

House Staff Member Awareness of Older Inpatients' Risks for Hazards of Hospitalization

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Background: Many hospitalized older adults develop iatrogenic complications unrelated to their presenting diagnoses that can result in longer hospitalizations, functional impairment, or unanticipated medical or surgical interventions. These complications are often referred to as "hazards of hospitalization" and include delirium, malnutrition, urinary incontinence, pressure ulcers, depression, falls, restraint use, infection, functional decline, adverse drug effects, and death. The aims of this study were to assess house staff member awareness of older patients' risk factors for developing hazards of hospitalization and to determine areas in which interventions may help improve recognition.

Methods: A cross-sectional study was performed, from December 1, 1999, through August 31, 2002, of internal medicine and medicine or pediatric house staff members and their patients from 4 medical units at Mount Sinai Medical Center. Each house staff member completed a 23-item survey on 3 of their recently admitted patients. These patients and, if appropriate, their surrogates were interviewed by the study investigator within 2 hours of the completion of the house staff survey. House staff member responses are compared with those obtained by the study investigator. The completed house staff surveys were compared with the reference standard, and areas of agreement and disagreement were noted.

Results: Eighty-six house staff teams, consisting of 1 intern and 1 resident (in either the second or third post-

graduate year), and 105 patients were enrolled in the study. The house staff members were in frank disagreement or poor agreement with the reference standard in knowing the following: how well their patients were oriented to place or how long they had been hospitalized; patients' quality of sleep, presence of pain, history of falls, mood, quantity of food intake, and use of hearing aids, glasses, or an ambulation assistive device when at home; and the name of their patients' primary care physicians.

Conclusions: This study showed that internal medicine house staff members are not aware of many of their patients' risk factors for developing the hazards of hospitalization. Some of these deficits are glaring, particularly the lack of awareness of patients' orientation to place and time (duration of hospitalization), presence of pain, and the identity of their primary care physician. It will likely take education and cultural change to improve this performance. Such improvement could be accomplished as part of 3 of the Accreditation Council for Graduate Medical Education competencies: interpersonal communication, patient care, and systems-based practice. Such a process might improve not only house staff member awareness but also patient outcomes, since interdisciplinary communication and interventions are key to preventing the hazards of hospitalization.

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OLDER ADULTS MAKE UP more than one third of all admissions to US acute care hospitals, and these numbers are increasing.¹

Although hospitalization of older adults may often be necessary and may lead to amelioration of the presenting diagnosis, many hospitalized older adults develop iatrogenic complications unrelated to their presenting diagnoses that can result in longer hospitalizations, functional impairment, or unanticipated medical or surgical interventions.^{2,3} These complications are often referred to as the "hazards of hospi-

talization"⁴ and include delirium, malnutrition, urinary incontinence, pressure ulcers, depression, falls, restraint use, infection, functional decline, adverse drug effects, and death.

Risk factors for these hazards have been identified in the medical literature. For some hazards, the incidence has been shown to decrease when risk factors are treated or certain precautions are taken when a risk factor is identified.^{5,6} Although many of the hazards are theoretically preventable, they occur at an alarmingly high rate among hospitalized older adults. One third of hospitalized older

Table 1. Common Risk Factor Domains for Hazards of Hospitalization

Risk Factor	Delirium	Malnutrition	UI	PU	Falls	Restraints	Infection	Mortality	Functional Decline	ADEs
Hospital-acquired, worsened risk factors										
Sleep impairment	+				+	+				
Hearing impairment	+									
Vision impairment	+				+				+	
Balance, gait, or mobility impairment			+	+	+	+			+	
Depression	+							+	+	
Pain	+									+
Urinary or fecal incontinence			+	+			+		+	
Malnutrition								+		
Hospital-acquired risk factors										
Bladder catheter use					+	+				
Environmental hazards			+	+			+		+	
Pressure ulcers							+	+		
Physical restraint use					+				+	
Medications	+		+		+	+				+
Lack of continuity of medical care										+

Abbreviations: ADEs, adverse drug events; PU, pressure ulcers; UI, urinary incontinence.

adults develop a new disability in an activity of daily living, and at least 20% of older patients develop delirium during hospitalization.⁷ These data suggest that the health care professionals who care for these patients may be unaware that these hazards can be prevented or even that certain of their patients are at high risk for such hazards.

