

Tying Up Loose Ends

Discharging Patients With Unresolved Medical Issues

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Background: Patients are increasingly being discharged from the hospital with unresolved medical problems requiring outpatient follow-up. This study evaluates the frequency with which hospital physicians recommend outpatient workups to address patients' unresolved medical problems and the impact that availability of discharge summaries has on workup completion.

Methods: We conducted a retrospective cohort study of patients discharged from the medicine or geriatrics service of a large teaching hospital between June 1, 2002, and December 31, 2003. Each subject's inpatient medical record was reviewed to determine if the hospital physician recommended an outpatient workup. Subjects' outpatient medical records were then reviewed to determine if the workups were completed.

Results: Of 693 hospital discharges, 191 discharged patients (27.6%) had 240 outpatient workups recommended by their hospital physicians. The types of workups were diagnostic procedures (47.9%), subspecialty referrals (35.4%), and laboratory tests (16.7%). The most

common diagnostic procedures were computed tomographic scans to follow up abnormalities seen on previous radiographic studies and endoscopic procedures to follow up gastrointestinal tract bleeding. Of recommended workups, 35.9% were not completed. Increasing time to the initial postdischarge primary care physician visit decreased the likelihood that a recommended workup was completed (odds ratio, 0.77; $P = .002$), and availability of a discharge summary documenting the recommended workup increased the likelihood of workup completion (odds ratio, 2.35; $P = .007$).

Conclusions: Noncompletion of recommended outpatient workups after hospital discharge is common. Primary care physicians' access to discharge summaries documenting the recommended workup is associated with better completion of recommendations. Future research should focus on interventions to improve the quality and dissemination of discharge information to primary care physicians.

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THE HIGH INCIDENCE OF MEDICAL errors cited in the Institute of Medicine's report, *To Err Is Human*,¹ may underestimate the overall extent of the patient safety problem in the United States. The Institute of Medicine's report did not address errors that occur during the transition of patient care from the hospital to the outpatient setting. Studies by Forster et al²⁻⁴ show that between 19% and 23% of patients who were recently hospitalized experienced an adverse event after discharge. Many of the adverse events described in the studies by Forster et al were due to inadequate postdischarge follow-ups for patients' unresolved medical problems. With the introduction of prospective payment systems to hospitals, patients are being discharged from the hospital "quicker and sicker"^{5(p1980)}; therefore, outpatient follow-ups for patients' unresolved medical problems are becoming an increasingly important component of pa-

tient safety. Postdischarge follow-up evaluations for patients are commonly outlined by hospital physicians in discharge summaries, and the discharge summary has traditionally been the means by which informational continuity⁶ between hospital physicians and primary care physicians (PCPs) is maintained. Inpatient-to-outpatient informational continuity, usually in the form of the discharge summary, is the common thread ensuring that patient care is appropriately transitioned between hospital physicians and outpatient PCPs. However, few PCPs ever receive these discharge summaries prior to their patients' initial postdischarge visits.^{7,8} In addition, discharge summaries often lack sufficient information required for PCPs to adequately address patients' unresolved medical problems.⁹⁻¹¹

This study evaluates the frequency with which hospital physicians recommend outpatient workups to address patients' unresolved medical problems, the frequency

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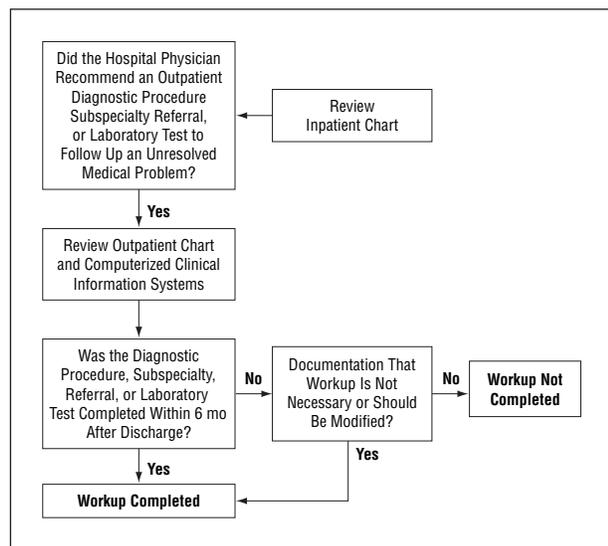


Figure 1. Algorithm for assessment of workup completion.

with which the recommended workups are completed, and the factors associated with workup completion. Specifically, we hypothesize that the availability of discharge summaries containing specific information regarding these follow-up evaluations will improve the likelihood that the recommended workups will be completed.

