Management of delirium across

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Facilitating throughput with systems thinking

an integrated health system

By Cynthia L. Holle, DNP, RN, and James L. Rudolph, MD, SM

Delirium, or acute brain failure, is a complex medical emergency with serious consequences for patients and health systems. Delirium is different from, but may be superimposed on, dementia. Dementia is a chronic disorder of cognitive decline in areas such as memory, language, and executive function, whereas delirium is an acute disorder of attention and arousal.[1] The occurrence of delirium in noninstitutional settings is estimated to be 1% to 2%; however, delirium is present in 8% to 17% of older adults in the ED and around 50% of older adult inpatients.[2] Patients with delirium stay longer in acute care; are more likely to experience injury, complications, or death; are more likely to be admitted to a skilled nursing facility; and represent higher acuity and cost.[3,4] Delirium is a burden on the health system, with stalled patient flow, higher utilization and costs, increased hospital readmissions, poor quality outcomes, and staff frustration and fatigue. Resources for preventing and managing delirium vary across an integrated health system,

and nurse leaders are challenged with promoting continuity of care, improving outcomes, and decreasing hospital readmissions. Nurse leaders can use systems thinking to address the needs of this vulnerable population across the system.

Throughput impact

Delirium presents with acute deficits in awareness, attention, and arousal. It has a fluctuating course, altered sleep patterns, and cognitive impairment.[5] Complications include an increased risk of falls, pressure injuries, dehydration, pneumonia, and aspiration.[6,7] Because brain function is critical to recovery from acute illness, patients with delirium recover more slowly, experiencing increased lengths of stay and frequent readmissions.

Delirium and its consequences cause slow patient throughput across an integrated system's continuum of care. Patients with delirium are less able to participate in their care and require more protective interventions. Delirium may span care transitions and affect throughput within every setting in the health system: acute care, skilled nursing facilities, and home care. Evidence has shown that patients with delirium experience difficult care transitions, challenging discharge planning, a higher risk of 30-day readmissions, increased risk of geriatric syndrome or other complications, delayed discharge to home, the need for long-term custodial care, and death.[3,4,6]

The preferred throughput for an older adult is one that progresses from the hospital to home with minimal delay. (See *Figure 1.*) A safe discharge to home is the goal. Typically, throughput involves aligning patient acuity with bed flow and staffing. However, a linear flow isn't typical of patients with delirium because attention is a critical cognitive domain for conforming to the preferred throughput. Impaired attention results in a deviation from the pathway due to nonparticipation, agitation, and hospital complications.[8] The complexity of delirium can cause multiple hospital readmissions, extended stays in skilled nursing facilities, and ED visits. Due to the potential for delirium to appear or persist after hospital discharge, health system nurse leaders need to be aware of the impact of delirium beyond the acute care setting.

Nurse leaders across the system's continuum should collaborate to assess patient risk factors, deploy delirium prevention strategies for at-risk patients, and develop evidence-based care plans to mitigate the effects of delirium in any setting. In addition to orchestrating the delivery of high-quality, patient-centered care, nurse leaders have a fiduciary duty to the health system that includes planning and providing care that's efficient and cost effective. Frequent readmissions and intensity of care that exceeds reimbursement can impact revenue and strain finite resources, further impacting the ability to care for high-acuity patients. Although the course of delirium is highly variable, which makes managing patient throughput challenging, it's important to patient well-being and organizational financial health to improve throughput for these patients.

In the hospital setting

Nursing considerations. Delirium can manifest as hypoactive, hyperactive, or mixed subtypes, measured by the patient's level of motor activity. Hypoactive delirium is the most common

