Acute Hospital Care for the Elderly Patient: Its Impact on Clinical and Hospital Systems of Care

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Elderly patients are frequently hospitalized with complex medical issues or issues related to frailty. In many cases, skill and time are required during the course of an acute hospitalization to negotiate patient care decisions with the patient and caregivers through the end of life. Approximately half of the hospital beds in the United States are presently occupied by those over age 65. However, the disproportionate numerical increase of elderly projected in the coming decades—particularly the oldest old (greater than 85 years)\textsuperscript{[1]} who are more likely to be medically complex or frail\textsuperscript{[2]} and have twice the rate of hospitalizations when compared with the youngest old (aged 65–74)\textsuperscript{[3]}—will have a further impact on health care expenditures. Currently, the cost for care of the elderly at the end of life accounts for 10\% to 12\% of the total United States health care budget and 28\% of the Medicare budget\textsuperscript{[4]}. In addition, a greater number of other health care resources will be needed, especially after-hospitalization services\textsuperscript{[5]} that include skilled nursing care, in-patient rehabilitation, visiting nursing services, and long-term care.

Furthermore, if a hospitalization outcome is largely dependent on the impact of the acute illness, the patient’s baseline vulnerability, and the hazards of the hospitalization process (including medical error) (Fig. 1), the elderly patient then is at a decided disadvantage in all three aspects. Elderly patients have a high prevalence of acute illness, and when compared with
younger patients, hospitalizations of the elderly are more frequent, severe, and protracted [6]. The older patient’s baseline vulnerability and risk of iatrogenic complications with hospitalization [7,8] rate is as high as 29% to 38%. These factors together contribute to a greater frequency of hospitalization, greater length of stay, and higher risk of readmission.

Finally, acute hospitalization for an elderly patient usually represents only one relatively brief health care encounter within a much larger health care framework that covers multiple caregivers, health care professionals, and settings for such care.

Clinical care of the elderly hospitalized patient: areas for improvement

One curricular framework targets four commonly seen, high-impact areas of hospital-based clinical care for the elderly. These areas include: (1) identifying frailty or vulnerability; (2) avoiding hazards of hospitalization, including delirium, falls, indwelling urinary catheter (IUC) use, deconditioning, adverse drug reactions and errors in drug administration, and pressure ulcers; (3) palliating and addressing end-of-life issues; and (4) improving transitions of care (Box 1) [9].

Elderly patients are significantly affected by hospitalization, with rates of iatrogenic complications approaching three to five times those of younger patients [10,11], a 35% risk of functional decline [5], increased incidence of delirium, greater risk of rehospitalization, and higher rates of institutionalization. Labeling the hospital “unsafe” does not provide the solution, given the high prevalence of acute illness in the elderly and need for acute hospitalization. Instead, there exist avenues of education that can bridge demonstrable knowledge gaps in many clinical areas, such as end-of-life care [12,13], delirium and its prevention [14], and frailty [15,16].

There is already heightened awareness regarding some areas of care that are especially relevant to the elderly. These include pain management,
end-of-life care, and preventing hazards of hospitalization, including medication error, falls, and delirium [17]. Much of the clinical focus on these issues is fueled by external factors, such as payers, the Joint Commission (TJC) [18], and patient and family advocacy groups. Yet, these areas have to be better defined, standardized, and systematized for the older patient population.

This article addresses and focuses on important patient care issues for older adults, including the issue of frailty, hazards of hospitalization, and transitions of care. In addition to these core clinical areas of knowledge and skills, the authors discuss systems improvements that benefit the hospitalized elderly, and particularly the frail elderly.

