpatient care, from the perspectives of participating providers.
Research Design: Multivariate general estimating equations regression analyses of a patient-specific survey of providers delivering HaH care in a prospective, nonrandomized clinical trial.
Subjects: Eleven physicians and 26 nurses employed in 3 Medicare-Advantage plans and 1 Veterans Administration medical center.
Measure: Problems with care; benefits; problem-free index.
Results: Case response rates were 95% and 82% for physicians and nurses, respectively. The overall problem-free index was high (mean 4.4, median 5, scale 1-5). "Major" problems were cited for 14 of 84 patients (17%), most relating to logistic issues without adverse patient outcomes. Positive effects included quicker patient functional recovery, greater opportunities for patient teaching, and increased communication with family caregivers. In multivariate analysis, the problem-free index was lower for nurses compared with physicians in one site; for patients with cellulitis; and for patients with a higher acuity (APACHE II) score. HaH physicians and nurses differed in their judgments of hours of continuous nursing required by patients.
Conclusions: The health care provider evaluation of substitutive HaH care was positive, providing support for the viability of this innovative model of care. Without provider support, no new model of care will survive. These findings also provide insight into areas to attend to in implementation. Organizations considering adoption of the HaH should monitor provider views to promote quality improvement in HaH.

Additional Notes/Comments

Relevant Literature

Key words: Mobile Acute Care Team; Hospital at Home Programs; Hospital at Home Trial; Johns Hopkins Hospital at Home; Hospital at Home Acute Care; COPD Hospital at Home; HF Hospital at Home

Journal	Title	Date
Annals of Internal Medicine	Hospital at home: feasibility and outcomes of a program to provide hospital-level care at home for acutely ill older patients.	12/6/2005

Purpose/Abstract

Background: Acutely ill older persons often experience adverse events when cared for in the acute care hospital.
Objective: To assess the clinical feasibility and efficacy of providing acute hospital-level care in a patient's home in a hospital at home.
Design: Prospective quasi-experiment.
Setting: 3 Medicare-managed care (Medicare + Choice) health systems at 2 sites and a Veterans Administration medical center.
Participants: 455 community-dwelling elderly patients who required admission to an acute care hospital for community-acquired pneumonia, exacerbation of chronic heart failure, exacerbation of chronic obstructive pulmonary disease, or cellulitis.
Intervention: Treatment in a hospital-at-home model of care that substitutes for treatment in an acute care hospital. Performance is assessed using clinical process measures, standards of care, clinical complications, satisfaction with care, functional status, and care costs.
Results: Hospital-at-home care was feasible and efficacious in delivering hospital-level care to patients at home. In 2 of 3 sites studied, 69% of patients who were offered hospital-at-home care chose it over acute hospital care; in the third site, 29% of patients chose hospital-at-home care. Although less procedurally oriented than acute hospital care, hospital-at-home care met quality standards at rates similar to those of acute hospital care. On an intention-to-treat basis, patients treated in hospital-at-home had a shorter length of stay (3.2 vs. 4.9 days) ($P = 0.004$), and there was some evidence that they also had fewer complications. The mean cost was lower for hospital-at-home care than for acute hospital care (5081 dollars vs. 7480 dollars) ($P < 0.001$).
Limitations: Possible selection bias because of the quasi-experimental design and missing data, modest sample size, and study site differences.
Conclusions: The hospital-at-home care model is feasible, safe, and efficacious for certain older patients with selected acute medical illnesses who require acute hospital-level care.