The most commonly identified risk factors for developing the hazards of hospitalization are sleep disturbance, sensory impairment, immobility and falls, incontinence, polypharmacy, depression, pressure ulcers, infection, malnutrition, and delirium (**Table 1**). The etiology of most of the hazards is multifactorial, and several share risk factors. Some hazards are themselves risk factors for developing other hazards; for example, delirium is a risk factor for causing falls or for developing urinary incontinence, and pressure sores,^{8,9} cognitive decline and loss of independence,⁶ and even increased mortality.^{5,6,8,10,11}

These risk factors are often considered the purview of nurses and social workers, yet intervening or correcting the risk factor often requires a physician's action. Lack of awareness of these risk factors can also interfere with a physician being able to provide appropriate care to a patient (eg, one who is hearing impaired or in pain). On teaching services, it is the medical house staff physicians who have the major responsibility for daily patient care and order writing. The purpose of this study was to ascertain house staff member awareness of the presence of risk factors for developing hazards of hospitalization in older patients in their care.

METHODS

HAZARDS OF HOSPITALIZATION QUESTIONNAIRE

A comprehensive list of the hazards of hospitalization, risk factors for developing them, their incidence and prevalence, and their consequences was compiled from a MEDLINE literature search (January 1, 1966, through August 31, 2002) using the terms *hospitalization, aged, acute disease, interventions, prevention, and diagnosis*. Each hazard was individually searched, and 100 articles

were identified. One of us (H.M.F.) reviewed all titles and selected original and review articles that evaluated risk factors for developing geriatric syndromes, complications and functional decline during hospitalization, and intervention trials to prevent the hazards. Articles were also identified from reviews and study bibliographies, geriatric textbooks, and discussions with the Mount Sinai School of Medicine geriatrics faculty.

Common risk factors were identified and grouped into 14 domains (Table 1 and **Table 2**). The Mount Sinai School of Medicine Geriatrics Education Committee (7 geriatricians, 3 geriatric fellows, 2 medical students, 1 educator, and 1 social worker) generated 56 questions that could address these risk factor domains. An additional question identifying the patient's primary care physician was added because the committee agreed that lack of awareness of the patient's actual medical history, medications, and baseline status would increase a patient's risk for decline in the hospital. Each question was carefully reviewed by the committee for content and face validity to identify the presence of a particular risk factor. Questions that were unlikely to be answered truthfully (eg, alcohol use) were eliminated, as were those questions that seemed unlikely to accurately identify the presence of a risk factor. This was an iterative process. After 3 reviews, consensus was achieved on a 24-item Hazards of Hospitalization Questionnaire (**Table 3**) that highlighted key risk factors for developing the hazards of hospitalization. This questionnaire includes items obtained from the patient's history, by observation of the patient or the patient's environment, and from discussion with the patient's nurse or review of the hospital medical record.

To determine interrater reliability, 10 cognitively intact and 10 cognitively impaired patients were interviewed independently by 2 raters within 1 hour of each other. Cognitive impairment was assessed with the Katzman short Orientation-Memory-Concentration test.¹² In cognitively intact patients, the κ for interrater reliability was greater than 0.61 for 24 of the 25 items. In the cognitively impaired patients, the κ was greater than 0.61 for 24 of the items.^{13,14} The questionnaire was modified to enhance interrater reliability after understanding the reasons for discrepancies among raters in the 2 items.

STUDY DESIGN

This was a cross-sectional study performed from December 1, 1999, through August 31, 2002. The Hazards of Hospitalization Ques-