METHODS

STUDY SETTING AND POPULATION

Mount Sinai Medical Center is an 1100-bed tertiary care urban academic teaching hospital with affiliated general internal medicine and geriatrics ambulatory practices. The medical center has an inpatient and outpatient paper chart and a computerized clinical information system in which laboratory, radiographic, cardiology, and endoscopy results can be obtained. Hospital physicians must complete a paper discharge summary that remains in the hospital chart and is not available to outpatient PCPs; in addition, hospital physicians have the option of completing an electronic discharge summary that is viewable by PCPs in the medicine and geriatrics practices via the institution's computerized clinical information system.

We retrospectively reviewed for inclusion in the study the inpatient medical records of all patients discharged from the medicine or geriatrics services between June 1, 2002, and December 31, 2003, who subsequently had postdischarge follow-ups at the affiliated medicine or geriatrics practices within 2 months after discharge. All outpatient PCPs at the affiliated medicine or geriatrics practices were attending-level physicians, house staff physicians, or nurse practitioners.

DATA COLLECTION

Using a standardized chart abstraction form, a board-certified internist (C.M.) and a trained nurse abstractor collected the following information from each study patient's hospital medical record (including admission notes, daily progress notes, consultation notes, and the discharge note): (1) demographic characteristics, (2) medical comorbidities, (3) discharge diagnoses, and (4) outpatient diagnostic procedures, subspecialty referrals, and laboratory tests recommended by hospital physicians.

For each study patient discharged with a recommended outpatient diagnostic procedure, subspecialty referral, or laboratory test, we reviewed the outpatient medical record to determine if the recommended outpatient workup was completed within 6 months after discharge (Figure 1). If the outpatient workup was not completed within 6 months after discharge, we reviewed the outpatient medical record for documentation that the PCP either considered the recommended workup unnecessary or modified the workup plan. If this documentation was found, the workup was defined as completed. However, if there was no documentation that the workup was completed and no documentation in the outpatient chart that the workup was unnecessary (or otherwise modified), the workup was defined as not completed.

Finally, for each hospitalization, we determined if a discharge summary was available for that hospitalization and, if so, if it documented the recommended outpatient diagnostic procedure, subspecialty referral, or laboratory test. Discharge summaries were available via the institution's computerized clinical information system. After discharge summaries were created, they were posted on the computerized clinical information system and were viewable by physicians in the affiliated ambulatory primary care practices. Each discharge summary was date stamped when it first became available on the clinical information system so that the study investigators knew if a given discharge summary was available for viewing when a patient had an initial post-discharge visit with a PCP. The study was approved by the Mount Sinai School of Medicine institutional review board.

STUDY OUTCOME AND RELIABILITY APPRAISALS

The primary outcome of interest was completion of the recommended outpatient workup. Figure 1 shows how completion of a recommended workup was assessed. A workup was considered not completed if an outpatient diagnostic procedure, subspecialty referral, or laboratory test recommended by a hospital physician to address an unresolved medical problem was not completed or otherwise addressed (modified or determined unnecessary) after discharge. Information in the outpatient charts and clinical information systems was reviewed for evidence of workup completion within 6 months after discharge.

Two investigators independently reviewed 20 randomly selected sets of inpatient and outpatient medical records to assess interrater reliability for workup completion. Reviewers had high reliability on their judgments regarding workup completion (κ , 0.89).

DATA ANALYSIS

Descriptive statistics were calculated using the *t* test for continuous variables and the χ^2 test for dichotomous variables. Logistic regression was used to examine demographic, medical, and system factors associated with completion of recommended outpatient workups. The following covariates were evaluated in the univariate analysis: age, sex, ethnicity, insurance type, number of chronic medical diagnoses, length of hospitalization, time from discharge to outpatient PCP visit, level of outpatient provider training (attending-level physician, house staff, or nurse practitioner), continuity of outpatient provider, availability of the discharge summary to the outpatient PCP, and whether the discharge summary documented the recommended workup. Patient demographics (age, sex, ethnicity, and insurance type) and all covariates associated with workup completion at the $P < .20$ level in the univariate analyses were included in a multivariate model. All analyses controlled for patient clustering (patients with >1 hospitalization or recommended workup), and $P < .05$ was considered statistically significant. A computer program (Inter-