<table>
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<td><strong>Geriatric topics</strong></td>
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<tr>
<td>- Identify and assess the vulnerable hospitalized older patient</td>
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<td>- Dementia in hospitalized older medical patients: recognizing and screening for dementia, assessing medical decision making capacity, implications for the treatment of nondementia illness, pain assessment, improving the posthospitalization transition of care</td>
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<td><strong>Theme #2: Recognize and avoid hazards of hospitalization</strong></td>
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<td>- Delirium: diagnosis, treatment, risk stratification, and prevention</td>
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<td>- Falls: assessment and prevention</td>
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<td>- Foley catheters: scope of the problem, appropriate indications and management</td>
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<td>- Deconditioning: scope of the problem, prevention</td>
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<td>- Adverse drug reactions and medication errors: principles of drug review</td>
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<td>- Pressure ulcers: assessment, treatment, and prevention</td>
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<td><strong>Theme #3: Palliate and address end-of-life issues</strong></td>
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<td>- Pain control: general principles and use of opiates</td>
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<td>- Symptom management in advanced disease: nausea</td>
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<td>- Difficult conversations and advanced directives</td>
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<td>- Hospice and palliative care and changing goals of care</td>
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<td><strong>Theme #4: Improve transitions of care</strong></td>
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<td>- The ideal hospital discharge: core components and determining destination</td>
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<td>- Destinations of posthospital care: nursing homes for skilled rehabilitation and long-term care</td>
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Identifying frailty

Definitions and impact on hospital care

When one hears the word “frail” in the context of an elderly patient, a number of words come to mind, including: “advanced age,” “nursing home patient,” “needs assistance,” or “confused.” Establishing a specific definition or phenotype of frailty seems to be as elusive as the words used to describe a frail elder. Definitions and measures of frailty in the elderly certainly exist [19]. In the Assessing the Care of the Vulnerable Elder (ACOVE) study, investigators developed one such definition by estimating the risk of frailty via a United States nationally representative sample of community-dwelling elders over 65 years [20]. Employing Medicare Current Beneficiary Survey data, the ACOVE investigators determined that functional status was a more important predictor of functional decline and death than any specific medical condition, and identified approximately 32% of community-dwelling elders as “vulnerable,” with a fourfold increased risk of functional decline or death over a 2-year period. This “vulnerability” risk was determined through the Vulnerable Elders Survey (VES)-13 [21], a phone screen tool based on age, self-rated health, and aspects of functional status. Using the ACOVE model, the phenotypic characteristics of vulnerable elder—established as being at advanced age with functional impairments—not only puts into perspective our verbal descriptions of “frail” but adds definition and the link to clinical outcomes.

Surveying patients over 65 with the VES-13 in an urban academic medical center determined a vulnerable elder rate of approximately 25% of adult patients on the general medicine service [22]. The implications of frailty in a hospitalized elder include further functional and cognitive decline [23–25], increased risk of delirium [26], prolonged hospitalization, and increased cost and mortality [27]. For the busy hospitalist, recognizing the frail or vulnerable elder at the point of admission is crucial in determining the need to screen for dementia and functional status, and to help frame patient care and discussions with a better understanding of the medical complexity, prognosis, and risk of adverse outcomes. The hospitalist’s identification of the frail elderly patient also serves as an important determinant for preventing delirium, deconditioning, falls, and pressure ulcers, and for instituting comprehensive discharge planning.

Using age criteria alone may help to capture a large number of such potentially frail or vulnerable older patients. For example, the prevalence of dementia increases with age, rising from an incidence of 5% to 10% at age 65, and up to nearly 50% at age 85 [28]. Similarly, the incidence of difficulties with basic life activities increases with age; approximately 26% of the 74- to 84-year-old age group (the “older old”) have some difficulty, and this rises to approximately 58% of the 85-plus (the “oldest old”) age group [29,30]. Not surprisingly, age and functional status predicted risk of
increased morbidity and mortality outcomes in the ACOVE studies [20] for the community-dwelling elder. Although acute care for elders (ACE) hospital units are not widespread (largely because costs per case are not proportionately reduced to the shorter stays documented [31]), they provide another model that typically uses age criterion as one point of entry. While not standardized across the ACE units in operation in the United States, the most common age group is 71 to 80 years of age [31]. Some younger patients with numerous comorbidities may also be at risk for problems seen in an older population. However, using an age criterion of greater than 70 years to screen for cognitive and functional status is a reasonable starting point and is supported by several studies in the literature.