Table 2. Risk Factors for Hazards of Hospitalization

Hospital-Acquired, Worsened Risk Factor	Hazards	Questionnaire Question
Sleep impairment	Delirium, falls, physical restraints, mortality	1. Did the patient sleep well last night?
Hearing impairment	Delirium	2. Does the patient wear a hearing aid? 2A. If yes, does the patient have a hearing aid in the hospital?
Vision impairment	Delirium, falls, functional decline	3. Does the patient use any kind of glasses? 3A. If yes, does the patient have his or her glasses in the hospital?
Balance, gait, or mobility impairment	Falls, physical restraints, urinary incontinence, pressure ulcers, functional decline	4. Before coming to the hospital, did the patient use a cane or a walker? 4A. If yes, does the patient have a cane or walker in the hospital? 5. Has the patient fallen in the past year prior to hospitalization?
Depression	Delirium, mortality, functional decline	15. Is the patient ambulating in the hospital?
Pain	Delirium, adverse drug events	6. Does the patient often feel sad or blue?
Cognitive impairment	Delirium, mortality, functional decline, falls, pressure ulcers, urinary incontinence, physical restraints	8. Does the patient currently have pain? 9. Does the patient know the name of this place? 10. Does the patient know how long he or she has been in the hospital?
Malnutrition	Mortality	11. Is the patient alert? 18. Is the patient able to feed himself or herself? 20. Is the patient NPO? 20A. If yes, how many days has the patient been NPO?
Urinary or fecal incontinence	Infection, urinary incontinence, pressure ulcers, functional decline	21. Is the patient eating more than 50% of the food on the tray? 16. Is the patient incontinent of urine?
Bladder catheter use	Infection, delirium, pressure ulcers, urinary incontinence	17. Is the patient incontinent of stool? 12. Does the patient have a Foley catheter?
Environmental hazards	Falls, physical restraints	13. Is the path to the bathroom obstructed? 14. Are the lower side rails raised?
Pressure ulcers	Infection	19. Does the patient have pressure ulcers?
Physical restraint use	Falls, mortality	22. Is the patient physically restrained?
Medications	Adverse drug events, delirium, falls, urinary incontinence, physical restraints	23. Is the patient receiving 4 or more regularly scheduled medications? 24. Is the patient receiving antipsychotics or anxiolytic medications?
Lack of medical continuity	Adverse drug events	7. Who is the patient's doctor when he or she is not in the hospital?

Abbreviation: NPO, nothing by mouth.

tionnaire was completed independently by each of the house staff members on the team (1 intern and 1 resident) and by the patient or surrogate. Three patients were identified for each participating house staff team. A trained research assistant obtained informed consent from the patient, or from a surrogate if the patient was unable to give consent, and then conducted a brief interview. Cognitive impairment was assessed with the Katzman short Orientation-Memory-Concentration Test¹²; it was chosen for its brevity and sensitivity. This was followed by the Hazards of Hospitalization Questionnaire. If the Katzman test suggested cognitive impairment, answers to fact-based questions were confirmed with or obtained from a surrogate, usually a family member. The reference standard identifying each patient's risk factors was defined by combining the patient or surrogate interview with the assistant's observations, consultation with the patient's nurse, and information gathered from the medical record and the hospital's computerized tracking system. Informed consent was also obtained from the house staff member, who then completed the Hazards of Hospitalization Questionnaire within 2 hours of the research assistant's interview.

PATIENT SELECTION

House staff members rotating on the following medicine units were eligible for inclusion: general medicine, gastrointestinal or liver, oncology, and acute care for elderly patients. Patients were eligible if they were patients of the house staff members in these units, older than 65 years, English speaking, and had been hospitalized for between 2 and 4 days.

STATISTICAL ANALYSIS

The completed house staff surveys were compared with the reference standard, and areas of agreement and disagreement were noted. In addition, comparisons of accuracy (as defined by the percentage of agreement) were made between interns and residents. Statistical significance of the percentage of agreement was ascertained using the κ statistic. The κ statistic is a measure of agreement among evaluators beyond what is expected by chance alone. The maximum value of κ is 1, which indicates perfect agreement. A κ value of 0 indicates a level of agreement no better than chance, whereas a κ value greater than 0 indicates disagreement with the reference standard. κ Values between 0 and 0.20 are generally considered poor agreement; 0.21 to 0.40, fair agreement; 0.41 to 0.61, moderate agreement; 0.61 to 0.80, good agreement; and 0.81 to 1.00, very good agreement.

The Pearson χ^2 test was used to measure the differences among the groups. The χ^2 test determines the measure of association among categorical variables. Statistical significance for the Pearson χ^2 test was set at $P \leq .05$.

RESULTS

Eighty-six house staff teams, consisting of 1 intern and 1 resident (in either the second or third postgraduate year), and 105 patients were enrolled in the study. The mean number of patients evaluated per team was 1.2 (range, 1-3).