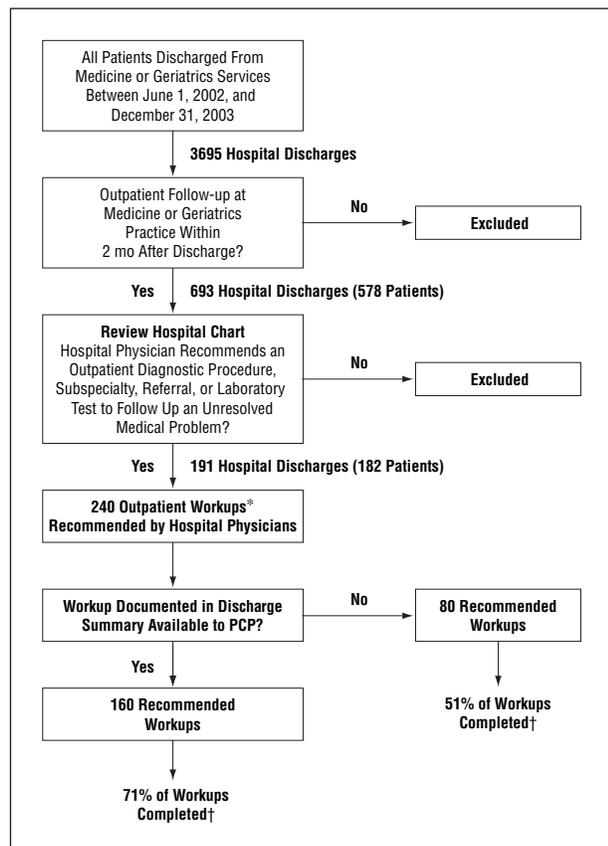


Figure 2. Study population. PCP indicates primary care physician. *Diagnostic procedure, subspecialty referral, or laboratory test. † $P = .003$ (Pearson χ^2 test).

cooled Stata for Windows, version 9.2; Stata Corp, College Station, Tex) was used for all calculations.

RESULTS

PATIENT CHARACTERISTICS

Of the 3695 hospital discharges during the study period, we selected the 191 discharges (representing 182 patients) in which (1) 1 or more outpatient diagnostic procedures, subspecialty referrals, or laboratory tests were recommended by a hospital physician to follow up the patient's unresolved medical problem; and (2) the patient had a postdischarge follow-up visit at the affiliated medicine or geriatrics practices within 2 months after discharge (**Figure 2**). Baseline patient characteristics are shown in **Table 1**. Most patients had either Medicaid or Medicare insurance, and about 11% had private insurance. Patients were hospitalized a median of 4 days, had a median of 4 medical comorbidities, and were seen for postdischarge follow-up visits with a PCP a median of 10 days after hospital discharge. The most common reasons for hospitalization were asthma exacerbation, chest pain, pneumonia, and congestive heart failure.

RECOMMENDED OUTPATIENT WORKUPS

Of 693 discharged patients, 191 (27.6%) had 1 or more outpatient workups recommended by hospital physicians to

Table 1. Baseline Characteristics of the 182 Patients*

Characteristic	Value
Age, y†	58 (15)
Female sex	132 (72.3)
Race	
Black	86 (47.1)
Hispanic	78 (42.9)
White	12 (6.8)
Other	6 (3.1)
Insurance	
Medicaid	90 (49.2)
Medicare	73 (40.3)
Private	19 (10.5)
Reason for hospitalization‡	
Asthma or chronic obstructive pulmonary disease	20 (11.0)
Chest pain	19 (10.5)
Pneumonia	18 (9.9)
Congestive heart failure	18 (9.9)
Gastrointestinal tract bleeding	16 (8.9)
Diabetic ketoacidosis or hyperglycemia	13 (6.9)
Acute renal failure	12 (6.4)
Deep vein thrombosis or pulmonary embolism	9 (4.7)
Urinary tract infection or pyelonephritis	8 (4.4)
Syncope	7 (4.2)
No. of comorbidities§	4 (2-5)
Length of hospitalization, d§	4 (3-7)
Time to the postdischarge visit, d§	10 (5-21)

*Data are given as number (percentage) of patients unless otherwise indicated.

†Data are given as mean (SD).

‡To conserve space, this is not a comprehensive listing. Several other reasons for hospitalization accounted for 1% to 3% each.

