

UCLA

Proceedings of UCLA Health

Title

LACE+ Score is Associated with Re-admission Risk for Patients Discharged to Skilled Nursing Facilities

Permalink

<https://escholarship.org/uc/item/1kj2m336>

Journal

Proceedings of UCLA Health, 28(1)

Authors

Martinez, Stephanie

Darouian, Navid

Ahmed, Salim F.

Publication Date

2024-10-17

RESEARCH PAPER

LACE+ Score is Associated with Re-admission Risk for Patients Discharged to Skilled Nursing Facilities

Stephenie Martinez, MD¹, Navid Darouian, MD^{1,2,3} and Salim F. Ahmed, MD^{1,2,3}

¹David Geffen School of Medicine at UCLA, Los Angeles, California

²Department of Internal Medicine, Ronald Reagan UCLA Medical Center, 757 Westwood Plaza, Los Angeles, CA, USA, 90095

³Department of Internal Medicine, UCLA Santa Monica Medical Center, 1250 16th St. Santa Monica, Los Angeles, CA, USA, 90404

Key Words: skilled nursing facility, LACE+ index, Medicare, readmission

Background

Skilled nursing homes (SNFs) are commonly used for post-acute hospital care. SNFs are commonly used to regain function, independence, and strength.¹ Patients referred to SNFs are vulnerable, commonly medically complex, requiring daily nursing care and physician oversight.¹ SNF goals are to eventually discharge the patient to a lower level of care, such as home, assisted living or board and care, if the patient can achieve increased independence and medical stability. Despite the efforts to facilitate SNF discharge, there is an overall high rate of hospital readmissions. SNF patients with heart failure had the highest hazard rate of readmission to hospital during the first two days of SNF stay.¹

Hospital readmissions should be avoided due to the financial burden they impose on hospital systems and patients. Medicare typically covers SNF costs at full expense for the first 20 days after hospital discharge, and many patients may be discharged on day 21.¹ However, one in five Medicare beneficiaries are readmitted to the hospital within 30 days of discharge.² Additionally, one in four patients discharged from a SNF to a lower level of care is readmitted within 30 days, with two-thirds of these readmissions potentially preventable.² The 20% of Medicare patients readmitted to a hospital within 30 days of discharge incur costs of nearly 20 billion each year.³ Identified risk factors for hospital readmissions include race, age, having a regular provider, major surgery, length of hospital stay, and premature discharge.⁴

Despite identified risk factors, healthcare providers still have difficulty predicting patients are at high risk of hospital readmission, without using risk assessment tools. Several systems have been developed to predict unplanned 30-day hospital readmissions. The LACE score calculates a patient's risk level of readmission or death within the first 30 days of discharge. This was initially validated in congestive heart failure patients and subsequently in the general population of hospitalized patients.⁵ The LACE+ index, an extension of the LACE score, consists of length of stay (L), admission acuity (A), comorbid conditions via the Charlson Comorbidity Index

(C), emergency department utilization within 6 months before admission (E), and sex, age, hospital teaching status, acute procedures, diagnoses, and number of readmissions in the year before the index admission (+).⁶ Total scores range from 1 to 19, with >9 indicating the highest risk of readmission or death within 30 days.⁷ Patients with a score greater than 10 are recommended to have increased monitoring.⁷

Methods

We studied patients discharged from UCLA Ronald Reagan and UCLA Santa Monica Hospital to Skilled Nursing Facilities from January 1st, 2022 to December 31st, 2022. Categorical data was retrieved from the Epic Electronic Medical Record and healthcare referral management software. Re-admissions were counted for patients admitted to observation or admission status within the 1 year of hospital discharge. Emergency room visits were not considered re-admissions in this study.

Categorical values were assessed using Pearson's Chi-square tests. Independent samples *t*-tests analyzed quantitative values. Results are presented as n (%) or mean $\pm$ SD, and *p* values $\leq$ 0.05 were considered statistically significant.

The study was reviewed by the UCLA IRB and received exemption status.

Results

From January 1st 2022 to December 31st 2022, a total of 2543 patients were discharged from UCLA Ronald Reagan and UCLA Santa Monica Hospitals to Skilled Nursing Facilities. The average hospital length of stay for these patients was 12 ± 15 days prior to discharge to SNF. The LACE+ Re-admission Score for the group was 62.61 ± 15.27 . A total of 466 patients (18.3%) of the study population had at least one hospital re-admission following the initial hospital discharge.

We found a significant difference between the LACE+ score for patients with hospital re-admission compared to the rest of the population (66.40 ± 12.25 vs 61.76 ± 15.75 , $p < 0.01$). Of the 2543 patients discharged to SNF, 601 patients (23.8%) had LACE+ scores of 75 or greater. In this highest risk group with scores of 75 or greater, 137 patients (29.4%) had hospital re-admission ($p=0.02$).

