



# NONADHERENCE TO GERIATRIC-FOCUSED PRACTICES IN OLDER INTENSIVE CARE UNIT SURVIVORS

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**Background** Older adults account for more than half of all admissions to intensive care units; most remain alive at 1 year, but with long-term sequelae.

**Objective** To explore geriatric-focused practices and associated outcomes in older intensive care survivors.

**Methods** In a 1-year, retrospective, cohort study of patients admitted to the medical intensive care unit and subsequently transferred to the medicine service, adherence to geriatric-focused practices and associated clinical outcomes during intensive care were determined.

**Results** A total of 179 patients (mean age, 80.5 years) met inclusion criteria. Nonadherence to geriatric-focused practices, including nothing by mouth ( $P=.004$ ), exposure to benzodiazepines ( $P=.007$ ), and use of restraints ( $P<.001$ ), were associated with longer stay in the intensive care unit. Nothing by mouth ( $P=.002$ ) and restraint use ( $P=.003$ ) were significantly associated with longer hospital stays. Bladder catheters were associated with hospital-acquired pressure injuries (odds ratio, 8.9; 95% CI, 1.2-67.9) and discharge to rehabilitation (odds ratio, 8.9; 95% CI, 1.2-67.9). Nothing by mouth (odds ratio, 3.2; 95% CI, 1.2-8.0) and restraints (odds ratio, 2.8; 95% CI, 1.4-5.8) were also associated with an increase in 30-day readmission. Although 95% of the patients were assessed at least once by using the Confusion Assessment Method for the Intensive Care Unit (overall 2334 assessments documented), only 3.4% had an assessment that indicated delirium; 54.6% of these assessments were inaccurate.

**Conclusion** Although initiatives have increased awareness of the challenges, implementation of geriatric-focused practices in intensive care is inconsistent. (*American Journal of Critical Care*. 2018;27:354-361)

**CE** 1.0 Hour

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This article is followed by an *AJCC* Patient Care Page on page 362.

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In the United States, more than half of all patients admitted to the intensive care unit (ICU) are older adults; those 75 years and older account for nearly 30% of ICU admissions.<sup>1-3</sup> In a study<sup>4</sup> of patients more than 75 years old admitted to the ICU, 62.1% were discharged from the hospital alive, and 53.1% remained alive 1 year after discharge. However, older ICU survivors often have poor outcomes after hospitalization and decreased quality of life.<sup>5</sup> Delirium and ICU-acquired weakness, reported in up to 80% of older patients, lead to long-term declines in cognition, function, and mental health. This constellation of debilitating impairments, known as post-intensive care syndrome (PICS), has an estimated annual cost of \$108 billion.<sup>6-11</sup>

In 2013, the Society of Critical Care Medicine published a set of evidence-based clinical practice guidelines for management of pain, agitation, and delirium in critically ill adult patients in the ICU.<sup>12</sup> In 2015, the Institute for Healthcare Improvement sponsored the Rethinking Critical Care Initiative, advocating for a bundle that serves as the implementation framework for the Society of Critical Care Medicine guidelines in the ICU.<sup>13</sup> The ABCDEF bundle is an evidence-based, patient-centered, multi-component intervention that supplies a new structure for ICU care; the goals are to reduce duration of mechanical ventilation, development of delirium, and length of hospitalization, which are known key precursors to the development of PICS.<sup>14-18</sup> The bundle components are A, assess, prevent, and manage pain; B, both spontaneous awakening and breathing trials; C, choice of analgesic and sedation; D, delirium: assess, prevent, and manage; E, early mobility and exercise; and F, family engagement and empowerment. Although the aim of the ABCDEF bundle is to improve adherence to best practices, they are geared to the general adult population, leaving critical care providers without clear strategies for recognizing and managing the specific needs of geriatric patients.

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Increasingly, evidence<sup>19-22</sup> indicates that integrating a geriatric approach, which emphasizes multidisciplinary management of the complex needs of older adults, leads to improved outcomes. Use of models of care, such as units dedicated to acute care for elders, have resulted in significant decreases in functional decline, institutionalization, and death.<sup>19</sup> However, the number of health care providers dedicated to the care of hospitalized older adults is currently insufficient.<sup>23,24</sup> Most health care providers have never received geriatric training.<sup>24</sup> Furthermore, and of critical importance, these models of care have not been studied in an ICU.