§Data are given as median (interquartile range).

Table 2. Recommended Outpatient Workups in 240 Patients

Workup Type	Total*	Completed†	
		Yes	No
Diagnostic procedure	115 (47.9)	50.4	49.6
Subspecialty referral	85 (35.4)	72.6	27.4
Laboratory test	40 (16.7)	85.0	15.0
Total	240 (100)	64.1	35.9

*Data are given as number (percentage) of the column total.

†Data are given as percentage of each workup type. $P < .01$ (Pearson χ^2 test) for the differences in completion rates for types of workups.

address unresolved medical problems, for a total of 240 recommended outpatient workups (**Table 2**). The recommended workups were in 3 categories: diagnostic procedures, subspecialty referrals, and laboratory tests. The most commonly recommended diagnostic procedures were computed tomographic scans to follow up abnormalities found on radiographic testing performed during hospitalization (34.8%), stress tests and echocardiograms to follow up patients with symptoms (chest pain and shortness of breath) consistent with cardiovascular pathological features (27.8%), and endoscopic procedures to determine the cause of gastrointestinal (GI) tract bleeding (23.5%).

The most commonly recommended subspecialty referrals were to cardiologists (16.5%), pulmonologists (15.3%), and gastroenterologists (10.6%) for workups of

Table 3. Data for the 56 Recommended Diagnostic Procedures That Were Not Completed

Type of Diagnostic Procedure*	No. of Procedures	Reasons for the Procedure
Radiologic		
CT scan of the chest	9	Assess lung nodule or mass, pleural effusion, and infiltrate found on previous radiography
CT scan of the abdomen or pelvis	2	Pericolic abscess and kidney mass
CT or MRI of the brain	2	Dementia workup and seizure workup
MRI of an extremity	2	Shoulder pain and knee pain
Carotid ultrasonography	1	Recent stroke
Abdominal ultrasonography	1	Gallstone pancreatitis
PET scan	1	Metastatic workup
Chest radiograph	1	Lung nodule on admission chest radiograph
Cardiovascular		
Stress test	8	Chest pain, shortness of breath, and ECG abnormality
Echocardiogram	4	Shortness of breath, stroke, and syncope
Cardiac catheterization	1	Recent myocardial infarction
Electrophysiologic testing	1	Severely decreased left ventricular function and left bundle branch block
Lower extremity plethysmography	1	Lower extremity edema
Event monitor	1	Rule out cardiac arrhythmia
Gastrointestinal		
Colonoscopy	12	Gastrointestinal tract bleeding and rule out malignancy
Esophagogastroduodenoscopy	2	Abdominal pain
Pulmonary		
Sleep study	4	Assess for obstructive sleep apnea
Pulmonary function tests	3	Shortness of breath and low oxygen saturation

Abbreviations: CT, computed tomography; ECG, electrocardiography; MRI, magnetic resonance imaging; PET, positron emission tomography.

*Of the 56 procedures, 19 (33.9%) were radiologic, 16 (28.6%) were cardiovascular, 14 (25.0%) were gastrointestinal, and 7 (12.5%) were pulmonary.

abnormalities found on inpatient stress tests, worsening chronic lung disease, and GI tract bleeding, respectively.

The most commonly recommended outpatient laboratory tests were to monitor anticoagulation for patients receiving warfarin therapy (60.0%). Many of these patients began receiving warfarin during their hospitalizations or had subtherapeutic or supratherapeutic anticoagulation levels during their hospitalizations. Finally, approximately 18% of recommended laboratory tests were to check electrolyte levels in patients at high risk for, or with previous, electrolyte abnormalities.

Table 4. Data for the 23 Recommended Subspecialty Referrals That Were Not Completed

Subspecialty	No. of Referrals	Reasons for the Referral
Urology	3	Bladder mass, epididymal abscess, and nephrolithiasis
Gastroenterology	2	Gastrointestinal tract bleeding and esophageal ulcer on inpatient endoscopy
Cardiology	2	Dilated cardiomyopathy and workup cause of pulmonary edema
Pulmonary	2	Abnormal chest computed tomographic scan and sarcoidosis
Neurology	2	Syncope and workup for seizures
Otolaryngology	2	Facial nerve paralysis and angioedema (tongue swelling)
Dermatology	2	Facial rash and hyperpigmented lesion on the knee
Rheumatology	2	Acute gout and shoulder pain
Nephrology	2	Renal vein thrombosis and renal failure
Orthopedics	2	Dislocated hip
Surgery	1	Infected wound
Psychiatry	1	Homicidal ideation and depression with psychotic features

RECOMMENDED WORKUPS NOT COMPLETED AFTER DISCHARGE AND AVAILABILITY AND COMPLETENESS OF DISCHARGE SUMMARIES

Approximately 36% of recommended workups were not completed (Table 2). The type of workups most likely to be completed were laboratory tests (85.0%), and the least likely to be completed were diagnostic procedures (approximately 50.4%). The difference in completion rates between the different types of recommended workups was significant ($P < .001$).

