



# Can we predict long-term disability and discharge destination after elective cervical spine surgery?

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## Introduction

We introduce predictive models for clinically meaningful improvement in disability, as well as discharge destination, after elective cervical spine surgery (CSS).

## Methods

430 patients undergoing CSS were enrolled into a prospective registry. LOESS regression was performed to verify the appropriateness of linear regression. A vast array of patient- and diagnosis-related variables were used to power a multivariate regression model for NDI. Possible interactions were also accounted for. We then used Repeated Random Sub-Sampling to validate the performance of our model. A separate logistic regression model was constructed to predict a clinically important improvement in NDI at one year. A third model was similarly developed and validated to predict post-surgery discharge destination (home versus facility).

## Results

Our predictive model for 12-month NDI has an R-squared of 0.69 (Figure 1), and in validation, it achieved an R-squared of 0.43. The predictors, in descending order of influence, are: employment, baseline NDI, diagnosis, smoking, ethnicity, claudication, narcotic use, and symptom duration. Our model for achieving a MCID in NDI has an AUC greater than 0.80 for the development phase and an AUC of 0.65 in validation. The predictors are: baseline NDI, motor deficit, depression, ambulation, revision surgery, employment, diagnosis, smoking, and symptom duration. Finally, our predictive model for discharge destination has an AUC greater than 0.80 for the development phase and an AUC of 0.75 for the validation phase (Figure 2). The predictors are: baseline EQ-5D, number of levels, myelopathy, depression, baseline NDI, and motor deficit.

## Conclusions

We present validated models that help predict disability at one year and discharge destination after elective CSS. Our NDI model explains roughly 70% of the variation in 12-month disability. Our model for discharge destination has strong predictive accuracy, and can become a useful tool as

## Learning Objectives

By the conclusion of this session, participants should be able to: 1) Describe the importance of variability in patient-reported outcomes after elective cervical spine surgery; 2) Identify drivers of long-term post-operative neck-related disability; and 3) Describe factors which influence post-operative discharge destination.

## References

