

# Evaluation of Stability and Workload Index for Transfer (SWIFT) Score as a Mechanism for Determining Critical Care Unplanned Readmission During Hospitalization in Surgical Patients

AUTHORS: Y-NHI NGUYEN; JESSICA PETERS RN, MSN, ACNP-BC; YI DENG, MD

AFFILIATIONS: ; JOHNS HOPKINS UNIVERSITY SCHOOL OF NURSING, BALTIMORE, MD

## 1 Background

Critical care is a finite resource meaning that there are limited number of beds with an ongoing demand and the ability to optimize patient care needs with the services available is a challenge. According to Frost et. al approximately one in ten patients who are admitted into an ICU are readmitted within the same hospitalization. Current literature defines unplanned readmissions into the ICU as unexpected ICU admissions following discharge within < 48 hrs (2,3). Readmission rates into the ICU have become an indicator of hospital quality and coordinated patient centered care (1,2,4,5). In comparison to coordinated patients, unplanned readmissions into the ICU are associated with poorer outcomes – increased morbidity and mortality (1,2,3,4,5,6). Unplanned readmission within 48 hours is often correlated with patient factors that were present during the initial admission. Thus it is critical to determine a patient's suitability prior to discharge to allow for appropriate interventions. Additionally, the impact of ICU readmissions is directly linked to increased hospital care costs and ultimately national health care expenses (4). In order to best match patient care needs with the services available it is important to consider utilizing resources to aid in clinical judgement as far as discharging patients from the ICU. Recent literature suggests that the Acute Physiology and Chronic Health (APACHE) scores have been useful in predicting mortality risk in ICU patients (1,2,3,4). However, the APACHE scores have not been successful in judging patients at risk for readmissions. In several studies the Stability and Workload Index for Transfer (SWIFT) score is a validated numerical tool with the ability to measure a patient's safe and suitable discharge from the ICU (1,2,5). It is important to note that the SWIFT score has been shown to be effective only in medical ICUs and not surgical ICUs.

## 2 Objectives

- To evaluate the Stability and Workload Index for Transfer (SWIFT) score as a tool for prioritizing patient transition from the surgical critical care unit.
- To retrospectively evaluate surgical patients who experienced unplanned surgical critical care readmission during hospitalization.
- The purpose is to evaluate any trends with patients' baseline, comorbidities, and ICU stay factors that were associated with higher risk of unplanned readmissions.