Additional Notes/Comments

Section 3. Related Literature

Related Literature		
Key words: Mobile Acute Care Team; Hospital at Home Programs; Hospital at Home Trial; Johns Hopkins Hospital at Home; Hospital at Home Acute Care; COPD Hospital at Home; HF Hospital at Home		
Journal	**Title**	**Date**
Journal of the American Medical Association (JAMA) Internal Medicine	Alternative Strategies to Inpatient Hospitalization for Acute Medical Conditions: A Systematic Review.	11/1/2016
Purpose/Abstract		
Importance: Determining innovative approaches that better align health needs to the appropriate setting of care remains a key priority for the transformation of US health care; however, to our knowledge, no comprehensive assessment exists of alternative management strategies to hospital admission for acute medical conditions. ***Objective:*** To examine the effectiveness, safety, and cost of managing acute medical conditions in settings outside of a hospital inpatient unit. ***Evidence Review:*** MEDLINE, Scopus, CINAHL, and the Cochrane Database of Systematic Reviews (January 1995 to February 2016) were searched for English-language systematic reviews that evaluated alternative management strategies to hospital admission. Two investigators extracted data independently on trial design, eligibility criteria, clinical outcomes, patient experience, and health care costs. The quality of each review was assessed using the revised AMSTAR tool (R-AMSTAR) and the strength of evidence from primary studies was graded according to the Oxford Centre for Evidence-Based Medicine. ***Findings:*** Twenty-five systematic reviews (representing 123 primary studies) met inclusion criteria. For outpatient management strategies, several acute medical conditions had no significant difference in mortality, disease-specific outcomes, or patient satisfaction compared with inpatient admission. For quick diagnostic units, the evidence was more limited but did demonstrate low mortality rates and high patient satisfaction. For hospital-at-home, a variety of acute medical conditions had mortality rates, disease-specific outcomes, and patient and caregiver satisfaction that were either improved or no different compared with inpatient admission. For observation units, several acute medical conditions were found to have no difference in mortality, a decreased length of stay, and improved patient satisfaction compared to inpatient admission; results for some conditions were more limited. Across all alternative management strategies, cost data were heterogeneous but showed near-universal savings when assessed. ***Conclusions and Relevance:*** For low-risk patients with a range of acute medical conditions, evidence suggests that alternative management strategies to inpatient care can achieve comparable clinical outcomes and patient satisfaction at lower costs. Further study and application of such opportunities for health system redesign is warranted.		
Additional Notes/Comments		

Related Literature

Key words: Mobile Acute Care Team; Hospital at Home Programs; Hospital at Home Trial; Johns Hopkins Hospital at Home; Hospital at Home Acute Care; COPD Hospital at Home; HF Hospital at Home

Journal	Title	Date
Journal of Hospital Medicine	So many options, where do we start? An overview of the care transitions literature	11/9/2015

Purpose/Abstract

Background: Health systems are faced with a large array of transitional care interventions and patient populations to whom such activities might apply.
Purpose: To summarize the health and utilization effects of transitional care interventions, and to identify common themes about intervention types, patient populations, or settings that modify these effects.
Data Sources: PubMed and Cochrane Database of Systematic Reviews (January 1950–May 2014), reference lists, and technical advisors.
Study Selection: Systematic reviews of transitional care interventions that reported hospital readmission as an outcome.
Data Extraction: Authors extracted transitional care procedures, patient populations, settings, readmissions, and health outcomes. Authors identified commonalities and compiled a narrative synthesis of emerging themes.
Data Synthesis: Among 10 reviews of mixed patient populations, there was consistent evidence that enhanced discharge planning and hospital-at-home interventions reduced readmissions. Among 7 reviews in specific patient populations, transitional care interventions reduced readmission in patients with congestive heart failure and general medical populations. In general, interventions that reduced readmission addressed multiple aspects of the care transition, extended beyond hospital stay, and had the flexibility to accommodate individual patient needs. There was insufficient evidence on how caregiver involvement, transition to sites other than home, staffing, patient selection practices, or care settings modified intervention effects.
Conclusions: Successful interventions are comprehensive, extend beyond hospital stay, and have the flexibility to respond to individual patient needs. The strength of evidence should be considered low because of heterogeneity in the interventions studied, patient populations, clinical settings, and implementation strategies**.**

Additional Notes/Comments

Overview of the Milliman Care Guidelines and McKesson InterQual Criteria

Prepared for the Hospital at Home Plus (HaH-Plus) Provider-Focused Payment Model Preliminary Review Team (PRT)

Background

The Hospital at Home Plus (HaH-Plus) payment model, proposed to the Physician-Focused Payment Model Technical Advisory Committee (PTAC) by the Icahn School of Medicine at Mount Sinai, proposed medical necessity review:

> *"…we propose review of all cases for need for hospitalization to guard against providing HaH services beyond what might be medically necessary. In our CMMI project, all cases have undergone independent review and met Milliman criteria for hospitalization…" (p. 10)*

To assist in evaluating the proposal and, specifically, the approach for determining necessity for inpatient admission, members of the HaH-Plus PRT requested Social & Scientific Systems, Inc. (SSS) to conduct a review of the literature to gather more detailed information on the Milliman criteria referenced in the HaH-Plus proposal.

