The Use of Physical Therapy ICU Assessments to Predict Discharge Home

Heidi Tymkew, DPT[1]; Traci Norris, DPT[2]; Cassandra Arroyo, PhD[1]; Marilyn Schallom, RN, PhD[1]

Objectives: To establish cutoff values for making recommendations for discharge to the home setting using standardized physical therapy assessments.

Design: Retrospective study.

Setting: Five ICUs at a large academic medical center.

Patients: 1,203 ICU patients.

Intervention: None.

Measurements and Main Results: The Functional Status Score for the ICU and the ICU Mobility Scale were collected during the initial physical therapy assessment, at ICU discharge, and prior to hospital discharge. The Activity Measure for Post-Acute Care–Inpatient Mobility Short Form "6 clicks" was only collected during the initial physical therapy assessment. Receiver Operating Characteristic curves were used to determine a potential cutoff value for discharge home. The Receiver Operating Characteristic was adjusted for ICU and hospital length of stay along with mobility status prior to hospital admission. Cutoff values were then determined by using Youden's Index. Sensitivity, specificity, positive predictive value, negative predictive value, and accuracy were calculated based on these cut off values. The Functional Status Score for the ICU at ICU discharge was the best predictor of a discharge to the home setting in patients who had an ICU admission. The area under the curve for the Functional Status Score for the ICU at ICU discharge was 0.80. A Functional Status Score for the ICU score at ICU discharge of 19 or higher predicted discharge to home with a sensitivity of 82.9% and specificity of 73.6%

Conclusions: The Functional Status Score for the ICU at ICU discharge provided the best accuracy for making a timely recommendation for discharge home in patients who had an ICU admission. (*Crit Care Med* 2020; XX:00–00)

Key Words: Intensive care; outcome assessment; discharge planning; physical therapy; humans; patient discharge

Discharge planning is a process that involves developing an individualized plan for each patient prior to hospital discharge that facilitates the patient's transition from the hospital to a postdischarge setting with the aim of improving patient outcomes while containing costs (1). Effective discharge planning can decrease hospital length of stay and readmission rates as well as increase patient satisfaction (1). Discharge planning can be a complicated process due to the many factors that can influence the discharge destination. Some of the common factors include sociodemographic variables, current functional status, comorbidities, type/severity of injury or surgery, family/social support, and insurance/funding. Often a team of healthcare professionals such as case coordinators, social workers, physical and occupational therapists, nurses, and physicians provide input into the discharge plan.

Physical therapists in the acute care setting provide important input regarding the patient's current and potential functional status during the discharge planning process (2). During patient encounters, physical therapists evaluate the movement system, treat functional limitations that are present and make recommendations regarding follow-up services needed at hospital discharge (3). Often these discharge recommendations are not based on standardized outcome measures. However, the recommendations are guided by four constructs—patient's functioning and disability, wants and needs, ability to participate in care, and life context (4). In addition to these constructs, the therapist's experience level may influence discharge recommendations with less experienced therapists being more conservative in their recommendations (4). The use of standardized outcomes not only help describe and quantify patient function, but they also can assist therapists in making appropriate discharge recommendations in the acute care setting.

One of the first studies that examined the use of a standardized assessment to predict hospital discharge in the acute care setting was performed by Jette et al (5). The authors described the use of the Activity Measure for Post-Acute Care "6 clicks" Inpatient Mobility Short Form (AM-PAC basic mobility "6 clicks") to predict discharge destination from the acute care hospital. The initial AM-PAC basic mobility "6 clicks" score from over 50,000 patients were extracted from the electronic medical record, and a cutoff score of 42.9 (raw score of 18) predicted discharge to the home setting.

There is limited evidence in the literature that describes the use of standardized ICU assessments to predict discharge home. A Clinimetric analysis of 819 ICU patients from five international datasets found that a score of 23 on the Functional Status Score for the ICU (FSS-ICU) at ICU discharge predicted

[1]Department of Research for Patient Care Services, Barnes-Jewish Hospital, St Louis, MO.

[2]Department of Rehabilitation, Barnes-Jewish Hospital, St Louis, MO.