Table 3 shows the recommended diagnostic procedures that were not completed. Approximately 34% were outpatient radiographic studies (most commonly recommended to follow up abnormal radiographic studies performed during the hospitalization), and 28.6% were outpatient cardiovascular studies (usually outpatient stress tests and echocardiograms to follow up patients admitted with chest pain). Of the diagnostic procedures not completed, 25.0% were outpatient GI tract studies (usually colonoscopies) to follow up patients with GI tract bleeding or patients with suspected GI tract malignancies.

Table 4 shows the recommended subspecialty referrals that were not completed. The types of referrals not completed were distributed over 12 different subspecialties, with no 1 subspecialty predominating.

The recommended outpatient laboratory tests most often not completed were to monitor anticoagulation (for 2 patients receiving warfarin) and to monitor liver function (for 2 patients taking multiple antituberculin medications). Also, 1 test for electrolyte levels (for a furosemide dose that increased during hospitalization) and 1 urinalysis (for hematuria observed during hospitalization) were not completed.

Table 5. Univariate and Multivariate Associations With Completion of Recommended Outpatient Workups

Characteristic*	Univariate Association		Multivariate Association	
	Odd Ratio (95% Confidence Interval)	P Value	Odd Ratio (95% Confidence Interval)	P Value
Female sex	0.44 (0.23-0.84)	.01	0.49 (0.24-1.01)	.05
Age (per 10 y)	0.99 (0.82-1.19)	.91	0.92 (0.71-1.19)	.53
Race				
Hispanic	1.79 (1.02-3.14)	.04	1.57 (0.85-2.90)	.15
White	2.77 (0.73-10.48)	.14	2.78 (0.62-12.51)	.18
Other	0.75 (0.18-3.17)	.70	1.04 (0.21-5.22)	.96
Insurance type				
Medicaid	0.73 (0.31-1.69)	.46	NA	NA
Medicare	0.98 (0.41-2.33)	.97	NA	NA
Length of hospitalization	0.96 (0.91-1.01)	.11	0.94 (0.88-0.99)	.04
Time to first postdischarge visit (in weeks)	0.77 (0.66-0.90)	.001	0.77 (0.65-0.91)	.002
No. of medical comorbidities	1.01 (0.88-1.15)	.89	NA	NA
Provider type				
House staff physician	1.43 (0.64-3.19)	.39	NA	NA
Nurse practitioner	3.61 (0.38-34.68)	.27	NA	NA
Outpatient physician continuity				
Saw patient 1 time before	1.71 (0.51-5.72)	.39	NA	NA
Saw patient ≥2 times before	1.07 (0.53-2.19)	.84	NA	NA
Discharge summary available†	1.59 (0.52-4.91)	.42	NA	NA
Workup documented in discharge summary	2.35 (1.34-4.10)	.003	2.35 (1.27-4.36)	.007

Abbreviation: NA, data not applicable.

*The reference for ethnicity was black; for insurance type, private insurance; for provider type, attending physician; and for outpatient physician continuity, seeing the patient for the first time.

†The discharge summary was available to the primary care physician for viewing on the computerized clinical information system at the initial postdischarge visit.

Discharge summaries were available to PCPs in 94.6% of cases; however, outpatient workups recommended by hospital physicians were documented in discharge summaries in only 45.6% of cases.

UNIVARIATE AND MULTIVARIATE PREDICTORS FOR COMPLETION OF RECOMMENDED WORKUPS

In the univariate analysis (**Table 5**), female sex and increasing time (in weeks) to the initial postdischarge PCP visit decreased the likelihood that a recommended workup was completed. Having the recommended workup documented in the discharge summary and Hispanic ethnicity increased the likelihood that a recommended workup would be completed. Having the discharge summary available alone (irrespective of whether the recommended workup was documented in the summary) was not significantly associated with workup completion.