Interestingly, hospital length of stay was not a statistically significant factor when comparing the patients who were re-admitted versus those without re-admission (12.14 ± 15.36 days vs 11.94 ± 14.95 days, $p=0.66$).

Conclusion

Cost of SNF Readmission

Avoiding hospital readmissions from skilled nursing facilities (SNFs) is important, primarily due to the significant costs associated with these readmissions. Readmissions impose a substantial financial burden on both the patient and the hospital. Approximately 40% of Medicare patients receive post-acute care after a hospital discharge, and about 25% of these patients are readmitted to the hospital within 30 days, making post-acute care one of the largest components of Medicare spending.⁸ In 2015, Medicare spent more than \$60 billion on post-acute care, which has increased rapidly in recent years.⁹

Medicare has a copayment policy for fee-for-service beneficiaries. Medicare pays for the first 20 days in an SNF, but on the 21st day, the patient's copayment increases from \$0 to \$150. It has been hypothesized that since patients do not have to pay until the 21st day, some patients stay at SNFs longer than needed, leading to unnecessary additional SNF days and wasteful spending with limited patient benefit. Recent studies have shown that because of the large increase in copayment on the 21st day, financial pressures have resulted in shorter stays, and earlier home discharges. Shorter SNF stays are associated with higher readmission rates and increased Medicare spending due to hospital readmissions.⁹

Providers should adopt tools that help predict risk of hospital readmissions. Utilizing tools like the LACE+ index may allow skilled nursing facilities (SNFs) to better anticipate the duration of a patient's stay and reduce potential readmissions. This approach could potentially reduce the financial burden on both patients and hospitals.

High Readmission Rates

Despite the increasing costs associated with readmissions, rates remain high for skilled nursing facilities (SNFs). One in five Medicare beneficiaries is readmitted to the hospital within 30 days of discharge, and two-thirds of these readmissions may be preventable.² High readmission rates are often due to poor communication and care coordination among providers.¹⁰

Risk of readmission after discharge from an SNF following a heart failure hospitalization, hypothesized that immediate transfer from the hospital to SNF results in a high risk of

readmission. With approximately 25% of patients readmitted to the hospital within 30 days of discharge from SNF. Risk of readmission was 2 to 4 times higher immediately after discharge from the SNF to home compared to later periods. This could be due to the disruption in continuity of care when a patient is transferred from SNF to home. Currently, there is little evidence of routine formal discharge planning. Patients with medically complex illnesses are at higher risk of readmissions. Patients discharged from SNFs may benefit from formal discharge planning, including written outpatient physician follow-up and discharge instructions.¹

In addition to changes in SNF practices, readmissions can also be prevented from the front end, while the patient is still in the hospital. Indexes such as the LACE+ could help identify patients are at higher risk for readmission before SNF admission and help providers make better decisions on their discharge care.

Quality of SNF

In addition to cost, the readmission rate to the hospital after a discharge from a skilled nursing facility (SNF) can also serve as a measure of SNF quality.¹ Repeated readmissions can result in financial penalties for SNFs. The Centers for Medicare and Medicaid Services (CMS) have profiled the readmission rates of SNFs and instituted financial penalties if SNF's readmission rate is higher than expected.¹¹

Readmissions place additional financial burdens on SNFs. One strategy is more efficient use of post-acute care. Better identification of patients at risk for readmission can also help manage financial costs. Using indexes such as the LACE+ index, may enhance the quality of care in SNFs and decrease the number of readmissions by improved prediction of which patients are at risk for readmission after discharge.²

LACE+ Score

We found patients with high LACE+ scores were more likely to be readmitted, particularly those with scores of 75 or greater. However, despite differences in the average length of stay between groups, the difference was not statistically significant. Thus, the hospital length of stay in the hospital does not appear to be a significant factor in predicting readmission risk. Therefore, the LACE+ index score can effectively identify patients at risk of readmission regardless of hospital length of stay.

These scores can be used to target interventions aimed at reducing readmission rates, thereby decreasing costs and improving the quality of SNFs and patient care. Other scores, include the HOSPITAL Score (Hemoglobin level at discharge, Oncology at discharge, Sodium level at discharge, Procedure during hospitalization, Index admission, number of hospital admissions, Length of stay) and the LACE index (Length of stay, Acute/emergent admission, Charlson comorbidity index score, Emergency department visits in the previous six months), have been studied and also show similar efficacy to the LACE+

score. However, they all have limitations, especially incomplete data and the absence of socioeconomic information.⁷

The LACE+ score, despite limitations, has potential for routine use in hospitals to predict patient readmissions following post-acute care. By enabling clinicians and providers to identify patients at high risk of readmission, it empowers care teams to intervene proactively, thus preventing readmissions and developing more effective care strategies more effectively. This approach not only fosters better patient outcomes but can also contribute to cost reduction for both patients and hospitals, ultimately enhancing overall patient care. Future studies may improve the predictive accuracy of the LACE+ index by incorporating socioeconomic information. These include housing stability, access to transportation, health insurance coverage, and social support. Enhancing the LACE+ index could improve readmission prediction and more tailored interventions.

