Gaining Ground: Care Management Programs to Reduce Hospital Admissions and Readmissions Among Chronically Ill and Vulnerable Patients

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ABSTRACT: Preventable hospital admissions and readmissions are indicators of health system fragmentation associated with suboptimal patient outcomes and avoidable costs of care. Three case studies illustrate the potential of care management programs to address this problem by improving care coordination and transitions among high-risk patients. Study sites included two academic medical centers and a managed care organization owned by a home health agency. The sites employed bundles of interventions involving multidisciplinary teams to improve provider communication, patient and family education, care transitions from the hospital, and follow-up ambulatory care. Results include a lengthening in average time between hospital encounters among asthmatic children and relative reductions in 30-day readmission rates of 46 percent among elderly patients with heart failure and of 21 percent among dually eligible Medicare and Medicaid beneficiaries with special needs. Spreading such models will likely require supportive changes in payment policy or aligned incentives between payers and providers.

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INTRODUCTION

Fragmentation of health care services can adversely affect patients' care experiences and outcomes while increasing the costs of care.[1] Effective care coordination and transitions can help to integrate care and prevent the poor outcomes that give rise to avoidable hospital admissions and readmissions.[2] Almost one of five hospitalized Medicare beneficiaries are readmitted within 30 days; more than one-third are readmitted within 90 days.[3] Research suggests that a substantial proportion of readmissions can be prevented with evidence-based care in the hospital combined with comprehensive discharge planning, supportive transitions in care, and timely primary care. With reduced readmissions, experts estimate the nation can save $12 billion annually in the Medicare program alone.[4]

A hospital stay provides a critical opportunity to identify and interact with high-risk patients to prevent future hospitalizations. In a recent review of the literature on initiatives to reduce readmissions, almost two-thirds of the 43 interventions studied were conducted in geriatric populations or among high-risk patients suffering from conditions such as heart failure that are associated with high rates of readmissions.[5] However, the actual mechanisms of the interventions are not always well described in the literature. By examining innovative approaches that are meeting the challenge of keeping high-risk patients from being hospitalized or rehospitalized, this case study series can offer lessons to inform the effective design and spread of care management programs.

OVERVIEW OF THE INITIATIVES

We conducted case studies of three organizations that implemented initiatives aimed at reducing hospital readmissions for children with asthma, elderly patients with heart failure, or dually eligible Medicare and Medicaid beneficiaries with special needs. The study sites were selected for this series based on the recommendations of experts familiar with their work, as well as on the strength of their early results.[6] Information was obtained from interviews with program leaders and documents supplied by the study sites.

1. **Cincinnati Children's Hospital Medical Center's Asthma Improvement Collaborative.** Many low-income children and their families have trouble controlling asthma, a common childhood condition that is exacerbated by environmental conditions or difficulty accessing medications.[7] Many of those hospitalized with asthma are readmitted, indicating missed opportunities for intervening to address poor asthma control.[8] Cincinnati Children's Asthma Improvement Collaborative aspires to eliminate asthma-related hospitalizations and emergency department visits, which serve as a marker for poor asthma control among Medicaid-insured children in the county. Interventions span hospital, primary care, and home care to help families overcome barriers to effective asthma self-care.

2. **UCSF Medical Center's Heart Failure Care Management Program.** Almost one-quarter of Medicare patients hospitalized with heart failure are readmitted within 30 days and one-half are readmitted within six months, reflecting the difficulty patients and family caregivers face in successfully managing this complex condition.[9] The University of California, San Francisco (UCSF) Medical Center initiated a care management program that aimed to reduce readmissions by 30 percent among elderly heart failure patients by enhancing patient education, arranging follow-up care, and facilitating patient-centered handoff communication among a multidisciplinary care team.

3. **Visiting Nurse Service of New York's (VNSNY) Choice Health Plans.** Dually eligible Medicare and Medicaid beneficiaries are a vulnerable population for whom fragmented care is especially problematic. These beneficiaries account for a disproportionate share of preventable hospitalizations and costs in both programs.[10] VNSNY created a managed care organization that offers a Medicaid Managed Long-Term Care Plan and a Medicare Advantage Special Needs Plan to help frail elderly patients remain safely in their homes as long as possible. A transitional care nurse works with hospitalized patients after discharge to help prevent readmissions as part of a broader continuous care management relationship in which a care manager coordinates services from an interdisciplinary team.

