Leveraging Analytics to Reduce Readmissions

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By Kapila Monga

Hospital readmissions cost significant money to our healthcare system every year. According to a report from the Healthcare Cost and Utilization Project and Agency for Healthcare Research and Quality, the total cost of the 3.3 million adult 30-day all-cause readmissions in the US was $41.3 billion in 2011.[1] The average cost of readmission(s) is typically anywhere between 60 to 135 percent of the original admission cost, depending on disease condition.[2] The non-financial implications of readmissions, such as patient health and safety, further emphasize the need to work to reduce them.

There are currently multiple strategies in play with the goal of reducing 30-day, 60-day, and/or 90-day re-admissions, such as financial penalties by the Centers for Medicare and Medicaid Services (CMS), care and disease management programs from payers, and outreach and education activities by providers. One strategy that is still under-utilized across the board is to apply an analytics-driven strategy to reduce readmissions. Hospitals and health systems can design analytical models that will predict at the time of patient discharge the probability of patients' readmission. These predictive models are generally disease-specific models that provide two kinds of outputs:

1. Likelihood of a patient being readmitted. This is typically a number between zero and one that reflects the likelihood of a patient being readmitted within next 30 – 60 days.
2. Likely readmission reason. This is typically a text phrase that tells the nurse or clinician why the patient will be readmitted

This information can then be used by the doctors and nurses to design appropriate discharge protocols and home healthcare paradigms for the patients, so that readmissions can be avoided. The models can be integrated with electronic health record (EHR) systems, thereby making the above information available to nurses at time of patient discharge in the form of two new fields in the EHR or patient management system.

As simple as this may sound, given the applicability of these analytical models, which is typically at point of care, they can actually play a significant role in avoiding readmissions.

Hospitals and providers have a gold mine of data with them in the form of EHRs, which not only provides comprehensive health information, but also provides accurate and real-time health indicators like glucose level, blood pressure level, and lab results. This data can serve as the basis of readmission prediction models. In order to build readmission reduction analytical models, the following steps are a good place to start:

1. For the identified disease condition, define a patient population that has been historically admitted and readmitted. Create a longitudinal data set for this patient population including clinical indicators like blood pressure, glucose level, sodium levels, and other disease-specific indicators at various (re)admission points.
2. Variables like first readmission, second readmission, etc. are then defined for this patient population and data cleansing, outlier analysis and missing value imputation is hence done.
3. Statistical techniques for longitudinal data are then applied on this data set to identify drivers of readmission, and the model hence developed.
4. The identified drivers of readmission are then discussed with clinical experts to get clinical validation, and once finalized the factors in form of analytical models are then used to score any patient getting discharged.

Not all readmissions can be avoided, but analysis of CMS 30-day all-cause readmission data shows that around 40 to 60 percent of readmissions can actually be avoided. Analytics is both a science and an art: science when you systematically and meticulously identify the drivers of business problem in question, and art when you assess how best those drivers can be quantified and analyzed. Business and clinical experts and analytics architects should work hand-in-hand to design analytical models for readmission reduction (focused on avoidable readmissions).

Another point that bears mentioning is that quality of business intervention is as important as quality of analytical models. Equal attention should be given to determining how best to use the analytical models and operationalize them for real-time scoring and for empowering clinicians with relevant information that can help in readmission reduction.

1. http://www.hcup-us.ahrq.gov/reports/statbriefs/sb172-Conditions-Readmissions-Payer.pdf
2. http://www.beckershospitalreview.com/quality/6-stats-on-the-cost-of-readmission-for-cms-tracked-conditions.html

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