Specifically, SSS was asked to:

(1) Gather information on hospital admission appropriateness tools, including the Milliman Criteria and InterQual Criteria

(2) Determine the differences in the Milliman Criteria and InterQual Criteria

(3) Provide information on how each of these tools is currently being used

(4) Identify the strengths and weakness of these tools

This environmental scan was prepared in response to the PRT's information request, identified above. Documents identified as part of the environmental scan included both peer-reviewed and grey literature.[i] Much of the information describing the systems was gathered from vendor marketing and sales materials (i.e. system websites), as a review of the literature yielded few relevant peer-review articles, with only a small number referencing either the Milliman Care Guidelines or the McKesson

[i] The literature review was conducted using PubMed. Search terms include combinations of the following:

- Milliman guidelines
- Milliman Care Guidelines
- Milliman & Robertson guidelines
- M&R
- MCG
- InterQual
- McKesson InterQual
- Clinical practice guidelines
- Medical appropriateness
- Validity
- Appropriateness
- Criteria

Given the limited number of articles and documents available, no time frame was imposed for this search.

InterQual Criteria systems as tools for assessing medical necessity or appropriateness of hospitalization. The majority of resources identified in the review focused on the use of these tools to help guide clinical decision-making. Given the limited information available in peer-reviewed articles coupled with the proprietary nature of both the Milliman and InterQual systems, identifying the strengths and weaknesses of both the Milliman Care Guidelines (MGC) and InterQual Criteria served challenging. However, publicly available documents and resources identified what entities and how the Milliman and InterQual systems are being used.

Milliman Care Guidelines and McKesson InterQual Criteria Guidelines Appropriateness

Milliman Care Guidelines, now known as MCG,[ii] and McKesson InterQual Criteria (InterQual Criteria) guidelines are both commercially available assessment tools that are used by hospitals, health systems, Medicare fiscal intermediaries, and other organizations.

These tools include evidence-based clinical guidelines that cover the entire continuum of care, as outlined below:[iii]

MCG	InterQual Criteria
• Clinical indications for admission • Goal or reasonable length of stay • Description of optimal care and patient status (e.g., level of care, clinical status, interventions, and medications) • Current best evidence, including evidence summaries, references, and footnotes • Description of conditions and clinical situations for which a hospital stay may exceed the goal length of stay (GLOS), including estimates of the duration of those extended stays • Readmission risk factors, risk reduction guidance, and risk screening tools	• Appropriateness of care decision support • Level of care criteria • Planning criteria to identify when services are appropriate (e.g., imaging studies, procedures, medications and specialty referral) • CMS content to support consistent application of third-party content • Coordinated care content to generate a patient-specific care plan for complex cases and high-risk members with a patented blended assessment

Literature reviews confirmed that such tools are utilized in assessment of 'appropriate payment,' by documenting 'justification' of medical need for the admission, consistency in coding, facility resource allocation for time and intensity, and length of stay. In addition, these tools predict facility payments for levels of acute care within the interpretations of complex payment regulations for observation stays, the two-midnight rule, three-day payment windows, and readmissions.[1]

Revisions made to both MCG and InterQual Criteria guidelines occur on an annual basis. The development of such tools was completed by actuarial and data consulting firms, and were never

[ii] Milliman Care Guidelines was acquired by the Hearst Corporation in 2012 and is now referred to as Hearst MCG Guidelines. MCG have also previously been called Milliman & Robertson guidelines or M&R guidelines.
[iii] This table is not intended to be comprehensive but rather to provide a high-level overview of some MCG and InterQual Criteria components.

