

Attachment A: Annotated Bibliography

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

This systematic review of interventions to reduce 30-day readmissions included randomized controlled trials (RCTs), cohort studies, and pre-post studies without control groups. Five of the 16 RCTs demonstrated statistically significant reductions in readmission rates. Nine of 20 cohort studies also had statistically significant improvements in readmissions, as did two of the seven pre-post studies without control groups. Four of the five effective RCTs included post-discharge phone calls and patient-centered discharge instructions, which are detailed documents tailored to patients' health literacy, health needs, and social circumstances. The fifth effective RCT involved comprehensive discharge planning. The authors recommend including post-discharge calls, tailored discharge instructions, and comprehensive discharge planning in care transition interventions, and suggest that transition coaches are an additional promising component. The authors state that interventions with multiple evidence-based components are most likely to be effective.

2. C.S. Kim and S.A. Flanders. 2013. Transitions of Care. *Annals of Internal Medicine* 58(5 Part 1): ITC3-1.

This article identifies best practices in transitions from the hospital to other settings. Best practices include: medication reconciliation; patient and family member education using the “teach back” method; involvement of interdisciplinary teams; arrangement of appropriate post-discharge services (including primary care follow-up visits, medications, and home care); preparation of a complete discharge summary within 48 hours of discharge (including current medications, test results, and treatment summary); and confirmation from the primary care physician (PCP) that the discharge summary was received.

The authors describe tools to identify high-risk patients, including the LACE model (length of stay, acuity of admission, comorbidities, and emergency department use) and the 8Ps Risk Assessment Tool, which incorporates both clinical and psychosocial factors. The article also outlines recommended processes for medication reconciliation, discharge summaries, and patient education.

The authors also discuss barriers that contribute to post-discharge complications. These include lack of time, work pressure and routines, the prioritization of clinical care rather than discharge tasks, lack of communication between hospitals and PCPs, and sudden transfers or transfers on weekends. For patients, barriers to completing appropriate follow-up care with a PCP include severity of illness, transportation, financial concerns, provider access, and insufficient education at discharge.

3. R. Burton. September 13, 2012. *Health Policy Brief: Improving Care Transitions. Health Affairs. (Issue Brief).* http://www.healthaffairs.org/healthpolicybriefs/brief.php?brief_id=76 (accessed 10/3/13).

Ineffective care transitions accounted for a large proportion of the estimated \$25 billion to \$45 billion wasted health care spending in 2011. This article highlights two care transition models adopted by more than 700 organizations nationwide: Eric Coleman's Care Transitions Intervention and Mary Naylor's Transitional Care Model. Care transitions are a priority for many health systems due to reimbursement changes under the Affordable Care Act. These include: shared savings programs for Accountable Care Organizations; reduced Medicare and Medicaid reimbursement for hospitals with high readmission rates; and additional payment to outpatient providers for care transition services.

4. A.B. Bindman, J.D. Blum, and R. Kronick. 2013. Medicare's Transitional Care Payment—A Step toward the Medical Home. *New England Journal of Medicine* 368(8): 692–4. <http://www.nejm.org/doi/full/10.1056/NEJMp1214122> (accessed 10/1/13).

This article summarizes the adoption of new Current Procedural Terminology billing codes by the Centers for Medicare and Medicaid Services (CMS) in 2013. These codes reimburse physicians with bundled payments for managing patients' care transitions to home from hospitals, rehabilitation facilities, or skilled nursing facilities (SNFs). Physicians are compensated for providing a follow-up visit within 14 days after discharge in addition to specified non-face-to-face care-transitions services.

CMS estimates that it will pay \$600 million for care transition services in 2013, primarily to PCPs, who will receive a seven percent increase in Medicare payments on average.

5. M.D. Naylor, L.H Aiken, E.T. Kurtzman, et al. 2011. The Importance of Transitional Care in Achieving Health Reform. *Health Affairs* 30(4): 746–54.