Figure 1: Uncomplicated throughput

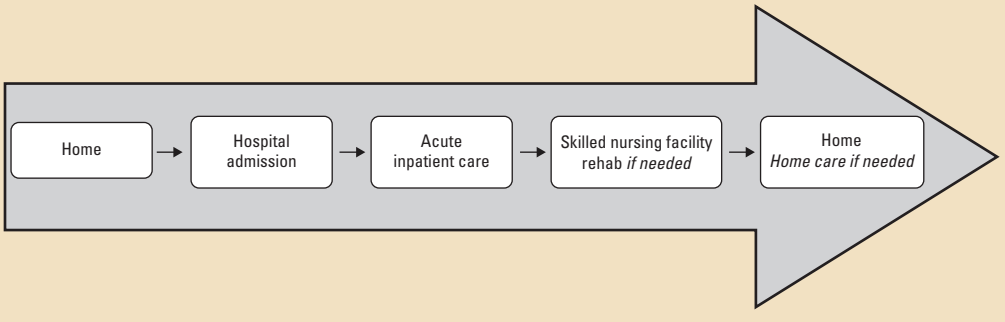

Table 1: Delirium motor subtypes

Delirium motor subtype	Recognition	Nursing implications
Hypoactive delirium		
May present as: Decreased alertness Slowed motor movements Decreased verbal responsiveness	Most difficult to recognize May look like depression or withdrawal	May be less likely to engage in care May be difficult to mobilize; may need assistance to ambulate and toilet, and assistance for repositioning May require use of lift devices; potential for lifting injury to staff May need assistance and encouragement to take food and fluids by mouth Higher risk of pneumonia Higher risk of pressure injuries Higher risk of circulatory compromise
Hyperactive delirium		
May present as: Agitation Hyperalert to the environment Restlessness Picking at I.V. lines, bed linens, or clothing Striking out at staff	Easiest to recognize	Potential for injury is high; protect from falls Protect from dislodging I.V.s, catheters, and endotracheal tubes May need sitters, restraints, and bed alarms May need additional assistance in providing care, ambulating, and toileting Potential for injury to staff
Mixed delirium		
Presents with features of both hyper- and hypoactive delirium May cycle rapidly or slowly between the two motor subtypes	May be difficult to recognize due to changes in presentation	Less continuity of symptoms necessitates more frequent nursing assessment and rapidly changing nursing intervention priorities

and impacts throughput because the patient may not be alert, may move slowly, and may have slow verbal responses.[9] In hyperactive delirium, the least common subtype, the patient may appear agitated or combative, with frequent movement. Patients with mixed delirium cycle through periods of hyperactivity and hypoactivity over the course of minutes to hours.[5] Delirium motor subtypes require different nursing considerations and resources. (See *Table 1.*) Regardless of the subtype, the presence of delirium means that patients recover more slowly and additional resources are required to respond to higher acuity, longer lengths of stay, and throughput slows.

Quality and safety. Delirium negatively impacts hospital quality and safety measures. Despite the use of sitters, bed alarms, restraints, and proximity to the nurses' station, patients with delirium experience injuries. In two recent studies of falls among hospitalized adult patients, researchers found evidence of delirium in 73% to 96% of the patients who fell.[10,11] In one study, a review of the data indicated that of the patients who fell, 60% couldn't be discharged home and the average length of stay increased from a mean of 5.83 days to 15 days.[11] A meta-analysis of delirium risks in hospitalized older adults suggests that this population has a higher risk of death, postacute institutionalization, and dementia long after experiencing delirium. After experiencing delirium, patients are more likely to need more supportive care and home-based services, and they're more likely to be readmitted to the hospital.[12]

Cost. For risk-based reimbursement, such as Medicare Diagnosis-Related Groups and managed-care capitation, an extended length of stay can result in more expense and less revenue.[13] Nurse leaders must balance concern for patient care with the commitment to the

financial well-being of the organization.[14] The complexity of delirium and its impact on throughput highlights this balance. Delirium increases patient acuity and costs, both variable and opportunity. Variable costs include the use of sitters and other staff to assist in protecting patients with delirium from injury. Frequent rounding and safety checks, application of restraints and bed alarms, and increased staff time at the bedside impact care costs. Opportunity costs can be more complex to calculate and include a loss of new admissions if patients with delirium impact throughput with an extended length of stay and cause beds not to turn over as expected. Capacity, census, and demand factor into cost calculations; nurse leaders can work with the chief financial officer to understand the impact of delirium on the system's financial health.