intended to replace physician oversight for clinical care. The algorithms for matching a patient's health status, with an expected estimate for facility resources in providing care, must include a physician assessment to correctly ascertain all of the professional and facility resources needed to stabilize and treat the patient when presented for acute care.[2] While both are updated annually, minor differences in their annual review and maintenance exist:

- MCG was initially developed by a team of actuaries and physicians, and are founded on evidence when available and expert opinion when not.[3] MCG was last updated in February 2017 with the release of the 21st edition of their care guidelines.
- InterQual Criteria are also updated via an assessment and review process performed by a panel of more than 750 board-certified clinical experts from various disciplines. Recently, clinical criteria updates have included significant changes in the addition of medical and behavioral health comorbidities. In addition to a panel of experts, InterQual Criteria includes the application of hundreds of Medicare National and Local Coverage Determinations. Inclusion of coverage determinations is purported to assist in reducing review times, supporting consistency, and streamlining the prior authorization process for Medicare patients undergoing inpatient or outpatient surgical procedures.[4]

Both InterQual Criteria and MCG include software and algorithms with a user interface so that facility staff can best utilize the guidelines when updating patient records to indicate health status, assess acuity, initiate a care plan and/or admission, and to support medical need for purposes of payment.

While the CMS Medicare Program Integrity Manual requires that contractor review staff use a screening tool as part of their medical review process for inpatient hospital claims, CMS has not issued any guidance to facilities on which specific tool may be used, and CMS officials have stated that these guidelines are not to be considered CMS-approved policy; rather, they are intended to be a tool for assistance and guidance in the review of medical documentation to determine if a hospital admission is medically necessary. Medicare has issued guidance on the use of such tools in the form of a checklist to Medicare Administrator Contractors (MACs) for assessing patient acuity and treatment options, which may be found in Chapter 6, Section 6.5.1, of the Medicare Program Integrity Manual and in the supporting Medicare Learning Network Article SE1037 In addition, CMS specifically states that:

> *"CMS does not require that the contractor use specific criteria nor endorse any particular brand of screening guidelines. CMS contractors are not required to pay a claim even if screening criteria indicate inpatient admission is appropriate. Conversely, CMS contractors are not required to automatically deny a claim that does not meet the admission guidelines of a screening tool. In all cases, in addition to screening instruments, the reviewer shall apply his/her own clinical judgment to make a medical review determination based on the documentation in the medical record."* [5]

Frequency of MCG and InterQual Use in Medicare Today

According to the MCG website[6], eight of the 10 largest U.S. health plans and more than 1,600 hospitals use MCG. In 2015, a press release[7] on the InterQual Criteria website indicated that more than 600 payers and providers utilize InterQual Criteria.

In December 2016[8], McKesson Health Solutions (MHS) announced that CMS, through a contractor, will continue the long-term use of InterQual Criteria for Medicare services auditing programs, continuing a 17-year relationship. The contract provides access across the spectrum of InterQual Criteria to help support quality oversight, utilization review, and appeals decisions.[iv] InterQual Criteria is delivered to CMS and its contractors through InterQual Anonymous Review[v], a hosted solution that lets users complete and save reviews without exposing personal protected health information (PHI).[9]

MCG has more than 25 years' experience working with Medicare and government contractors, such as Beneficiary and Family-Centered Care (BFCC)-Quality Improvement Organizations (QIOs).[10] The MCG website indicates utilization of the MCG Indicia among the following entities: MACs, Recovery Auditor/Audit Contractors (RACs), Beneficiary Family Care Contractors– Quality of Care Concerns–Quality Improvement Organizations (BFCC-QIOs), Quality Innovation Network (QIN)--QIOs, and External Quality Review Organizations (EQROs). MCG's Indicia software provides access to care guidelines to support reimbursement, care management, and care management goals, and integrates with electronic health record (EHR) systems.[11]

In addition, it appears that a few of the entities that develop clinical practice guidelines (CPGs) have utilized MCGs as a reference and/or adopted specific MCG guidelines, including Kaiser Permanente[12] and Magellan Complete Care guidelines.[13] Whereas CMS does not endorse such tools (i.e. MCG or InterQual Criteria), CMS recognizes that they may be important for facility staff in assessing patient acuity and in establishing medical need for an inpatient stay. Therefore, CMS has furnished guidance for MACs on how to perform Medicals reviews when such tools are used for demonstrating medical need and when services have been submitted for payment.