**Dementia**

While dementia is common in the elderly patient, it is often not diagnosed or fully recognized [32,33]. Screening for dementia in the hospitalized elder is particularly important in the patient who is losing weight, noncompliant with medications, readmitted to the hospital, or admitted from the nursing home. Finding that a patient’s insight and judgment are significantly impaired can have a life-altering impact on the patient’s ability to make major health care decisions during hospitalization and to live or operate an automobile independently at discharge. Similarly, results of cognitive screening can significantly affect the management of other nondementia-related illness, end-of-life issues (such as feeding tube placement), and signal an increased risk of delirium and readmission. A study of the predisposing factors that affect the risk of delirium in the elderly hospitalized patient showed that a mini-mental status examination (MMSE) of less than 24/30 increased the risk of delirium to 2.82 times that of the nondemented older hospitalized patient [26].

While the clinical diagnosis of dementia is still based on the Diagnostic and Statistical Manual of Mental Disorders, 4th edition, criteria [34], two commonly used screening tools, the MMSE [35] and the mini-cog (Box 2) [36], identify the elderly at high risk for dementia. Both screening tests have similar sensitivities, and although the mini-cog has not been specifically validated for the hospital setting, it is faster to administer at bedside. A limitation of the MMSE and the mini-cog is that they do not directly screen for executive function, such as planning, organizing, or prioritizing, often requiring further investigation by the physician.

Some organizations have specific system initiatives to prevent delirium in patients with underlying dementia. However, even in the absence of these programs, hospitalists can use tools, such as an orientation board, to help to decrease confusion for an in-patient with dementia. An orientation board prominently lists the day, the date, the name of the next meal, the current weather, and other information that helps the patient
with reality orientation. Use of an orientation board and a program of cognitive stimulation decreased the confusion rate from 26% to 8% in the Hospital Elder Life Program (HELP) [37]. The HELP program was initially reported as a multicomponent intervention in 1999, targeting modifiable risk factors, and was later transformed into a formal program that is commonly known as the HELP program. The program has target risk factors and patient groups, associated interventions, and specific outcomes of interest (Table 1). In addition, having family or caregivers stay with the patient overnight, avoiding physical restraints, removing unnecessary foley catheters, and reducing polypharmacy are other important interventions.

While delirium may be the most common cause of severe behavioral disturbances in hospitalized patients with underlying dementia, many patients with dementia may have baseline behavioral patterns that are problematic in the acute hospital setting. Up to two-thirds of patients with dementia exhibit sleep disturbances, agitation, aggression, hallucinations, and wandering. Preventing delirium is important, but managing these behaviors is also critical to provide a safe hospitalization for these patients. These patients may require pharmacologic therapy. Antipsychotics and benzodiazepines are the most commonly used agents to treat agitation and aggression. However, in the elderly, benzodiazepines should not be a first-line agent. Therefore, antipsychotics should be considered first-line therapy. Typical antipsychotics, such as haloperidol, are felt to be safe and effective, but do not have strong clinical trial data to support their use in the in-patient setting for this purpose. Haloperidol, especially when given intravenously, can cause prolongation of the QT interval, so the intravenous route should be avoided. The atypical antipsychotics, such as olanzapine and risperidone, have clinical trial data that suggest a moderate effect in the chronic treatment of these effects. However, there are published studies that demonstrate an increased

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Box 2. Dementia screening tool: mini-cog

- Step 1: Remember and repeat three unrelated words
- Step 2: Clock-drawing test (CDT) — distracter
- Step 3: Repeat three previously presented words
- Step 4: Scoring: 1 point for each recalled word
  - Score = 0; positive screen for dementia
  - Score = 1–2 with abnormal CDT; positive screen for dementia
  - Score = 1–2 with normal CDT; negative screen for dementia
  - Score = 3; negative screen for dementia

mortality effect in elderly patients treated with these atypical antipsychotics when used chronically [38,39]. Therefore, antipsychotics should be used when necessary, but consideration for these side effects needs to be given.

