Readmission to hospital within weeks of discharge can signal deficits in care quality and cost efficiency. It may indicate a failure in a patient’s treatment plan either during or after their initial hospitalization. It exposes frail patients to hospital acquired infections for longer periods of time. It is expensive and wasteful, especially when an opportunity is missed to address patients’ needs through timely outpatient or deescalated care. Finally, it frustrates patients who prefer to be home. Accordingly, accrediting organizations use readmission rates as a measure of the quality of the services that insurance companies like L.A. Care render to their members. L.A. Care in turn monitors the readmission rates of the PPGs and hospitals within it network.

We have the means to reduce readmission rates here at L.A. Care. Our Care Management professionals within Utilization Management (UM) and Care Management (CM) routinely reach out to members and provide them with information, resources and support to help them stay out of the hospital. They identify the members who need this assistance through professional referrals, self-referrals, and the Health Risk Assessment (HRA) survey which is administered to a subset of the membership. UM and CM have asked EDSA’s Data Science Initiative (DSI) for a new tool that will calculate every hospitalized member’s risk of readmission.

DSI’s first readmission risk prediction tool

It outperforms the [LACE index](https://www.besler.com/lace-risk-score/), a widely used formula developed in Canada in TK, as shown in the table below:

| **Model** | **Kappa** | **AUPRC** | **Precision** | **Recall** |
| --- | --- | --- | --- | --- |
| Our Model (Iter. 1) | 0.3803 | 0.6643 | 0.7135 | 0.6355 |
| Baseline - LACE | 0.2979 | 0.6311 | 0.6845 | 0.5526 |

We took advantage of the opportunity to develop a model from our own, unique population. That’s why the model above beat the LACE. We limited the input to what LACE requires, i.e. Length of Stay (i.e. how long a member initially stayed in the hospital), Acuity (whether the member started , the same 14 comorbidities, and 6 month count of prior ER visits, so our only advantage was our modeling techniques and espousing the characteristics of our population. It was enough.

The LACE+, the Rothman Index, and a model developed in Australia [by Maali et al](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5755362/) using machine learning techniques all outperform the LACE Index. So does the 1st iteration of the model our own group developed at the end of Apri

We have an opportunity to produce better predictions still by expanding the input. Right now we’re working on including social and diagnostic characteristics. We’ve also drawn up a list of several hundred variables that are associated with readmission according to peer reviewed work. On their own, the Rothman Index, LACE+, Tabak’s ALaRMS, Maali’s model, the HOSPITAL Index, etc., each use a small subset of these predictors and interestingly the overlap between these subsets is small beyond the fields that compose the LACE. If we can access a large, inclusive, set of input variables then we are well positioned to improve on the results of Iteration 1 and to do not just as well as Rothman or Maali, but as well as any model that combines their input fields together. And we’re on our way, with a possible collaboration with MLK that may give us access to the labs, vitals and nursing notes that power the Rothman Index, for example.

LA Care is in the advantageous position to describe a member and his or her care beyond the walls of the hospital. The fact that we are a payer, as well as the development of sharing networks like eConnect and EDIE or LANES, and possible collaborations with hospitals that may share with us our members’ EMRs – all of this puts us in a position to build models on data that have a wider scope. I’m attaching a synopsis of a group in Dallas for which information sharing together with machine learning-driven modeling led to improvements in reducing readmission. Here at DSI, I’m working on Iteration 2 and I’ll keep you updated.

or uncover systemic drivers.