Computer says YES- AI Predictive Model to Identify Need for Post Acute Care following inpatient admission

Jacqueline. Naeem, MD1, Albert. Karam, MS1, Shelley.Chang, MD,PhD1, Manjula.Julka, MD,MBA, Marilyn.Callies, RN,MBA,ACM, Sheryl.Mathew, LCSW,ACM-SW1

1 PCCI (Parkland Center for Clinical Innovation), Dallas, Texas
2 Parkland Health and Hospital System, Dallas, Texas

Abstract

The creation of an innovative automated predictive model designed to identify which patients are likely to require post-acute care allows case managers to allocate more time and resources ensuring these patients are being discharged with fewer delays and to the right care environment. The model was then tested live in a 3 week pilot to confirm whether the model was able to identify those patients requiring post-acute care prior to case manager review.

Background/Approach

One of the common barriers to discharge from hospital for many patients is the need for post-acute care (PAC) following their admission. Post-acute care includes skilled nursing facilities, inpatient rehab and home health. Patients who require PAC have on average an increased length of hospitalization due to both complicated admissions, as well as the time to arrange suitable care upon discharge. The national prevalence rate is 22% of patients requiring some form of PAC1. In our patient population (a large safety-net hospital in Dallas) the prevalence rate through the hospital is 4%. Every inpatient is reviewed by a case manager to identify what will be required for discharge as well as most appropriate discharge disposition which can take hours at a time. As the prevalence rate is so small, this results in case managers spending a significant amount of time reviewing patients who will not require PAC, and not being able to prioritize their daily work flow to optimize their time by providing earlier assessment and thorough planning for the patients who will require placement for PAC upon their discharge. Through the creation of a predictive model, we believe that this problem could be improved by providing the team with lead-time to facilitate placements earlier and targeted valuable resources for high risk groups. We used data from an 862 bed safety-net academic county hospital, building the model using over 70,000 inpatient admissions over a period of 2 years. We used published guidelines, and literature to identify elements within the EMR relevant to post-acute care placement. The model ingests real-time patient clinical data from EMR including laboratory results, orders, diagnoses and flow sheet data, including variables that are social determinants of health. The result of the prediction as to whether a patient will need PAC as well as contextual insights (i.e does this patient have orders for DME pending) was provided to the care team by 7 am each morning for their review.

Conclusion

In our pilot, the automated model could identify 65% percent of patients who will be discharged to PAC by day 1 of admission. This rate increased to 80% of patients by day 2 of admission. With an NPV of 98%, and PPV of 39%, this predictive model achieved the goal of identifying patients who are likely to need PAC. The case managers felt that there was significant value in time saved reviewing case notes of all patients, having the ability to prioritize review of the patients that were predicted to require PAC, and the unique insights brought to the front of the report. The pilot was a three week pilot over 1 unit within the hospital, during which time there were 84 patients admitted. There are plans to further extend the model throughout the hospital, as the care team was very enthusiastic about potential impact and changes to workflow. There will be lookback analysis to compare length of stay and readmission for patient included in the pilot once sufficient time has passed to effectively evaluate this. The next phase will also include snippets using NLP to identify common barrier to discharge and increased length of stay in addition to identifying what level or type of PAC is the most appropriate for each patient needing PAC. The overall goal with the next phase is to not only reduce medically unnecessary length of stay and the complications that so often occur during these extra days in hospital, but also reducing readmission rates through patients receiving the care they need in the right location.

References