**Functional impairment**

Activities of daily living (ADLs) and instrumental activities of daily living (IADLs) are commonly employed in research and clinical assessment as measures to determine degree and type of functional impairment. Testing for patient mobility by observing the patient’s gait and ability to transfer from bed or chair, and using a more formal screen (such as the “get up and go” test) [40] (Fig. 2) will provide more information into the kinds of physical therapy or occupational therapy needed, and the immediate discharge destination (eg, home physical therapy versus acute rehabilitation).

Functional measures are strong predictors of mortality in the hospitalized older patient, and study evidence suggests these measures contribute more to prognosis than the combined measures of comorbidity, disease severity, and staging or diagnosis [41]. This echoes the findings of the ACOVE investigators [20] in the community-dwelling elder. Many of the interventions in clinical trials for improving the outcomes of the hospitalized older patient target functional decline. While most of these interventions involve interdisciplinary and team care—such as inpatient geriatric evaluation and management units [42], ACE units [43,44], and HELP [37]—the practicing hospitalist can perform baseline screening of ADLs and IADLs, and institute early mobilization with the help of physical or occupational therapy, nursing, and family or caregivers. A set of four simple screening questions can identify older patients at significant risk for functional decline while in the hospital. They are:

1. Does the patient have a decubitus ulcer?
2. Are there baseline cognitive deficits?
3. Is there baseline functional impairment?
4. Is baseline social activity low?

Zero positive responses places the patient at low risk for functional decline during the hospitalization (8%), one to two positive responses results in moderate risk (28%), and three to four positive responses is high risk (63%) [45]. The HELP program has been shown to not only prevent delirium, but to also reduce the risk of functional impairment.

**Frailty and systems interventions**

In identification of patients at increased risk for hazards of hospitalization, crucial and systematic screening can be implemented for patients through use of a simple age criterion. Physicians working with a multidisciplinary team can develop methods of screening this large segment of hospitalized patients.
<table>
<thead>
<tr>
<th>Targeted risk factor and eligible patients</th>
<th>Standardized intervention protocols</th>
<th>Targeted outcome for reassessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive impairment&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Orientation protocol: board with names of care-team members and day’s schedule; communication to reorient to surroundings. Therapeutic-activities protocol: cognitively stimulating activities three times daily (eg, discussion of current events, structured reminiscence, or word games). Nonpharmacologic sleep protocol: at bedtime, warm drink (milk or herbal tea), relaxation tapes or music, and back massage. Sleep-enhancement protocol: unit-wide noise-reduction strategies (eg, silent pill crushers, vibrating beepers, and quiet hallways) and schedule adjustments to allow sleep (eg, rescheduling of medications and procedures). Early mobilization protocol: ambulation or active range-of-motion exercises three times daily; minimal use of immobilizing equipment (eg, bladder catheters or physical restraints)</td>
<td>Change in orientation score</td>
</tr>
<tr>
<td>Sleep deprivation</td>
<td></td>
<td>Change in rate of use of sedative drug for sleep&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>All patients; need for protocol assessed once daily</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Immobility**
All patients; ambulation whenever possible, and range-of-motion exercises when patients are chronically nonambulatory, bed or wheel-chair bound, immobilized (eg, because of an extremity fracture or deep venous thrombosis), or when prescribed bed rest.

**Vision protocol:** visual aids (eg, glasses or magnifying lenses) and adaptive equipment (eg, large illuminated telephone key-pads, large-print books, and fluorescent tape on call bell), with daily reinforcement of their use. Hearing protocol: portable amplifying devices, earwax disimpaction, and special communication techniques, with daily reinforcement of these adaptations. Dehydration protocol: early recognition of dehydration and volume repletion (eg, encouragement of oral intake of fluids)

**Change in activities of daily living score**

<table>
<thead>
<tr>
<th>Change in activities of daily living score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early correction of vision, &lt; 48 hrs after admission</td>
</tr>
<tr>
<td>Change in Whisper Test score</td>
</tr>
<tr>
<td>Change in ratio of blood urea nitrogen to creatinine</td>
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</tbody>
</table>

Visual impairment
Patients with <20/70 visual acuity on binocular near-vision testing

Hearing impairment
Patients hearing <6 of 12 whispers on Whisper Test

Dehydration
Patients with ratio of blood urea nitrogen to creatinine >18, screened for protocol by geriatric nurse-specialist

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The orientation score consisted of results on the first 10 items on the MMSE.

