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REFLECTIONS

Applying the geriatric 5Ms in critical care: the ICU-5Ms

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Over 50% of patients in intensive care units (ICUs) in Canada are over the age of 65.[1] Interest in integrating evidence-based geriatric principles in ICU care has increased as a result.[2–5] Early involvement of geriatric services in the ICU has been suggested as one method of integration;[6] however, a major limitation in Canada is the scarcity of geriatricians, with fewer than 400 nationally.[5] Capacity building among critical care teams in geriatric principles may be a more feasible way to meet the needs of critically ill older adults.[2] We propose a popular geriatric framework—the Geriatric 5Ms©[7,8]—which could be used by ICU teams to incorporate these geriatric concepts.

The Geriatric 5Ms framework was originally created by Canadian and USA geriatric specialists to communicate core competencies in geriatric medicine in a memorable way to those outside the field.[8] The 5Ms are now widely used in the USA, Canada, Australia, and New Zealand.[7] Using our expertise in both geriatric and critical care medicine, and with permission of the original creators, we have adapted the Geriatric 5Ms to create the ICU-5Ms (Table 1). The ICU-5Ms are meant to stimulate thought and discussion by drawing parallels between geriatric medicine and critical care. The ICU-5Ms have not been directly studied or validated in the clinical setting. We use the framework to outline how evidence-based geriatric principles can be used in the ICU.

A core principle when caring for older adults is the emphasis on interdisciplinary teamwork. This is mirrored in the ICU population where interprofessional care teams have been shown to be central to high-quality care.[9] While all ICU patients, regardless of age, could likely benefit from the interdisciplinary, comprehensive, and patient-centred care described by the ICU-5Ms, this article focuses on critically ill older adults. We aim to stimulate interest in the dissemination and implementation of geriatric principles in the ICU and have summarized the information outlined in this article in a quick-reference checklist for ICU teams (Electronic Supplementary Material, eFigure).

Mind

The ICU-5Ms' *Mind* refers to delirium, dementia, depression, and postintensive care syndrome (PICS) involving cognitive and mental health (Table 1).

Pre-existing dementia is under-recognized in the ICU,[10] although a new diagnosis of dementia or depression may not be appropriate given the limited ability to conduct thorough interviews with critically ill patients. These diagnoses are sometimes highly suspected, however, based on collateral history. Geriatric medicine or psychiatric consultation should be considered if the diagnosis would impact treatment decisions.

For all patients, evidence-based recognition, prevention, and management of delirium should be incorporated into routine care.[11] Older adults in the ICU are at increased risk

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Table 1 Bridging the philosophies of geriatric and critical care medicine

	Geriatric 5Ms©[7,8]*	ICU 5Ms	Application to critical care medicine
Mind	Mentation Dementia Delirium Depression	Delirium Dementia Depression PICS-cognitive and mental health	Focus on nonpharmacologic delirium prevention/management, such as mentation maintenance through the minimization of sedation, and identification of pre-existing cognitive impairment or depression
Mobility	Impaired gait and balance Fall injury prevention	Early physical therapy and rehabilitation PICS-physical impairment	Focus on preventing deconditioning, and early mobilization
Medications	Polypharmacy Deprescribing Optimal prescribing Adverse medication effects and medication burden	Deprescribing Optimal prescribing Adverse medication effects	Focus on pharmacokinetics, choice of sedation, and drug interactions
Multicomplexity	Multimorbidity Complex biopsychosocial situations	Frailty Complex biopsychosocial situations	Focus on frailty, concurrent acute-on-chronic illness, and impact of multiorgan failure
Matters Most	Each individual's own meaningful health outcome goals and care preferences	Urgent care planning and goals of care	Focus on patient-centred goals of care and family involvement

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ICU = intensive care unit; PICS = post-intensive care syndrome

for delirium,[12] defined as an acute change in attention and awareness that is fluctuating and accompanied by disturbed cognition.[13] Delirium is associated with increased mortality, longer duration of mechanical ventilation, longer ICU and hospital stays, and postdischarge cognitive impairment.[14] Intensive care unit care teams should screen for delirium in all patients using a validated tool such as the Confusion Assessment Method for the ICU (CAM-ICU) or the Intensive Care Delirium Screening Checklist.[11] Screening should ideally be done during daily awakening trials, given that both sedation and delirium can alter the level of arousal and deep sedation can significantly increase the likelihood of a positive delirium assessment.[11]

