

Reducing Patient Retriage and Improving Physician Attitudes by Provision of Consensus Workup Guidelines in the Emergency Department

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Abstract

- **Objective:** To implement a quality improvement project that entailed explicit detailing of internal medicine expectations of emergency medicine (EM) physicians' evaluations for major diagnoses in order to reduce retrriages and improve relationships between EM physicians and internal medicine residents and hospitalists.
- **Design:** Pre/postintervention study.
- **Setting:** Community teaching hospital.
- **Participants:** EM physicians, medical residents, and hospitalists.
- **Measurements:** An electronic audit tool was created that allowed residents to record whether agreed-upon tests for individual patients were being checked by the EM physicians prior to admission. Retriage rates and attitude survey results before and after interventions were compared.
- **Results:** During the baseline period, EM physicians whose workups were judged satisfactorily complete in $\geq 89\%$ of the audited cases had no cases retriated in the audited sample. Following the interventions, the overall complete workup rate rose from baseline of $89\% \pm 11\%$ to $94\% \pm 5\%$ ($P < 0.01$) and the retrriage rate fell from 5.2% to 1.5% ($P = 0.02$) of all cases recorded in the resident audits. However, the surveys at the end of the project failed to reveal an improvement in perceived behaviors of the physicians.
- **Conclusion:** Explicit evaluation guidelines can lead to more efficient management but are inadequate for improving relationships between EM and internal medicine physicians.

In virtually all fields of medicine, the working relationships among medical colleagues are essential for the proper management of patients. The rapport between emergency medicine physicians and internal medicine

residents and hospitalists is frequently subject to stress due to different patient care role expectations, especially when these groups sequentially evaluate patients in the emergency department (ED). The primary goals of emergency medicine physicians in the management of patients are to correctly diagnose major ailments, stabilize patients, and triage them to admission or discharge. The initial goals of residents and hospitalists are to thoroughly evaluate patients' conditions and develop a comprehensive differential diagnosis and management plan. Residents and hospitalists commonly require a broader information base to accomplish their goals than emergency medicine physicians and, hence, may become frustrated when the evaluations by emergency medicine physicians do not meet their expectations.

One result of these different goals may be that residents and hospitalists countermand the decision regarding the level of care for admitted patients made by the emergency medicine physicians. These retrriage decisions may be based on additional information or because patients deteriorate during their extended evaluation. Such retriering also introduces delays and inefficiencies in the admission process because new beds need to be identified and prepared and nursing reports redone. In our institution, residents and hospitalists reported retrriages as a major cause of miscommunication and poor working relationships with emergency medicine physicians. Also, differences in residents' and emergency medicine physicians' goals can lead to emergency medicine physicians perceiving the residents as not expediting transfer of patients out of the ED because of the residents' focus on a complete immediate evaluation. We therefore implemented a quality improvement project that

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entailed explicit detailing of internal medicine expectations of emergency medicine physicians' evaluations for major diagnoses in order to reduce retrriages and improve relationships between emergency medicine physicians and residents and hospitalists.

Methods

Setting and Practice

Norwalk Hospital is a 328-bed, university-affiliated community teaching hospital in an urban center. Residents provide care for about 80% of the medical patients, 60% of whom are placed on a hospitalist teaching service. Patients are primarily admitted through the ED. Emergency medicine physicians are charged with performance of evaluation, admission decision, and assignment of patients to general medicine, telemetry, or intensive care units (ICUs). Emergency medicine physicians are expected to notify the residents prior to patients transferring from the ED, which typically prompts the residents to come to the ED to assess the patients. Residents and hospitalists may change level of care (triage) decisions made by emergency medicine physicians for the admitted patients.

Surveys

Two surveys were administered during the study: 1 to medical residents and hospitalists and 1 to emergency medicine physicians. The survey contained 7 or 8 statements regarding appropriateness of emergency medicine physicians' or residents' diagnostic evaluations, admission and triage decisions, and documentation and whether level of communication, cooperation, and respectfulness was satisfactory. Respondents were asked to select the percentage decile that corresponded with the percentage of time they agreed with each statement. In order to ensure confidentiality, each respondent was assigned a unique coded identifier and the data were recorded in a database by an independent party. Surveys were administered during the baseline observation period and then readministered to the same individual physicians following the intervention.