Sedative drugs included standard hypnotic agents, benzodiazepines, and antihistamines, used as needed for sleep.

Get Up and Go Test

The “Get Up and Go Test” is an assessment that should be conducted as part of a routine evaluation when dealing with older persons. Its purpose is to detect “fallers” and to identify those who need evaluation. The staff should be trained to perform the “Get Up and Go Test” at check-in and query those with gait or balance problems for falls.

INITIAL CHECK

All older persons who report a single fall should be observed as they:
• From a sitting position, stand without using their arms for support.
• Walk several paces, turn, and return to the chair.
• Sit back in the chair without using their arms for support.

Individuals who have difficulty or demonstrate unsteadiness performing this test require further assessment.

FOLLOW-UP ASSESSMENT

In the follow-up assessment, ask the person to:
• Sit.
• Stand without using their arms for support.
• Close their eyes for a few seconds, while standing in place.
• Stand with eyes closed, while you push gently on his or her sternum.
• Walk a short distance and come to a complete stop.
• Turn around and return to the chair.
• Sit in the chair without using their arms for support.

While conducting the test, pay attention to any abnormal movements. As you observe, answer the questions below. Record your assessment in the Yes or No boxes provided and/or on the “Falls Evaluation: Initial Visit” form.

Follow-Up Assessment Observations

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>☐</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the person steady and balanced when sitting upright?</td>
<td>☐</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Is the person able to stand with the arms folded?</td>
<td>☐</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>When standing, is the person steady in narrow stance?</td>
<td>☐</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>With eyes closed, does the person remain steady?</td>
<td>☐</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>When nudged, does the person recover without difficulty?</td>
<td>☐</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Does with person start walking without hesitancy?</td>
<td>☐</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>When walking, does each foot clear the floor well?</td>
<td>☐</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Is there step symmetry, with the steps equal length and regular?</td>
<td>☐</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Does the person take continuous, regular steps?</td>
<td>☐</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Does the person walk straight without a walking aid?</td>
<td>☐</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Does the person stand with heels close together?</td>
<td>☐</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Is the person able to sit safely and judge distance correctly?</td>
<td>☐</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Additional Observations

Fig. 2. The “Get Up and Go Test.” (From Mathias S, Nayak US, Issacs B. Balance in elderly patients: The “get-up and go” test. Arch Phys Med Rehabil 1986;67:387–9; with permission.)
Screening can be done by physicians or nurses, but can also be done using nonclinical volunteers [46].

Of the multidisciplinary interventions that have been published, the HELP program has a positive impact on the cognitive and functional status of the elderly patient. This program does require a committed team, including physician sponsorship to incorporate into routine practice the types of screening and interventions used in the HELP program. Geriatricians and hospitalists would be ideal leaders in initiating these types of systematic improvements to the way patient-care is provided within their own medical center. An example of incorporation of the HELP program in a community hospital follows in the delirium section.

Avoiding hazards of hospitalization

Hazards of hospitalization, an overview

Some of the hazards of being hospitalized include iatrogenic illness, such as medication errors, nosocomial infection, and errors during diagnostic or therapeutic procedures. In addition to health system issues that may contribute to patient safety, the elderly patient’s baseline vulnerability and severity of illness play a large role. For example, the incidence of delirium is greater in an older patient with an MMSE of less than 24, a severe illness, or an iatrogenic event [26]. High-risk areas related to hospitalization are important to target in daily medical practice and as areas for system redesign and standardization. Some important clinical issues include the development of pressure ulcers or delirium, preventing deconditioning and further functional decline, and addressing the risk of adverse drug reactions and errors of medication administration in the elderly hospitalized patient. This article’s discussion of hazards of hospitalization will focus on delirium identification and strategies for its prevention, adverse drug events and medication review, and reducing the number of unnecessary urinary catheters.

