

Research BRIEF

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HOSPITAL READMISSION AND SOCIAL RISK FACTORS IDENTIFIED FROM PHYSICIAN NOTES

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KEY FINDINGS

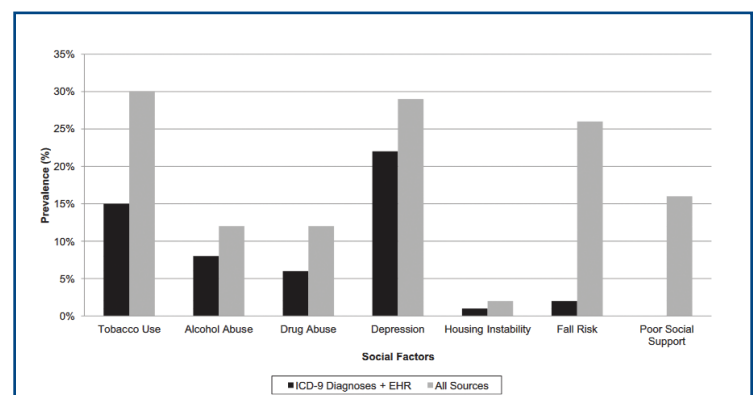
Physician notes contain valuable information on social risk factors that put patients at high risk of hospital readmission. This study finds that automated methods for analyzing physician notes within electronic health records can identify social risk factors more completely than administrative data, enhancing a hospital's ability to identify patients at risk of readmission.

THE QUESTION

Value-based payments, including penalties for readmissions through Medicare's Hospital Readmissions Reduction Program, are providing direct financial incentives for hospitals to reduce unplanned readmissions. Thus, hospitals are responding by attempting to tailor care and discharge resources to the needs of the patients, including those with challenging social circumstances.

This study sought to answer two questions: first, how does the prevalence of seven selected social characteristics (tobacco use, alcohol abuse, drug abuse, depression, housing instability, fall risk, and poor social support) change when adding information from physician notes to that from billing codes and structured electronic health record (EHR) data? Second, is the social information about patients in physician notes associated with higher readmission risk, even after accounting for other data available in the medical record?

The increase through use of the physician notes was largest for fall risk (24 percentage point increase), poor social support (16 percentage point increase), and tobacco use (15 percentage point increase).



Source: Navathe et al., *Health Services Research*

THE FINDINGS

Identifying social characteristics

Six of the seven selected social characteristics were more frequently identified through analysis of physician notes as compared to billing codes alone, or billing codes together with structured EHR data. When combining all three sources, the prevalence of all seven factors was higher.

Social factors and readmission risk

Of the nearly 94,000 index hospitalizations and 50,000 patients in the study, 18 percent experienced a readmission within 30 days. The additional patients identified through physician notes were at high risk of readmission.

When the authors adjusted for demographic and clinical factors, four of the seven selected social factors were significantly associated with increased readmission risk: housing instability (readmission rate 25 percent), depression (21 percent); drug abuse (20 percent), and poor social support (20 percent). Importantly, adding patients identified through physician notes resulted in drug use becoming a significant factor, and poor social support changing from a protective factor (associated with less readmission risk) to a significant risk factor for readmission.

THE IMPLICATIONS

Patients with social risk factors are substantially more prevalent than currently identified through billing codes or EHR data alone, and are at a higher risk of returning to the hospital within 30 days of discharge. Using information from physician notes may lead to better identification of those patients at high risk of readmission.

This is the first study to use clinical text to systematically identify a comprehensive set of social factors, and study how these factors are associated with hospital readmissions. It shows how a health system could use its own data in an automated and reliable way to direct care management activities. Efforts to get supplementary data on social factors from sources like point-of-care surveys are not readily automated or scalable. This study relies exclusively on data available to hospitals and collected routinely through clinical care, and shows what is possible using natural language processing (NLP). NLP provides a fast and scalable way to get information from physician notes.

In an era of accountable care, understanding patient characteristics and tailoring population management strategies to patient needs is critical. This study demonstrates that a hospital may use its own data in an automated and reliable fashion to direct care management activities to patients at greatest risk.

THE STUDY

This was an observational study of 49,319 patients with cardiovascular disease, who experienced 93,606 hospital admissions at one of five hospitals within the Partners Healthcare System (Boston, MA) in 2011-2013. The authors looked at EHR and administrative claims for commercial payers, Medicare, and Medicaid. The EHR data included structured input fields as well as unstructured physician notes. They focused on patients with cardiovascular disease because of higher readmission rates, availability of evidence-based care management, and because social factors are likely to have a more consistent relationship within a disease group.

The authors examined 30-day all-cause unplanned readmissions. They selected seven social factors to look for in analysis of physician notes, billing codes and structured EHR data: tobacco use, alcohol abuse, drug abuse, depression, housing instability, fall risk, and poor social support. They evaluated the prevalence of the seven social factors when adding information from physician notes, in comparison with billing codes and structured EHR data, and compared the characteristics of patients readmitted to the hospital with those not readmitted.

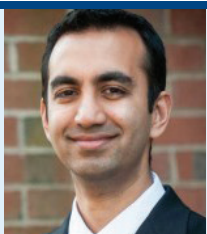
The authors went on to look at the incremental impact of each data source on social factors and readmission risk. They examined the changes in the risk-adjusted association between readmission and the social factors as additional information was incorporated from billing codes, EHR data, and physician notes.

Navathe, A. S., Zhong, F., Lei, V. J., Chang, F. Y., Sordo, M., Topaz, M., Navathe, S. B., Rocha, R. A. and Zhou, L. (2017), [Hospital Readmission and Social Risk Factors Identified from Physician Notes](#). Health Serv Res. doi: 10.1111/1475-6773.12670

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Amol Navathe, MD, PhD, is an Assistant Professor of Health Policy and Medicine at Penn. He is a practicing physician, health economist and engineer with an expertise in delivery transformation and policy design. His work focuses on the use of data analytics and technology to enhance health care delivery, inform policy and improve physician and economic behavior. This study won the 'Best of AcademyHealth' award at the 2016 Annual Research Meeting, and was published with other award-winners in a special series of the journal *Health Services Research*.