Intervention

We formulated order sets for 12 major diagnoses and monitored use via computerized physician order entry. First, the 12 most common discharge diagnoses for internal medicine were identified through a billing database: pneumonia, chest pain, stroke, pancreatitis, alcohol withdrawal, congestive heart failure, chronic obstructive pulmonary disease exacerbation, seizure, altered mental status, atrial fibrillation, deep venous thrombosis, and pulmonary embolism. Then, a working group comprising senior hospitalists, project organizers, and the emergency medicine chairman was convened to agree on the basic diagnostic testing that should be

obtained in the ED prior to the admission and triage decision by the emergency medicine physician for those 12 diagnoses. The test results affecting triage decision and patient stability that needed to be reviewed by the emergency medicine physician before admission decision and transfer were also identified. The selected diagnostic tests were reviewed by the full hospitalist and emergency medicine physician staffs and their suggestions incorporated and consensus reached. No specific actions to encourage adherence by emergency medicine physicians to use these testing guidelines were made during the 10-month baseline period.

An electronic database (Lotus Notes 6.5, IBM, Cambridge, MA) was constructed for medical residents to enter their assessments of emergency medicine physician performance in ordering the agreed-upon tests, responding to test results, and appropriately triaging patients admitted with the 12 designated principal diagnoses. Cases with at least 1 of the 12 designated admitting diagnoses were included in the analysis. The database included yes/no questions regarding diagnostic tests performed such as blood counts, chemistry panels, and computed tomography scans and questions regarding need for retrriage as well as global completeness of workup. Specifically, the residents were asked to note whether the workup by the emergency medicine physician was satisfactorily complete for the primary and secondary admitting diagnoses, regardless of whether all the agreed-upon tests were performed and appropriately responded to by the emergency medicine physician. Residents entered their evaluations Monday through Friday during resident morning report about the preceding days' patients. Information about patients admitted after report on Friday and on Saturday was generally not entered into the database. Because of time constraints during morning report, the resident audits were not mandated. Residents did receive regular reminders at morning report by chief residents and study sponsors as well as by text messaging.

Following the 10-month baseline period, the emergency medicine physicians were actively encouraged to adhere to the agreed-upon order sets for the workups of the 12 designated diagnoses. Emergency medicine physicians received report cards containing their individual and group retrriage rates and residents' ratings regarding the completeness of their ED evaluations. Each emergency medicine physician's performance was known only to that physician and the non-emergency medicine study organizers (SG, JF).

Electronic order sets for patients with problematic diagnostic complaints such as chest pain, shortness of breath, and change in mental status were created. Reminders about the essential tests that should be performed before admission were posted in the emergency medicine physician work areas. Academic detailing by the study organizers (SG, JF) was performed through individual meetings with

Table 1. Case Distribution by Primary Diagnosis

	Cases, <i>n</i> (%)	
	Preintervention	Postintervention
Change in mental status	30 (9.1)	44 (16.2)*
Atrial fibrillation	18 (5.6)	13 (4.8)
Chest pain	76 (23.0)	63 (23.2)
CHF	41 (12.4)	28 (10.3)
COPD	30 (9.1)	24 (8.8)
Pneumonia	44 (13.3)	40 (14.7)
Pulmonary embolism	14 (4.2)	7 (2.6)
Deep vein thrombosis	8 (2.4)	3 (1.1)
Seizure	15 (4.6)	12 (4.4)
Stroke	33 (10.0)	18 (6.6)
Pancreatitis	9 (2.7)	9 (3.3)
Alcohol withdrawal	12 (3.6)	11 (4.0)
Total	330	272

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease.

**P* value = 0.01.

emergency medicine physicians in regard to their individual performance of triage and completeness of workup. In addition, a group meeting was held between emergency medicine physicians, hospitalists, department chiefs, and a senior administrator to address communication issues and attitudes.