DOI: 10.1097/CCM.0000000000004467

home discharge ($p < 0.01$; area under the curve [AUC], 0.75) (6). Other investigators examined the FSS-ICU scores of ICU patients and found that those patients who were discharged home had higher FSS-ICU scores than those patients discharged to a facility (7, 8). Higher ICU Mobility Scale (IMS) scores at ICU discharge were also reported with higher likelihood of discharge to the home setting (9). While these studies noted differences in the FSS-ICU or IMS scores between those discharged home versus a facility, no analysis of a cutoff score to predict discharge home was established (7–9), except in the study by Huang et al (6).

Incorporating the results of standardized ICU assessments in the discharge planning process could support discharge destination recommendations. Providing early recommendations to the healthcare team may help to initiate earlier discharge planning during the patient's hospital stay, which may decrease the additional hospital days that are related to placement issues. The objective of this study was to determine the ability of the FSS-ICU, IMS, and AM-PAC basic mobility "6 clicks" to predict discharge home from an acute care setting for patients who required an ICU admission and to establish cutoff values for making recommendations on discharge to home.

MATERIAL AND METHODS

A quality improvement (QI) project was conducted from March 2015 to July 2016, which involved the implementation of an early mobility program to all of the ICUs at a large academic hospital (10). This project was deemed a nonhuman subjects research project by The Washington University Human Research Protection Office. As part of this QI project, a retrospective chart review of 1,939 randomly selected patients was conducted by a member of the research team. The random sample was derived from a randomization chart developed by a statistician with monthly variations of the following: 1) initial patient to start (1–5) and 2) skip interval (every second through fifth patient). If patient numbers for a unit were not met (described below), the extraction continued with the next skip level. For example if initially reviewed every fourth patient, review moved to every fifth patient. If the patient did not meet criteria, the next patient's chart was reviewed. If a patient met eligibility, the skip interval was subsequently used to review the next designated patient's chart. Twenty percent of patients from each of the ICUs, or a minimum of 20 patients in the smaller ICUs, who had an ICU length of stay greater than 3 days were selected. Sample size was based on the American Association of Critical Care Nurses mobility protocol that recommended that 10% or a minimum of 10 charts be used for monitoring improvement and sustainment of the early mobility protocol (11). Since this project was conducted at a large academic hospital, the sample size was increased to 20% of the patients or a minimum of 20 patients per ICU. This sample size was deemed sufficient to reflect the diversity of patients seen in these ICUs, so for this QI project, a power analysis sample size was not calculated.

Data were collected from each ICU for 2 months prior to the initiation of the early mobility protocol and 12 months after implementation of the early mobility protocol. The ICU location, hospital and ICU length of stay, prior ambulatory status, and discharge location were collected from each medical chart by a reviewer that was not involved in collecting the physical therapy (PT) ICU assessments. The patient's prior ambulatory status was based on patient or family report at time of admission to the hospital; however, since this is a subjective report the reliability and validity cannot be established. The documentation from the initial PT assessment along with the treatment notes at ICU discharge (± 24 h of ICU discharge) and prior to hospital discharge were reviewed. Functional outcome measures included the FSS-ICU and the IMS during three time points, initial PT assessment, ICU discharge and hospital discharge, and the AM-PAC basic mobility "6 clicks" during the initial PT assessment. Hospital discharge measures were obtained from the last treatment session documented prior to hospital discharge within a time interval of 2 days prior to hospital discharge through day of discharge. These outcome measures were not performed daily or at every therapy session, therefore, these time points were chosen at time points that were common for each participant and at critical times when discharge recommendations were often made.

The FSS-ICU is a functional assessment scale used in the ICU by PTs. It consists of five functional tasks scored from 1 (total assistance) to 7 (complete independence) for a total score range of 0–35; higher scores represent better function (12). Interrater reliability reports for the FSS-ICU range from good to excellent among PTs who work in the ICU (7, 13). This assessment also has good internal consistency, validity and is a responsive measure of physical function in the ICU (6).

The IMS is a scale that documents the patient's highest level of mobility where 0 = nothing and 10 = walking independently without a gait aid (14). The IMS has good interrater reliability between PTs and ICU nurses (14) and is a valid and responsive method of measuring mobility in the ICU (9). Since the IMS was not considered standard of care at the time of the QI project, one of the researchers independent of knowing discharge location scored the IMS retrospectively based upon the documentation in the PT note.