This article identifies 21 RCTs of transitional care interventions for chronically ill patients in the United States. Eight of the 21 studies reduced 30-day readmissions for all causes, and, of these, three also reduced readmissions through six and 12 months. None of the 21 interventions targeted people eligible for both Medicare and Medicaid (dual eligibles). The authors highlight the two most effective types of interventions:

- Multicomponent interventions that reduced readmission rates by incorporating comprehensive discharge planning, patient-directed goal setting, individualized care planning, educational and behavioral strategies, and clinical management
- Telehealth interventions that reduced the time to the first readmission (but not 30-day readmission rates) by using daily home videophone or phone monitoring, biometric transmission, self-care instruction, and symptom management

Only two studies included economic analyses that accounted for the majority of relevant costs and savings (including readmissions, emergency department visits, unscheduled physician visits, visiting nurses, and intervention costs). These estimated nearly \$3,000 in Medicare savings at six months and \$5,000 at 12 months.

6. M.D. Naylor, E. T. Kurtzman, M.V. Pauly. 2009. Transitions of Elders between Long-Term Care and Hospitals. *Policy, Politics, & Nursing Practice*, 10(3): 187–94.

This article evaluates the evidence on care transitions among patients receiving long-term care (LTC). The authors drew from care transitions research among chronically ill elderly adults, because there is limited research specific to the LTC patients. To improve transitions from hospital to LTC facilities, the authors recommend Coleman’s Care Transitions intervention and Naylor’s Transitional Care Model, as described below in items 11 and 13. The authors also highlight the Evercare model, which may reduce preventable hospitalizations among elderly people living in nursing homes (described below in item 17).

7. R.E. Burke and E.A. Coleman. 2013. Interventions to Decrease Hospital Readmissions: Keys for Cost-Effectiveness. *JAMA Internal Medicine*. Published online ahead of print on March 25, 2013.

This article proposes best practices for developing creative strategies to reduce 30-day readmissions at minimal up-front cost, based on evaluated interventions and clinical experience. For health systems that cannot make substantial initial investments, the authors recommend the following best practices:

- **Match the intensity of the intervention to patients’ risk of readmission.** Target intensive interventions only to high-risk patients. While existing risk stratification models had limited predictive power, the best approaches incorporated both clinical and psychosocial data.
- **Avoid common but unproven interventions.** These include routine post-discharge calls, inpatient clinical pathways (standardized care plans for a given diagnosis), telemonitoring and care management that is not intensive and locally deployed. Evaluations of these interventions show mixed or negative results, particularly when the interventions were used in isolation.
- **Use interventions with long-term impacts.** Some care transition models show clinical impacts six months post-discharge (such as Naylor’s model), which would be needed if CMS changes the 30-day readmission metric for quality of care transitions.
- **Create an effective team prior to selecting interventions.** Staff should be local, highly skilled and well trained; should adhere to proven models; and should seek mentorship from successful groups.
- **Focus on previously unrecognized high-risk patient populations.** The authors identify four groups of high-risk patients for whom few evidence-based interventions exist: (1) patient discharged with pneumonia, psychiatric disease, renal failure, or metabolic disturbances; (2) patients with congestive heart failure and comorbidities; (3) patients discharged from acute care to SNFs; and (4) patients discharged into the care of family caregivers.

8. J.L. Greenwald, C.R. Denham, B.W. Jack. 2007. The Hospital Discharge: A Review of a High Risk Care Transition with Highlights of a Reengineered Discharge Process. *Journal of Patient Safety* 3(2): 97–106. <http://www.bu.edu/fammed/projectred/publications/greenwald.pdf> (accessed 10/3/13).

This article outlines the Project RED (Reengineered Discharge Process) intervention, which addresses the modifiable components of care transitions from the hospital to home. The authors detail the initiative’s guiding principles and operational tasks, and discuss the research supporting each feature.

9. S. Kripalani, A.T. Jackson, J.L. Schnipper, E.A. Coleman. 2007. Promoting Effective Transitions of Care at Hospital Discharge: A Review of Key Issues for Hospitalists. *Journal of Hospital Medicine* 2(5): 314–23. <http://onlinelibrary.wiley.com/doi/10.1002/jhm.228/full> (accessed 10/3/13).

This article reviews evidence-based transition strategies for hospitalists, including: enhanced care coordination with outpatient physicians, medication reconciliation, establishment of follow-up care, and physician-patient communication. The authors outline specific tasks to improve each of these domains.