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In the postacute setting

Skilled nursing facilities. Delirium impacts throughput in the long-term-care setting, creating unique challenges in the skilled nursing facility. The effects of delirium in the skilled nursing facility contribute to a prolonged and more chaotic, unpredictable throughput. There may be discontinuity in care at the time of transfer, with a lack of documentation of delirium in written or verbal transfer communication. The skilled nursing facility admission process may lack a delirium risk assessment and care planning for prevention and screening. The risk of falls persists beyond the acute care setting, with falls occurring more often in skilled nursing facility residents who've experienced delirium.[7] Complications such as dehydration, pressure injuries, urinary retention, and aspiration are more prevalent in skilled nursing facility residents when delirium is present.[6] Similar to the hospital setting, the rate of discharge to home within 30 days of skilled nursing facility admission was 26.9% for patients with delirium compared with 52.5% for their nondelirium counterparts.[15]

The skilled nursing facility environment is different from the hospital. Skilled nursing facility staffing, nurse skill mix, and the ability to treat in place are less than in the acute care setting. Skilled nursing facilities don't have the same level of interprofessional staffing and on-site resources as found in hospitals, such as clinical nurse specialists, pharmacists, staff physicians, radiology, and lab services. Unlicensed assistive personnel (UAP) deliver the majority of direct resident care in skilled nursing facilities, and LPNs provide about 70% of licensed nursing care.[16] The nursing staff may have less ability to differentiate delirium and dementia, and they may have a more difficult time assessing risk and preventing and managing delirium. Skilled nursing facility medical records are most often paper-based, whereas most hospitals are using electronic medical records (EMRs). The use of electronic records makes it possible to create alerts for delirium risk so that prevention activities can begin sooner.

Home care. Delirium in the home care setting may be harder to detect than in other settings because care isn't continuous. Care rendered by professional caregivers is episodic; family members or other caregivers may provide day-to-day assistance to the patient, with outpatient practitioners providing medical care and direction. One systematic review indicated that the prevalence of delirium in the general population of older adults age 65 or older is 1% to 2%, rising with

age to 10% of those over age 85. However, among patients with adverse events, delirium was ranked as one of the top five adverse events.[17] A recent pilot of a randomized controlled trial indicated that it's feasible to add nursing interventions focusing on detecting and reducing delirium in the home care setting. Interventions are grouped in seven domains: assessment, detection, monitoring, support, direct care, health promotion, and education.[18] Failing to detect or manage delirium in the home-care and outpatient setting can lead to increased ED visits and potential hospital admissions in this population.

Table 2: Risk factors and precipitating factors for delirium

Risk factors[24]	Precipitating factors[2]
Cognitive impairment	Drugs: psychoactive, sedatives, hypnotics, or multiple medications
Age >65	Electrolytes (labs)
Age >80	Lack of drugs (pain, withdrawal)
Infection	Infection
Fracture	Restraints
Vision impairment	Intraoperative insults (anesthesia, inflammation, recovery, environment)
Severe illness	Urinary and other indwelling apparatus (catheters, I.V., intubation)
	Medical conditions (urgent or trauma)

Across the care continuum

Delirium education. Early recognition of delirium is important because it can lead to rapid interventions and supportive care aimed at reducing the length and severity of the delirium episode. However, it appears that nurses across the health system often fail to recognize delirium. Studies of nurses and UAP in skilled nursing facilities and hospitals indicated that these staff members correctly recognized hypoactive delirium superimposed on dementia (DSD) about 21% of the time.[19] A similar study in an acute care setting found that although 83% of RNs could correctly identify dementia in case studies, there was far less correct identification of delirium versus DSD or the hypoactive motor type of delirium and DSD. Twenty-one percent of the RNs identified hypoactive DSD and 41% identified hypoactive delirium correctly in the case study.[20]

Improving the throughput of the patient with delirium across the system begins with a commitment to education. Nurse leaders may sponsor the effort, and existing professional practice councils and safety committees can serve as champions by adopting the goals of delirium management. Frontline nurse managers play an important role in guiding staff to recognize the value in the effort for patients, staff, and the healthcare entity. Topics should include risk factors, admission assessments for risk, prevention strategies, delirium detection, environment management, pharmacologic management, symptom management, and supportive care. Annual staff competencies can include delirium recognition and care.

All staff members in contact with patients should receive education on delirium at a level appropriate for their role. Nonclinical and volunteer staff should understand that a nurse needs to be alerted if they witness behavior that signals delirium. Delirium detection can be improved by pairing didactic education with peer-to-peer coaching at the bedside.[21] The Gentle Persuasive Approach in Dementia Care is a program that staff members can use for providing a person-centered approach to caring for patients with delirium. It's been tested and used in both long-term-care and acute care settings, guides the delivery of care that seeks to understand behaviors associated with delirium and dementia, and can diffuse acting-out behavior.[21,22]

A systems approach to delirium education allows learning to occur in each setting in the continuum. Hospital nurse educators and clinical nurse specialists can be deployed to the postacute setting to deliver delirium in-services and provide bedside coaching. A train-the-trainer approach can be used, allowing the hospital-based educators to train postacute staff development nurses in delirium content.

