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A Nomogram For Survival Prediction Based on Socioeconomic Factors in Patients with Chronic Lymphocytic Leukemia: An Analysis of SEER Database

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OBJECTIVES

• The prognostic role of socioeconomic factors in chronic lymphocytic leukemia/small lymphocytic lymphoma (CLL/SLL) has not been systematically investigated.

• We aimed to construct a nomogram containing socioeconomic factors to predict the survival of patients with CLL/SLL.

CONCLUSIONS

• 67238 patients diagnosed with CLL/SLL from the Surveillance, Epidemiology, and End Results (SEER) database were identified. Survival data and socioeconomic factors were collected.

• A nomogram for overall survival (OS) based on marital status, age, gender, race, year of diagnosis, subsequent malignancies, median household income, and rural-urban difference was constructed, performing well in predicting the survival of CLL/SLL patients.

• Socioeconomic factors need to be taken into consideration when making clinical decisions for CLL/SLL patients.

INTRODUCTION

• Socioeconomic factors has been demonstrated to impact the outcomes of several malignancies.

• The prognostic role of socioeconomic factors in chronic lymphocytic leukemia/small lymphocytic lymphoma (CLL/SLL) has not been systematically investigated.

METHODS

• We identified 67238 patients diagnosed with CLL/SLL from the Surveillance, Epidemiology, and End Results (SEER) database.

• In addition to survival data, the following variables were collected: age, gender, race, year of diagnosis, subsequent malignancies (defined by total number of in situ/malignant tumors for patient), marital status, median household income, rural-urban difference (defined by rural-urban continuum code).

• The patients were randomly divided into the training (n=47066) and validation (n=20172) cohorts in a 7:3 fashion.

• The univariate and multivariate Cox regression analyses were performed to screen the predictors for overall survival (OS). The nomograms were developed and validated by the C-index, calibration curve, receiver operating characteristic curve, and decision curve analysis.

RESULTS

• The median age was 69 years, and the male/female ratio was approximately 1.5:1. Most patients were married (42310, 62.9%), followed by widowed (10666, 15.9%), single (8380, 12.5%), and divorced (5882, 8.7%). There was no difference in baseline characteristics between the training and validation cohorts.

• In the training cohort, compared to married patients, single (hazard ration [HR] = 1.15, P<0.001), divorced (HR =1.17, P<0.001), and widowed (HR = 2.33, P < 0.001) patients had worse OS.

• In multivariate analysis, older age, male gender, diagnosis in 2000-2013, presence of subsequent malignancies, unmarried marital status, lower income (< $75000), and rural residence predicted worse OS in the training cohort.

• A nomogram for OS based on marital status, age, gender, race, year of diagnosis, subsequent malignancies, median household income, and rural-urban difference was constructed (Figure 1).

• The C-indexes of the nomogram for OS were 0.720 (95% confidence interval [CI]: 0.717-0.724) and 0.721 (95% CI: 0.715-0.727) in the training and validation cohorts, respectively.