In this study, we investigated practices of critical care providers with regard to geriatric-focused indicators in older ICU survivors. The indicators were defined by a combination of the guidelines for management of pain, agitation, and delirium<sup>12</sup>; the ABCDEF bundle<sup>13</sup>; and general evidence-based geriatric-focused indicators.<sup>25-30</sup> We then assessed the association between nonadherence to geriatric-focused practices (delirium screening; early mobilization and nutrition; avoidance of restraints, indwelling bladder catheters, and potentially inappropriate medications [PIMs]); and clinical outcomes (hospital-acquired pressure injuries, length of stay, discharge disposition, and 30-day readmissions). In addition, for delirium specifically, we also explored the accuracy of screening. Our ultimate aims were to characterize geriatric-focused practices in older adults and to determine whether adherence to these practices in the ICU can improve short-term PICS-related clinical outcomes.

Older adults account for more than half of all ICU admissions, yet most health care providers have never received geriatric training.

**Table 1**  
Application of geriatric-focused practices in ICU survivors

Practices	Definition of nonadherence
Delirium screening (ABCDEF bundle/ACOVE <sup>23,27,29</sup> )	No documentation of the CAM-ICU results
Early mobilization (ABCDEF criteria/ACOVE <sup>26,27,29</sup> )	Presence of a bed rest order
Early nutrition (HELP <sup>25</sup> )	Presence of an order for nothing by mouth
Avoidance of restraints (Joint Commission <sup>28</sup> )	Presence of a restraint order
Avoidance of indwelling bladder catheters (ACOVE <sup>26</sup> )	Presence of an order for indwelling bladder catheter
Avoidance of potentially inappropriate medications (Beers criteria/ABCDEF bundle <sup>23,27,29</sup> )	Presence of an order for benzodiazepines, psychotropic agents, or anticholinergic agents

Abbreviations: ABCDEF, A, assess, prevent, and manage pain; B, both spontaneous awakening and breathing trials; C, choice of analgesic and sedation; D, delirium: assess, prevent, and manage; E, early mobility and exercise; and F, family engagement and empowerment; ACOVE, Assessing Care of Vulnerable Elders; CAM-ICU, Confusion Assessment Method for the Intensive Care Unit; HELP, Hospital Elder Life Program; ICU, intensive care unit.

## Methods

We conducted a 1-year (September 22, 2014, to October 3, 2015) retrospective cohort study at a 764-bed tertiary academic acute care hospital in the New York City metropolitan area. We used an existing database of 10 529 patients who were discharged from the medicine service. Among the 10 529 patients, 386 were admitted to an ICU; of the 386, 73 were admitted to a nonmedicine ICU and 134 were transferred to the medical ICU after admission to a medical unit. Patients were included in the study if they were 65 years or older, came to the emergency department, were admitted to the medical ICU, survived, and were transferred to a medical unit during the study period. Of the 313 admitted to the medical ICU, 179 (57.2%) met inclusion criteria for the study. Data were extracted from electronic medical records (EMRs; Sunrise Clinical Manager, Allscripts).

Demographic data collected included sex, ethnicity, race, insurance, marital status, and score on the Charlson Comorbidity Index.

Geriatric-focused practices were defined on the basis of a combination of the guidelines for management of pain, agitation, and delirium; the ABCDEF bundle; and general geriatric best practices for the care of hospitalized older adults, including geriatric models of care (dedicated units for acute care for elders, the Hospital Elder Life Program), quality indicators of the Assessing Care of Vulnerable Elders (ACOVE) project, Beers list of PIMs, and Joint

Commission mandates for indicators such as restraint use<sup>12,14,19,30</sup> (Table 1).