Delirium identification and strategies for prevention

The incidence of delirium in the hospitalized older patient is as high as 50%, including increased mortality, length of hospital stay, and placement in long-term care [11,47,48]. However, it typically goes unrecognized by both nurses and physicians [49,50]. Important steps in improving rates of delirium are developing a strategy for identifying delirium and understanding predisposing and precipitating risk factors. Only with this understanding in place can a successful strategy for delirium preventing be developed and implemented.

The Confusion Assessment Method (CAM) (Fig. 3) [51], a standardized screening tool for making the diagnosis of delirium, has been validated for use in a variety of hospital settings, including the emergency department, inpatient unit, and intensive care unit. Based on work by Inouye and others,
in a study group comprised of patients older than 70 years old, increased risk of developing delirium included vision impairment, severe illness (a composite variable based on the acute physiology and chronic health evaluation or APACHE score greater than 16 or a nurse rating of “severe”), cognitive impairment (MMSE less than 24), and blood urea nitrogen/creatinine ratio greater than or equal to 18 [26]. Precipitating factors for delirium in the elderly patient during the acute hospitalization process included use of physical restraints or a bladder catheter, three or more medications added, an iatrogenic event, or malnutrition [52].

The Yale Delirium Prevention Trial studied the impact of a set of delirium prevention interventions. These included interventions to prevent cognitive impairment, sleep deprivation, immobility, dehydration, and vision or hearing impairment [14,37]. These interventions were low-tech but labor intensive, reduced the incidence of delirium significantly from 15% to 10% in the intervention group, and decreased the total number of days with delirium and number of episodes. There was no significant effect on severity or recurrence rate of those once delirious. Additionally, there was an 8% decline in MMSE by two or more points (control 26%) and a 14% decline by two or more ADLs (control 33%) in those enrolled in this study.

While HELP-funded programs may be difficult to replicate in other settings, the cost-savings associated with this program have made it appealing to many institutions. A Pittsburgh community hospital without research funding or infrastructure established a modified HELP program, demonstrating clinical effectiveness and cost-saving. With the HELP intervention, delirium rates dropped by 14.4% and total cost decreased $626,261 for a 40-bed unit over a 6-month survey period. Nursing and family satisfaction ratings were very favorable. Furthermore, these benefits were sustained. This community hospital project did eliminate some of the components of the original HELP program—the exercise and fluid repletion portions—because of resource limitations [46].

While efforts to prevent delirium in at-risk patients are essential, delirium will still occur. Two key steps are essential in managing patients with

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delirium, as identified when using a tool such as the CAM. The first is to identify an underlying cause, particularly those that have reversible medical causes. These include fluid and electrolyte imbalances, metabolic derangements, infections, adverse drug reactions, hypoperfusion, and withdrawal effects. Treatment of the underlying medical cause is essential and should be initiated immediately. However, patients with significant behavioral disorders secondary to delirium may require interventions to control those behaviors. Restraints should be avoided if at all possible. If used, they should be of the least restrictive and for the shortest period of time possible. More commonly, pharmacologic management is required. Like the treatment of behavioral disturbances in patients with dementia, antipsychotics, particularly the typical antipsychotics, are the first-line pharmacologic treatment option for these patients. These medications should be discontinued as soon as safely possible.

Adverse drug events, polypharmacy, and medication review

An adverse drug reaction (ADR) is usually defined as any noxious drug effect occurring at standard drug treatment doses. ADRs account for hospital admission rates of 3% to 10%. The in-hospital ADR rate is approximately 2%, with the fatal in-hospital ADR rate at 0.19% [53]. ADRs in hospitalized patients also result in excess length of stay and cost [54].

Bates and colleagues [55] looked at “preventable” in-hospital drug errors and found that one-third of the errors were preventable but accounted for 50% of the cost. Analgesics, sedatives, and psychoactive drugs were the most common of the “culprit” drugs and delirium was a common presentation in the “preventable” in-hospital ADR group.

The elderly patient is already at increased risk of ADRs, largely because of the greater number of medications he or she may be on and the additional number of comorbidities seen with aging. However, age is not an independent risk factor for developing ADRs [56].