PROGRAM FEATURES

The settings, objectives, target populations, project team, approaches, timeline, funding, and results of these interventions are summarized in Exhibit 1. All three interventions are sponsored by provider organizations: two are based in academic medical centers and the third in a managed care organization owned by a home health care agency. The three study sites

designed multidimensional approaches that spanned care settings and engaged interdisciplinary teams to enhance communication across the continuum of care, both for program planning and care management. Care managers or coordinators make in-person and telephone contact with patients and families to provide education on self-care as a key component of their work.[11]

To provide a common framework for describing these programs, we analyzed their components using a taxonomy adapted from Luke Hansen and colleagues, who classified readmission interventions into pre-discharge, post-discharge, and bridging domains (Exhibit 2).[12] We modified the framework to include additional core activities from the case studies. Hansen's literature review found considerable variation in the number and combination of activities used in prior intervention studies, with most testing only a single activity and slightly more than one-quarter testing a bundle of three or more activities. The studies of isolated activities generally failed to show much effect, suggesting that a combination of activities is needed to make a measurable difference in readmissions. All the case study programs examined in this series use a bundle of multiple activities.

In general, a study site's ability to successfully deploy an activity depends on whether it has control over or influence with the actors and resources to conduct or arrange for the activity. For example, the ability to schedule timely follow-up appointments depends on the capacity and availability of primary care physicians in the community, which can be difficult for a hospital to influence unless the physician practices are affiliated with or employed by the institution. UCSF Medical Center found that outreach to home health agencies, primary care providers, and skilled nursing facilities enabled it to create a wider sphere of influence for building common interest in shared goals for patient care. VNSNY Choice seeks collaborative relationships with hospitals and physicians who perform pre-discharge and follow-up activities. Some facilities and staff are more receptive than others to engaging in transitional care planning.

Pre-Discharge or Extended Activities

Four activities that the literature review classified as occurring during the pre-discharge stage—educating patients on self-care, planning for post-discharge needs, reconciling medications to identify discrepancies, and scheduling or checking on follow-up appointments—were uniformly used across the case study sites, though not confined strictly to the inpatient setting. For example, medication reconciliation was conducted in the inpatient, outpatient, or home setting depending on the study site's scope of services and approach.

These activities were often part of a care management approach that extended beyond inpatient care to encompass post-discharge or transitional care. For example, teaching self-care is a key activity for Cincinnati Children's primary care-based care coordinators and for VNSNY's care managers, who have relationships with patients that continue after hospitalization. Palliative care discussions with patients and family may begin in the hospital at UCSF Medical Center and are helpful for clarifying goals of care that may inform treatment choices following discharge. The VNSNY Choice palliative care program is comprehensive in approach; in that sense, it takes on the characteristic of a bridging activity, as described below.

Study sites identified patient assessment and risk stratification as related activities that facilitate successful discharge planning and care management. For example, VNSNY Choice care managers conduct and regularly update a comprehensive assessment of new members. Risk stratification approaches vary across study sites and may consider factors such as prior hospitalizations, medication adherence or complexity, and psychosocial needs to determine the intensity of care management or other services to be provided. For example, Cincinnati Children's uses a standard asthma risk assessment tool in both the inpatient and outpatient setting to guide patient education and determine service needs.

Post-Discharge Activities

There was greater variability in the post-discharge domain, which can encompass activities such as timely communication with the primary care physician, timely clinic follow-up, a follow-up telephone call with the patient, a post-discharge hotline, and home visits. For example, the heart failure program coordinators at UCSF Medical Center conduct a follow-up phone call to check on patients' progress and provide an educational "booster" to reinforce teaching on self-care within one week of hospital discharge. They have found that the relationship established with patients during their hospital stay is critical to effective follow-up.

All the sites were working to increase the availability of home health care. Home-based visits are a key attribute of VNSNY's Managed Long-Term Care program, as they allow patients to remain independent in their homes and out of long-term institutional care. Because many elderly heart failure patients are frail, UCSF Medical Center created a policy to make home care the default for patients discharged to their homes. The medical center will cover the cost of a home visit in rare cases when it is not covered by the patient's insurance. Cincinnati Children's developed a "home health pathway" that identifies high-risk patients who are likely to benefit from home assessment and education to help mitigate barriers to good asthma control.