Strengths and Weaknesses of Each System

Given the limited availability of specific criteria for both proprietary systems, sufficient information was unavailable to determine the strengths and weaknesses of each system. It is important to further emphasize that CMS has not issued any guidance on such tools, that they have publicly stated that these tools/systems are intended to assist and guide facilities, and that clinical judgement should always be utilized.[14]

Few relevant peer-reviewed studies were identified in the search of the literature, and SSS found little evidence related to the accuracy of either MCG or InterQual Criteria for use in assessing 'clinically' appropriate inpatient admissions. The research that emerged during the Milliman search did not yield any studies completed in the last 16 years. The studies that emerged on InterQual Criteria were more

[iv] Medicare Fiscal Intermediaries, MACs, Quality Improvement Organizations (QIOs), Administrative Law Judges, and various CMS departments can use InterQual evidence-based clinical decision support to help better manage care in an industry transitioning to value-based purchasing models for care.

[v] Web–based reviews without specifying patient data, then transfer the results into another application.

recent, but focused solely on specific medical specialties such as pediatrics, behavioral health, and surgery.[vi] One study examined the validity of the InterQual Criteria guidelines as hospital admission appropriateness tools:

> Wang et al. (2013) examined the accuracy of InterQual Criteria in determining observation versus hospitalization need in chronic heart failure (CHF) patients. They reviewed data from 503 CHF patients from January 2009 to December 2010. Their results indicated that based on the initial review at the emergency departments, clinical variables from InterQual Criteria did not appear to help accurately predict the level of care in CHF patients in their patient population. However, the authors suggested that other clinical variables may need to be added in the criteria for better prediction.[15]

Availability of similar MCG and InterQual tools to determine admission appropriateness

There are several tools and CPGs available publicly, privately, domestically, and internationally. In the 2011 Institute of Medicine's (IOM's) *Clinical Practice Guidelines We Can Trust* report[16], the IOM indicated that the Agency for Healthcare Research and Quality's (AHRQ) National Guideline Clearinghouse (NGC) contains nearly 2,700 CPGs, and the Guidelines International Network's database lists more than 3,700 CPGs. However, the IOM 2011 report identified the MCG and InterQual Criteria guidelines as the two main purveyors of commercial guidelines, focusing on quality of care, efficient resource expenditure, and reduction in inappropriate care variations. Furthermore, the IOM report also states that there is limited public information about CPGs produced commercially.

IOM also notes that what differentiates MCG and InterQual Criteria from other publicly available CPGs is the use of software programs that integrate staff behavior and real-time management reports (i.e. integration in the EHR or EHR systems), usage reviews, workflow and resource controls, and decision tools devoted to quality improvement and cost efficiency. IOM also notes that both companies support research staff to continuously mine the literature and consultants to review and revise guidelines over time, to provide the most up-to-date expert advice and consensus on recommendations when evidence is lacking.[17]

The NGC is produced by AHRQ in partnership with the American Medical Association (AMA) and the American Association of Health Plans (AAFP) Foundation. The CPGs available in the AHRQ NGC are all publicly available and can be retrieved by submitting organization name, medical subject headings (MeSH) tag, or by clinical specialty at https://www.guideline.gov/. NGC provides guideline summaries for several clinical specialty areas including cardiology, emergency medicine, internal medicine, surgery, and others. These summaries include structured, standardized abstracts about relevant guidelines and their development. The NGC users and audience includes individual physicians and other clinicians, health care organizations and integrated delivery systems, medical specialty and professional societies, employers and larger purchasers, educational institutions, and state and local governments.

[vi] These articles were not included due to relevance.

