

Hospital readmissions among patients with skin disease: A retrospective cohort study

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Background: Hospital readmissions represent a potential target for reducing unnecessary health care expenditures; however, readmissions following dermatology hospitalizations remain poorly characterized.

Objective: To assess the frequency and demographics of readmissions for skin disease.

Methods: We performed a retrospective cohort study of dermatology hospitalizations by using the 2014 Nationwide Readmissions Database.

Results: Readmissions following dermatologic hospitalizations cost the American health care system \$1.05 billion in 2014. The 30-day rate of all-cause readmission following the 647,251 weighted index admissions for skin disease was 12.63%. Readmission was most common following hospitalizations for cutaneous lymphomas (39.63%), connective tissue disorders (26.28%), and cutaneous congenital abnormalities (23.86%). Predictors of readmission included public insurance with Medicaid (odds ratio [OR], 1.61; 95% confidence interval [CI], 1.53-1.70) or Medicare (OR, 1.55; 95% CI, 1.48-1.62), residence in a low-income community (OR, 1.14; 95% CI, 1.09-1.20), an increased number of chronic conditions (OR, 4.46; 95% CI, 4.15-4.79), and a large hospital (OR, 1.10; 95% CI, 1.05-1.16). Urban (OR, 0.90; 95% CI, 0.87-0.94) and rural (OR, 0.78; 95% CI, 0.73-0.82) nonteaching hospitals were protective against readmissions from skin disease.

Limitations: We were unable to assess the impact of inpatient dermatology consultations on hospital readmission rates.

Conclusions: There are significant health care and demographic disparities in readmissions for skin disease. (J Am Acad Dermatol <https://doi.org/10.1016/j.jaad.2018.03.042>.)

Key words: dermatology hospitalizations; Healthcare Cost and Utilization Project; health care expenditures; hospital readmissions; inpatient dermatology; Nationwide Readmission Database.

Hospital readmissions cost the American health care system an estimated \$41 billion annually and may be emblematic of poor quality and inadequate care coordination.¹ To reduce the number of potentially preventable rehospitalizations, the Hospital Readmissions Reduction

Abbreviations used:

CI:	confidence interval
HRRP:	Hospital Readmissions Reduction Program
NRD:	Nationwide Readmissions Database
OR:	Odds ratio

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Program (HRRP) was created under the Affordable Care Act to penalize hospitals with all-cause readmissions in excess of the national average following index stays related to specific medical and surgical discharges.² The HRRP has effectively reduced readmissions for this subset of hospitalizations, and the subset may be expanded to include additional conditions.³ To better characterize readmissions following hospitalizations for skin disease, we performed a retrospective cohort analysis of dermatology hospitalizations by using a national inpatient database.

METHODS

This study utilized the 2014 Nationwide Readmissions Database (NRD), which is a resource sponsored by the Healthcare Cost and Utilization Project of the Agency for Healthcare Research and Quality. The NRD samples nearly 50% of hospitalizations in the United States, excluding rehabilitation or long-term acute care stays, to generate national hospitalization estimates.⁴ Our primary aim was to determine the overall readmission rate for index stays related to skin disease and the financial costs of the associated rehospitalizations. In this study, readmission was defined as hospital re-entry for any indication within 30 days of discharge (30-day all-cause readmission) from an index stay principally for skin disease. All-cause readmissions were analyzed because the HRRP imposes penalties for excess hospital readmissions following index stays for certain conditions, regardless of the reason for readmission. We also aimed to identify the categories of skin disease with the highest rates of readmission and to determine whether there are demographic or hospital characteristics associated with readmission.

We examined records of discharges occurring between January 1, 2014, and November 30, 2014, and identified hospitalizations for skin disease by the presence of a dermatologic *International Classification of Diseases, Ninth Revision, Clinical Modification* code in the primary diagnosis field, which represents the principal reason for admission. The 22 categories of skin disease were adapted from the American Academy of Dermatology's Burden of Skin Disease report and included disorders of the skin, hair, and nails but excluded disorders of the external ear or genitalia, eyelid, and lips.⁵

Unclassifiable conditions, such as skin disorder not otherwise specified, were also excluded. We did not use diagnosis-related groups because disparate forms of skin disease are grouped together in this classification system, thereby preventing an analysis of readmission rates by disease category. In addition, skin diagnosis-related groups include conditions

outside dermatologists' scope of practice, such as breast disease and trauma-related injuries. Patient linkage numbers assigned by the NRD were used to identify readmissions occurring within the calendar year for each unique patient. Patients who died during the index hospitalization or those with no indicated length of stay were excluded from the analysis. Patients younger than 1 year were also excluded

because the demographics for this age category have been inconsistently reported.

A nationally representative sample with standard errors and confidence intervals was generated by using weights provided by the NRD. Descriptive statistics were used to calculate all-cause readmission rates. The financial costs associated with readmissions for skin disease were calculated by summing the charges for hospitalizations occurring within 30 days of discharge from an index stay principally for skin disease and by converting charges to costs using the cost-to-charge ratio file provided by the database. Survey-weighted multivariate logistic regression models were constructed with hospitalization for skin disease as the dependent variable and age, sex, income quartile, payer, number of chronic medical conditions, season, hospital size, and teaching status as the independent variables. A 2-sided *P* value less than .05 was considered statistically significant. All analyses were performed by using survey procedures to adjust for survey weighting and sampling clusters (SAS software, version 9.4, SAS Institute Inc, Cary, NC). The Children's National Health System Institutional Review Board deemed this study exempt from the need for informed consent. All study researchers with access to the NRD were compliant with the data use agreement of the Healthcare Cost and Utilization Project.

RESULTS

Following the 647,251 weighted hospitalizations for skin disease that occurred in 2014 in the United

CAPSULE SUMMARY

- Hospital readmissions represent a costly and potentially preventable form of hospitalization.
- There are health care and demographic disparities in patients readmitted following dermatologic hospitalizations.
- Additional interventions are necessary to reduce hospital readmissions among patients with skin disease.

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