We assessed 6 geriatric practices in patients during their ICU stay: delirium screening; early mobilization and nutrition; and avoidance of restraints, indwelling bladder catheters, and PIMs. Nonadherence to geriatric practices was defined as the presence of an EMR order for bed rest, nothing by mouth, restraints, urinary bladder catheter, and high-risk medications (benzodiazepines, psychotropic agents, and anticholinergic agents; Table 1). In addition, nonadherence to delirium screening was defined as no documentation of results of the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU; Table 1). EMR extraction of the geriatric practices was validated by 2 independent screeners; all 179 charts were reviewed by 2 experienced chart abstractors; interrater agreement was 95%. For the 5% that were discrepant, the chart abstractors met with a third independent arbitrator (a physician) to reach consensus. We then evaluated the relationship between nonadherence to geriatric-focused practices and secondary clinical outcomes, including pressure injuries, hospital length of stay, ICU length of stay, discharge disposition, mortality, and 30-day hospital readmissions.

In addition, we explored the accuracy of delirium-screening documentation. Nurses are required to document a nursing assessment note in the EMR field of "cognitive/perceptual/neuro" every shift. In addition, they must complete the CAM-ICU (includes the Richmond Agitation-Sedation Scale [RASS]) as standardized assessments in a separate EMR section. Adherence to delirium screening was measured by using nursing documentation of the CAM-ICU.<sup>31,32</sup> All ICU nurses had received delirium training via mandatory CAM-ICU online education modules. EMR nursing documentation of the CAM-ICU features was compared with documentation in the daily nursing assessment notes of the EMR (cognitive/perceptual/neurological section) from that time. Inaccuracy was defined as discrepancies between EMR CAM-ICU documentation and EMR cognition documentation in the daily nursing assessment note.

Delirium recognition based on the medical chart has been used in previous studies by using keywords.<sup>33,34</sup> We also used this approach. Specifically, key words were extracted from the cognitive/perceptual/neurological examination section of the EMR. Keywords included the following: *altered mental status, delirium/delirious, alert and oriented x 3, confused/confusion, disoriented, and lethargy/lethargic*. Similar to the aforementioned data abstraction process,

CAM-ICU and nursing documentations were independently reviewed by 2 experienced chart abstractors; the interrater reliability was high (Cohen  $\kappa$  = 0.95).

### Statistical Analysis

Descriptive statistics (means and standard deviations for continuous variables; frequency and percentages for categorical variables) were calculated for the overall sample of 179 patients. In order to determine whether nonadherence with geriatric practices (eg, bed rest, nothing by mouth, indwelling bladder catheter, use of benzodiazepines, use of antipsychotic agents, and use of restraints) was associated with poor categorical outcomes (eg, pressure injuries, discharge disposition, and 30-day readmission), univariate logistic regression was performed; results were reported as odds ratios (ORs) with corresponding 95% CIs. To determine whether nonadherence to geriatric practices was associated with ICU and hospital lengths of stay, standard methods of survival analysis (eg, computing the Kaplan-Meier product limit curves, in which the data were stratified according to the geriatric practices) were applied.<sup>35</sup> No data were considered censored. The groups were compared by using the log-rank test. The median and corresponding 95% CI for each group were obtained from the Kaplan-Meier/product-limit estimates by using the Greenwood formula to calculate the standard error.<sup>36</sup> All analyses were performed by using SAS, version 9.4, software (SAS Institute Inc).

## Results

### Clinical Outcomes

Among the 313 patients admitted to the medical ICU, 179 (57.2%) met inclusion criteria for our study. Demographics are presented in Table 2.

Indications of nonadherence to geriatric-focused practice included orders for bed rest for 125 patients (69.8%; mean duration, 1.82 days), nothing by mouth for 127 patients (70.9%; mean duration, 1.2 days), physical restraints for 49 patients (27.4%; mean duration, 39.3 hours), and indwelling bladder catheters for 144 patients (80.4%; mean duration, 3.43 days). During the course of their ICU stay, 95 patients (53.1%) were exposed to opiates, 54 (30.2%) to benzodiazepines, 29 (16.2%) to antipsychotic agents, 18 to anticholinergic agents (10.1%), and 63 (35.2%) to more than 1 of these medications. Delirium screening was not documented for 9 patients (5.0%; Table 3).