Bridging Activities

The case study sites adapted bridging activities that, as defined by Hansen, "emphasize longitudinal relationships active in both the pre- and the post-discharge period, as well as the role of the patient or caregiver in maintaining safe transition." The two academic medical centers were working to improve patient-centered discharge instructions, although their approach may be less intensive than those used in published studies. Linkages with postacute care providers take various forms depending on the nature of the relationships. For example, UCSF Medical Center's heart failure program coordinators collaborated with independent skilled nursing facilities and home health agencies to

agree on a consistent approach to patient education that begins in the hospital and continues after discharge.

Information technology can enable bridging activities across care settings. For example, UCSF Medical Center uses secure electronic messaging to create virtual care teams among inpatient clinicians and postacute care providers who communicate with each other about the patient's history and progress as the patient moves across the continuum of care. Cincinnati Children's participates in a community health information exchange that electronically alerts primary care physicians when their patient has been admitted to and discharged from the hospital so that the physician can communicate with inpatient providers if needed and follow up with the patient promptly after the hospital stay.

VNSNY Choice uses a nurse practitioner to provide transition care after a hospitalization in an approach that adapts elements of effective models developed at the Universities of Pennsylvania and Colorado.[13] The nurse practitioner collaborates with hospital staff and the patient's physician to develop a transitional care plan and follow the patient for 30 to 45 days after hospital discharge. Cincinnati Children's hired care coordinators in its primary care clinics to meet with patients in the hospital and follow-up with them after hospitalization. At UCSF Medical Center, select high-risk heart failure patients have access to nurse practitioners in the outpatient heart failure clinic to help them transition successfully to ambulatory care.

Conceptually, the programs seek to address nonmedical as well as medical determinants of health. For example, Cincinnati Children's saw clear benefit from linking low-income families to community-based organizations such as legal aid services that can advocate with landlords or housing agencies for improvements or changes in living arrangements, particularly in the case of asthma, where the presence of mold or unsafe conditions can trigger exacerbations. VNSNY Choice has found that psychosocial needs and supports (e.g., availability of family caregivers or other social supports to help patients cope with medical and nonmedical challenges) are a key determinant of the

intensity of care management required to help vulnerable dually eligible patients maintain independent living in their homes.

RESULTS

The study sites reported promising results associated with their intervention. Among elderly patients with heart failure at UCSF Medical Center, there was a 46 percent relative reduction in the 30-day all-cause heart failure readmission rate, from 24 percent in 2009 to 13 percent in 2011, and a 35 percent relative reduction in the 90-day all-cause heart failure readmission rate, from 40 percent in 2009 to 26 percent in 2011.

Among dually eligible Medicare and Medicaid beneficiaries with special needs enrolled in VNSNY Choice Health Plans, there was a 21 percent relative reduction in the 30-day all-cause readmission rate, from a median monthly rate of 28 percent during the first six months of 2009 to 22 percent during the first six months of 2011. A study by VNSNY of 573 continuously enrolled Medicare members reported reductions of 54 percent in hospitalizations, 24 percent in 30-day readmissions, and 27 percent in emergency department visits over 24 months.

Among a cohort of high-risk children who received intensive care coordination services at Cincinnati Children's Hospital Medical Center's primary care clinics, the average time between hospital encounters (emergency department visit or admission) lengthened by 100 days during the study period, from May 2009 to January 2012.

Limitations

Because of differences in measurement methodology, results are not comparable across the three sites. Because results are based on time series data, there is no control group for comparison, but the improvements reported are generally consistent with those found in published controlled studies.[14] It is not possible to tease apart the contribution made by each component of the interventions. Results reflect local factors that may change over time and may differ if replicated at other institutions. Of the three study sites, only the health plan has the comprehensive data on an enrolled population to track systemwide hospital use. Hospitals can measure only admissions and readmissions that occur at their own facilities. This points to the need for all-payer databases so that hospitals and others can assess the systemwide impact of efforts to reduce readmissions. Future evaluation of programs such as these also would benefit from the inclusion of patient-reported experiences.

FUNDING AND SUSTAINABILITY

The programs have followed different paths from start-up to sustainability. The pediatric asthma intervention at Cincinnati Children's used internal funding to hire a care coordinator in its primary care clinic to supplement and intensify efforts to address the determinants of poor health outcomes. Based on positive results from the pilot, the leaders of the initiative subsequently used federal funding through participation in the Beacon Community Cooperative Agreement Program to expand and demonstrate the effectiveness of this intervention.[15] Cincinnati Children's hopes to negotiate a shared-savings arrangement with Medicaid managed care organizations to make the program sustainable based on savings from reductions in hospital use that flow primarily to payers.