Most risk factors occurred in 10% to 25% of the patients, although the incidence varied considerably (**Table 4**). Almost none had lower side rails raised or physical restraints present, whereas more than 85% used glasses, had 4 or more medications ordered, and had a primary care physician. Thirty-five percent to 55% used a cane or walker, had fallen in the previous year, slept poorly the night before, had not ambulated yet in the hospital, and often felt sad. Most patients had multiple risk factors (**Figure**). The median number of risk factors per patient was 7.5 (range, 2-13). Only 5% had 2 or fewer, 61% had 3 to 6, 25% had 7 to 9, and 9% had 10 or more.

Agreement between the house staff members and the reference standard was fair to moderate on the use of indwelling bladder catheters or restraints, urinary or fecal incontinence, pressure ulcers, nothing-by-mouth status, dependence in feeding, patient immobility, patient level of consciousness, and numbers of medications and orders for antipsychotics or anxiolytics.

The house staff members were in frank disagreement or poor agreement with the reference standard in knowing how well their patients were oriented to place or how long they had been hospitalized; patients' quality of sleep, presence of pain, history of falls, mood, quantity of food intake, and use of hearing aids, glasses, or an ambulation assistive device when at home; and the name of the primary care physician.

COMMENT

This study is the first, to our knowledge, to evaluate whether house staff members are aware of their patients' risk factors for developing the hazards of hospitalization. The study patients were clearly at risk, with 22 of the 24 risk factors occurring in at least 10% of patients. House staff members were in fair to moderate agreement with the reference standard on the presence of 10 of these 22 risk factors (45%) but in poor agreement on the presence of the other 13 (59%).

Much of the agreement was in areas that required physician orders before implementation (eg, use or removal of an indwelling catheter or restraints, nothing-by-mouth dietary status, and prescription of multiple or psychotropic medications). House staff members were much less likely to accurately know their patients' temporal orientation, pain status, sleep quality, or mood; whether their patients had a history of falls, used assistive equipment (glasses, hearing aids, or ambulatory devices), had lower side rails up or an obstructed path to the bathroom, or were eating poorly; or the name of their patient's primary care physician.

Some of these deficits are glaring, particularly the lack of awareness of patients' orientation to place and time (duration of hospitalization), presence of pain, and the identity of their primary care physician. A change in orientation is one of the first clues that a patient may be delirious. Delirium^{2,6} is a medical emergency, has a poor functional prognosis,^{2,6,8,11,15,16} and is associated with increased mortality.^{8,10} The diagnosis of delirium and treatment of the underlying medical disorder can be significantly delayed if orientation is not regularly assessed.

Table 3. Hazards of Hospitalization House Staff Questionnaire

Question No.	Question
1	Did the patient sleep well last night?
2	Does the patient wear a hearing aid?
2A	If yes, does the patient have a hearing aid in the hospital?
3	Does the patient use any kind of glasses?
3A	If yes, does the patient have his or her glasses in the hospital?
4	Before coming to the hospital, did the patient use a cane or a walker?
4A	If yes, does the patient have a cane or walker in the hospital?
5	Has the patient fallen in the past year prior to hospitalization?
6	Does the patient often feel sad or blue?
7	Who is the patient's doctor when he or she is not in the hospital?
8	Does the patient currently have pain?
9	Does the patient know the name of this place?
10	Does the patient know how long he or she has been in the hospital?
11	Is the patient alert?
12	Does the patient have a Foley catheter?
13	Is the path to the bathroom obstructed?
14	Are the lower side rails raised?
15	Is the patient ambulating in the hospital?
16	Is the patient incontinent of urine?
17	Is the patient incontinent of stool?
18	Is the patient able to feed himself or herself?
19	Does the patient have pressure ulcers?
20	Is the patient NPO?
20A	If yes, how many days has the patient been NPO?
21	Is the patient eating more than 50% of the food on the tray?
22	Is the patient physically restrained?
23	Is the patient receiving 4 or more regularly scheduled medications?
24	Is the patient receiving antipsychotics or anxiolytic medications?

Abbreviation: NPO, nothing by mouth.

