Why Majority of Readmission Risk Assessment Tools Fail in Practice

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Abstract—Focus on readmission risk assessment tools has never been higher, and yet for all the time, resources, and attention spent developing and implementing these disparate models, readmission rates have barely budged. Fundamental flaws exist in most approaches in the areas of Data, Model Adaptability, and Clinical Workflow Integration. Many tools rely solely on historical patient data mined from the EHR or on disease-specific models that cannot be scaled to address all readmissions challenges. Models that rely on data collected at discharge are not timely enough to enable clinicians to take meaningful action, and ones that are not well-integrated into clinical workflow are not easily adopted. Finally, static prediction tools that do not adjust to a hospital’s specific patient population deliver limited results over time. For a readmission risk assessment tool to achieve a meaningful and long-lasting impact, these common pitfalls must be avoided at all costs.

Keywords—readmission; risk assessment; predictive modeling

I. BACKGROUND

Potentially preventable readmissions are a scourge on the US healthcare system. Each year millions of patients are discharged from the hospital, only to return within 30 or 60 days. Not only do patients, their families, and their caregivers suffer as a result, but hospitals, insurers, and the government waste billions of dollars that could be spent on other public health priorities. Many if not most of these readmissions could have been avoided if clinicians had effective, scalable, and timely methods for identifying not only which patients were the highest risk, but what steps should have been taken to mitigate that risk.

In recent years there has been a proliferation of readmission risk assessment models, yet readmission rates have barely budged. Fundamental flaws exist in most approaches in the areas of Data, Model Adaptability, and Clinical Workflow Integration. Many tools rely solely on historical patient data mined from the EHR or on disease-specific models that cannot be scaled to address all readmissions challenges. Models that rely on data collected at discharge are not timely enough to enable clinicians to take meaningful action, and ones that are not well-integrated into clinical workflow are not easily adopted. Finally, static prediction tools that do not adjust to a hospital’s specific patient population deliver limited results over time. For a readmission risk assessment tool to achieve a meaningful and long-lasting impact, these common pitfalls must be avoided at all costs.

II. DATA CHALLENGES

A. Historical Data does not Predict Future Readmissions

Anybody who has ever invested in the stock market, rooted for a local sports team, or stuck with a television show past its tenth season knows that past performance gives you no guarantee on future returns. Factors beyond our control and beyond our ability to predict may cause our fortunes to turn on a dime. Consider the Dow Jones Industrial Average: Those who had any investments around July of 2007 remember the feelings of unabashed optimism and certainty inspired by the great bull run of the early 2000s. Unfortunately, those same investors also most assuredly remember what happened shortly thereafter, when the financial crisis of 2008 erased trillions of dollars’ worth of wealth.

A recent systematic review of readmission risk models concluded that many hospitals still model their approach to identifying high-risk patients based on historical admissions, clinical data, and outdated information on patient populations [1]. Using these old data to model and predict readmissions is dangerous. And with increasing pressure on hospitals to reduce readmissions, this approach also runs the risk of becoming extremely costly. Just ask the guy who splurged on Brooklyn Dodgers tickets in 1958, or the woman who put all her money into 8-track cassettes in 1979, or the guy who started a Hummer dealership in 2005.

Any of these folks will tell you that past performance data can not only betray you, but it may also prevent you from recognizing the obsolescence of your sources. As a result, this data may cost you a fortune.

B. Disease-Specific Models are too Myopic

In the Patient Protection and Affordable Care Act, Section 3025 created a program that penalizes hospitals for excess Heart Attack, Heart Failure, and Pneumonia readmissions in their Medicare populations [2]. As a result, academic researchers and commercial enterprises built models that predicted readmissions for these diseases only [3].

Focusing efforts on these disease areas alone neglects other at-risk patient populations. So when the government announces new penalties for Total Hip and Knee Arthroplasty and Chronic Obstructive Pulmonary Disorder (COPD), hospitals are ill-prepared to respond [4]. In addition, suppose that theoretically a hospital could develop risk assessment tools...
for the majority of their most-commonly treated diseases. Many readmitted patients have multiple chronic conditions and comorbidities. How can clinicians determine which tools to run on which patients? This approach would be incredibly difficult to scale and maintain.