Clinical outcomes are described in Table 4. With regard to the association between clinical outcomes

**Table 2**  
Characteristics of 179 patients

Demographics	Value <sup>a</sup>
Age, mean (SD), y	80.47 (8.82)
Sex	
Female	90 (50.3)
Male	89 (49.7)
Ethnicity	
Non-Hispanic/Latino	164 (91.6)
Hispanic/Latino	8 (4.5)
Unknown	6 (3.4)
Declined	1 (0.6)
Charlson Comorbidity Index, mean (SD)	7.11 (2.33)
Race	
White	132 (73.7)
African American	14 (7.8)
Asian	12 (6.7)
Other <sup>b</sup>	21 (11.7)
Marital Status	
Married	91 (50.8)
Widowed	49 (27.4)
Other <sup>c</sup>	39 (21.8)
Reason for ICU admission	
Sepsis	66 (36.9)
Respiratory failure	31 (17.3)
Shock	26 (14.5)
Cardiovascular disease	18 (10.1)
Neurological disorders	
Renal electrolytes	7 (3.9)
Diabetic ketoacidosis	6 (3.4)
Pulmonary/venous thromboembolism	4 (2.2)
Other	11 (6.1)
Mechanical ventilation	58 (32.4)
Vasoactive drugs	88 (49.2)
Advanced directives (DNRs)	46 (25.7)

Abbreviations: DNR, do not resuscitate; ICU, intensive care unit.

<sup>a</sup> Data presented as number (%) unless indicated otherwise.

<sup>b</sup> Includes Native American/Alaskan, other, declined/not specified.

<sup>c</sup> Includes single, separated/divorced, partner, other, declined/not specified.

and nonadherence, patients who had an indwelling bladder catheter were 8.9 times more likely than patients without catheters to have pressure injuries (OR, 8.9; 95% CI, 1.2-67.9). Patients without catheters were also 3.4 times more likely to be discharged home (OR, 3.4; 95% CI, 1.0-11.9). Similarly, patients who had indwelling bladder catheters were 8.9 times more likely to be discharged to subacute rehabilitation (OR, 8.9; 95% CI, 1.2-67.9).

Nonadherence to geriatric best practices of nothing by mouth ( $P$  = .004), exposure to benzodiazepines ( $P$  = .007), and use of restraints ( $P$  < .001) were associated with longer ICU stay; nothing by mouth ( $P$  = .002) and use of restraints ( $P$  = .003) were significantly associated with longer hospital stay.

**Table 3**  
Nonadherence to geriatric-focused practices

Geriatric best practices	No. (%) <sup>a</sup>	
Delirium assessment (CAM-ICU)	9 (5.0)	
Early mobilization		
Bed rest	125 (69.8)	
Nutrition		
Nothing by mouth	127 (70.9)	
Restraints	49 (27.4)	
Indwelling bladder catheter	144 (80.4)	
Potentially inappropriate medications		
Opiates	95 (53.1)	
Benzodiazepines	54 (30.2)	
Antipsychotic agents	29 (16.2)	
Anticholinergic agents	18 (10.1)	
Polypharmacy <sup>b</sup>	63 (35.2)	
Accuracy of delirium assessment (comparison of CAM-ICU <sup>c</sup> with nursing documentation <sup>d</sup> )	No. (%) <sup>a</sup>	
Total number of CAM-ICU assessments (n = 170)	2334	
Patients with positive CAM-ICU	6 (3.5)	
Assessments with positive CAM-ICU (n = 6)	25 (1.1)	
CAM-ICU features for delirium assessment	CAM-ICU	Nursing documentation
Criterion 1: acute change or fluctuating course of mental status	346 (14.8)	386 (16.5)
Criterion 2: inattention	294 (12.6)	111 (4.8)
Criterion 3: altered level of consciousness (RASS)	419 (18.0)	606 (26.0)
Criterion 4: disorganized thinking	160 (6.9)	0 (0.0)
Unable to assess	205 (8.8)	289 (12.4)
CAM-ICU <sup>c</sup> /nursing documentation <sup>d</sup> disagreement	1275 (54.6)	

Abbreviations: CAM-ICU, Confusion Assessment Method for the ICU; ICU, intensive care unit; RASS, Richmond Agitation-Sedation Scale.

<sup>a</sup> Data presented as number (%) of 179 patients unless indicated otherwise.

<sup>b</sup> More than 1 potentially inappropriate medication.

<sup>c</sup> Nursing documentation in the CAM-ICU section of the electronic medical record.