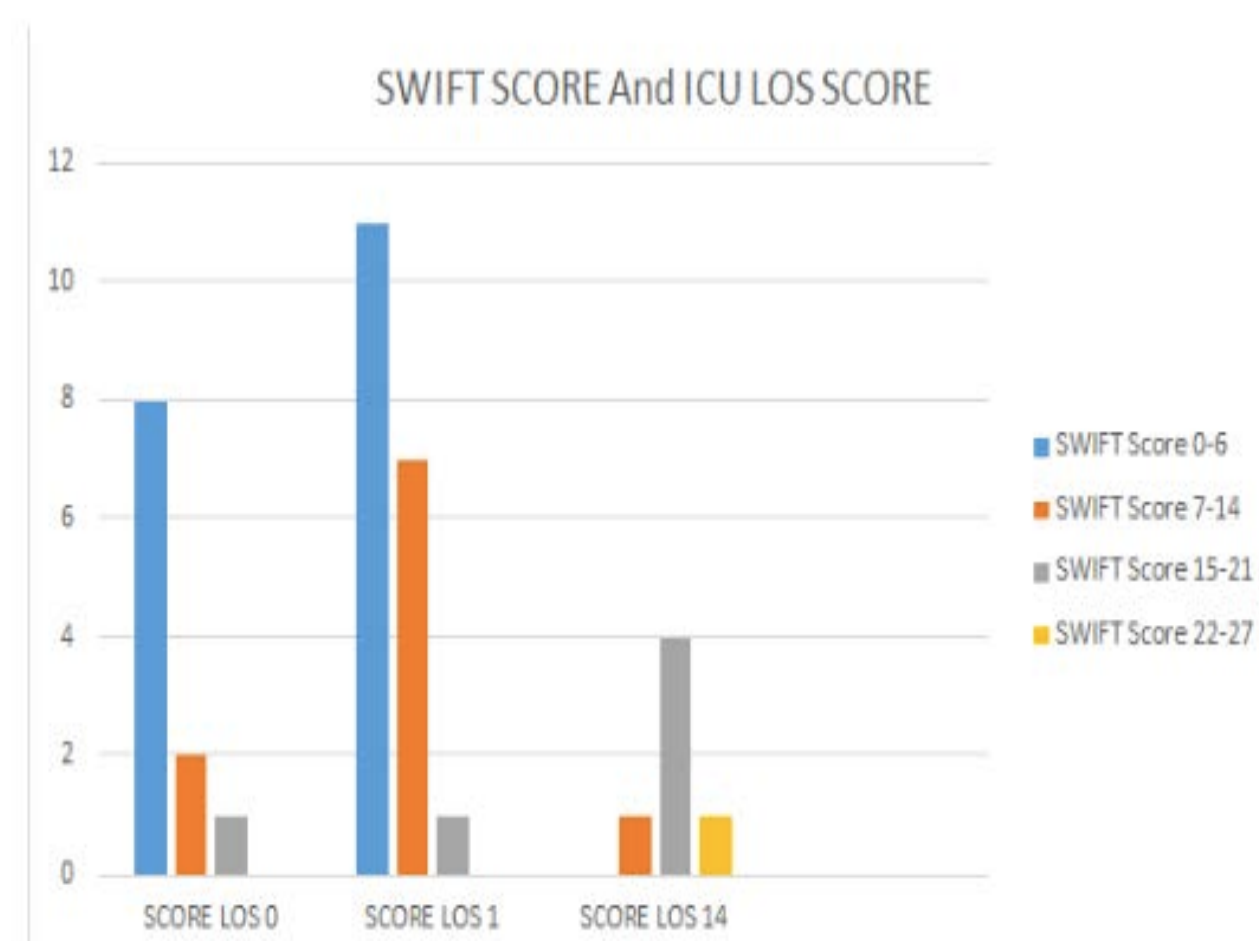
## 3 Methods

A total of 95 patients were included in the review. All patients had to meet enrollment criteria including: greater than 18 years of age, underwent previous surgical critical care admission, and subsequent unplanned readmission for the period from January 1<sup>st</sup>, 2013 to December 31<sup>st</sup>, 2013.

- Utilizing the SWIFT score criteria patients were scored on the following: original source of initial ICU admission (ER/OR department or transferred from an internal ward or outside hospital); total ICU length of stay in days during initial admissions; last measured PaO<sub>2</sub>/FIO<sub>2</sub> ratio during initial ICU admission; Glasgow Coma Scale at time of ICU discharge; and last arterial blood gas PaCO<sub>2</sub> value (1).

## 4 Results

The mean SWIFT score was 9.8 (SD = 6.9) with the most frequent SWIFT scores of 6 (n=12), 5 (n=7), 11 (n=7). For ICU length of stay 9 participants (12.9%) experienced an initial ICU length of stay that was greater than 10 days. 50% of our participants (n = 36) experienced length of stay greater than 48 hours but less than 10 days. The mean pulmonary function (PF) ratio was 375. 76% of the participants (n = 56) had a GCS score of 15, 12.3% (n=9) had a GCS score of 14. The lowest GCS score calculated on our population was 11 (n=2).



**Figure 1 SWIFT score and ICU Length of Stay (LOS) score;** The LOS is the total ICU length of stay in days during initial admissions. A LOS of 0 equates to 0 – 1 days; LOS of 1 equates to 2 – 10; and LOS of 14 equates to >10 days. The higher SWIFT scores are correlated with the LOS score of 14.

## 5 Conclusions

The mean SWIFT score we had was 6; however, 15 is considered a positive SWIFT score. According to Wong et. al a SWIFT score of greater than 15 is correlated with an increased unplanned readmission risk and in our population 20% of the participants had a SWIFT score over 15.

Only 12% of the patient population had a PF ratio on transition of less than 200. This demonstrates that while a lower PF ratio is correlated with poor patient outcomes (Frost et al.) and increased risk of unplanned readmission this was only found in 12% of our population. However, when we retrospectively evaluated readmission diagnoses on our readmitted patients 50% of our patients were readmitted for respiratory compromise and increased oxygen requirements.

Of the patients that had a length of stay greater than 10 days the mean SWIFT score was 21 ( $p < 0.001$ ). Therefore, based on this data for our surgical patients that experienced an increased length of stay the SWIFT score is a valuable tool for predicting unplanned readmission during hospitalization.

## 6 Future Directions

Because the research conducted is a pilot evaluation that can be utilized in a surgical intensive care environment specific to Johns Hopkins Hospital future studies should examine its applicability in medical surgical intensive care unit. Furthermore, to include the range of factors that may contribute to readmission risk future studies should analyze individual-level variables for example the possible correlation between patient specific diagnosis and readmission risk. Additionally, future research should investigate how the severity of a patient's illness at discharge contributes to ICU readmission risk (2). A case control study in which patients with a specific diagnosis are matched with a case control intervention and compared to a control group can be used to further assess the prognostic value of the SWIFT score in the SICU. Considering the Kareliusson et al. study it might be beneficial to modify the SWIFT score to include renal function to reassess its predictive value readmission risks in SICU patients.

## 7 References

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### Funding Source:

The Helene Fuld Leadership Program for the Advancement of Patient Care Quality and Safety



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