In the multivariate model, increasing time to the initial postdischarge follow-up visit and increasing length of hospitalization were associated with decreased likelihood that a recommended workup would be completed. Conversely, having the recommended workup documented in the discharge summary increased the likelihood that a recommended workup would be completed.

COMMENT

Our study evaluates the outpatient workups recommended by hospital physicians to address patients' unresolved medical problems. One in 4 patients in our study

had at least 1 outpatient workup recommended by a hospital physician; however, 35.9% of the recommended workups were not completed after hospital discharge. The most common recommended workups not completed were radiographic, cardiovascular, and GI tract imaging procedures to follow up previously abnormal radiographs, patient symptoms suggestive of cardiovascular pathological features, and GI tract bleeding, respectively. Typical scenarios we found were patients with admission chest radiographs suggestive of incidental pulmonary nodules, in which case hospital physicians subsequently recommended outpatient computed tomographic scans of the chest to further evaluate the nodules. Other common scenarios were patients found to have heme-positive stool specimens during their hospitalizations who were subsequently given outpatient follow-ups for colonoscopies and patients experiencing chest pain during their hospitalizations who were given follow-ups for outpatient stress tests after ruling out for myocardial infarctions. Failure to complete these recommended workups has been described as a type of medical error or discontinuity error that may potentially put recently discharged patients at higher risk for adverse outcomes.¹² Future research should focus on whether these patients experience harm as a result of their outpatient workups not being completed.

We found consistent and significant decreases in information about patients' discharge plans documented in their discharge summaries when compared with the discharge plans documented in their hospital charts. Just more than half (54.1%) of all discharge summaries failed to document the recommended outpatient workups that were

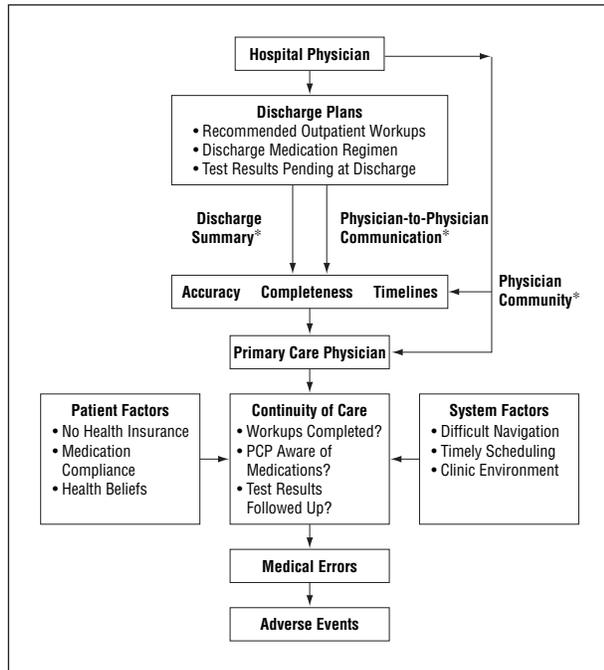


Figure 3. Conceptual framework for inpatient-to-outpatient transitions of care. PCP indicates primary care physician. *A mechanism of informational continuity.

clearly documented in patients' hospital charts. Therefore, it is not surprising that we found no association between availability of discharge summaries to PCPs and improved completion of recommended outpatient workups. This finding is consistent with the study by van Walraven et al,⁷ which found no significant association between hospital readmission and the availability of discharge summaries to PCPs. Other studies^{9,11,13} have shown similarly suboptimal dissemination and poor quality of discharge summaries. In our study, there was an association between the availability of discharge summaries documenting recommended outpatient workups and higher completion rates of workups. Therefore, it is not sufficient for outpatient PCPs to simply receive patients' discharge summaries; the discharge summaries must document pertinent details about patients' discharge plans to ensure inpatient-to-outpatient continuity of care.