Multidisciplinary teams can implement nonpharmacologic delirium prevention strategies, such as the ABCDEF Bundle, to reduce the incidence of delirium[15] (implementation resources are available at URL: https://www.icudelirium.org/medical-professionals/overview). The involvement of an ICU pharmacist has been shown to improve bundle implementation[16] as well as sleep duration and quality,[17] which can be important for preventing delirium. The bundle includes the management of pain, daily spontaneous awakening and breathing trials, the targeting of light sedation to a Richmond Agitation-Sedation Scale of 0 to –1, delirium monitoring and management, early mobility, and family engagement.[15] Of note, the ABCDEF bundle has not yet been studied in a randomized controlled trial but it has shown promising results in a large, prospective cohort study of over 15,000 patients.[15]

With respect to pharmacologic interventions for delirium, dexmedetomidine may reduce delirium incidence[18,19] and could be preferentially used for sedation in frail older adults who require sedation for other reasons.[5] If delirium symptoms such as hallucinations, anxiety, or agitation pose harm to patients or healthcare workers, limited-duration prescribing of an as-needed antipsychotic is preferred over standing orders, which are often unintentionally continued after hospital discharge.[20] Antipsychotics have not been shown to reduce the incidence or duration of delirium and should be otherwise avoided.[11,21]

New or worsening cognitive or mental health impairment following ICU discharge is a common component of PICS.[5,22,23] Modifiable risk factors for PICS-cognitive impairment during ICU admission include incidence and duration of delirium and use of benzodiazepines.[24] With respect to PICS-mental health, the creation of an ICU diary by the patient's family and medical team during critical illness may reduce depression and improve quality of life after discharge.[25] Outpatient referral to geriatric medicine or geriatric psychiatry for diagnosis and management of PICS-cognitive impairment and PICS-mental health could be considered.

Mobility

The ICU-5Ms' *Mobility* focuses on preserving physical independence and function through early mobilization in the ICU (Table 1).

Physical impairment is common following ICU discharge and can include weakness, decreased mobility, and reduced activity endurance.[5,26] Intensive care unit-acquired weakness is found in more than 25% of ICU survivors[26] with increasing age, high disease severity, and delirium as important risk factors.[24,27] Depending on the degree of physical impairment and presence of comorbid diseases, decreased mobility may lead to new long-term disability.[28] This may result in previously independent patients being unable to live independently[29] depending on their social and financial supports (see Multicomplexity). Maintaining functional independence and working to improve mobility to pre-ICU levels is important for both patients and the healthcare system.

To address mobility, all members of the ICU team should be involved in early mobilization. Regular and early physical therapy sessions to maintain baseline physical function are highly encouraged.[30] Nurses are encouraged to ensure the patient is seated rather than supine whenever feasible, and to minimize physical restraints. Dieticians can support these efforts by ensuring adequate energy, protein, and hydration to maintain muscle mass. Intensivists can ensure minimal sedation is used to allow for maximal patient participation.

Following ICU discharge, patients may require physical rehabilitation to return to prior function, although those with pre-existing severe frailty typically do not return to baseline function.[29] Referral to physiatry services for further management could be considered.

Medications

The ICU-5Ms' *Medications* pertains to minimizing polypharmacy and avoiding adverse drug reactions (Table 1).