10. P.E. Sokol and M.K. Wynia, writing for the AMA Expert Panel on Care Transitions. 2013. *There and Home Again, Safely: 5 Responsibilities of Ambulatory Care Practices in High Quality Care Transitions* (Chicago, IL: American Medical Association). <http://www.ama-assn.org/resources/doc/patient-safety/ambulatory-practices.pdf> (accessed 10/3/13).

This report outlines the role of ambulatory care providers in ensuring safe transitions from the hospital to home, based on recommendations from an expert panel convened by the American Medical Association. The panel reached consensus on five tasks required for safe transitions, which generally should be enacted by outpatient providers: patient assessment (before and after discharge, if possible); patient goal setting to inform the care plan; coaching in self-management; medication management; and care coordination. The guiding principles for these tasks should be care that is patient-centered, collaborative, structured, iterative, and flexible. The report includes recommendations on ways to accomplish these tasks, including tools and patient education strategies. The panel notes that inadequate communication between clinicians in different care settings and misaligned financial incentives were systemic issues that often impede high-quality transitions.

11. M.D. Naylor, D.A. Brooten, R.L. Campbell, et al. 2004. Transitional Care of Older Adults Hospitalized with Heart Failure: A Randomized, Controlled Trial. *Journal of the American Geriatrics Society* 52: 675–84. <http://www.cha.com/pdfs/Quality%5CReducing%20Hospital%20Readmissions/Related%20Articles/Transitional%20Care%20of%20Older%20Adults.pdf> (accessed 10/3/13).

This RCT of the Transitional Care Model developed by Mary Naylor at University of Pennsylvania demonstrates the effectiveness of hospital-to-home care transitions in reducing readmissions. Results include a 36 percent drop in the one-year readmission rate and a 39 percent cost reduction per patient (\$4,845) one year after patient discharge. The program enrolled 239 high-risk, high-cost elderly patients. On average, patients were 76 years old and had more than six chronic conditions. Advanced practice nurses (APNs) provided a minimum of eight home visits over three months and were available by phone seven days a week. APNs collaborated with PCPs to develop care plans, coached patients in self-management and red-flag symptoms, reconciled medications, and coordinated care between providers. This intervention is one of the most widely implemented care transition models nationwide, along with Eric Coleman’s Care Transition Intervention and Project RED.

12. V. Snow, D. Beck, T. Budnitz, et al. 2009. Transitions of Care Consensus Policy Statement, American College of Physicians: Society of General Internal Medicine, Society of Hospital Medicine, American Geriatrics Society, American College of Emergency Physicians, Society of Academic Emergency Medicine. *Journal of General Internal Medicine* 24(8): 971–6. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2710485/> (accessed 10/3/13).

These consensus standards outline best practices in care transitions from the hospital to outpatient care. The guidelines recommend care transitions that incorporate the following elements:

- One coordinating clinician should have responsibility for timely and complete information transfer between the discharging provider and the next provider that cares for the patient, using infrastructure that is secure, standardized, and available to all providers and patients (which can be accomplished through electronic health records);

- Care plans with thorough data sets (including medication list, test results, follow-up care, advance directives, physician contact information, and patient’s caregiver and cognitive status);
- Handoffs of responsibility between providers, with the discharging provider retaining responsibility for patients until the next provider confirms receipt of the care plan;
- Community standards for care transitions based on national guidelines and best practices; and
- Evidence-based metrics for evaluating the quality of care transitions.

13. E.A. Coleman, C. Parr, S. Chalmers, S. Min. 2006. The Care Transitions Intervention: Results of a Randomized Controlled Trial. *Archives of Internal Medicine* 166: 1823–28. <http://www.caretransitions.org/documents/The%20CTI%20RCT%20-%20AIM.pdf> (accessed 10/3/13).