The Activity Measure for Post-Acute Care (AM-PAC) instrument is based on the activity limitation domain of the World Health Organization's International Classification of Functioning, Disability, and Health. The AM-PAC measures three functional domains: basic mobility, daily activities, and applied cognition (15). This tool was developed for use across care settings to monitor an individual's function across an episode of care. The AM-PAC basic mobility "6 clicks" form assesses basic mobility in individuals who are in the acute care setting. Each of the six mobility items are scored from 1 to 4 based on the amount of assistance required or the amount of difficulty present when performing tasks. The maximum raw score is 24 with higher scores equating to higher function. The AM-PAC basic mobility "6 clicks" has been shown to be a reliable and valid method of measuring mobility in the acute care setting (16, 17). At the time of the study, AM-PAC Basic Mobility "6 clicks" short-form Version 1 was the instrument used at this facility and was performed only during the initial PT assessment per standard of care.

Statistical Analysis

For the purposes of this study, we restricted the analysis to patients with FSS-ICU and IMS at all three time points, and AM-PAC basic mobility "6 clicks" at the initial time point. Descriptive statistics for sample characteristics were calculated. Medians and interquartile ranges were used to summarize continuous variables, whereas frequencies and proportions were used to summarize categorical variables. To estimate potential cutoff values for ICU mobility assessment scores for making recommendations on discharge to home versus another post-acute care setting, we generated a random sample (Sample A) of approximately 50% of the patients in our data. Sample A was used to develop unadjusted and adjusted Receiver Operating Characteristic (ROC) curves for FSS-ICU and IMS at the initial assessment, discharge from the ICU and prior to discharge from the hospital. We also developed unadjusted and adjusted ROC curves for the initial AM-PAC basic mobility "6 clicks". ROC analyses were adjusted for ICU and hospital length of stay, and preadmission mobility status as potential confounders. ROC analysis calculates the sensitivity and 1-specificity for each possible cutoff value on a scale. The values are plotted against each other and allowed us to determine an optimal cutoff value for predicting discharge to home using Youden's index to maximize sensitivity and specificity. We used a standardized prevalence for discharge to home of 50% to calculate positive predictive value (PPV) and negative predictive value (NPV) and positive likelihood ratio (PLR) and negative likelihood ratio (NLR). Using the remaining sample of approximately 50% of the patients (Sample B), we evaluated the accuracy of our cutoff values by calculating sensitivity, specificity, PPV, NPV, PLR, NLR, and accuracy for each measure at each time point. All analyses, except the adjusted ROC, were conducted using SPSS Statistics version 25 for Windows (IBM Corporation). The adjusted ROC analysis was conducted using the "adjusted.roc()" function in the ROCt package (18) in R Studio Statistical Software (19) for Windows. MedCalc for Windows, version 19.1.7 (MedCalc Software, Ostend, Belgium), was used to evaluate the adjusted ROC cutoff values' performance in Sample B.

RESULTS

A total of 1,939 charts were reviewed from the QI project, of which only 1,203 had assessments performed at all predetermined time points. There was representation from all ICUs—medical ICU, 16.4%; cardiothoracic ICU, 34.2%; surgical burn trauma ICU, 24.3%; cardiac medicine ICU, 6.7%; and neurosurgery ICU, 18.5%. The median ICU length of stay was 5 days and median hospital length of stay was 13 days. Based on patient report, prior to hospital admission, 87.2% of the patients reported ambulating community distances, 7.1% ambulated household distance, 5.1% used a wheelchair/scooter for mobility, and 0.7% considered themselves bedbound. The discharge location of these patients consisted of home with or without home health services, 56.0%; inpatient rehabilitation facility, 20.9%; skilled nursing facility, 14.9%; long-term acute care hospital, 3.9%; expired or placed on hospice, 2.7%; and other, 1.6% (**Table 1**).

TABLE 1. Demographics

	Overall (n = 1203)	Discharge Home (n = 673)	Not Discharged Home (n = 530)
ICU length of stay, median (IQR)	5.0 (6)	6.24 (5.0)	9.5 (8.1)
Hospital length of stay, median (IQR)	13.0 (12)	15.2 (10.8)	19.5 (13.1)
Preadmission mobility status, n (%)			
Ambulation community distance >300 feet without AD	888 (73.8)	537 (79.8)	351 (66.2)
Ambulation community distance with AD	161 (13.4)	84 (12.5)	77 (14.5)
Ambulated household distances	85 (7.1)	33 (4.9)	52 (9.8)
Uses wheelchair/scooter for mobility	61 (5.1)	17 (2.5)	44 (8.3)
Bedbound	8 (0.7)	< 5	6 (1.1)
ICU location, n (%)			
Surgical burn trauma ICU	292 (24.3)	163 (24.2)	129 (24.3)
Medical ICU	197 (16.4)	109 (16.6)	88 (16.6)
Cardiothoracic ICU	411 (34.2)	291 (43.2)	120 (22.6)
Neurosurgery ICU	223 (18.5)	65 (9.7)	158 (29.8)
Cardiac ICU	80 (6.7)	45 (6.7)	35 (6.6)

IQR = interquartile range, n = number of subjects, AD = assistive device.