The UCSF Medical Center heart failure program relied on grant funding for two years to start up and prove its model. The medical center also expanded follow-up options for high-risk patients, such as visits with nurse practitioners in its heart failure clinic and home visits by a geriatrician. The program is being extended to younger adults as part of a broader hospitalwide readmissions reduction effort. The medical center is participating in a state Medicaid pay-for-performance program for safety-net institutions and an accountable care organization for city and county employees that are creating a financial model for sustaining such initiatives.

VNSNY Choice funds its care management programs through partial or full capitation arrangements with Medicaid or Medicare, which create incentives for coordinating care across settings. As a health plan, VNSNY Choice can be creative in using resources outside the usual benefit framework. For

example, the plan can provide better transitional care by paying for postacute care for a patient who would not meet traditional Medicare's rule for a minimum three-day hospital stay before qualifying for skilled nursing care.

POLICY IMPLICATIONS

The degree to which these approaches can be replicated at other health care organizations may depend on those organizations' leadership and quality improvement infrastructures, their ability to marshal internal and external resources to support change, the relative size of the target patient population, and the institutions' mission and commitment to promoting integrated care. The academic medical centers were motivated to focus on reducing admissions and readmissions for both intrinsic and extrinsic reasons including a commitment to improving patient care consistent with their missions and reputations as well as the potential to prepare for new expectations set by health reform. Under current fee-for-service reimbursement arrangements, reducing admissions may not be financially viable for a hospital unless it can fill beds with other admissions.

Spreading effective care management models will require supportive changes in payment policy or aligned incentives between payers and providers—creating a business case for hospitals and other providers to participate. Appropriately structured pay-for-performance and shared-savings incentives may promote such alignment. For example, California's "Bridge to Reform" Medicaid demonstration waiver offers safety-net hospitals the opportunity to earn financial rewards for reducing hospital readmissions, among other care improvements. Likewise, a fledgling commercial accountable care organization in Sacramento reported a 17 percent reduction in hospital readmissions among retirees in a pilot program that creates incentives for coordinated effort among participating hospitals, physicians, and an insurer.[16]

Medicare could realize substantial savings through bundled payment arrangements for inpatient and follow-up care that would provide a stronger incentive for hospitals to employ care management programs. For example, a recent analysis found that if Medicare paid hospitals the average cost of a hospital admission plus 30 days of follow-up care for heart failure, and if those hospitals used effective disease management programs like those studied in controlled trials, they could save between $96 and $875 per patient through a reduction in 30-day readmissions. Even greater savings were projected using a 180-day bundle.[17] Experts have noted that incorporating longer follow-up periods in a payment bundle may be important for older patients with special needs who require longer recovery times after hospitalization.[18]

There is currently no national policy that offers incentives for Medicaid providers to reduce unnecessary hospital use. Because Medicaid is a federal–state partnership, some innovative payment approaches are occurring at the state level.[19] Medicare and Medicaid are structured and regulated as two separate programs with little or no incentive to integrate services for dually enrolled individuals. The federal government recently created a Coordinated Health Care Office to fund state demonstrations and identify new care models for dually eligible beneficiaries, which may result in the development and spread of more effective integrated financing mechanisms.

The complexity of health care financing in the United States means that programs to fill gaps in care and reduce fragmentation of services must be coordinated with one another. For example, clinical care managers at a hospital or primary care clinic must coordinate with health plan case managers to ensure coverage of services. Even within a single organization such as VNSNY, care managers must coordinate with each other across Medicaid and Medicare programs that reflect the complexity of the financing arrangements that the health plan seeks to bridge.

The fact that hospital readmission rates are closely related to hospital admission rates in a region suggests that readmissions should be addressed in a holistic fashion as part of a larger strategy to reduce unnecessary hospital use.[20] Achieving greater system-wide efficiency will require a reduction in a community's hospital bed capacity as hospital use declines

through better care coordination. Redirecting resources to primary care can expand access to adequate preventive care, chronic disease management, and care coordination services to help prevent the onset and delay the complications of chronic disease. Framing the problem in this broader context should help engage patient-centered medical homes in communitywide efforts to improve transitions in care.