Our study has several limitations. First, the study was conducted at a single academic medical center in a predominantly adult black and Hispanic patient population with a relatively small sample size, thus limiting its generalizability. We were unable to determine outcomes for patients who did not have postdischarge follow-ups at our institution. Given that there is no existing mechanism to disseminate discharge summaries to PCPs outside of our institution, presumably the workup error rate would be higher in this patient population because the outpatient PCPs would not have had access to discharge summaries or our institution's computerized clinical information system. Therefore, our study likely underestimates the overall rate at which recommended outpatient workups are not completed. Conversely, because we did not include patients who had postdischarge follow-ups at other institutions, we may have overestimated the "true" frequency with which hospital

physicians recommend outpatient workups. It is conceivable that hospital physicians would be more likely to keep patients in the hospital to have their workups if they are unsure where patients will have their outpatient follow-ups. Second, we relied on documentation in the medical record to determine if recommended workups were completed. It may be that many PCPs were aware of the recommended workups but chose to modify or cancel the workup without documenting this fact in the medical record. Third, our study was conducted at a single institution with no electronic medical record. Therefore, our results may not be generalizable to institutions with an electronic medical record and it may be that institutions with electronic medical records have higher-quality inpatient-to-outpatient continuity of care. Finally, hospital physicians who document specific discharge plans in the discharge summary may be systematically different from physicians who do not. For example, hospital physicians who document specific discharge plans in discharge summaries may be more likely to communicate discharge plans to patients' PCPs (via telephone and e-mail), thus increasing the likelihood that recommended discharge plans will be completed.

To discuss the implications that our study results have for clinical practice, there must be a conceptual framework for assessing inpatient-to-outpatient transitions of care (Figure 3). Our study shows that patients are frequently discharged from the hospital with unresolved medical problems requiring outpatient workups and that these workups are often not completed. In addition, other medical errors related to discontinuity of care can occur; hospitalized patients may have changes made to their medication regimens, and these changes may go unnoticed by the outpatient PCP.^{12,14,15} Also, approximately 11% of patients have abnormal test results that become known after hospital discharge but that are still pending at discharge; however, PCPs are frequently unaware of the abnormal results.¹⁶ Failure to preserve inpatient-to-outpatient continuity of information⁶ may put patients at greater risk for posthospital medical errors and subsequent adverse events. Informational continuity, in the form of discharge plans that define and address posthospital management issues, can be preserved via 1 of 3 mechanisms: the discharge summary, physician-to-physician communication, and physician continuity (Figure 3). Our study findings strongly suggest that, at a minimum, all communications regarding patients' discharge plans should include a list of patients' unresolved medical problems and the plans to address those problems, as well as patients' discharge medication regimens and the test results that are still pending at hospital discharge. Future research efforts should focus on developing technologies to facilitate dissemination of accurate, complete, and timely discharge summaries to PCPs and on assessing the effect on posthospital medical errors and adverse events. Advances in health information technology solutions, such as patient health smart cards and Web portals, offer the promise that patients' discharge information will be more readily available to PCPs in a timely manner.

As our conceptual framework illustrates, other mechanisms for maintaining informational continuity exist and, in some cases, have been shown to improve patient care. Inpatient-to-outpatient physician continuity has been

shown to improve posthospital outcomes.^{17,18} A study by van Walraven et al¹⁸ found that recently discharged patients had decreased adjusted risks of death or readmission if they had postdischarge follow-ups with the same physicians who cared for them during hospitalization. Similarly, Diem et al¹⁷ reported that recently discharged patients who had a postdischarge follow-up with the physicians who cared for them during hospitalization had fewer emergency department visits within 1 month after discharge. However, in some environments with hospitalist models of care, PCPs are telephoned by hospital physicians as the preferred mechanism for maintaining informational continuity.¹⁹

In addition to informational continuity, patient factors, such as medication compliance and health beliefs, may influence the rate of posthospital medical errors and adverse events. Omori et al¹⁴ found that half of all recently discharged patients were nonadherent with their discharge medication regimens, including incorrect addition or deletion of drugs. Schnipper et al²⁰ found unexplained discrepancies between discharge medication lists and postdischarge regimens in 29% of patients. In addition, some patients may believe that the physical discomfort anticipated from a recommended outpatient diagnostic procedure (eg, colonoscopy or mammography) is not worth the perceived benefit.²¹

System barriers may also facilitate medical errors and adverse events during transitions of care. For example, if the health care system is difficult for patients to navigate, some patients may become frustrated and give up trying to complete recommended outpatient workups. In this regard, patient navigators, who coordinate and facilitate patients' care, have been used to help patients successfully complete follow-ups for abnormal diagnostic screening test results.^{22,23} Future research should therefore focus not only on improving inpatient-to-outpatient informational continuity but on investigating modifiable patient and system barriers that may affect completion rates of recommended outpatient workups, adherence to discharge medication regimens, and follow-up of abnormal test results still pending at hospital discharge.

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