<sup>d</sup> Documentation of daily nursing assessment in the cognitive/perceptual/neuro section of the electronic medical record.

**Table 4**  
Clinical outcomes of older ICU survivors

Clinical outcomes	Value <sup>a</sup>
Hospital-acquired pressure injuries	17 (9.5)
ICU LOS, days, median (SD)	4 (3.10)
Hospital LOS, days, median (SD)	10 (9.20)
Discharge disposition	
Mortality	4 (2.2)
Home	141 (78.8)
Skilled nursing facility/rehabilitation/long-term care	31 (17.3)
Hospice	3 (1.7)
30-day readmissions	43 (24.0)

Abbreviations: ICU, intensive care unit; LOS, length of stay.

<sup>a</sup> Data are presented as number (%) unless indicated otherwise.

Patients who had orders for nothing by mouth were 3.2 times more likely than patients without such orders to have a 30-day readmission (OR, 3.2; 95% CI, 1.2-8.0), and patients with restraints were 2.8 times more likely than patients without restraints to have a 30-day readmission (OR, 2.8; 95% CI, 1.4-5.8).

### Delirium Screening

The nursing EMRs had 2334 CAM-ICU documentations for 170 patients; 95% of the patients had the results of at least 1 CAM-ICU recorded during at least 1 nursing shift during the patients' ICU stay. CAM-ICU results indicated delirium in only 25 (1.1%) of the 2334 assessments, in a total of 6 patients (3.5%). Documentation of the specific features of the CAM-ICU is given in Table 3.

When comparing EMR nursing documentation of the RASS and CAM-ICU features with documentation in the daily nursing assessment notes of the EMR cognitive/perceptual/neuro section, we noted lack of agreement between EMR CAM-ICU documentation and EMR cognition documentation in the daily nursing assessment. Overall, more than half (54.6%) of CAM-ICU assessments disagreed with EMR nursing documentation of delirium features. Of the 160 assessments, a score of -4 or -5 was recorded in 36 assessments (22.5%); of those, a CAM-ICU was inappropriately assessed in 30 assessments (83.3%). Compared with the 14.8% of CAM-ICU assessments that were positive for criterion 1 (acute change or fluctuating course of mental status), documentation of acute confusion was noted in 16.5% of the nursing cognitive/perceptual/neuro section. Similarly, criterion 2 (inattention) was recorded in 12.6% of the CAM-ICU assessments compared with 4.8% of the nursing documentation. Criterion 3 (altered level of consciousness [RASS]) was noted in 18.0% of the CAM-ICU assessments and in 26.0% of the nursing documentations. Criterion 4 (disorganized thinking) was noted in 6.9% of the CAM-ICU assessments and in 0% of the nursing documentation (Table 3).

### Discussion

At a national level in the United States, the overall implementation of ICU best practices in adult medical patients has improved during the past 2 decades.<sup>37</sup> Because of the prevalence of PICS in older ICU survivors, our goal was to specifically characterize geriatric practices for critically ill older adults in the ICU and the patients' associated outcomes. We found that, in a large academic tertiary medical ICU, adherence was low for all

geriatric-focused practices. Furthermore, although adherence to delirium screening was high, performance accuracy was strikingly poor.

Immobilization via bed rest continues to be the norm for ICU geriatric patients, despite the known association between early mobilization and decreased delirium in the ICU.<sup>38</sup> Furthermore, mobilization of critically ill patients under the direct supervision of a physical therapist can reduce length of hospital stay and improve muscle strength.<sup>39</sup> Of interest, in our study, although bed rest was common, it was not significantly associated with poor outcomes, perhaps because the retrospective review of bed rest documentation did not necessarily mean that patients were actually taken out of bed for toileting or other activities, rather than for specific ambulation performance.

Poor nutrition, a prevalent finding in ICUs, has been associated with longer hospital stays, a lower likelihood for discharge to home, and increased hospice referral or death on discharge.<sup>40</sup> Although we did not specifically measure nutritional status, we did find an association between orders for nothing by mouth and adverse outcomes, namely, prolonged stays in the ICU and hospital.