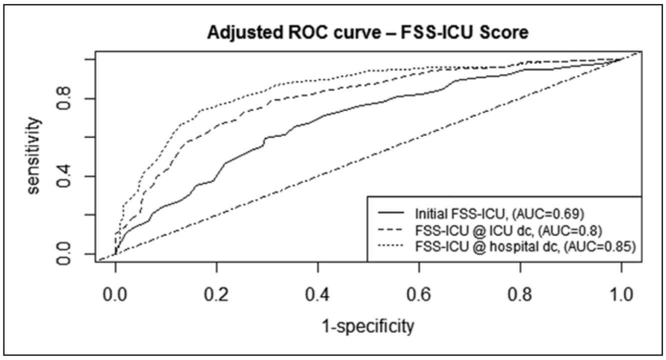

Figure 1. Receiver operating characteristic (ROC) curves for Functional Status Score for the Intensive Care Unit (FSS-ICU). AUC = area under the curve, dc = discharge.

The ROC curve for the FSS-ICU at initial assessment for the validation sample estimated an AUC of 0.71 (95% CI, 0.67–0.75). The ROC curve for the FSS-ICU at ICU and hospital discharge estimated an AUC of 0.80 (0.77–0.84) and 0.86 (0.82–0.89), respectively. A FSS-ICU score at initial assessment of 16 or greater predicted discharge home with a sensitivity of 71.8% and specificity of 73.6%. A FSS-ICU score at ICU discharge of 19 or greater predicted discharge home with sensitivity of 82.9% and specificity of 73.6%; and a FSS-ICU score at hospital discharge of 22 or greater predicted discharge home with a sensitivity of 84.2% and specificity of 79.7%. Accuracy at initial assessment, ICU discharge, and hospital discharge were 72.6%, 78.9%, and 80.1%, respectively. ROC curves for the FSS-ICU are shown in **Figure 1**.

The ROC curve for the IMS during the initial assessment estimated an AUC of 0.68 (0.63–0.72). The ROC curve for IMS at ICU and hospital discharge estimated an AUC of 0.73 (0.68–0.77) and 0.76 (0.72–0.79), respectively. An IMS score at initial assessment of 5 or greater predicted discharge home with sensitivity of 85.8% and specificity of 49.4%. An IMS score at ICU discharge of 8 or greater predicted discharge home with sensitivity of 85.6% and specificity of 67.8%; and an IMS score at hospital discharge of 8 or greater predicted discharge home with sensitivity of 92.6% and specificity of 52.7%. Accuracy at initial assessment, ICU discharge, and hospital discharge were 70.3%, 78.1%, and 75.8%. The ROC curves for IMS are shown in **Figure 2**.

The ROC curve for the initial AM-PAC basic mobility "6 clicks" (**Fig. 3**) estimated an AUC of 0.71 (0.67–0.76).

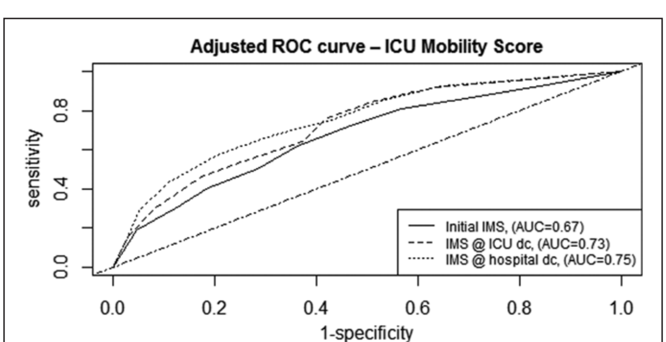

Figure 2. Receiver operating characteristic (ROC) curves for ICU Mobility Scale (IMS). AUC = area under the curve, dc = discharge.

