Appendix 1. Supplementary Data Tables

Appendix 1 Table 1. Intervention Components, Modifications, and Implementation Challenges

Component	Original Design	Modifications and Challenges
Inpatient Medication Safety	Inpatient pharmacist counseling to ensure accurate medication reconciliation, patient/caregiver education, communication with providers	Not deployed on all units due to staffing constraints; Difficulties identifying patients in need of discharge counseling in time to provide it (i.e., before discharge)
Inpatient Discharge Advocate (DA)	Nurse who communicates with outpatient team to ensure a safe discharge plan and prepares patients for discharge	Hospital 1: one NP played role, high degree of quality control, but not enough availability to see all patients; Hospital 2: Attending Nurses played role, but restricted to communication with ROC, less quality control
Responsible Outpatient Clinician (ROC)	Provider (e.g., nurse) from patient's primary care practice to communicate with DA, conduct video conference, post-discharge call, and post-discharge visit with patient	Variability due to licensure/scope of practice of ROC (RN, LPN, PA); Competition for time with other tasks
Communication between ROC and DA	Exchange of information regarding previous challenges to post-discharge management, anticipation of needs for current post-hospitalization course	Inconsistently implemented until research team added a project manager to facilitate communication; Challenges with different communication styles between inpatient and outpatient providers

Inpatient Video Conference	ROC conference with patient while in the hospital to provide encouragement and logistical support for post-discharge visit	Not implemented due to logistical challenges of finding a time when ROC, patient, and DA all available
Post-discharge Phone Call	ROC call to patient within 2 days of discharge to screen for new or worsening symptoms and problems carrying out post-discharge care plan	Used templates to standardize content, with some success; Inconsistently implemented in surgical patients
Post-discharge Clinic Visit	Multi-disciplinary primary care visit to assess progress along plan of care, ensure patient safety, and optimize post-discharge outcomes	Often PCP alone, used templates, but content rarely standardized in practice; Some practices booked post-discharge patients with another physician.
Visiting Nurse Appointments*	Network home care nurse to visit patient soon after discharge and assess ability of patient to carry out post-discharge care plan, identify key caregivers, and communicate concerns with PCP	Variability among front-line visiting nurses; Some did not see enough patients to develop proficiency in intervention
Home Pharmacist Visits*	Home visit by pharmacist to identify and resolve medication discrepancies, screen for drug-related problems, provide management plan, and communicate findings	Referral rates and patient acceptance of program lower than expected
CHF Telemedicine Program*	Daily monitoring and transmission of weights, with diuretic dose adjustment by a nurse specialist	Low enrollment rates due to eligibility criteria, competing programs
Advance Care Planning*	Identify patients at high risk of short-term mortality, provide palliative care	Modified eligibility criteria from an existing risk algorithm to

	consultation, and communicate with providers as appropriate	soliciting input from inpatient attendings and PCPs; Enrollment rates were low
Integrated Care Management Program*	Existing nurse-run program which provides intensive outreach and support through primary care office for selected high-risk patients	Modified post-discharge elements of the intervention in participating patients to avoid redundancy with this program
Partners' Enterprise Patient List application	System to document in real-time all members of the patient's care team and facilitate email communication	Documentation of team members limited by workflow and cultural issues; email capability used sporadically
Automated Admission Notification	Secure, electronic notification sent to PCP when a patient is admitted to an ACO-affiliated hospital	In many practices, the nurse care manager also monitored these messages on a daily basis to know who was admitted and discharged from affiliated hospitals
Web-based Discharge Ordering Module	Ensure quality of discharge documentation by auto-importing information and requiring completion of structured data fields	No modifications
Tests Pending at Discharge Notification System	Automated notification of inpatient attending and PCP of tests pending at discharge after results finalized	Implemented in Hospital A only

* Optional programs for selected patients

Appendix 1 Table 2. Rates of Adverse Events By Type

Adverse Event Type	Usual Care (Rate per 100 patients)	Intervention (Rate per 100 patients)	IRR (95% CI)	P value
Adverse Drug Event	12.1	8.0	0.66 (0.48-0.90)	**0.009**
Hospital Acquired Infection	0.6	0.3	0.52 (0.12-2.33)	0.39
Procedural Complication	3.2	0.9	0.28 (0.13-0.62)	**0.002**
Surgical Complication	2.4	4.1	1.74 (0.97-3.10)	0.06
Diagnostic Error	0.3	0.2	0.69 (0.10-4.94)	0.72
Management Error	4.3	3.7	0.86 (0.53-1.41)	0.55