This RCT of University of Colorado’s Care Transition Intervention developed by Eric Coleman demonstrates the savings potential of hospital-to-home care management interventions. Results include a 30 percent reduction in 30-day readmissions, 17 percent reduction in 180-day readmissions, and 15 percent drop in average patient costs. The intervention was conducted in a large integrated delivery system in Colorado and enrolled 750 high-risk elderly patients being discharged from the hospital. Advanced practice nurses met with patients in the hospital, then conducted one home visit and three phone calls over four weeks following the patient’s discharge. APNs developed care plans with PCPs, coached patients in self-management and red-flag symptoms, reconciled medications, and coordinated care between providers. This model is one of the three most highly regarded care transitions interventions nationwide, along with Mary Naylor’s Transitional Care Model and the Project RED model, and has been successfully implemented by both health systems and private payers.

14. B.W. Jack, V.K. Chetty, D. Anthony, et al. 2009. A Reengineered Hospital Discharge Program to Decrease Rehospitalization: A Randomized Trial. *Annals of Internal Medicine* 150(3):178–88. <http://www.bu.edu/fammed/projectred/publications/AnnalsArticle2-09.pdf> (accessed 10/3/13).

This RCT of the Project RED intervention showed statistically significant reductions in the rate of combined 30-day readmissions and emergency department (ED) visits, which fell by 30 percent. The RCT also demonstrated statistically significant increases in the number of patients who had follow-up PCP visits and felt prepared for their discharge. Total health care costs in the intervention group were approximately 34 percent lower than in the control group (a savings of \$412 per patient), based on savings from ED visits and inpatient visits, even after accounting for additional spending on primary care services. The total savings for all of the 749 participants was \$149,995. The cost-saving estimates did not include the intervention costs, which required a half-time nursing position and a 0.15-time pharmacist position. The authors believe that less time would be required if these functions were integrated within a health system’s protocol, particularly if the system’s electronic health records could produce the discharge summary.

The intervention consisted of a nurse discharge advocate who met with patients and families in person prior to discharge. Nurses coached patients on self-care using the “teach back” method, conducted comprehensive discharge planning, reconciled medications, and provided patients with written materials on their diagnoses, medications, test results, signs of worsening symptoms, and physician contact information. Nurses also made follow-up appointments with patients’ PCPs, and provided PCPs with a copy of the discharge information. Pharmacists called patients two to four days after discharge to review medications and address and problems. Any issues or changes to the medications were communicated to the patients’ PCPs.

15. G. Hesselink, L. Schoonhoven, P. Barach, et al. 2012. Improving Patient Handovers from Hospital to Primary Care: A Systematic Review. *Annals of Internal Medicine* 57(6): 417–28.

This article systematically reviews RCTs of care transition interventions from the hospital to home. Of the 36 articles included in the review, 25 demonstrated statistically significant improvement in at least one outcome. Nearly all interventions described multicomponent interventions. Twenty-six of the studies incorporated aspects of care management (such as case managers, liaisons, or multidisciplinary teams), of which 19 showed statistically significant improvements in at least one outcome measure. Measures included hospital use, continuity of care, patient status, medical errors, and use of primary care. The successful interventions included at least one of the following elements: medication reconciliation; discharge planning; involvement of both hospital and primary care staff in follow-up; electronic tools to generate quick, clear, and structured discharge summaries; electronic discharge notifications; clinical decision support; scheduling of follow-up care; post-

discharge call to determine the status of follow-up care; or PCP access to web-based discharge information. Effective medication reconciliation was conducted by pharmacists and other clinicians. The most common statistically significant outcome was reduced hospital use, including readmissions. Interventions were highly heterogeneous and there was no single intervention component that consistently improved care transitions.

16. **M. Crotty, D. Rowett, L. Spurling, et al. 2004. Does the Addition of a Pharmacist Transition Coordinator Improve Evidence-Based Medication Management and Health Outcomes in Older Adults Moving from the Hospital to a Long-Term Care Facility? Results of a Randomized, Controlled Trial. *The American Journal of Geriatric Pharmacotherapy* 2(4): 257–64.**

This RCT, which included 110 patients, evaluated whether a pharmacist coordinator could improve health outcomes for elderly adults entering a LTC facility for the first time following hospital discharge. The intervention consisted of medication reconciliation, prompt discharge summaries, and case conferences with physicians and pharmacists. When all patients were analyzed at eight weeks after discharge, including those who had died during this time, the only statistically significant impact was less worsening pain in the intervention group compared to the control group. When the analysis excluded those who died in the eight weeks after discharge, the intervention also reduced hospital usage (combined ED visits and readmissions).