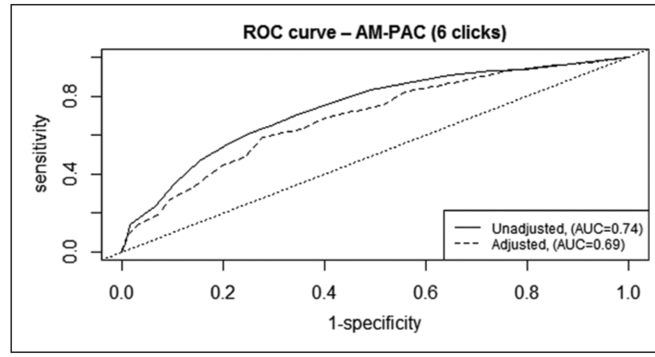

Figure 3. Receiver operating characteristic (ROC) curve of the initial Activity Measure for Post-Acute Care "6 clicks" Inpatient Mobility Short Form. AUC = area under the curve.

An initial AM-PAC basic mobility "6 clicks" raw score of 14 or higher (*t*-score 35.55 or higher) predicted discharge home with sensitivity of 68.4% and specificity of 75.1%. The sensitivity, specificity, PPV and NPV, PLR and NLR, and accuracy of each of the ICU assessments are listed in **Table 2**. All performance values for the derivation sample for all three instruments can be found in **Supplemental Table 1** (Supplemental Digital Content 1, http://links.lww.com/CCM/F596).

DISCUSSION

Data from this study provide cutoff scores for some commonly used ICU assessments that provide physical therapists with an objective measurement upon which to make recommendations for discharge home at the earliest prediction time during the patient's hospital stay, which was ICU discharge. The ICU assessment that provided the best accuracy for early determination if a patient was discharged to the home setting was a FSS-ICU of 19 or higher at ICU discharge. The area under the ROC curve showed good accuracy at ICU discharge with a sensitivity of 82.9%, specificity of 73.6%, and accuracy of 78.9%. The FSS-ICU score of 19 is slightly lower than that reported by Huang et al (6) who found that a score of 23 on the FSS-ICU at ICU discharge predicted discharge home.

The initial FSS-ICU, IMS, and AM-PAC basic mobility "6 clicks" assessments were not as accurate as the FSS-ICU at ICU discharge for predicting discharge home as evidenced by lower AUC values (0.67–0.69). These initial scores may have been impacted by the patient's medical status (i.e., sedation or hemodynamic instability), which prevented mobility from being fully assessed. The IMS at ICU and hospital discharge demonstrated fair accuracy in predicting discharge home with AUC values between 0.73 and 0.75. In the study performed by Tipping et al (9), a ROC curve for the IMS was not determined; however, via logistic regression models, a higher IMS at ICU discharge predicted discharge home. This seems logical from a clinical standpoint because typically patients who are higher functioning will tend to be discharged home versus discharged to a postacute care facility. In a large data analysis study, Jette et al (5) found that the AM-PAC basic mobility "6 clicks" score of 42.9 (raw score of 18) yielded the most accurate prediction of discharge to the home setting. The difference between cutoff score results by Jette et al

TABLE 2. Performance of Mobility Assessments for Discharge to Home at the Optimal Youden's Index[a]