Indwelling bladder catheters were often placed in the ICU, with a mean duration of 3.43 days. Research<sup>41</sup> has shown that urinary catheters are a common and frequent source of infections in the ICU. Furthermore, unnecessary urinary catheters are often not removed after insertion, and the prolonged use of these devices can increase hospital costs, length of stay, and mortality rates in ICU patients.<sup>42</sup> Although ICUs have integrated removal of indwelling bladder catheters into the daily checklists, most likely additional education or alerts would be beneficial. In addition to indwelling bladder catheters, use of restraints in the ICU was associated with prolonged ICU and hospital stays as well as hospital readmissions. Our data indicate that indwelling bladder catheters are strongly associated with hospital-acquired pressure injuries and discharge to subacute rehabilitation.

ICU survivors often experience polypharmacy with high-risk medications, subjecting the survivors to adverse drug events during the hospital stay and after discharge. Use of the Beers criteria can lead to avoidance of PIMs in older ICU patients.<sup>43,44</sup> Yet, 85% of elderly ICU survivors are still taking at least 1 PIM at the time of discharge.<sup>43</sup> Morandi et al<sup>43</sup> reported that the percentage of patients prescribed at least 1 PIM increased from 66% before admission to 85% at discharge. Multiple studies<sup>44-47</sup> have

indicated that high-risk medications, particularly benzodiazepines, increase the risk for poor outcomes, such as delirium and falls. In our study, one-third of patients were exposed to benzodiazepines, and use of these medications was associated with prolonged ICU stays.

Delirium has been linked to poor short- and long-term outcomes, including functional decline, loss of independence, institutionalization, and death.<sup>2,48,49</sup> Whereas use of delirium screening instruments in the real world is inconsistent,<sup>50-54</sup> delirium screening has become the standard of care in the ICU, as a result of publication of the clinical practice guidelines for management of pain, agitation, and delirium in adult ICU patients.<sup>12</sup> Indeed, in our study, documentation of adherence with CAM-ICU assessment was 95%. However, translation from documentation to effective diagnosis, as reported in interprofessional progress notes, was essentially nonexistent.

Our study did have limitations, because data were collected retrospectively from a single site. The database we used had information solely on older patients who were admitted to the ICU and survived. This situation might have led to an underestimate of possible associations between lack of adherence to best practices and clinical outcomes. Future studies should include evaluation of these practices in both ICU survivors and nonsurvivors. Because our study was retrospective, we could not assess for true appropriateness of the geriatric-focused practices, including chronic indwelling bladder catheters and nothing by mouth. In addition, data were retrospectively collected from the EMR, so results of additional standardized cognition tests and functional measures were not available. Furthermore, comparison of nursing documentation of delirium with the results of the CAM-ICU with regard to the specific features of delirium has not been validated. In future studies, researchers should seek to provide an age-stratified comparison between older ICU survivors and nonsurvivors.

Multiple studies<sup>34,55-58</sup> in outpatients and inpatients, but not in ICU patients, have indicated better compliance with general medical best practices than with geriatric-focused practices. Successful implementation of geriatric-focused practices in the ICU setting most likely will require interprofessional, multicomponent interventions.<sup>59,60</sup>

**Implementation of geriatric-focused practices in ICUs is still widely inconsistent.**

## Conclusion

The aging population, along with advances in critical care medicine, has led to a large and growing cohort of older adult ICU survivors. Although initiatives such as the guidelines for management of pain, agitation, and delirium and the ABCDEF bundle have increased awareness about the challenges of caring for older adults in the ICU, implementation of geriatric-focused practices is widely inconsistent. The number of geriatric health care providers dedicated to the care of hospitalized older adults is increasingly insufficient to meet the growing demands of the aging population.<sup>23</sup> Hence, the need to develop and implement multicomponent solutions to improve providers' performance of geriatric care in the ICU is urgent.

**FINANCIAL DISCLOSURES**  
None reported.

### SEE ALSO

For more about geriatric care, visit the *Critical Care Nurse* website, [www.ccnonline.org](http://www.ccnonline.org), and read the article by Hardin, "Vulnerability of Older Patients in Critical Care" (June 2015).

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2. Analyze associations between geriatric-focused practices in older ICU survivors and clinical outcomes.
3. Explore the accuracy of CAM-ICU documentation in the ICU.

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