17. **R.L. Kane, G. Keckhafer, S. Flood, et al. 2003. The Effects of Evercare on Hospital Use. *Journal of the American Geriatrics Society* 51: 1427–1434.**

This quasi-experimental study evaluates the Evercare program, an enhanced primary care initiative provided by nurse practitioners (NPs) for HMO enrollees living in nursing homes. Evercare employs nurses to provide primary care in nursing homes and communicate with PCPs and caregivers. Nursing homes also receive higher reimbursement if they provide care to patients who would otherwise be hospitalized. Hospital utilization by Evercare enrollees was compared to two control groups: residents in the same nursing homes who were not enrolled in the program and residents at nursing homes that had no Evercare enrollees. Evercare enrollees had a hospitalization rate half that of the two control groups, and saved an estimated \$103,000 per NP annually, after accounting for NP salary costs.

18. **A. Giordano, S. Scalvini, E. Zanelli, et al. 2009. Multicenter randomised trial on home-based telemanagement to prevent hospital readmission of patients with chronic heart failure. *International Journal of Cardiology* 131: 192–199.**

This RCT of telemonitoring among 460 Italian heart failure patients showed statistically significant reductions in readmissions due to heart failure and all causes within one year after discharge. Participants had an average age of 57, were enrolled prior to discharge from a hospitalization related to heart failure, and were given a telemonitoring device. Nurses provided phone appointments every seven to 15 days, and were available by phone 24/7. The nurses assessed patient symptoms, health behaviors, and medication adherence, and reinforced patient education. The intervention group had 33 percent fewer readmissions related to heart failure during the study year, but the difference in rates did not occur until 100 days after discharge. The total readmission rate for all causes was 30 percent lower in the intervention group compared to the control group. Mean costs per readmission were lower in the intervention population, by a statistically significant 35 percent.

19. **G. Paré, M. Jaana, C. Sicotte. 2007. Systematic Review of Home Telemonitoring for Chronic Diseases: The Evidence Base. *Journal of the American Medical Informatics Association* 14(3): 269–77. <http://jamia.bmj.com/content/14/3/269.full.pdf+html> (accessed 10/3/13).**

This systematic review examines the impact of telemonitoring on patients with pulmonary conditions, diabetes, hypertension, and cardiovascular diseases. The authors found 65 studies that fit their inclusion criteria, approximately one-third (35 percent) of which were randomized and had a control group. The authors conclude that telemonitoring does not consistently improve patient outcomes for any of the four diseases. However, there is consensus that telemonitoring reliably provides high-quality data, and that such interventions generally have high patient satisfaction. Several studies reported improved patient self-management and quality of care, particularly for pulmonary conditions and diabetes, but these effects were minimal or inconclusive for cardiac conditions. The majority of studies on cardiac and pulmonary diseases reported reduced admissions, readmissions, ED visits, and/or length of stay, but these results were less consistent for diabetes telemonitoring. Only one study presented a comprehensive cost-benefit analysis of telemonitoring compared to usual care,

which found a 15 percent savings (\$355 per patient) for telemonitoring for patients with pulmonary conditions compared to traditional home care.

20. P.Y. Takahashi, J.L. Pecina, B. Upatising, et al. 2012. A Randomized Controlled Trial of Telemonitoring in Older Adults with Multiple Health Issues to Prevent Hospitalizations and Emergency Department Visits. *Archive of Internal Medicine* 172(10): 773–9. <http://archinte.jamanetwork.com/article.aspx?articleid=1149633> (accessed 10/3/13).

This RCT found that telemonitoring for 205 high-risk elderly patients with multiple comorbidities did not improve hospitalization or ED visit rates compared to usual care. Study patients had a mean age of 80.3 years and multiple comorbidities. The telemonitoring device had real-time videoconferencing capability in addition to biometric monitoring of patients' weight and blood pressure. Nurses contacted patients if red-flag symptoms arose, and communicated with providers as appropriate. Usual care included standard discharge planning, including a call one business day after discharge and phone access to nurses. The intervention group had no statistically significant reductions in hospitalizations, ED visits, or total hospital days, but did have statistically significantly higher mortality rates (reasons unknown). These results confirm earlier research findings demonstrating that telemonitoring alone is ineffective for high-risk elderly patients with multiple comorbidities.