Appendix 1 Table 3. Subgroup Analyses for Post-Discharge Adverse Events

	Int vs Usual Care Adjusted Incidence Rate Ratio (95%CI)**	p-value for effect of intervention	p-value for interaction term (subgroup*arm)
Service			
Medicine	0.60 (0.37, 0.99)	**0.046**	0.80
Surgery	0.60 (0.35, 0.91)	**0.02**	
Study Hospital			
BWH	0.69 (0.47, 1.02)	0.06	>0.99
MGH	0.69 (0.43, 1.09)	0.11	
Age			
65 and over	0.57 (0.34, 0.96)	**0.03**	0.95
Below 65	0.58 (0.37, 0.92)	**0.02**	
Hospital score			
5 or more	0.72 (0.38, 1.38)	0.32	0.34
Below 5	0.54 (0.35, 0.85)	**0.007**	
s-TOFHLA Literacy Score			
Adequate	0.71 (0.31, 1.63)	0.42	0.56
Inadequate to marginal	0.62 (0.39, 0.97)	**0.04**	
N/A	0.48 (0.27, 0.85)	**0.01**	
Elixhauser Comorbidity Score			
5 or more	0.52 (0.32, 0.84)	**0.01**	0.35
Below 5	0.64 (0.39, 1.03)	0.07	

Adjusted for arm, HOSPITAL readmission risk score, Elixhauser comorbidity score, ED visits in the previous 6 months, study month, season, SF-12 score; primary care practice and inpatient unit as random effects. **IRR: incidence rate ratio

Appendix 1 Table 4. Examples of adverse events in the control arm that could potentially been prevented by the intervention

Clinical History	Category of Adverse Event	How it Might Have Been Prevented
Patient with history of recurrent kidney stones and urinary infections admitted for urinary infection, discharged on trimethoprim/sulfamethoxazole (for methicillin-resistant staph aureus) and amoxacillin/ clavulanic acid (for enterococcus). Patient did not take the former antibiotic because thought she was supposed to take it after completing the course of the latter antibiotic. Readmitted for worsening urinary infection.	Adverse Drug Event due to patient non-adherence	Better education and counseling at discharge regarding discharge medication regimen; post-discharge phone call to confirm taking the correct medication regimen.
Patient with bipolar disorder and hemophilia A admitted after mechanical fall and trauma to left knee, found to have hemarthrosis, treated with analgesics and physical therapy. Given crutches to use at discharge, but patient decided not to take them home. Seen in follow-up, noted to have increased pain, due in part to full weight-bearing. Given crutches at that appointment.	Management error	Better coaching at discharge regarding need for partial weight-bearing and use of crutches. Follow-up phone call to ensure receipt of durable medical equipment and ability to carry out discharge plan.
Patient with metastatic uterine sarcoma admitted for debulking surgery. Was not discharged on stool softeners, regular diet ("advance as tolerated"). Called her providers a few days after discharge with increased abdominal pain and bloating. Instructed to scale back to a clear liquid diet and take	Management error	Better coaching at discharge regarding what to expect after surgery, danger signs to watch for, need to slowly advance diet, use of a bowel regimen.

laxatives, which relieved her symptoms.		
Patient admitted for a myocardial infarction, underwent cardiac catheterization with placement of a bare metal stent, discharged on several new medications, including high-dose atorvastatin. Patient informed at the pharmacy that medication required a prior authorization by his insurance, which was eventually obtained, but patient was without a statin for approximately 5 days.	Management error	Pharmacist-assisted medication reconciliation at discharge to ensure all medications covered at discharge.
Patient admitted with chest pain, found to have acute renal failure due to ANCA-positive vasculitis, treated with steroids, cyclophosphamide, rituximab, and plasmapheresis. Discharged to continue plasmapheresis. A few days after discharge, patient developed fatigue and weakness, contacted providers, who felt it was likely due to poor oral intake in the setting of plasmapheresis.	Procedural complication	Better education and coaching prior to discharge regarding potential side effects of plasmapheresis, need for good oral intake.
Patient with severe osteoarthritis admitted for elective total knee arthroplasty. Discharged with home health services. Developed cellulitis below the knee 1½ weeks after discharge, possibly from poor wound care at home.	Surgical complication	Better coaching around self-management at discharge and after discharge regarding wound care.
Patient with severe osteoarthritis admitted for total knee arthroplasty. Discharged on opioids and docusate, activity as tolerated. Developed constipation (no bowel movement for 5 days), noted	Adverse drug event; surgical complication	Counseling at discharge about possible constipation while on opioids and what to do if it occurs. Post-discharge call regarding development of any medication side effects. Counseling at discharge and

during follow-up, treated with polyethylene glycol laxative. Also developed bleeding from wound, likely from excessive flexion of the knee, placed in an immobilizer for 1 week.		after discharge regarding avoiding excessive knee flexion.

Appendix 1, Figure Legend

Appendix 1 Figure 1. Stepped Wedge Study Design

Diagram illustrates when each primary care practice was assigned to Usual Care and was switched to the Intervention arm. If a practice started the Intervention late, the dates of the actual start are shown in parentheses. The region of delay is shaded by a darker blue. Also shown are the number of patients in each study arm of each practice.

*For practices K and N, part of the practice started the intervention on one date, and part of the practice started the intervention at a later date.