Assessments and Times Collected	Sensitivity (%) (95% CI)	Specificity (%) (95% CI)	Positive Predictive Value (%) (95% CI)	Negative Predictive Value (%) (95% CI)	Positive Likelihood Ratio (95% CI)	Negative Likelihood Ratio (95% CI)	Accuracy (%) (95% CI)
FSS-ICU ≥ 16 at initial assessment	71.8 (66.8–76.4)	73.6 (67.8–78.8)	78.5 (74.7–81.9)	66.0 (61.8–69.9)	2.72 (2.20–3.36)	0.38 (0.32–0.46)	72.6 (68.8–76.1)
FSS-ICU ≥ 19 at ICU DC	82.9 (78.6–86.7)	73.6 (67.8–78.8)	80.8 (77.4–83.9)	76.2 (71.5–80.3)	3.14 (2.55–3.86)	0.23 (0.18–0.30)	78.9 (75.5–82.1)
FSS-ICU ≥ 22 at hospital DC	80.3 (75.8–84.4)	79.7 (74.3–84.4)	84.2 (80.6–87.2)	75.1 (70.8–79.0)	3.96 (3.09–5.06)	0.25 (0.20–0.31)	80.1 (76.7–83.2)
IMS ≥ 5 at initial assessment	85.8 (81.7–89.2)	49.4 (43.2–55.7)	69.5 (66.8–72.1)	72.1 (66.0–77.4)	1.70 (1.49–1.93)	0.29 (0.22–0.38)	70.3 (66.5–73.9)
IMS ≥ 8 ICU DC	85.8 (81.7–89.2)	67.8 (61.8–73.4)	78.2 (74.9–81.1)	78.0 (73.0–82.3)	2.66 (2.22–3.19)	0.21 (0.16–0.28)	78.1 (74.6–81.3)
IMS ≥ 8 Hospital DC	92.6 (89.3–95.1)	53.3 (47.0–59.4)	72.7 (70.0–75.3)	84.2 (78.4–88.7)	1.98 (1.73–2.26)	0.14 (0.09–0.20)	75.8 (72.2–79.2)
Initial Activity Measure for Post-Acute Care "6 clicks" Inpatient Mobility Short Form basic mobility "6 clicks" ≥ 14	68.4 (63.2–73.2)	75.1 (69.4–80.2)	78.7 (74.7–82.2)	63.8 (59.9–67.7)	2.75 (2.20–3.43)	0.42 (0.36–0.50)	71.2 (67.5–74.8)

DC = discharge, FSS-ICU = Functional Status Score for the Intensive Care Unit, IMS = ICU Mobility Scale.

[a]Youden's index calculated using receiver operating characteristic curves from Sample A; sensitivity, specificity, positive predictive value, negative predictive value, positive likelihood ratio, negative likelihood ratio, and accuracy calculated using remaining 50% of sample (Sample B).

and our findings (raw score ≥ 14) could be due to the fact that assessments in this study were all performed in the ICU during the initial PT assessment, whereas Jette et al did not specifically state the location (floor vs. ICU) of those assessments except that it was in the hospital during the first PT visit. Therefore, acuity and location of the patient could have affected the difference in results. If the AM-PAC basic mobility "6 clicks" had been performed at ICU and hospital discharge, it may have demonstrated a stronger prediction of discharge location; however, our practice at the time of this study was to perform the AM-PAC basic mobility "6 clicks" only during the initial PT assessment.

The utility of FSS-ICU at time of ICU discharge centers around the clinician incorporating the patient's functional status to predict discharge to the home setting. For the FSS-ICU assessment at ICU discharge, a positive result (i.e., above the cutoff score) improves the accuracy of the prediction of discharge to home from 56% pretest to 80% posttest. This study was conducted at a large academic center with specialized ICUs; however, analysis was conducted on the entire population meeting inclusion criteria rather than analyzing subpopulations. Thus these findings may be generalizable to mixed patient population ICUs in the acute care hospital. We balanced the performance of the measures (i.e., sensitivity, specificity, etc.) with the timing of the outcome measures (initial assessment vs. ICU discharge vs. hospital discharge). Although the outcome measures performed slightly better at hospital discharge, this time point has limitations in provision of timely recommendation for early discharge planning.

The use of standardized assessments for PT recommendation for discharge location in the acute care setting could also impact readmission rates. Several studies demonstrated that incorporating a PT into the interdisciplinary discharge rounds helps to decrease hospital readmissions. Kadivar et al (20) reported that when a PT was not involved in the discharge team, the odds of 30 day readmission were 3.78 times greater than when a PT was involved. These results were also supported by Smith et al (21) who demonstrated that if the discharge plan did not match the PT recommendation, the patient was 2.9 times more likely to be readmitted within 30 days. Early determination of the discharge plan could assist all stakeholders such as patients, family, physicians, nursing, and case management in obtaining the resources needed to ensure a safe transition to the next level of care. Advanced notice of discharge needs could also decrease caregiver burden and anxiety especially in the high stress ICU environment.

In addition to making a discharge recommendation to the home setting, the cutoff score could also be used to determine which patients are at risk for not being discharged home. This could potentially allow more rehabilitation resources to be directed to this subgroup of patients with the goal of improving the patient's strength and mobility that would allow a discharge home. As these assessments are being used earlier in a hospital stay, earlier prioritization of rehabilitation resources could lead to improved patient outcomes. Use of the FSS-ICU score at ICU discharge could also provide a framework to explain to the patient what needs to be accomplished to achieve a safe discharge home. Corcoran et al (22) examined the effect of an early mobility program with increased intensity of therapy services on patients in the ICU. This program increased rehabilitation therapy services by approximately 60 minutes per patient per day, and this resulted in improved patient outcomes such as decreased length of stay, increase in mobility level at discharge, and more patients being discharged to the home setting.