The ICU represents a unique opportunity for intensivists to consider deprescribing with the support from a critical care pharmacist.[9] Pharmacists can assist with comprehensive medication review, and their involvement has been shown to reduce adverse drug reactions in the ICU.[31] At the time of transfer out of the ICU, some medications may no longer be necessary based on the indication, risks, benefits, and time-to-benefit in the context of the patient's new health status and prognosis. We suggest prioritizing deprescribing medications that cause the most harm, such as benzodiazepines and drugs with high anticholinergic burden. The Beers and Screening Tool of Older People's Prescriptions (STOPP) criteria are useful resources for medications that should be preferentially avoided in older adults,[32,33] while the Screening Tool to Alert to Right Treatment (START) criteria identify medications that are often under-prescribed but should be considered for initiation.[32] Online anticholinergic calculators (e.g., URL: http://www.anticholinergicscales.es/) can assess which medications have the highest anticholinergic effect, helping clinicians prioritize their deprescribing.

Additionally, new medications started in the ICU such as sedatives, opioids, antipsychotics, and stress-ulcer prophylaxis should be discontinued when the patient is transferred from the ICU if they are no longer indicated. Almost 25% of patients started on antipsychotics for ICU-associated delirium are prescribed these medications at the time of hospital discharge despite no on-going indication.[20] If these medications are still deemed necessary, a clear tapering plan or timeline for reassessment should be communicated with the family and transferring physician.

Multicomplexity

The ICU-5Ms' *Multicomplexity* focuses on frailty and complex biopsychosocial situations.

Frailty is a dynamic state of reduced physical, cognitive, or physiologic reserve that results in increased vulnerability to new health stressors.[34] In the ICU, pre-ICU frailty is present in approximately 30% of older adults[35] and is associated with increased hospital and long-term mortality,[36,37] worsened post-ICU physical function,[29,37] and higher admission rates to long-term care.[29] Frailty can be understood as the slow accumulation of deficits in multiple systems and is therefore similar, although not synonymous, with multimorbidity, which is defined as the presence of two or more chronic conditions.[38] The Clinical Frailty Scale (CFS) has been widely used to diagnose frailty in the ICU[39] and is assessed based on the patient's function at least two weeks prior to the incident critical illness.[40] The optimal management of patients with frailty and strategies to limit worsening of frailty in the ICU is unclear, as there have been no interventional trials.

In noncritically ill older adults, geriatricians use comprehensive assessments that incorporate the patient's biopsychosocial context to develop a patient-centred frailty care plan. This considers not only the individual's physiologic state but also their cognitive, functional, emotional, financial, and social state. In the ICU, social workers can gather information on preadmission functional status, living environment, and financial and social supports, and can promote the early involvement of

family members in the ICU.[41] In combination with the patient's CFS score, this information can broaden the ICU team's understanding of the patient's story, highlight areas where they might need individualized care and support, and give context to individual prognosis and what matters most during goals of care discussions (see Matters Most).

Matters Most

The ICU-5Ms' *Matters Most* is about understanding patient values and preferences to ensure the anticipated risks and benefits of ICU treatment align with patients' expectations of symptoms and quality of life after discharge.

In the ICU, discussing goals of care with patients and substitute decision makers involves prognosticating both mortality and morbidity. The ICU-5Ms can help this process by pulling together the individual's baseline frailty, function, and biopsychosocial context while recognizing current cognitive and physical impairments that may or may not be reversible. *Matters Most* is more than what treatment to pursue; it is a holistic approach that emphasizes who the patient was prior to their critical illness and who they wish to be after their critical-illness survival. It is important to stress that while age is important—in that it often changes what matters most to patients[42]—it is less important than frailty when prognosticating post-ICU outcomes.[43] Attention to frailty may also help alleviate any misperception of ageism in discussions of goals of care. The epitome of patient-centred care is helping patients live their remaining years as they choose. While the literature addressing values and preferences of critically ill older adults continues to evolve, several studies suggest that health-related quality of life is maintained in noncognitively impaired older ICU survivors.[42,44]

Several tools have also been developed to help clinicians integrate patient values into care planning.[45,46] These tools can potentially minimize conflict, and implementation work is ongoing to adapt them to local ICU contexts.[47]

Conclusion

Older adults now account for more than 50% of patients admitted to intensive care in Canada. The ICU-5Ms outline evidence-based geriatric principles in the care of critically ill older adults within the categories of mind, mobility, medications, multicomplexity, and matters most. This framework may be considered as a starting point for ICU teams to incorporate geriatric principles into routine ICU care.

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