Data Analysis

A Cronbach's alpha was performed to assess the reliability of the survey questions, and the absolute difference between pre and post data was calculated. A 2-sample *t* test and a Mann-Whitney test were performed on the pre and post survey questions to assess for a significant change in responses. A correlation coefficient was calculated for retriages and number of complete cases per emergency medicine physician, and retriages were evaluated to assess the relationship with specific diagnoses. A *t* test was performed to evaluate differences in case distribution before and during interventions. A kappa coefficient was calculated for completion rates based on resident report and completion of required tests and a *t* test was performed on individual diagnoses to evaluate for significant changes pre- and postintervention.

Results

During the baseline observation period (15 February 2006–13 November 2006), medical residents entered audits on 330 primary cases or a total of 352 audited diagnoses. During the intervention period (15 November 2006–19 May 2007), residents entered audits on 272 primary cases or a total

Table 2. Retriage Rate by Primary Diagnosis

Diagnosis	Retriages, <i>n</i> (%)		<i>P</i> Value
	Preintervention	Postintervention	
Change in mental status	4 (13.0)	0 (0)	0.01
Atrial fibrillation	1 (5.6)	1 (7.7)	0.81
Chest pain	3 (4.0)	1 (1.6)	0.40
CHF	2 (4.9)	0 (0)	0.23
COPD	2 (6.7)	0 (0)	0.19
Pneumonia	1 (2.3)	2 (5.0)	0.50
Pulmonary embolism	1 (7.1)	0	0.47
Deep venous thrombosis	0	0	—
Seizure	2 (13.0)	0	0.19
Stroke	1 (3.0)	0	0.46
Pancreatitis	0	0	—
Alcohol withdrawal	0	0	—

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease.

of 304 audited diagnoses. All residents participated in the data entry. The distribution of diagnoses during these time periods was approximately the same, except for change in mental status (Table 1).

During the baseline observation period, the audited retriage rate was 5.2%, ranging from 13% for patients admitted with change in mental status to 0% for patients with alcohol withdrawal. Thirteen of 17 retriages (76%) were initially admitted to the floor by the emergency medicine physician and then reassigned by the residents to either telemetry or ICU. The mean \pm SD satisfactorily complete workup rate based on resident appraisal for the 17 emergency medicine physicians was 89% \pm 11%. All of the 9 emergency medicine physicians with satisfactorily complete workup rates greater than 89% had no retriages on the resident audit. All emergency medicine physicians with less than the mean satisfactorily complete workup rates had at least 1 retriage associated with their care on the resident audit. The correlation coefficient between observed retriage cases and resident designated complete workup as a variable for likelihood of retriage was 0.83. The majority of cases retriaged were deemed "workup not satisfactorily complete" by the medical resident.

Following the intervention, the satisfactorily complete workup rate rose to 94% \pm 5% (*P* < 0.01) and the retriage rate fell to 1.5% (*P* = 0.02). During this period, retriages were reported only for pneumonia, chest pain, and atrial fibrillation cases (Table 2). Change in mental status was the only specific diagnosis that showed a significant decrease in retriage rate postintervention (*P* = 0.01).

Table 3. Completeness of Emergency Department Workup Assessed by Test Performance and Medical Residents

Diagnosis	Preintervention				Postintervention			
	No. of Cases	Test	Resident	Kappa	No. of Cases	Test	Resident	Kappa
Pneumonia	48	38	40	0.86	48	45	37	0.37
Chest pain	85	72	66	0.82	68	63	49	0.34
Stroke	34	13	25	0.36	20	12	13	0.89
Pancreatitis	9	0	9	0	9	1	6	0.12
Alcohol withdrawal	12	0	7	0	11	0	6	0
CHF	45	2	36	0.02	33	3	25	0.06
COPD	31	28	27	0.84	27	26	22	0.29
Seizure	16	3	9	0.30	14	3	8	0.34
Altered mental status	30	0	19	0	46	1	36	0.01
Atrial fibrillation	19	0	14	0	14	0	10	0
Pulmonary embolism	15	5	8	0.61	9	7	8	0.61
Deep vein thrombosis	8	2	7	0.09	5	2	5	0

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease.