There are several limitations of this study, first being that data were obtained via a retrospective chart review from a single facility. When collecting information retrospectively, there is no way to control for missing or poor quality data in addition there is also a chance of inaccuracy due to error when extracting the data and/or entering the data into a database. Since this study was only performed at a single large academic medical center, it may not be generalizable to all acute care hospitals and future work is needed to evaluate the tool's ability to predict discharge to home in a variety of hospital settings. In addition to these known limitations of retrospective chart review projects, there are other factors, besides mobility, that can impact the discharge planning process such as insurance coverage, family/patient input, medical issues, and cognition. The impact of these factors could potentially influence discharge placement more than the patient's physical function. Future research is needed to determine which factors have the most influence on discharge location when discharge planning is initiated in the ICU. Restricting the analysis to only those patients who had all three measures at all three time points could be a potential source of bias; however, restriction was done to ensure the ROC curves would be estimated from the same population for comparability across all measures and time points. This restriction of patients resulted in more patients from the general medicine and cardiac medicine ICUs being removed from the study population, which could bias the measures being more representative of the surgical populations. Another potential limitation of this study is that the IMS was not considered standard of care at this facility at the time of this study. The IMS was scored retrospectively by one reviewer (who is a PT) based on the documentation found in the PT note. If the patient participated in a higher level of mobility that was not documented in the PT note or if the documentation was inaccurate, then the IMS may not reflect the patient's highest level of mobility. Finally, while the use of the AM-PAC basic mobility "6 clicks" has been widely used in the acute care environment, little to no research exists specifically examining outcomes with this tool in ICU patients. Since the floor effect for the AM-PAC basic mobility "6 clicks" in our sample was 12.9%, there is no significant threat of bias to this study. More work could be done to test the validity of this assessment in the ICU setting.

CONCLUSION

In conclusion, a cutoff score of 19 or greater on the FSS-ICU scale at ICU discharge provided the best accuracy for making the earliest recommendation for discharge to the home setting. The use of this cutoff score could help clinicians in supporting a discharge home recommendation based on an objective measure. Although a patient's mobility and functional status are only one of several components currently involved in developing a discharge plan, information obtained through standardized assessments may assist the physical therapist when making a discharge recommendation in the ICU setting.

Supplemental digital content is available for this article. Direct URL citations appear in the printed text and are provided in the HTML and PDF versions of this article on the journal's website (http://journals.lww.com/ccmjournal).

The authors have disclosed that they do not have any potential conflicts of interest.