The term “polypharmacy” is frequently defined as taking five or more medications. As defined, polypharmacy emphasizes the greater risk of drug interactions with increasing numbers of medications and the resulting potential for accompanying adverse drug effects. However, defining polypharmacy without a measure of appropriateness may not be as clinically useful in the elderly, who often require five or more medications.

Medication oversight is a time-consuming endeavor involving a systematic and rigorous review of each medication for appropriateness in conjunction with comorbidities and the other medications the patient may be taking. These systematic reviews may be beneficial when conducted by pharmacists [57]. However, there are components of medication review that certainly lend themselves to the use of integrated technologies, such as the review of medications upon admission and reconciliation of medications upon discharge. Another approach to medication review is use of explicit criteria for inclusion or exclusion of medications noted on an elderly patient’s medication list.
The Beers list of medications [58] is a list of potentially hazardous medications for older adults. It was developed as a guide for prescribing based on expert consensus after rigorous literature review. It states that older patients are more prone to ADRs, with specific medications or classes of medications that cause a high likelihood of adverse effects with little proven therapeutic benefit. The Beers recommendation is that the medications or classes of medications with a high severity rating should be avoided, and that often a safer alternative exists. Using the Beers recommendations as the only tool for medication review is inadequate, but is a good starting point to identify medications with significant side effects in the older adult.

For the hospitalist, the elderly patient’s entry to the hospital is an important juncture for medication review, especially at admission and discharge. This situation presents an opportunity to reduce polypharmacy at admission, as approximately 50% of older community-dwelling patients take one or more unnecessary medication [59]. This is all the more important because at discharge more medications are usually added to the elderly patient’s medication list [60].

The Joint Commission’s requirement for a medication reconciliation process mandates a need to develop systems to review medication lists at points-of-care transition. Hospitalists involved in the care of the elderly can take the lead in developing such systematic safety nets intended to improve care. This process can be automated for those hospitals with a computerized order entry and embedded clinical decision-making support. These integrated electronic systems substantially reduce medical error rates [61]. When medication reconciliation processes are instituted electronically, the physician is able to capture and convey the crucially important clinical information needed to target unnecessary or harmful medication. Even in hospitals without these integrated technologic systems, a TJC mandated medication reconciliation process must be established using a manual process.

Incorporating pharmacists into the review of medications at discharge may prove effective at improving the appropriateness of discharge medications. In a single site study, hospitalized older patients who were being discharged to a long-term care facility had a pharmacist-based medication review which resulted in a lower rate of inappropriate medications [62]. While this study showed favorable trends in clinical outcomes, the clinically relevant decrease in hospital usage and adverse drug events did not reach statistical significance. With such promising clinical outcomes, hospitals that already use pharmacists in the discharge process could incorporate pharmacist-driven medication review of frail patients using the Medication Appropriateness Index [57].

**Urinary catheters**

Indwelling urinary catheters are used in approximately 25% of hospitalized elderly, account for 40% of nosocomial infections [63,64], and are a risk factor for precipitating delirium [52] and falls [65]. The widely accepted
indications for IUCs include inability to void, brief after anesthesia use, monitoring of urine output in a patient unable to comply, protection of an open wound in patients with urinary incontinence, or as part of a palliative care plan. Unfortunately, up to one-third of physicians are not even aware that an IUC has been placed [66]. Many of these catheters are placed at other patient-care sites, such as the emergency department or intensive care unit. Often the original need for the catheter has resolved and the catheter now becomes a “forgotten” focus of potential infection and other hazards in the elderly patient.

IUC use in the hospitalized elderly patient is an example of a hospital-care issue that lends itself to a number of simple systems interventions. For those institutions with a computerized order entry, embedded clinical decision support can be effective in reducing the number of IUCs employed without appropriate indication. In a Veterans Administration study, a combination of an electronic medical reminder and an automated 72-hour default stop date reduced the average use duration of IUCs by 3 days [67]. For those institutions without this level of electronic medical record, similar paper reminders can be effective [68]. Finally, for male patients who require a catheter for reasons other than urinary retention, condom catheters may be an alternative. In addition to being rated as more comfortable, condom catheters have been shown to reduce the risk of bacteriuria, symptomatic urinary tract infections, and death [69]. Hospitalists can advocate reducing the number of IUCs by assisting their institutions in developing electronic or paper reminder systems and incorporating condom catheters into a hospital IUC protocol.