Admission risk assessment and screenings. Because delirium is an acute brain emergency, it's important to begin assessing for delirium without delay. Patients with hospital-acquired delirium are at significantly greater risk for a longer and more complex hospital course, with greater risk of

long-term care or death. The best chance for swift, uncomplicated throughput begins at admission. All older adults should have a delirium risk assessment completed as a function of admission.[23,24] (See *Table 2.*) With the widespread use of EMRs in acute care, systems can automatically parse health data for risk factors and issue rapid alerts to staff. Nurse leaders can build a business case for developing electronic rules that issue reminders and flags when medical record data contain indicators of delirium risk factors. Risk stratification can direct staff members to perform additional screening for those patients at greatest risk and implement preventive and supportive measures. Patients at risk should receive a high priority for delirium screening and care planning for risk reduction.

Ongoing screening for delirium is as simple as taking vital signs. Tools such as the modified Richmond Agitation and Sedation Scale enable the nurse to ask a patient a question and note his or her level of attention, ranging from combative to unarousable.[25] This assessment takes less than 15 seconds; when completed regularly, results indicate changes in attention that trigger a more in-depth assessment.[25] (See *Table 3.*)

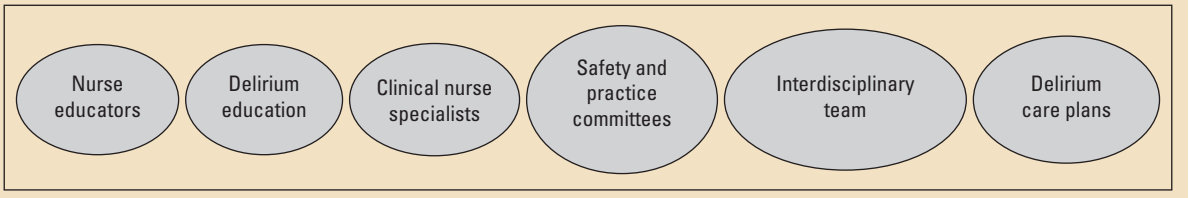
All nurse leaders, from the CNO to unit managers, can champion a culture that anticipates delirium risk. An internal media campaign can link delirium to negative outcomes and ask nurses if their patients are at risk and were screened. Admission risk assessment and screening should occur at every level of care in the system. Nurses can ensure that the results of hospital admission risk assessments are part of the information provided at handoff between levels of care. Nurse educators can

Table 3: Modified Richmond Agitation and Sedation Scale[25]

Step 1	State the patient's name and ask the patient to open his or her eyes and look at the speaker. Ask "Describe how you're feeling today." If the patient answers with a short answer (<10 seconds), cue with a second open-ended question. If the patient has no response to the verbal cue, physically stimulate him or her by shaking the shoulder.
Step 2	Score modified Richmond Agitation and Sedation Scale below:

Score	Term	Description
+4	Combative	No attention; overly combative, violent, immediate danger to staff
+3	Very agitated	Very distractible, repeated calling or touch required to get or keep eye contact or attention; can't focus; pulls or removes tubes or catheters; aggressive, fights environment, not people
+2	Slightly agitated	Easily distractible; rapidly loses attention; resists care or uncooperative; frequent nonpurposeful movement
+1	Restless	Slightly distractible; pays attention most of the time, anxious, but cooperative; movements not aggressive or vigorous
0	Alert and calm	Pays attention; makes eye contact; aware of surroundings; responds immediately and appropriately to calling name and touch
-1	Wakes easily	Slightly drowsy; eye contact >10 seconds; not fully alert, but has sustained awakening; eye-opening/eye contact to voice >10 seconds
-2	Wakes slowly	Very drowsy; pays attention some of the time; briefly awakens with eye contact to voice <10 seconds
-3	Difficult to wake	Repeated calling or touch required to get or keep eye contact or attention; needs repeated stimuli (touch or voice) for attention, movement, or eye opening to voice (but no eye contact)
-4	Can't stay awake	Arousable but no attention; no response to voice, but movement or eye opening to physical stimulation
-5	Unarousable	No response to voice or physical stimulation

Figure 2: System resources for delirium prevention and management



provide instruction on admission risk assessment throughout the care continuum. All parties involved in the handoff should anticipate the need for vital information about the patient's brain health. If the nurse handing off doesn't mention the patient's delirium risk, the receiving nurse must ask for that information.