III. MODEL ADAPTABILITY CHALLENGES

Most hospitals are a microcosm of their local community. When a readmission risk assessment model is developed based on a particular hospital’s patient population, there is no guarantee that those results will translate to other locations. Is a Medicare patient in rural Iowa the same as a Medicare patient in West Philadelphia? How different are their environments, socioeconomic situations, and access to community resources? While the basics of a model may be relevant, and a hospital may see readmission rates drop as a result of using a tool versus using nothing, the size of the reduction is essentially capped: unless a model can adapt and learn over time to fit the individual characteristics of the patient population.

The aforementioned systematic review of readmission risk strategies is highly critical of existing models. The review identifies two major categories of risk assessment: those designed to calculate risk-standardized readmission rates and those aimed at identifying high-risk patients. The authors characterize both as incomplete and generally inferior in their predictive capabilities relative to ‘patient level factors’ such as medical comorbidities, basic demographic data, and clinical variables [5].

Another reason that so little progress has been made in reducing readmissions is because few consistent standards exist for evaluating risk prediction models [6]. Many risk assessment strategies lack internal adaptability, a certain consequence of peddling in outdated patient population data.

Hospitals also have different focus areas that are often not accounted for in existing risk assessment approaches. For instance, one of two hospitals in a city may focus on a disease such as Sickle Cell Anemia. If those patients were not represented in initial modeling, then their individual risk factors may go unnoticed, leading to poorer outcomes and higher readmissions.

IV. CLINICAL WORKFLOW CHALLENGES

A. Information Collected is not Timely

In some instances, readmission risk assessment modeling calls for data that is not available until close to discharge [7]. While no doubt these factors, when run in a multivariate regression, show statistically significant predictive powers retroactively, one mustn’t lose sight of the main objective: to be able to identify patients during their hospitalization and take meaningful steps to prevent a readmission. What can a case manager realistically accomplish with a score that is created just hours before a patient is to be discharged?

It takes several conversations with a patient and their family to gain their trust and engagement that the care transitions steps being recommended are truly in the patient’s best interest. Clinicians must stratify their patients based on their post-discharge needs as close to admission as possible to allow for the maximum amount of time to work with their patients.

Not surprisingly, models that begin collecting critical patient data right before discharge are far less effective than models that gather data throughout a patient’s hospital stay. Beginning the risk-assessment process at admission translates into greater patient education and engagement as well as greater time to arrange for the best post-acute care interventions. Last-minute cramming is a poor substitute for the steady stream of information and personal attention that hospitals should be providing patients.

B. Systems Integration is Critical

Identifying a readmission risk assessment methodology that can be run at admission, that is disease agnostic, and that does not rely on static historical data is a necessary but not sufficient step in reducing readmissions. Attention must be paid to the integration of the risk assessment tool into clinical workflow. Case managers and nurses are already overburdened with too many “clicks” in the various IT systems required to do their jobs, and adding a standalone tool with which to run risk assessments is akin to asking them to take all patient temperatures using rectal thermometers: it’s just not happening.

V. READMISSION RISK IDENTIFICATION – NOW WHAT?

Despite the focus in the healthcare industry on readmission risk assessment methods, many approaches stop short of providing maximum value because they identify high-risk patients, and nothing more.

Researchers and clinicians must take the next step from mere identification and move towards specific recommendations for action. What types of in-hospital or post-acute interventions are most appropriate for each patient?

- “This patient needs a Social Work or Physical Therapy consult.”
- “Given this patient’s risk factors, a Skilled Nursing Facility is the ideal setting.”
- “A follow-up PCP appointment should be scheduled within 3 days.”

Taking it one step further, enabling these actions through technology would further increase caregiver efficiency and enhance patient experiences and outcomes. Think of what could be accomplished by sending automatic alerts to clinical entities, scheduling appointments with PCPs, and generating post-acute care referrals.

When a readmission risk assessment model avoids common data challenges, adapts to various patient populations, embeds seamlessly into existing clinical workflow, and is enabled with streamlined connective technology, hospitals can finally realize the kinds of windfall readmission reductions gains that have been often promised, but seldom delivered.
REFERENCES