Almost no change in test ordering pattern for the audited diagnoses occurred during the intervention period compared with the preintervention period. For all diagnoses, $73\% \pm 16\%$ of the required tests were done in the preintervention period and $82\% \pm 13\%$ of the required tests were performed during the intervention period. For individual diagnoses, the percentage of tests performed ranged from $97\% \pm 14\%$ for pneumonia to $53\% \pm 31\%$ for alcohol withdrawal. Some tests such as complete blood count and pulse oximetry were almost always performed during both periods of observation for pneumonia and other tests such as magnesium in alcohol withdrawal and drug screen in altered mental status were almost never done during either period. There was poor and inconsistent agreement between the complete workup rate as determined by all the recommended tests being ordered and the satisfactorily complete workup rates as judged by the residents (Table 3).

The surveys were administered during the baseline observation period in the spring of 2006 and during the intervention period in the spring of 2007 to the same group of medical residents ($n = 17$), hospitalists ($n = 7$), and emergency medicine physicians ($n = 10$). The Cronbach's alpha for reliability of the survey showed a reliability coefficient greater than 0.70 for all 3 surveys, indicating that the survey was reliable: 8 questions in the medical resident survey had reliability coefficients ranging from 0.75 to 0.81; 7 questions in the emergency medicine physician survey had reliability coefficients ranging from 0.81 to 0.86; and 8 questions in the hospitalist survey had reliability coefficients ranging from 0.83 to 0.89. Overall, minimal changes in perceived behavior were recorded (Table 4, Table 5, and Table 6). Monitoring of electronic medical records revealed minimal utilization by

the emergency medicine physicians of the diagnosis-related order sets that were specially created to streamline their evaluations and aid adherence to the recommended workups.

Discussion

We found that an intervention involving explicit communication of evaluative workup combined with feedback on performance was associated with a 71% decrease in the audited retriage rate for patients admitted through the ED. A strong correlation between the performance of satisfactorily complete workup by emergency medicine physicians as judged by admitting internal medicine residents and the likelihood of retriage was also documented. The association between the improvement in the residents' subjective assessment of workup completion and the striking decrease in retriage rate implies that the intervention had a salutary effect on both of these parameters.

The means by which the intervention impacted emergency medicine physician performance and/or resident judgment is unclear, however. The improvement in satisfactorily complete workup was not well supported by changes in test ordering practices. Furthermore, there was inconsistent and often poor agreement between the residents' judgment of satisfactorily complete and the recommended tests being performed. This discrepancy may be due to unaccounted for changes in emergency medicine physician behavior. For example, most retrriages in the preintervention period entailed assignment of patients to higher-acuity beds by the residents. During the intervention period, emergency medicine physicians may have increased their admissions to telemetry and thus lessened the likelihood of resident disagreement and retriage. Another possibility is that the

Table 4. Hospitalist Survey Results

Statement	Average Agreement	
	Preintervention	Postintervention
The diagnostic evaluation by EM physicians is appropriate	0.64	0.67
I agree with EM physicians' admission decisions	0.76	0.79
I agree with EM physicians' triage decision	0.70	0.79
Patients are ready for transport when I am notified about the admission by EM physicians	0.71	0.73
Communication between EM physicians and me is effective	0.57	0.53
Documentation by EM physicians is satisfactory	0.34	0.26
EM physicians deal respectfully with me	0.89	0.90
EM physicians and I cooperate in care of patients	0.81	0.79

EM = emergency medicine.

emergency medicine physicians and residents communicated better, although this behavioral change was not well reflected in the attitude surveys.

Despite the decrease in retrriages and improvement in resident satisfaction with emergency medicine physician workups for the targeted diagnoses, emergency medicine physician satisfaction with the residents' performance in regard to expediting patient transfer decreased. A possible explanation for this occurrence may be that the residents prefer to workup patients in the ED due to the availability of nurses and the proximity of imaging services. Residents commonly state their belief that imaging studies ordered in the ED are more rapidly done than those tests ordered on the medical ward. Conversely, surveyed opinions of the internal medicine residents and their hospitalist attendings about the emergency medicine physicians' overall performance changed minimally following the intervention. Hence, although a chief point of contention, namely retrriages, was addressed, other factors continued to dictate general attitudes. Single cases of controversy, for example, may have continued to undermine any trust potentially accrued by the decline in retrriages and improvement in satisfactory workups.