• In the training cohort, the area under the curve (AUC) of ROC curves predicting 5- and 10-year OS were 0.750 and 0.759, respectively. In the validation cohort, the area under the curve (AUC) of ROC curves predicting 5- and 10-year OS were 0.747 and 0.753, respectively (Figure 2).
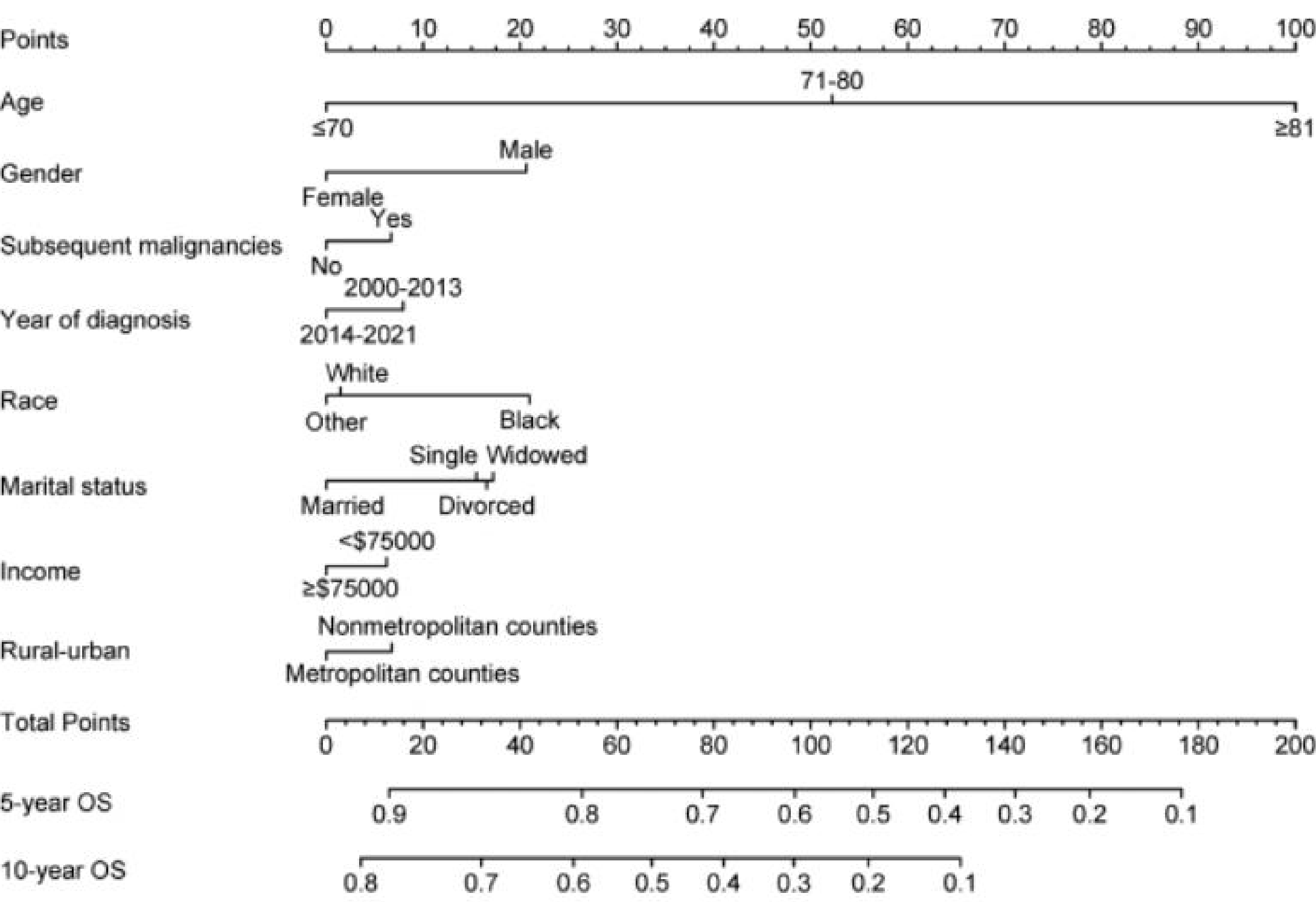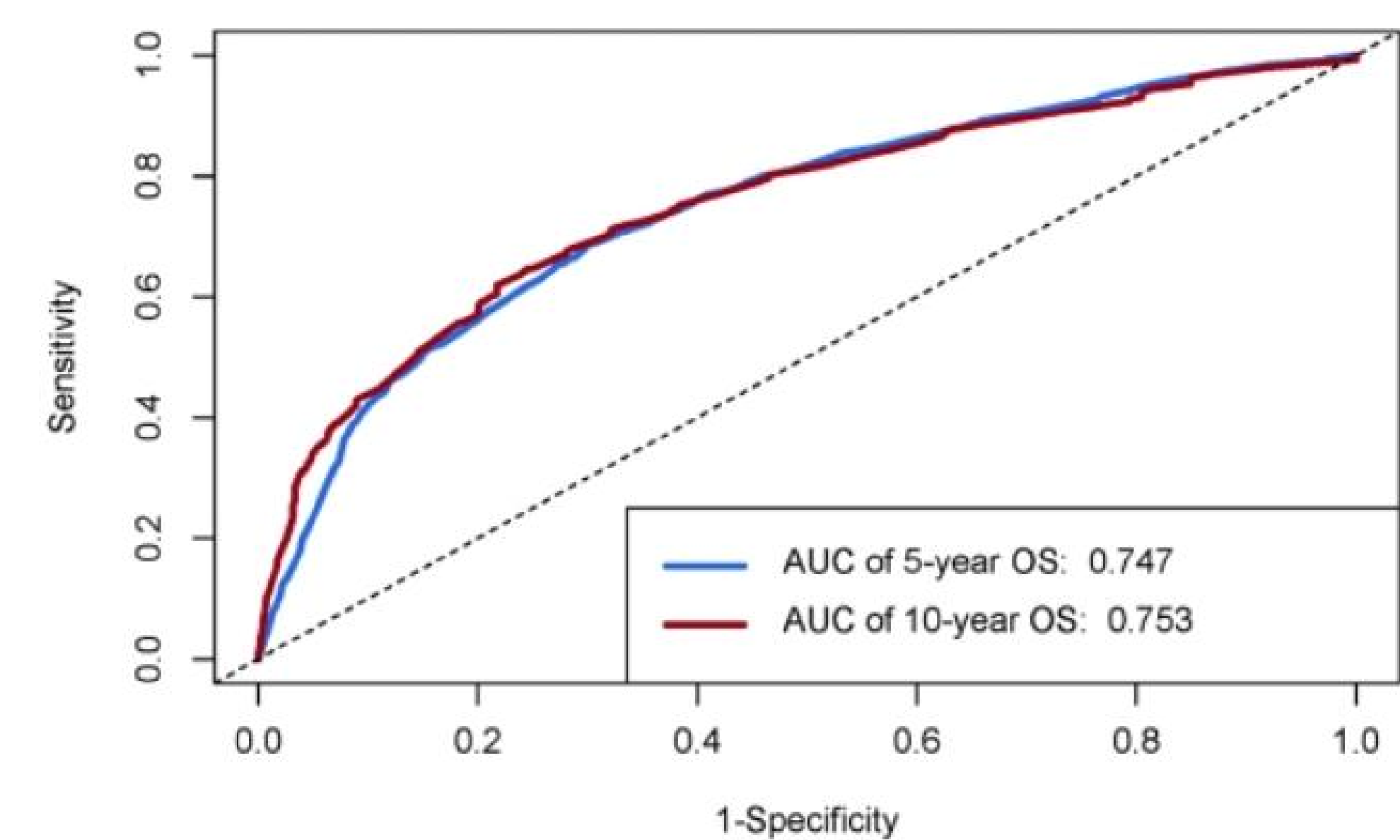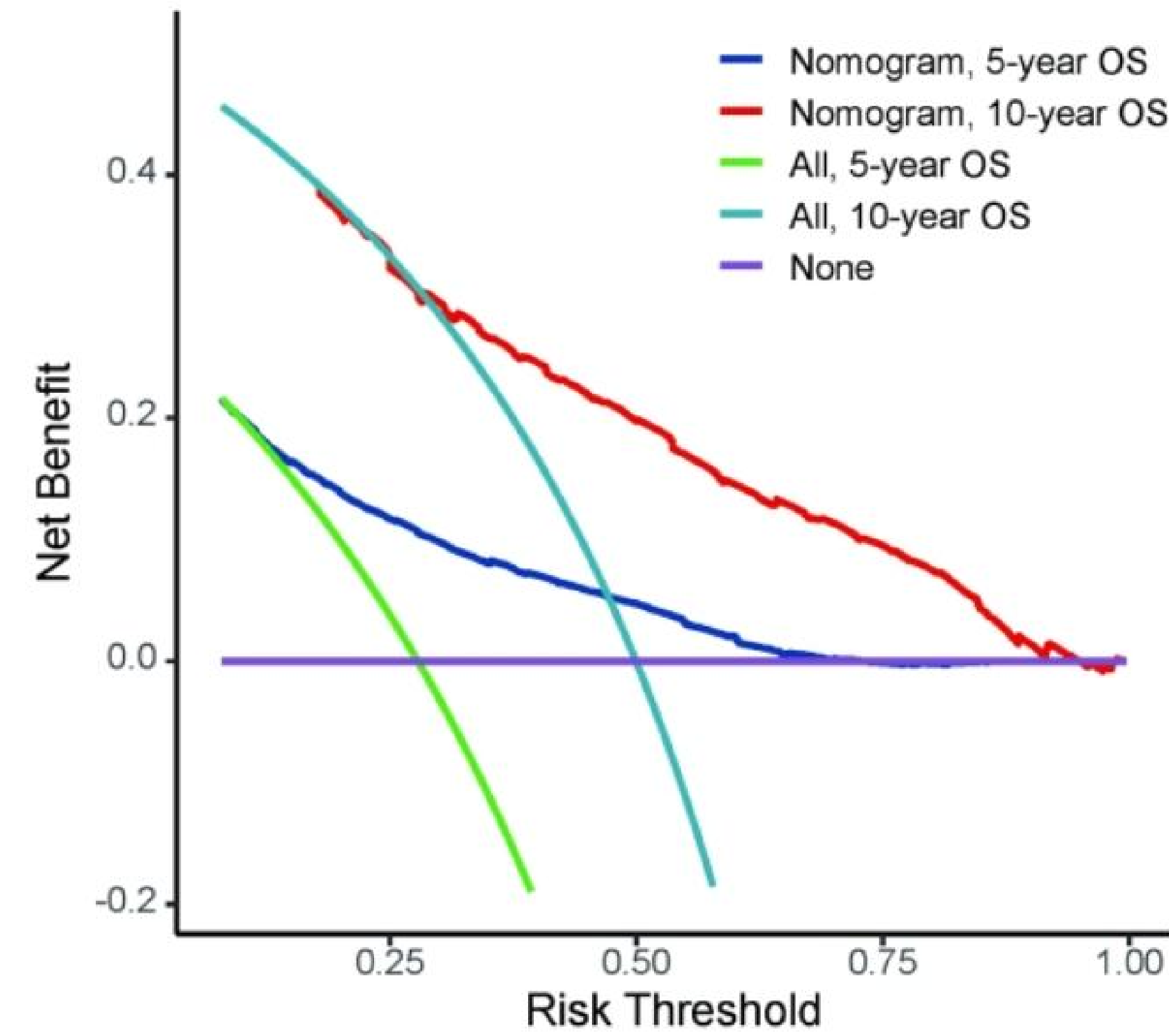
Figure 1.

Figure 2.

• Calibration curves showed good concordance between the predicted 5- and 10-year OS with the actual survival in both the training and validation cohorts.

• Decision curve analysis (DCA) demonstrated considerable clinical net benefits for the 5- and 10-year survival prediction (Figure 3).

Figure 3.

CONCLUSIONS

• We constructed a clinically feasible nomogram containing socioeconomic factors that perform well in predicting the survival of patients with CLL/SLL.

• Socioeconomic factors need to be taken into consideration when making clinical decisions for patients with CLL/SLL.

REFERENCES

• Zhang J et al. Therapeutic advances in hematology. 2025

ACKNOWLEDGMENTS

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