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Hospital at Home and Independence at Home Comparison

Comparison of the Hospital at Home Model and the Independence at Home Models		
	Hospital at Home	**Independence at Home**
Beneficiary eligibility	Patients with selected conditions who would otherwise require hospital admission for conditions identified in emergency departments, observation units, ambulatory care, or at home. All cases are certified for need for hospitalization. Conditions include: Respiratory Infections, COPD, Simple Pneumonia, Pulmonary Embolism, Respiratory Signs & Symptoms, Pancreas Disorders, Bronchitis/Asthma, Heart failure & Shock, Peripheral Vascular Disorders, Pulmonary Edema, Major GI Disorders, Renal Failure, Cellulitis, Diabetes, Kidney & Urinary Tract Infections, Hypertension, Esophagitis, and Fever or Viral Illness.	To participate in IAH, beneficiaries must have: • Two or more chronic conditions; • Have coverage under the original fee-for-service Medicare; • Need assistance with two or more functional dependencies; • Have had a non-elective hospital admission in the prior 12 months; • Have received acute or subacute rehabilitation services in the prior 12 months. Beneficiaries are ineligible if they are covered under a Medicare Advantage plan, enrolled in the Program for All-Inclusive Care for the Elderly (PACE), reside in a long-term facility, or are admitted to a skilled nursing facility and not expected to return home when skilled nursing facility care ends. Beneficiaries who transition to hospice continue to be enrolled in the IAH model.
Provider and Care Delivery Requirements	Participating APM entities must be certified to participate in HaH-Plus. Certification could be performed along the lines of NCQA certification of patient-centered medical homes. Mount Sinai's Mobile Acute Care Team (MACT) Accreditation Checklist includes the following:[1] • Provide patient centered care – e.g., provide clinical services 7 days/week; respond to urgent calls 24 hours/day; deliver same-day service	Participating practices include primary care practices and other multidisciplinary teams that: • are led by physicians and nurse practitioners; • are organized for the purpose of providing physician services; • Have experience providing home based primary care to patients with multiple chronic conditions'; • Serve at least 200 eligible beneficiaries.

[1] See Appendix H (page 35) in the HaH-Plus PFPM proposal.

Comparison of the Hospital at Home Model and the Independence at Home Models		
	Hospital at Home	**Independence at Home**
Provider and Care Delivery Requirements	• Offer team-based coordinated care in the home • Provide continuity of care via medical records both in the home and at all times through an EHR • Use comprehensive health assessment and evidence-based decision support • Identify and coordinate care from all providers and community organizations • Use performance data to identify opportunities for improvement and acts to improve clinical quality, efficiency, and patient experience.	Multiple practices within a geographic region may form a consortium and practices with between 200-500 beneficiaries/year may become part of a national pool of providers and must establish a legal entity. CMS will treat legal entities as one IAH practice for the purposes of establishing expenditure targets, evaluating quality, and determining incentive payments. Providers participating in another Medicare Shared Savings program may not participate. Participating practices must also have: • Experience with providing home-based primary care to applicable beneficiaries; • Make in-home primary care visits; • Be available 24 hours a day, 7 days a week to carry out plans of care tailored to an individual patient's needs; • Uses electronic health records, remote monitoring, and mobile diagnostic technology; • Furnishes services to an average of 200 or more applicable beneficiaries during each year of the Demonstration; • Report information about their patients and the health care services provided; and • Report on required quality measures.
Team composition	The composition of a typical core HaH-Plus Team includes: • Physicians, who conduct initial admission visits, perform follow-up, supervise nurse practitioner visits, direct care • Nurse practitioners, who conduct follow-up and some post-acute visits	Home-based primary care teams are led by physicians or nurse practitioners. The practice must be a legal entity comprised of physicians or nurse practitioners, or a group of physicians or nurse practitioners that provide care as part of a team. Other team members may include physician assistants, clinical staff, and other health and social service staff.