Prevention. Because delirium is a highly individualized phenomenon, each patient's risk factors need targeted prevention strategies. Strategies include getting patients up out of bed and ambulating, and ensuring better sleep, adequate fluid intake, and that patients with visual and hearing impairments have their glasses and hearing aids. Patients at risk for delirium should have their medications reviewed by a pharmacist to ensure that none contribute to delirium risk. Prevention can also include music therapy, dynamic light application, and care at home when feasible.[26] Nurses can access a delirium toolbox for aids in preventing delirium, such as a variety of eyeglasses, stress balls, sleep masks, soothing music, and puzzle books. The delirium toolbox is an immediate intervention for use at any point in the continuum of care that needs no physician orders.

Applying systems thinking

The American Organization of Nurse Executives identifies systems thinking as a nurse leader competency.[14] Nurse leaders are the champions of system integration, interprofessional collaboration, and the use of evidence-based standards of care to deliver quality outcomes across the care continuum. Systems thinking prepares nurse leaders to solve problems and make decisions across the organization, using visionary thinking and a variety of resources and relationships. Systems thinking can leverage a well-developed acute care professional nurse practice environment across the health system and enable nurses to engage in performance improvement and patient safety initiatives that benefit the patient with delirium.[27] Systems thinking also informs approaches to prevent, identify, and manage delirium, and streamline throughput so that patients can achieve optimal outcomes and return to home after recovery.

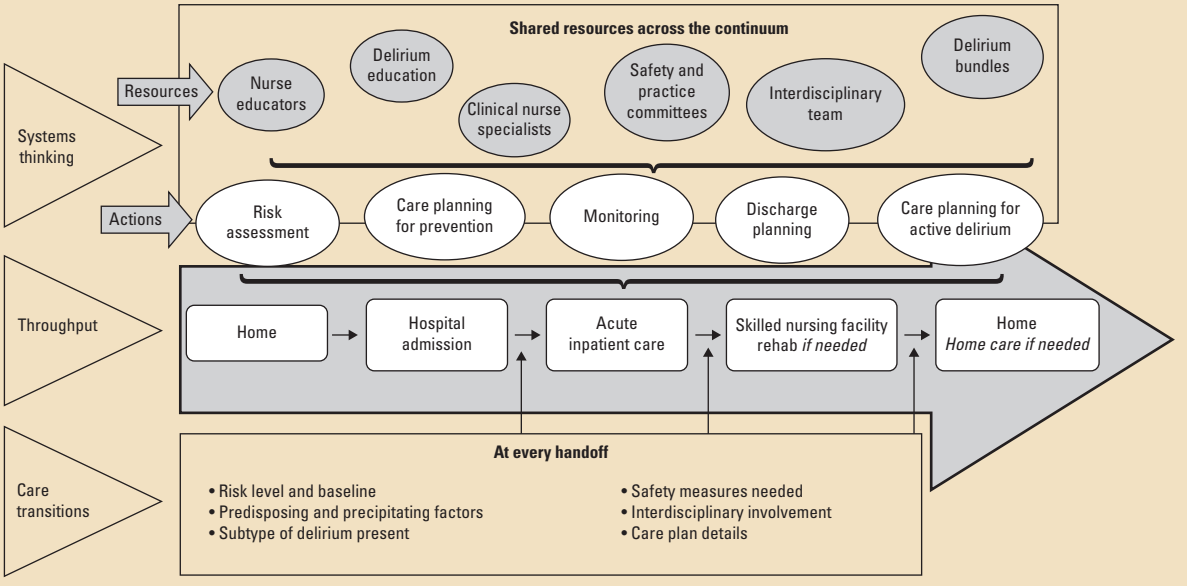
Nurse leaders can draw on systems thinking by assessing needs and deploying delirium resources across the integrated system to streamline throughput. (See *Figure 2.*) Staff education, delirium risk assessment and screenings, and prevention strategies are vital across the integrated system. Acute clinical nurse specialists, NPs, nurse educators, and quality improvement facilitators can provide staff education and consultation to nurses in other care settings. Discharge planners and case managers can anticipate the needs of patients with delirium and improve care transitions by arranging education for family caregivers and bringing postacute providers into care conferences early in the discharge process. Change-of-shift report, transfer within the acute care setting, and transfer between levels of care should include information on the patient's delirium risk level and any manifestation of delirium. A delirium checklist can be helpful in preparing and assessing a systems thinking-driven response to the complexity of addressing delirium. (See *Table 4.*)