For information regarding this article, E-mail: Heidi.Tymkew@bjc.org

REFERENCES

1. Gonçalves-Bradley DC, Lannin NA, Clemson LM, et al: Discharge planning from hospital. *Cochrane Database Syst Rev* 2016; 2016:CD000313
2. Falvey JR, Burke RE, Ridgeway KJ, et al: Involvement of acute care physical therapists in care transitions for older adults following acute hospitalization: a cross-sectional national survey. *J Geriatr Phys Ther* 2019; 42:E73–E80
3. Masley PM, Havrilko CL, Mahnensmith MR, et al: Physical therapist practice in the acute care setting: a qualitative study. *Phys Ther* 2011; 91:906–919
4. Jette DU, Grover L, Keck CP: A qualitative study of clinical decision making in recommending discharge placement from the acute care setting. *Phys Ther* 2003; 83:224–236
5. Jette DU, Stilphen M, Ranganathan VK, et al: AM-PAC "6-Clicks" functional assessment scores predict acute care hospital discharge destination. *Phys Ther* 2014; 94:1252–1261
6. Huang M, Chan KS, Zanni JM, et al: Functional Status Score for the ICU: an international clinimetric analysis of validity, responsiveness, and minimal important difference. *Crit Care Med* 2016; 44:e1155–e1164
7. Ragavan VK, Greenwood KC, Bibi K: The Functional Status Score for the Intensive Care Unit scale: is it reliable in the intensive care unit? Can it be used to determine discharge placement? *J Acute Care Phys Ther* 2016; 7:93–100
8. Thrush A, Rozek M, Dekerlegand JL: The clinical utility of the Functional Status Score for the Intensive Care Unit (FSS-ICU) at a long-term acute care hospital: a prospective cohort study. *Phys Ther* 2012; 92:1536–1545
9. Tipping CJ, Bailey MJ, Bellomo R, et al: The ICU mobility scale has construct and predictive validity and is responsive. A multicenter observational study. *Ann Am Thorac Soc* 2016; 13:887–893
10. Schallom M, Tymkew H, Vyers K, et al: Outcomes associated with implementation of an interdisciplinary AACN early mobility protocol. *Crit Care Nurse* 2020; 40:e7–e17
11. American Association of Critical Care Nurses: Early Progressive Mobility Protocol. Available at: https://www.aacn.org/docs/EventPlanning/WB0007/Mobility-Protocol-szh4mr5a.pdf. Accessed March, 2020
12. Zanni JM, Korupolu R, Fan E, et al: Rehabilitation therapy and outcomes in acute respiratory failure: an observational pilot project. *J Crit Care* 2010; 25:254–262
13. Hiser S, Toonstra A, Friedman LA, et al: Interrater reliability of the functional status score for the intensive care unit. *J Acute Care Phys Ther* 2018; 9:186–192
14. Hodgson C, Needham D, Haines K, et al: Feasibility and inter-rater reliability of the ICU mobility scale. *Heart Lung* 2014; 43:19–24
15. Haley SM, Coster WJ, Andres PL, et al: Activity outcome measurement for postacute care. *Med Care* 2004; 42:I49–I61

16. Jette DU, Stilphen M, Ranganathan VK, et al: Interrater reliability of AM-PAC "6-Clicks" basic mobility and daily activity short forms. *Phys Ther* 2015; 95:758–766
17. Jette DU, Stilphen M, Ranganathan VK, et al: Validity of the AM-PAC "6-Clicks" inpatient daily activity and basic mobility short forms. *Phys Ther* 2014; 94:379–391
18. Foucher Y, Dantan E, Le Borgne F, et al: ROCt: Time-Dependent ROC Curve Estimators and Expected Utility Functions. R Package Version 0.9.5. Available at: https://CRAN.R-project.org/package=ROCt. Accessed October 29, 2019
19. R Core Team: The R Project for Statistical Computing. Available at: https://www.R-project.org/. Accessed October 29, 2019
20. Kadivar Z, English A, Marx BD: Understanding the relationship between physical therapist participation in interdisciplinary rounds and hospital readmission rates: preliminary Study. *Phys Ther* 2016; 96:1705–1713
21. Smith BA, Fields CJ, Fernandez N: Physical therapists make accurate and appropriate discharge recommendations for patients who are acutely ill. *Phys Ther* 2010; 90:693–703
22. Corcoran JR, Herbsman JM, Bushnik T, et al: Early rehabilitation in the medical and surgical intensive care units for patients with and without mechanical ventilation: an interprofessional performance improvement project. *PMR* 2017; 9:113–119

Supplemental Table 1: Comparison in the DERIVATION SAMPLE*

	Sensitivity (%)	Specificity (%)	Positive Predictive Value (%)	Negative Predictive Value (%)	Positive Likelihood Ratio	Negative Likelihood Ratio
FSS-ICU ≥ 16 @ initial	59.5	70.5	66.8	63.5	2.01	0.58
FSS-ICU ≥ 19 @ ICU DC	78.5	69.3	71.9	76.3	2.56	0.31
FSS-ICU ≥ 22 @ Hospital DC	73.5	83.4	81.6	75.9	4.44	0.31
IMS ≥ 5 @ Initial	72.1	53.4	60.7	65.7	1.55	0.52
IMS ≥ 8 @ ICU DC	75.5	58.2	64.4	70.4	1.81	0.42
IMS ≥ 8 @ Hospital DC	58.0	79.1	73.5	65.3	2.77	0.53
Initial 6 clicks AM-PAC ≥ 14	58.8	72.3	43.2	63.7	2.12	0.57

*These were all calculated using a standardized prevalence of 50%.

%=Percentage; FSS-ICU=Functional Status Score for the Intensive Care Unit; ICU=Intensive care unit; DC=Discharge; IMS=ICU Mobility Scale; AM-PAC Basic Mobility “6 clicks” = Activity Measure for Post-Acute Care “6 clicks” Inpatient Mobility Short Form