Hospital at Home and Independence at Home Comparison

Comparison of the Hospital at Home Model and the Independence at Home Models		
	Hospital at Home	**Independence at Home**
	• Registered nurses, who perform initial patient visit, 1x-2x daily follow up, and clinical coordination • Social workers, who perform care coordination, transitional care management, education, patient/caregiver support, and discharge planning • Home health aides, placed with selected patients • Administrative support staff • Physical, occupational and speech therapists	
Length of episode	Acute period and 30 days following discharge from the acute period.	Patients remain in the program as long as they continue to have two or more chronic conditions and two or more functional impairments.
Payment methodology	HaH payment model consists of two components: (1) a DRG-like payment for acute, hospital-level care and the 30 day transition period; (2) a performance-based payment that is linked to Medicare spending for the entire episode and performance on quality metrics. Community paramedicine visits, professional fees, transportation home, and 30-day transition period – which are not typically covered by a DRG payment – are included in the bundled amount. The following services are outside the bundle and reimbursed on a fee-for-service basis: professional fees for inpatient consultations, post-acute radiology and lab services, post-acute skilled nursing, outpatient, and home	Providers receive standard Medicare fee-for-service reimbursement. A performance-based incentive is available for practices meeting financial and quality criteria after meeting a minimum savings requirement.

Comparison of the Hospital at Home Model and the Independence at Home Models		
	Hospital at Home	**Independence at Home**
	health services, post-acute emergency department services and readmissions.	
Benchmarking/Spending Targets	Benchmark is calculated based on CMS allowed costs for a weighted sample of the fee-for-service comparison population in the same region, admitted to the hospital with one of the selected conditions/DRGs and who meet other criteria (e.g., patient was in Medicare Advantage, had both Parts A and B).	Practice-specific, annual spending targets are calculated at the end of each performance year. Spending targets reflect the average fee-for-service cost in the beneficiary county of residence during a base period that is trended forward. This amount is adjusted for risk (HCC scores) and a frailty factor.
Shared Savings Approach & Incentive Payments	Total spending in HaH episodes will be compared annually to a benchmark, less a 3% discount. If the APM's spending is less than the benchmark the APM may be eligible to earn a performance based payment up to 100% of the difference between the benchmark and costs – up to a cap of 10% of the benchmark. If spending is worse, the APM may be liable up to 100% of losses – up to a cap of 10% of the benchmark. Each of 10 quality metrics are tied to 10% increments of savings and 5% increments of losses. Achieving all 10 quality targets entitles the APM to 100% of savings or to a liability of 50% of losses, up to the cap.	Savings are calculated as the difference between each practice's spending target and actual FFS costs. Each practice must meet a minimum savings rate to be eligible to share in savings. The size of the minimum savings varies – inversely – by practice size. To qualify for an incentive payment a practice must meet or exceed performance requirements on 3 of 6 quality measures. Practices that do not meet performance expectations on 3 measures are ineligible for an incentive payment. Practices that meet performance requirements on 3 or more measures receive an incentive payment amount that varies (from 50% to 100%) depending on the magnitude to which the practice exceeded the minimum savings rate.
Quality Measures	Quality measures (3 processes, 5 HCAHPS, 1 safety, and 1 for submission of functional outcomes) tied to incentive payments include: • Patients who have an advance care plan • Documentation of current medications in the medical record • Medication reconciliation post-discharge	Quality measures tied to incentive payments include the following: • Inpatient admissions for ambulatory care sensitive conditions • 30-day readmission • Emergency department visits for ambulatory care sensitive conditions • Contact with beneficiaries within 48 hours of admission and discharge from the hospital

Hospital at Home and Independence at Home Comparison

Comparison of the Hospital at Home Model and the Independence at Home Models		
	Hospital at Home	**Independence at Home**
	• Beneficiary experience of care (modified HCAHPS) • Rate of combined adverse events (falls and pressure sores) • Reporting of Inpatient Basic Mobility Short Form • Reporting of Inpatient Daily Activity Short Form	• Contact with beneficiaries within 48 hours of discharge from the emergency department • Medication reconciliation in the home • Documentation of patient preferences Other quality measures that are monitored, but not tied to incentive payments, include the following: • Identification of beneficiary/caregiver goals • Conduct of screenings and assessments (e.g., depression, home safety evaluation, risk of falling, cognitive deficits) • Medication management • Voluntary disenrollment • Referrals made to home health, hospice, community and social services • Patient satisfaction

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