REFERENCES

1. **Weerahandi H, Li L, Bao H, Herrin J, Dharmarajan K, Ross JS, Kim KL, Jones S, Horwitz LI.** Risk of Readmission After Discharge From Skilled Nursing Facilities Following Heart Failure Hospitalization: A Retrospective Cohort Study. *J Am Med Dir Assoc.* 2019 Apr;20(4):432-437. doi: 10.1016/j.jamda.2019.01.135. PMID: 30954133; PMCID: PMC6486375.
2. **Neuman MD, Wirtalla C, Werner RM.** Association between skilled nursing facility quality indicators and hospital readmissions. *JAMA.* 2014 Oct 15;312(15):1542-51. doi: 10.1001/jama.2014.13513. PMID: 25321909; PMCID: PMC4203396.
3. **Jencks SF, Williams MV, Coleman EA.** Rehospitalizations among patients in the Medicare fee-for-service program. *N Engl J Med.* 2009 Apr 2;360(14):1418-28. doi: 10.1056/NEJMsa0803563. Erratum in: *N Engl J Med.* 2011 Apr 21;364(16):1582. PMID: 19339721.
4. **Auerbach AD, Kripalani S, Vasilevskis EE, Sehgal N, Lindenauer PK, Metlay JP, Fletcher G, Ruhnke GW, Flanders SA, Kim C, Williams MV, Thomas L, Giang V, Herzig SJ, Patel K, Boscardin WJ, Robinson EJ, Schnipper JL.** Preventability and Causes of Readmissions in a National Cohort of General Medicine Patients. *JAMA Intern Med.* 2016 Apr;176(4):484-93. doi: 10.1001/jamainternmed.2015.7863. Erratum in: *JAMA Intern Med.* 2016 Oct 1;176(10):1579. PMID: 26954564; PMCID: PMC6900926.
5. **Saluk JL, Blackwell RH, Gange WS, Zapf MAC, Kothari AN, Kuo PC, Quek ML, Flanigan RC, Gupta GN.** The LACE Score as a Tool to Identify Radical Cystectomy Patients at Increased Risk of 90-Day Readmission and Mortality. *Curr Urol.* 2018 Oct;12(1):20-26. doi: 10.1159/000447226. Epub 2018 Jun 30. PMID: 30374276; PMCID: PMC6198769.
6. **Jun-O'Connell AH, Grigoriuc E, Silver B, Kobayashi KJ, Osgood M, Moonis M, Henninger N.** Association between the LACE+ index and unplanned 30-day hospital readmissions in hospitalized patients with stroke. *Front Neurol.* 2022 Oct 5;13:963733. doi: 10.3389/fneur.2022.963733. PMID: 36277929; PMCID: PMC9581259.
7. **Staples JA, Wiksyk B, Liu G, Desai S, van Walraven C, Sutherland JM.** External validation of the modified LACE+, LACE+, and LACE scores to predict readmission or death after hospital discharge. *J Eval Clin Pract.* 2021 Dec;27(6):1390-1397. doi: 10.1111/jep.13579. Epub 2021 May 8. PMID: 33963605.
8. **Chen LM, Acharya Y, Norton EC, Banerjee M, Birkmeyer JD.** Readmission Rates and Skilled Nursing Facility Utilization After Major Inpatient Surgery. *Med Care.* 2018 Aug;56(8):679-685. doi: 10.1097/MLR.0000000000000941. PMID: 29995694.
9. **Werner RM, Konetzka RT, Qi M, Coe NB.** The impact of Medicare copayments for skilled nursing facilities on length of stay, outcomes, and costs. *Health Serv Res.* 2019 Dec;54(6):1184-1192. doi: 10.1111/1475-6773.13227. Epub 2019 Oct 27. PMID: 31657002; PMCID: PMC6863243.
10. **Gupta S, Zengul FD, Davlyatov GK, Weech-Maldonado R.** Reduction in Hospitals' Readmission Rates: Role of Hospital-Based Skilled Nursing Facilities. *Inquiry.* 2019 Jan-Dec;56:46958018817994. doi: 10.1177/0046958018817994. PMID: 30894035; PMCID: PMC6429649.
11. **Rivera-Hernandez M, Rahman M, Mor V, Trivedi AN.** Racial Disparities in Readmission Rates among Patients Discharged to Skilled Nursing Facilities. *J Am Geriatr Soc.* 2019 Aug;67(8):1672-1679. doi: 10.1111/jgs.15960. Epub 2019 May 8. PMID: 31066913; PMCID: PMC6684399.