A systemwide culture of delirium awareness will result in a framework of patient-centered interprofessional and interdepartmental cooperation. This includes supporting the autonomy and self-efficacy of clinical nurses to access resources and take action to benefit their patients. Clinical nurses should be able to screen at-risk patients and alert the physician and other care team members if screening indicates deficits in attention and arousal. They should have access to delirium toolboxes to deploy prevention strategies, be

Table 4: A delirium checklist

Preparation	
Is your staff ready?	Have you in-serviced staff on delirium recognition and prevention? Are your clinical nurse specialists and nurse educators prepared to be expert advisors to staff? Will your safety, falls, or wound and skin committee champion delirium prevention? Do you have a nurse leader champion?
Do you know your facility benchmarks?	Do you know how many patients develop delirium in your facility? In your system? Your rate of falls and pressure injuries?
Do you have a delirium toolbox?	Have you stocked items that assist patients in maintaining their level of attention and arousal, and promote restful sleep (such as playing cards, puzzle books, stress balls, generic eyeglasses, sleep masks, earplugs, and soothing music)?
Risk assessment	
Are you ready to determine which patients are at greatest risk for delirium?	Can your EMR identify risk factors and issue alerts? Do you need to in-service nurses on performing risk assessment at the time of admission?
Screening	
Are you prepared to screen all adults older than age 65 for level of awareness and arousal?	Are nurses in-serviced on the use of the modified Richmond Agitation and Sedation Scale or the screening tool of choice? Have documentation guidelines been established? Does a policy need to be created and approved? How will results suggestive of delirium be handled? Are interdisciplinary plans in place for a delirium assessment when indicated?
Prevention	
Are you ready to engage the patient's brain and senses, and guard against precipitating factors?	Provide the opportunity for adequate sleep; offer sleep masks and earplugs as needed. Arrange care to allow for uninterrupted sleep. Allow for best sensory input: Ensure that eyeglasses and hearing aids are in use. Engage the patient's brain: Offer puzzle books, playing cards, and so on.
Protection	
Are you prepared to protect the patient from complications and minimize the severity and duration of delirium complications?	Maintain nutrition and hydration. Maintain mobility. Initiate fall prevention strategies. Assist with toileting, transfers, and hygiene. Remove tethers as soon as possible, such as indwelling catheters, I.V.s, and tubing.
Collaboration	
Are you planning ahead and sharing information? Have you disseminated the delirium plan across the integrated system? To all levels of care?	Include the patient's family in education and care. Share information with the discharge planner or care manager to prepare the next level of care for the patient's needs. Advocate for delirium champions to include all health system levels of care in delirium education and prevention. Discuss every older adult's risk of delirium at handoffs.

Figure 3: A systems model of delirium management



free to consult with clinical nurse specialists and nurse educators on delirium care, and take an active role in safety and practice committees. Delirium doesn't stop at the hospital door and neither should risk assessment, prevention, monitoring, and management strategies. (See *Figure 3.*)

Cleaner throughput

Health systems invest heavily in the resources, staff, and processes involved in smoothly moving patients from admission to discharge. When patients develop delirium, the system is challenged to adapt to higher acuity needs and a longer, more complex course of care. Greater resources are required, and the throughput process slows. The throughput of a patient with delirium may necessitate care in multiple settings in an integrated health system. For the best outcomes, these settings need to be coordinated and share information, particularly about mental status, resulting in the ability to flex evidence-based care pathways to address patient needs. Because risk stratification, prevention, and care delivery largely reside with the nursing staff, nurse leaders can use systems thinking to integrate care that better serves patients with delirium. NM

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