Most of the risk factors that the house staff members were unaware of are considered part of a complete admission history and physical or daily follow-up for hospitalized adults.¹⁷ Why did house staff members in a well-respected internal medicine residency program not know these details about their patients? Time demands may lead house staff members to be less compulsive in their patient interviews. There is enormous pressure on house staff members to juggle limited time (the 80-hour workweek was in effect in New York during this study) with what can feel like unlimited responsibilities and a major focus on decreasing length of stay. Contacting the primary care physician, asking questions about subjective concerns such as sleep and pain, and finding out how the patient copes with his or her environment when at home are time-consuming tasks, especially when a proxy may be needed to accurately answer these questions. House staff members need to prioritize and may decide to abandon those aspects of patient history perceived to be within another's purview. However, our data suggest that house staff did not just abandon asking the questions to save time. Other mem-

Table 4. House Staff Member Awareness of Patient Risk Factors for Developing Hazards (Percentage of Agreement of House Staff Members With Reference Standard)

Risk Factor	Response to Hazards of Hospitalization Questionnaire	Patients With Risk Factor or Hazard, % (n=105)	Agreement, % (n=173)	κ Value
Cognitive impairment	Not oriented to location	17.1	75.7	0.11
	Not oriented to duration of hospitalization	22.8	68.8	0.19
	Not alert	12.4	86.1	0.29
Medication adverse effects	≥ 4 Medications ordered	91.4	75.7	0.20
	Antipsychotics or anxiolytics ordered	14.3	82.8	0.35
Insomnia	Did not sleep well	40.0	39.9	-0.25 ^a
Pain	Had pain	21.9	64.2	0.14
Sensory impairment	Uses a hearing aid	17.1	72.2	0.15
	Uses glasses	86.7	43.4	-0.04 ^a
Mobility	Uses a cane or walker	55.2	56.0	0.14
	Fell in the past year	43.8	41.0	-0.18 ^a
	Path to the bathroom obstructed	10.5	83.2	0.08
	Lower side rails raised	1.0	73.4	0.02
	Has not ambulated in the hospital	35.2	65.3	0.31
Depression	Physical restraints present	0	91.3	NC
	Often feels sad	39.0	32.9	-0.37 ^a
Discontinuity of care	House staff unaware of primary physician's name	98.1 ^b	46.8	0.02
Incontinence	Incontinent of urine	22.8	74.6	0.27
	Incontinent of stool	21.0	80.3	0.35
	Foley catheter present	15.2	85.5	0.44
Poor nutrition	Unable to self-feed	13.3	86.1	0.44
	Currently NPO	12.4	85.5	0.28
	Eating less than half of food on tray	21.9	45.7	-0.04 ^a
Skin integrity	Pressure ulcers present	10.5	87.9	0.42

Abbreviations: NC, not calculable; NPO, nothing by mouth.

^aA κ value less than 0.2 indicates disagreement or poor agreement with reference standard.

^bPercentage of patients with a primary care physician.

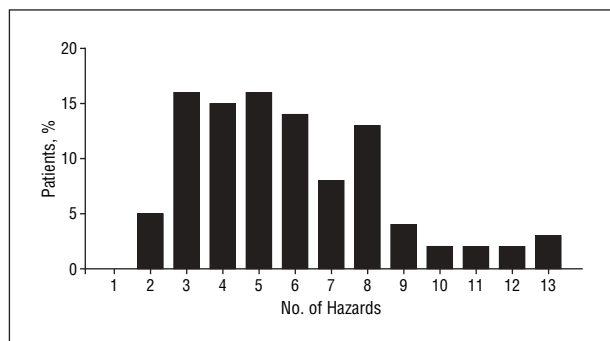


Figure. Number of hazards per patient.

bers of the patient care team (eg, the nurse and the social worker) probably knew the answers to these questions and could have provided them to the house staff member, or the house staff member might have obtained the information from their medical record notes. Rather, it appears that the house staff members did not see these answers as information they needed to know. The prioritization may reflect a lack of understanding of how this knowledge might influence their diagnostic and management decisions and decrease the possibility of their patients developing one of the serious hazards of hospitalization.

For certain interventions to be implemented, the physician must be aware that the risk factors are important and that they are associated with hazards that have serious consequences (Table 1). For example, sleep deprivation and pain increase the risk of delirium.² Exces-

sive noise, medications, and pain are among the causes of sleep disturbances. Physicians who are unaware of their patients' problems with sleeping or pain will not begin diagnostic evaluations, review medications, or initiate treatments to improve sleep or decrease pain. Prevention of certain hazards is discipline specific, whereas others require that all members of the team be aware of the risk and take responsibility. For the patient with sleep impairment, all staff members have to be responsible for minimizing nighttime noise and allowing the patient to get uninterrupted sleep (eg, no nighttime measurement of vital signs if not medically necessary).