**Improve transitions of care**

Coordination of after hospitalization health care—particularly of the medically complex, frail, or functionally debilitated elderly patient—requires anticipatory discharge planning, starting typically at the patient’s point of entry into the hospital. Advanced and integrated systems of communication and coordination are needed to support such expanded and integrated patient-care and follow-up at discharge. Such discharge planning often incorporates family, caregivers, nursing, social work, primary care physicians and specialists, pharmacists, and nurse practitioners. To further add to the complexity of the communication and systems coordination needed in the elderly patient population, the after hospitalization follow-up care is often given in a variety of settings, including the patient’s or caregiver’s home, physician’s office, skilled nursing or acute rehabilitation, and long-term care facilities.

While patient discharge processes vary among hospitals, there are key components to any successful discharge that can be generalized across institutions. The Society of Hospital Medicine’s Hospital Quality and Patient Safety Committee developed such components in a discharge check sheet (Table 2) [70], derived by the consensus of experts and rigorous review of
the literature and existing products. This peer reviewed tool, although not yet formally evaluated, provides the key clinical care elements in the discharge summary section and sections on patient instructions, along with communication to the patient’s physicians in other institutions or in the

<table>
<thead>
<tr>
<th>Process</th>
<th>Discharge summary</th>
<th>Patient instructions</th>
<th>Communication to follow-up clinician on day of discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presenting problem that precipitated hospitalization</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>Key findings and test results</td>
<td>x</td>
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<td>Final primary and secondary diagnoses</td>
<td>x</td>
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<td>Brief hospital course</td>
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<tr>
<td>Condition at discharge, including functional status and cognitive status, if relevant</td>
<td>x – Functional status</td>
<td>o – Cognitive status</td>
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<tr>
<td>Discharge destination (and rationale, if not obvious)</td>
<td>x</td>
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<td>x</td>
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<td>Discharge medications:</td>
<td></td>
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<tr>
<td>Written schedule</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>Include purpose and cautious (if appropriate) for each</td>
<td>o</td>
<td>x</td>
<td>o</td>
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<tr>
<td>Comparison with preadmission medications, (new, changes in dose/ frequency unchanged, “medications should no longer take””)</td>
<td>x</td>
<td>x</td>
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<tr>
<td>Follow-up appointments with name of provider, date, address, phone number, visit purpose, suggested management plan</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>All pending labs or tests, responsible person to whom results will be sent</td>
<td>x</td>
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<tr>
<td>Recommendations of and subspecialty consultants</td>
<td>x</td>
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<td>o</td>
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<tr>
<td>Documentation of patient education and understanding</td>
<td>x</td>
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<tr>
<td>Any anticipated problems and suggested interventions</td>
<td>x</td>
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<td>24/7 call-back number</td>
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<tr>
<td>Identify referring and receiving providers</td>
<td>x</td>
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<tr>
<td>Resuscitation status and any other pertinent end-of-life issues</td>
<td>o</td>
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</tbody>
</table>

x, required element; o, optional element

outpatient setting. This discharge checklist can be used by the individual hospitalist or hospital-wide in the discharge process.

**Summary**

A significant portion of hospital care involves elderly patients who have frequent and severe disease presentations, higher risk of iatrogenic injury during hospitalization, and greater baseline vulnerability. These risks frequently result in longer and more frequent hospitalizations.

The frailty and complication rates of the elderly population underscore the importance of hospital-based programs of education, and screening for cognitive and functional impairments, to determine risk and needed additional care and services during hospitalization and at discharge. In addition, physicians are needed to take the lead in instituting programs of prevention (eg, delirium, ADRs, unnecessary IUC use) and improving the systems of care with integrated technologies (eg, aspects of discharge planning, medication reconciliation, and reduction of medication error). As such, it is a multtiered approach, with interventions in the areas of education, screening, prevention, and systems of care improvements, that is needed to improve the clinical care and outcomes of the hospitalized elderly patient.

**References**