CONCLUSION

The three case studies summarized above describe how organizations can promote complex changes to improve care coordination and transitions across the continuum of care. The multifaceted, boundary-spanning approaches they adopted were associated with promising trends in reduced hospital use and readmissions. In contrast, published studies have found that isolated interventions are typically not effective at reducing hospital readmissions. Stimulating wider adoption and success of systemic care improvements such as these will likely require supportive changes in policy and payment.

The three case studies in our *Innovations in Care Transitions* series examine the Cincinnati Children's Hospital Medical Center's asthma care collaborative, UCSF Medical Center's heart failure care management initiative, and the Visiting Nurse Service of New York's managed care plan for lower-income, vulnerable patients. To read them, visit our website at http://www.commonwealthfund.org/Publications/Case-Studies/2013/Jan/Care-Transitions-Synthesis.aspx.

Exhibit 1. Case Study Program Features

	Cincinnati Children's Hospital Medical Center	University of California, San Francisco Medical Center	Visiting Nurse Service of New York Choice Health Plans
Initiative	Asthma Improvement Collaborative (AIC)	Heart Failure Disease Management Program	Medicaid Managed Long-Term Care Plan, Medicare Advantage Special Needs Plan, or both
Setting	Integrated, nonprofit, urban pediatric academic medical center encompassing a 523-bed teaching hospital and outpatient facilities, including three primary care clinics serving the greater Cincinnati area.	Academic medical center with several inpatient and outpatient facilities and primary care clinics in San Francisco including a 559-bed main hospital at its Parnassus campus, the site of the intervention.	Managed care organization serving adult residents of New York City who are eligible for Medicare, Medicaid, or both. It was created by VNSNY, a nonprofit home health care provider serving the greater New York City area.
Objective	Eliminate asthma-related hospitalizations and emergency department (ED) visits in the target population by July 2013 by supporting improved asthma management across the continuum of care.	Reduce by 30 percent the rate of hospital readmissions for any cause within 30 and 90 days of a hospital discharge among the target population.	Improve access to appropriate care, help patients navigate a complex health care system, enable frail individuals to safely remain in their homes as long as possible, and reduce preventable hospitalizations.
Target population	Low-income children (ages 2–17) with asthma insured by Medicaid in Hamilton County, Ohio. (Many of these children receive inpatient or emergency care for asthma at Cincinnati Children's.)	Patients age 65 years and older (average age 80) hospitalized with a primary or secondary diagnosis of heart failure on three pilot units at UCSF; more than half identify with a racial/ethnic minority group and almost one-third speak a language other than English.	Vulnerable and ethnically diverse Choice Health Plan members enrolled in a Medicaid Managed Long-Term Care Plan or a Medicare Advantage Special Needs plan, or both. Most members are elderly and suffer from multiple chronic conditions; many speak a language other than English.
Project team	Multidisciplinary team led by Cincinnati Children's Division of General and Community Pediatrics that includes leaders from the medical center's inpatient, outpatient, emergency, pharmacy, home health, subspecialty, and primary care units in partnership with community-based organizations including the health department, schools, legal aid, and managed care organizations.	Two part-time nurse coordinators supported by a multidisciplinary team including the service line director, hospitalists, cardiologists, clinical nurse specialists, case managers, social workers, pharmacists, dieticians, chaplains, educators, primary care physicians, skilled nursing facility staff, home care nurses, and outpatient heart failure nurse practitioners.	A specially trained nurse care manager is assigned to each member to coordinate services from a multidisciplinary team including physicians, nurses, rehabilitation therapists, nutritionists, social workers, behavioral health specialists, transitional care and palliative care nurse practitioners, clinical pharmacists, family caregivers, and community services.

Exhibit 1. Case Study Program Features (continued)