In 2006, the Institute of Medicine report that addressed the challenges facing EDs noted that delays in the ED lead to poor medical outcomes, increased cost from waste and rework, frustrated patients, and potential harm [1]. The overlap in patient care by emergency and internal medicine phy-

Table 5. Resident Survey Results

Statement	Average Agreement	
	Preintervention	Postintervention
The diagnostic evaluation by EM physicians is appropriate	0.65	0.72
I agree with EM physicians' admission decisions	0.69	0.68
I agree with EM physicians' triage decisions	0.69	0.73
Patients are ready for transport when I am notified about the admission by EM physicians	0.64	0.65
Communication between EM physicians and me is effective	0.63	0.74
Documentation by EM physicians is satisfactory	0.64	0.66
EM physicians deal respectfully with me	0.83	0.88
EM physicians and I cooperate in care of patients	0.81	0.79

EM = emergency medicine.

Table 6. Emergency Medicine Physician Survey Results

Statement	Average Agreement	
	Preintervention	Postintervention
Residents limit their ED evaluation to triage decision	0.29	0.21
Residents perform tasks necessary to move patients out of ED	0.47	0.36
I agree with residents' triage decisions	0.74	0.72
Residents respond in a timely manner when called for an admission	0.60	0.55
Communication between residents and me is effective	0.76	0.78
Residents deal respectfully with me	0.88	0.85
Residents and I cooperate in care of patients	0.87	0.86

ED = emergency department.

sicians leads to redundant evaluations and retrriageing that, in turn, causes delays that contribute to this ED overcrowding, with the attendant impact on patient care and patient satisfaction. Defining and enforcing the roles of the emergency and internal medicine physicians in the emergency evaluation and treatment of these patients may reduce this overlap in patient care and thereby expedite patient transfer out of the ED to the hospital ward. Good relationships and

communication between emergency medicine physicians and medical residents and hospitalists is crucial to appropriate evaluation and patient handoff [2].

An important limitation of this study derives from the use of resident audits to collect data on completion of emergency medicine physician workup and retrriages. Because of the time constraints placed on the residents, cases were entered on a convenience basis and may not have been representative. Recall bias and selection bias may also have occurred, with the residents more likely entering distressing cases and, during busy times, foregoing data entry. All residents recorded cases, but an imbalance may have occurred in the number of potential cases each resident could have entered because of variable admission rates. In addition, because the intervention period spanned more of the busy winter months than the preintervention period, the lack of improvement in perceptions by the internal medicine physicians during the intervention period despite the decrease in retrriages may have reflected greater intolerance due to the heavier winter work load. Also, although some tension between emergency medicine and internal medicine physicians is inherent in their different roles, our single-center study findings may not be generalizable to nonteaching institutions, hospitals with different admission policies, or even different types of residencies.

As seen in our study, just adding order sets and clarifying expectations in regards to laboratory testing and examinations does not influence the overall working attitudes between medical teams and emergency medicine physicians. This study shows that such interventions are not likely to be sustainable without attitude changes between the physicians involved. Constructing ways to facilitate attitude change and opening lines of communication between emergency medicine physicians and medical teams through structured meetings or combined conferences regarding retrriage cases and unsatisfactory workups may be helpful to improve understanding of the different management goals. An admission policy that entails direct communication of

admissions between emergency medicine physicians and hospitalists has been shown to improve working relationships between the departments, although attitudes and retrriage rates were not directly measured [3]. A similar change has been made at our institution and may provide an avenue for improved communication.

Hospitals may need to devise incentives to improve communication and design systems to align the perspectives of the emergency medicine physicians and hospitalists. Recognition of the cultural and medical divides between emergency medicine and internal medicine physicians needs to be acknowledged by the physicians and hospital systems, as this is adversely impacting patient care and patient satisfaction. Hospital systems and physicians must work together to integrate our roles more successfully to improve communication and quality of patient care.

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