An interdisciplinary team, including providers, AI scientists, and administrative staff were established to develop a deep learning AI model for 30-day readmission risk prediction. The model utilized a general inpatient population and incorporated data across demographic, diagnostic (imaging and lab), coding, and clinical care. AI scientists utilized a multi-model approach to analyze readmissions leveraging the longitudinal patient record to account for all diagnoses, patient similarity, and elimination of any redundant data. The final model was trained on the Minnesota dataset, which includes 14,453 readmissions from 10,682 unique patients, resulting in an accuracy of 72% in readmission prediction. The next step is to validate the model on independent datasets to ensure its reliability and generalizability.

The model achieved a 79% accuracy of hospitalization prediction on both the internal dataset and the publicly available dataset. When comparing the performance of the AI model to the clinical reference standard of LACE+ scores, the AI model provided a 16-percentage point improvement in accuracy. In comparison to the standard of LACE+ scores, the AI model provided a 16-percentage point improvement in accuracy. The model was then compared to the current clinical reference standard for hospitalization prediction of the LACE+ index.

The hospital readmission case study provides one example of the power of AI to predict an outcome and provide guidance for early intervention. The opportunities for AI models to improve the quality of care by working in tandem with care teams are difficult to deny. Successful implementation of AI technology in healthcare is possible with a strong culture of innovation, dynamic partnerships between clinical and technology teams, and a robust AI execution strategy. Healthcare leaders should consider:

- Additional investment in education to deepen understanding of AI applicability within healthcare and define areas of opportunity for impactful investment.
- Partnering with EHR and other software vendors to evaluate and integrate new algorithms with user-friendly and intuitive interfaces that support clinical care teams and improve patient experience and outcomes.
- Developing a deep learning AI model for 30-day readmission risk prediction.
- Continuous assessment of the ethical, legal, and social implications of using predictive AI methodologies.