	Cincinnati Children's Hospital Medical Center	University of California, San Francisco Medical Center	Visiting Nurse Service of New York Choice Health Plans
Approach	Redesign the care process to address key drivers of poor asthma control and associated preventable hospital use: 1) Notify managed care organizations of admissions and ED visits to ensure coverage of and linkage to ancillary services. 2) Provide a 30-day supply of asthma medications at discharge. 3) Mitigate environmental barriers by assessing risks and making referrals for social and community services. 4) Improve care transitions by scheduling follow-up appointments and sending timely patient information to primary care providers, and by instituting a home health pathway for higher-risk children to continue receiving a heightened level of care at home after discharge. 5) Hire primary care coordinators to help high-risk patients and their families overcome barriers to good asthma control. 6) Educate patients and families on self-care.	Create an ideal transition from hospital to home: 1) Form a multidisciplinary team to support learning and improvement. 2) Engage in extensive patient education using teach-back techniques. 3) Schedule a follow-up physician appointment to occur within seven days of discharge. 4) Make a follow-up telephone call to the patient within seven days of discharge. 5) Refer the patient to needed services including palliative care and home health care. 6) Collect and analyze readmission data to measure progress. 7) Communicate and collaborate with clinicians and providers across the continuum of care.	Integrate care across settings: 1) Comprehensive assessment of members, often conducted in their homes. 2) Continuous care management to meet members' medical, psychosocial, cognitive, and functional needs, with an emphasis on in-person member encounters and collaborative relationships with hospitals and primary care physicians. 3) Teaching and coaching for members and family caregivers about how to monitor and optimally manage health conditions. 4) Risk stratification to identify and intensify care management for members at highest risk for rehospitalization. 5) Interdisciplinary team meetings to review care needs and plans of high-risk members. 6) Transitional care by a nurse practitioner following a hospital stay. 7) Palliative care for members with life-limiting chronic disease. 8) Information technology to facilitate decision-making, communication, and monitoring. 9) Frequent staff training on protocols and skills.

Exhibit 1. Case Study Program Features (continued)

	Cincinnati Children's Hospital Medical Center	University of California, San Francisco Medical Center	Visiting Nurse Service of New York Choice Health Plans
Timeline and funding	The AIC was formed in July 2007 and launched its quality improvement teamwork in January 2008. The AIC initially operated without dedicated funding, but later secured internal and external funding (through the federal Beacon Community Program) to hire care coordinators.	UCSF initiated the heart failure program in late 2008 in collaboration with the Institute for Healthcare Improvement and with funding from the Gordon and Betty Moore Foundation. The program has since become self-sustaining.	VNSNY Choice began enrolling members in a Managed Long-Term Care plan in 1998 under a New York State Medicaid demonstration program subsequently authorized by state legislation. A Medicare Advantage Special Needs Plan was licensed in 2006 and began enrolling members in 2007.
Early success, as reported by the study sites	Among a cohort of high-risk children who received intensive-care coordination services, average time between hospital encounters (ED visit or admission) increased by more than 100 days from May 2009 to January 2012.	Within the target population, there was a 46 percent relative reduction in the 30-day all-cause heart failure readmission rate, from 24 percent in 2009 to 13 percent in 2011. Likewise, there was a 35 percent relative reduction in the 90-day all-cause heart failure readmission rate, from 40 percent in 2009 to 26 percent in 2011.	Among dually eligible Medicare and Medicaid Choice members, there was a 21 percent relative reduction in the 30-day all-cause readmission rate, from a median monthly rate of 28 percent during the first six months of 2009 to 22 percent during the first six months of 2011. A study of 573 continuously enrolled Medicare members reported reductions of 54 percent in hospitalizations, 24 percent in 30-day readmissions, and 27 percent in ED visits over 24 months.

Exhibit 2. Categorization of Program Components

Activity		Cincinnati Children's Asthma Improvement Collaborative	UCSF Medical Center's Heart Failure Program	Visiting Nurse Service of New York Choice Health Plans
Pre-discharge or extended activities	*Patient assessment and risk stratification*	√	√	√
	Patient education	√	√	√
	Discharge planning*	√	√	√
	Medication reconciliation	√	√	√
	Palliative care (when appropriate)		√	√
	Appointment scheduled before discharge	√	√	Hospital-specific
Post-discharge activities	Timely primary care provider communication	√	√	√
	Timely clinic follow-up	√	√	Practice-specific
	Follow-up telephone call	√	√	√
	Post-discharge hotline		√	
	Home visit**	√	√	√
Bridging activities	Transition coach or services	Primary care-based care coordinators for high-risk patients	Heart failure clinic nurse practitioners for high-risk patients	Transitional care nurse practitioners
	Patient-centered discharge instructions***	√	√	Hospital-specific
	Provider continuity across settings	Primary care-based care coordinators for high-risk patients		Care manager assigned to each plan member
	Linkage to postacute care providers	√	√	√
	Linkage to community services	√		√
	Virtual team messaging or electronic alerts	√	√	√

Notes: This framework was adapted from L. O. Hansen, R. S. Young, K. Hinami et al., "Interventions to Reduce 30-Day Rehospitalization: A Systematic Review," *Annals of Internal Medicine,* Oct. 18, 2011 155(8):520–28. Activities in italics were added by the case study authors. Hospitals and providers in the VNSNY Choice network might provide additional activities not shown in the chart. See the full case study reports for details.
* Discharge planning was interpreted to mean planning for post-discharge needs.
** Home visit was interpreted to include referral to home health care.
*** Patient-centered discharge instructions meant individualized information tailored to patients' health literacy and social circumstances such as medications and follow-up plans.

