The Unique Challenges of Using Determinants of Health Data within the Electronic Health Record to Understand Readmissions: A Case Study in Rural Appalachia.

Jennifer A. Mallow
PhD, FNP-BC

Andrea Bailey
MSN, FNP-BC

Karen Clark
MD, FACP

Laurie Theeke
PhD FNP-BC, GCNS-BC

WestVirginiaUniversity.

Background

- Understanding and predicting hospital readmission has been of interest for more than three decades.
- In an effort to strategically place readmission reduction resources where most beneficial, organizations use readmission risk-stratification tools.
- The LACE index (**L**ength of stay, **A**cuity, **C**omorbidity, and number of **E**mergency Department visits)
- Multifactorial social determinants of health are experienced by socially disadvantaged, rural populations which may exacerbate readmission vulnerability.
- In addition, at the time of data collection, the process of aggregating the LACE index data was manual within the organization.

Purpose

- The primary purpose of this study was to examine the available determinants of health data contained within the Electronic Health Record(EHR) in relation to 30-day readmission.

Setting

- Large Academic Medical Center in Appalachia
- The population of the state has:
  - The highest underinsured population
  - Low high school graduation rates
  - Highest incidence of infectious disease,
  - Highest prevalence of low birth-weight infants
  - Low availability of primary care providers

Design

- Retrospective cohort study
- data from de-identified EHR records in the Integrated Data Repository
- All adult patients that were admitted to a general medicine service between January 1, 2014 and December 31, 2015

Variables

- Patient Characteristics
  - Gender, Race, Marital Status, Age, Insurance Status, Chronic Conditions
- Functional Status
  - Literacy, living arrangements, history and/or treatment for substance abuse, behavioral issues, financial concerns and functional health assessments.
- Thirty Day Readmission
- Lace Index
  - Length of Stay, Acuity of admission, comorbid conditions, emergency department utilization

Data Analysis

- From the IDR and imported Statistical Package for the Social Sciences 24
- Descriptive analysis
- Comprehensive descriptive analysis for those readmitted
- Chi-Square
- Mean comparisons

Results

- N = 9,854, Mean age = 57.5, SD 18.2
- 45.6% with ≥ 1 chronic illness

Gender	N	%
Female	5018	50.9
Male	4835	49.1
Ethnicity	**N**	**%**
White	9317	94.6
African American	304	3.1
Hispanic/Latino	44	0.4
Unknown	189	1.9

Marital Status	N	%
Married	4109	41.7
Single	2566	26.0
Divorced	1392	14.1
Widowed	1370	13.9
Unknown/Other	417	4.1

Insurance Status	N	%
Medicare	4950	50.2
Medicaid	2543	25.8
Private	1934	19.6
Self Pay	197	2.0
Unknown/Other	230	2.3

Results

There was a significant association between readmission within 30 days and being insured by Medicaid, $x^2(1, n=7493) = 9.69$, $p=.002$, $phi=-.04$.

A pattern of missing data was identified for Medicaid insured for all functional status variables.

There was a difference between LACE scores of those who were readmitted($M=8.1$, $SD=4.20$) and those who were not ($M=9.4$, $SD=4.5$; $t(3291.9)=-12.8$,$p=.00$, two-tailed, *Cohen's d*=0.1).

LACE scores for those readmitted were lower than published thresholds(mean=9.4, SD 4.5) while the entire population readmission exceeded the national average(22.3%).

The only individual component of the LACE index that was predictive for readmission was co-morbid conditions.

Discussion

Functional status was systematically not available in the EHR for the patients with Medicaid, who readmit more frequently.

The mental health status of the population was not assessed, limiting the findings even further

Conclusions

- The LACE index does not discriminate between patients who are at risk for 30-day readmission in this population.
- The factors identified in this study that influence readmission are co-morbid conditions and insurance status.
- Functional status and significant health disparities are more likely the cause of 30-day readmission.
- The collection of standardized data, and the reporting and analysis of that data, should be a top priority.
- Without data to discover exactly why these disparities occur, where they occur, and how detrimental they are, we will not be able to prevent poor outcomes.

Questions

- What common data elements should we use to collect health disparity data?
- What resources need to be available when collecting data on functional status?
- Should standardized mental health assessments be a common data element?