Our house staff members did not recognize that their patients were eating poorly. Many patients are in negative nitrogen balance during short-term hospitalization,¹⁸ and inadequate nutrition can result in malnutrition, weakness, delayed recovery of function, and ultimately higher rates of mortality and discharge to nursing homes.¹⁹ Liquid dietary supplements have been shown to decrease mortality by 33% in older or acutely ill hospitalized patients while decreasing length of stay by 3 days.²⁰ Being unaware of a patient's food intake makes it less likely that a physician will order dietary supplements.

Depression in hospitalized older patients is associated with greater dependency in the basic activities of daily living at 1 and 3 months after hospitalization,²¹ increased readmissions at 6 months,²² and increased mortality at 3 years after hospitalization.²³ No data are available on whether identifying depression during short-term hospitalization reduces these poor outcomes; however, case

finding can occur during hospitalization. Depression needs to be recognized to craft an optimal discharge plan and to ensure adherence.

This study is the first, to our knowledge, to assess house staff member awareness of the risk factors for the hazards of hospitalization in their own patients. Usually medical education studies measure knowledge recall or performance with simulated cases, not actual performance, when caring for patients. These house staff members were trained in multiple different medical schools and were ranked highly by this residency program in the match, suggesting that they represent above-average internal medicine residents.

This study has several limitations. The average number of patients assessed per team was only 1.2 (range, 1-3). Although we limited the time between the house staff members and the reference standard examinations to 1 hour, acutely ill patients can change during that period, particularly their orientation and whether they have ambulated during the hospitalization. The comparison between the reference standard and the house staff member could also be affected if the reference standard were inaccurate. We have assumed that not knowing the name of the patient's physician means that the primary care physician has not been contacted by the house staff member; however, this may not be true, and the house staff member may just have been unable to recall the name.

We are unable to say whether the house staff member's lack of awareness was accompanied by a deficit in their knowledge of the risk factors and their relationship to poor hospital outcomes. This needs to be determined, and if true, a comprehensive educational intervention that explains the importance and repercussions of the hazards of hospitalization, while focusing on intervention strategies to prevent risk factors from progressing, is needed. Studies to increase house staff member knowledge through educational interventions have shown that it is generally possible to create a teaching intervention that provides sustained improvement in house staff member knowledge and behavior; studies focused on skin cancer screening,²⁴ depression identification,²⁵ and teaching proper inhaler use²⁶ all showed modest to significant increases in house staff member awareness and lasting alterations in behavior, particularly the study examining depression diagnosis. However, didactic sessions alone may not be enough to alter daily behavior without active learning time that provides skills in addition to information.

Knowledge and skills are necessary but insufficient to create behavioral change. Adult learners require an intrinsic motivation to learn which approaches will be associated with deeper learning.^{27,28} This commitment to change is needed and will require the house staff members to feel as strongly about ensuring that their patients avoid the hazards of hospitalization as they do about proper treatment for the conditions for which the patients were admitted. Behavioral change is a subset of the patient safety movement, hardwiring into our care the processes to make it less likely that patients are harmed from interventions intended to help them during hospitalization.²⁹

A critical aspect to this commitment to change is the awareness that medical conditions are often multifac-

eted in older adults; therefore, an interdisciplinary approach is essential for the evaluation and management of physical and cognitive impairments, psychosocial issues, and functional disabilities in hospitalized older adults. This approach has been shown to decrease functional decline and improve patient and caregiver satisfaction. One core aspect of interdisciplinary care is communication among team members.^{1,30,31} Interdisciplinary team members on the units are often the key figures who ensure accurate, efficient flow of information from patients to physicians. To facilitate house staff member knowledge and practice of interdisciplinary teamwork, supervising attending physicians should serve as teachers of teamwork and role models of communication.

In summary, this study showed that internal medicine house staff members are unaware of many of their patients' risk factors for developing the hazards of hospitalization. It will likely take education and cultural change to improve their performance. This could be accomplished as part of 3 of the Accreditation Council for Graduate Medical Education competencies: interpersonal communication, patient care, and systems-based practice. Such a process might improve not only house staff member awareness but also patient outcomes, since interdisciplinary communication and interventions are key to preventing the hazards of hospitalization.

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