NOTES

1   A. Shih, K. Davis, S. C. Schoenbaum, A. Gauthier, R. Nuzum, and D. McCarthy, *Organizing the U.S. Health Care Delivery System for High Performance* (New York: The Commonwealth Fund, Aug. 2008).

2   K. M. McDonald, V. Sundaram, D. M. Bravata et al., *Closing the Quality Gap: A Critical Analysis of Quality Improvement Strategies, Vol. 7: Care Co-ordination* (Rockville, Md.: Agency for Healthcare Research and Quality; June 2007); M. D. Naylor, L. H. Aiken, E. T. Kurtzman et al., "The Importance of Transitional Care in Achieving Health Reform," *Health Affairs,* April 2011 30(4):746–54.

3   S. F. Jencks, M. V. Williams, and E. A. Coleman, "Rehospitalizations Among Patients in the Medicare Fee-for-Service Program," *New England Journal of Medicine,* April 2, 2009 360(14):1418–28.

4   Medicare Payment Advisory Commission, "Payment Policy for Inpatient Readmissions," in *Report to the Congress: Promoting Greater Efficiency in Medicare* (Washington, D.C.: MedPAC, June 2007).

5   L. O. Hansen, R. S. Young, K. Hinami et al., "Interventions to Reduce 30-Day Rehospitalization: A Systematic Review," *Annals of Internal Medicine,* Oct. 18, 2011 155(8):520–28.

6   Cincinnati Children's Hospital Medical Center is a participant in the Institute for Healthcare Improvement's (IHI) Triple Aim initiative. UCSF Medical Center participated in IHI's Transforming Care at the Bedside collaborative and serves as a mentor site for IHI's State Action on Avoiding Rehospitalizations (STAAR) initiative sponsored by The Commonwealth Fund. The Visiting Nurse Service of New York is a grantee of The Commonwealth Fund.

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10 J. Kasper, M. O. Watts, and B. Lyons, *Chronic Disease and Co-Morbidity Among Dual Eligibles: Implications for Patterns of Medicaid and Medicare Service Use and Spending* (Menlo Park, Calif.: The Henry J. Kaiser Family Foundation, July 2010); Medicare Payment Advisory Commission, "Coordinating the Care of Dual-Eligible Beneficiaries," Chapter 5 in *Report to the Congress: Aligning Incentives in Medicare* (Washington, D.C.: MedPAC, June 2010); H. J. Jiang, L. M. Wier, D. E. B. Potter et al., *Hospitalizations for Potentially Preventable Conditions Among Medicare–Medicaid Dual Eligibles, 2008,* Statistical Brief #96 (Washington, D.C.: Agency for Healthcare Research and Quality, Sept. 2010).

11 The three study programs shared many features of effective care coordination for high-risk patients identified in a recent review of the Medicare Coordinated Care Demonstration program: face-to-face patient contact, physician engagement, care coordinators who act as a "communications hub" with physicians, evidence-based patient education, medication management, and transitional care. See: R. S. Brown, D. Peikes, G. Peterson et al., "Six Features of Medicare Coordinated Care Demonstration programs That Cut Hospital Admissions of High-Risk Patients," *Health Affairs,* June 2012 31(6):1156–66.

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[13] M. D. Naylor, D. Brooten, R. Campbell et al., "Comprehensive Discharge Planning and Home Follow-Up of Hospitalized Elders: A Randomized Clinical Trial," *Journal of the American Medical Association,* Feb. 17, 1999 281(7):613–20; E. A. Coleman, C. Parry, S. Chalmers et al., "The Care Transitions Intervention: Results of a Randomized Controlled Trial," *Archives of Internal Medicine,* Sept. 25, 2006 166(17):1822–28.

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[15] Cooperative Agreement #90BC0016/01 from the Office of the National Coordinator for Health Information Technology of the U.S. Department of Health and Human Services.

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