

PRODUCT

Predictive models to understand surgical candidacy and potential outcomes.

INDICATION

Clinical decision support
orthopedics spine practice

VALUE PROPOSITIONS

Introduce patient specific data to predict personalize outcomes

Increase surgical outcome success rates.

Understand and reduce post-surgical utilization

Maximize service line success and financial viability

CONTACT INFORMATION

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Predictive Modeling for Surgical Spine Procedures

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PROBLEM/OPPORTUNITY

Outcomes for surgical spine procedures are highly variable, many of which have only a 50% success rate. Various scholarly articles estimate the direct economic cost of patients with spine conditions is estimated at ~\$100B. These costs result from heterogeneous interventions, poor outcomes, and extreme post-operative healthcare utilization.

SOLUTION

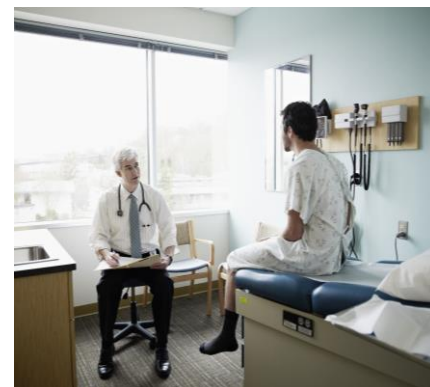
Predictive models enable better outcomes for patients and lower post-surgery costs for the spine service line. A series of characteristics including patient background/demographics, encounters and utilization history, comorbidities, labs, or medication orders were used to train several models.

- Patient reported outcomes (PRO) PROMIS and PHQ-9
- Utilization
- Post-surgical costs between 0-90 days and 90-180 days.

These models were built for seven (7) of the most common surgeries including lumbar laminectomy, lumbar laminectomy and fusion, cervical laminectomy, cervical laminectomy and fusion, cervical posterior foraminotomy, lumbar microdiscectomy, and anterior cervical discectomy.

All models perform better than their naïve versions and are expected to continue to improve with additional data and refinement.

- The model focused on outcomes using PROs has demonstrated an ability to identify unsuccessful surgeries 66% of the time.
- The model for utilization was trained and tested using 1,117 patients with first time lumbar laminectomies. This prediction has an R^2 of .61 demonstrating a reasonable ability to predict post-surgical utilization.
- Trained on the same population, post-surgical cost models had an R^2 of .77 predicting surgical costs within +/- \$2600 of actual surgical costs.



Continued model development and refinement is in process to determine acceptable success/failure criteria for utilization and cost.