21. S.I. Chaudhry, J.A. Mattera, J.P. Curtis, et al. 2010. Telemonitoring in Patients with Heart Failure. *New England Journal of Medicine* 363: 2301–9. <http://www.nejm.org/doi/full/10.1056/NEJMoa1010029#t=article> (accessed 10/3/13).

In contrast to Koehler and colleagues, this RCT found that telemonitoring did not reduce readmissions among 1,653 high-risk patients who were recently hospitalized for heart failure (mean patient age of 61). The intervention included a phone-based interactive voice response system that collected daily information on patients' symptoms and weight, which was reviewed by clinicians. There were no statistically significant differences in rehospitalization rates (for all causes or for heart failure), mortality, number of days in the hospital, or number of hospitalizations.

22. C. van Walraven, I.A. Dhalla, C. Bell, et al. 2010. Derivation and Validation of an Index to Predict Early Death or Unplanned Readmission after Discharge from Hospital to the Community. *Canadian Medical Association Journal* 182(6): 551–7. <http://www.cmaj.ca/content/182/6/551.full.pdf+html> (accessed 10/3/13).

This prospective cohort study (N=4812) validated the predictive power of the LACE index. The index was able to accurately distinguish low- and high-risk patients and predict outcome risk.

23. Marie Beisel, RN, MSN, CPHQ, Project Manager at the Michigan Care Management Resource Center. May 13, 2013. Personal communication.

Marie Beisel described the key elements of the Michigan Primary Care Transformation demonstration's approach to care transitions. Nurse care managers contact patients 24 to 48 hours after discharge, and schedule an outpatient follow-up visit within two weeks. During the call, care managers also conduct medication reconciliation, assess barriers that patients may face in performing self-care, and determine whether the appropriate follow-up care is in place (such as home care or necessary medical equipment). This process depends upon prompt notification from the discharging facility.

24. Society of Hospital Medicine. 2008. Risk Assessment Tool: the 8Ps. http://www.hospitalmedicine.org/ResourceRoom/Redesign/RR_CareTransitions/html_CC/06Boost/03_Assessment.cfm (accessed 7/29/13).

This site describes the literature supporting the 8Ps Risk Assessment Tool, a component of the Project Boost initiative. This initiative is a care transition model being piloted by providers nationwide—including 22 pairs of health systems and POs in Michigan that have partnered with BCBSM to implement this model—but no rigorous evaluation has been conducted to date. The 8Ps stand for problem medications, psychological factors, principal diagnosis, polypharmacy, patient support, prior hospitalization in the past 6 months, and palliative care.

25. D. Joshi, R.A Bluhm, P.N. Malani, et al. 2013. **The Successful Development of a Subacute Care Service Associated With a Large Academic Health System.** *Journal of the American Medical Directors Association* 13: 567.

This article describes the early results of the Subacute Care Service (SACS) pilot at UMHS for high-risk medical and surgical patients discharged to SNFs. The program consisted of physicians and NPs employed by UMHS who worked in designated SNFs to care for discharged UMHS patients. Discharging physicians had confidence in the quality of care offered by the UMHS care team in the SNF, often leading to earlier inpatient discharge. Physicians and NPs in the SNF used the UMHS laboratory and documented patient care in the system's electronic health records, allowing discharging physicians to monitor patient progress and test results in real time. To avoid delays in medication upon discharge, the first doses could be acquired from the UMHS pharmacy. This model encouraged earlier discharge from the SNF to home, because the providers were salaried, rather than receiving the usual per diem payment. Upon discharge from the SNF, patients were given a comprehensive discharge packet, and physicians and NPs continued to work closely with home care providers until the patient's PCP took responsibility for ongoing management. Early results indicated that this model reduced hospital length of stay for medical and surgical patients, justifying UMHS' financial investment in SACS.