

Predicting Stroke Mortality: Integration of Non-Medical Drivers with Clinical Data

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BACKGROUND

- Stroke is fifth leading cause of death in the United States¹
- Up to 80% of strokes could have been prevented with changes in lifestyle including diet, exercise, and smoking.¹
- One in three U. S. adults have at least one metabolic risk factor including high blood pressure, high cholesterol, obesity, and diabetes as well as smoking.^{1, 2}
- There are also environmental risk factors associated with stroke including air pollution and toxic exposures.¹
- Evidence shows that stroke outcomes are influenced by Non-Medical Drivers of Health (NMDOH), but their effects are subtle and often masked by clinical factors.³

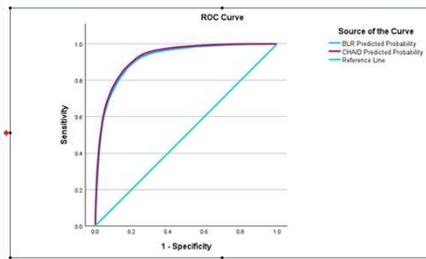
PURPOSE

- The aim of this study was to identify both NMDOH and clinical factors that are predictive of stroke mortality.

RESULTS

Variables included in the Models

	Hemorrhagic	Ischemic
Seasonal	3	3
Demographic	11	18
Health related	23	41
NMDOH	5	6

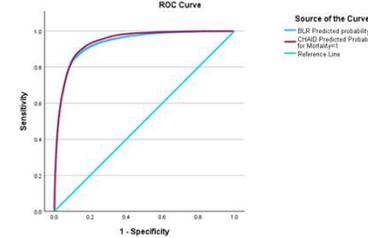


Area Under the ROC Curve

Test Result Variable	Area	Std. Error ^a	Asymptotic Sig. ^b	Asymptotic 95% Confidence Interval
			Lower Bound	Upper Bound
Predicted Probability for Mortality ^c	.928	.001	.000	.926 .931
Predicted probability	.920	.001	.000	.917 .923

The test result variable(s): Predicted Probability for Mortality^c. Predicted probability was at least one to between the positive actual case group and the negative actual case group. Statistics may be biased.

a. Under the nonparametric assumption
b. Null hypothesis: true area = 0.5
c. Null hypothesis: true area = 0.5



Area Under the ROC Curve

Test Result Variable	Area	Std. Error ^a	Asymptotic Sig. ^b	Asymptotic 95% Confidence Interval
			Lower Bound	Upper Bound
BLR Predicted probability	.935	.001	.000	.932 .938
CHAD Predicted Probability for Mortality ^c	.943	.001	.000	.940 .945

The test result variable(s): BLR Predicted probability, CHAD Predicted Probability for Mortality^c was at least one to between the positive actual case group and the negative actual case group. Statistics may be biased.

a. Under the nonparametric assumption
b. Null hypothesis: true area = 0.5
c. Null hypothesis: true area = 0.5

METHODS

- Comparable variables identified in two NMDOH datasets
- Mapped to 359,797 encounters between 2016 and 2023 in the statewide Texas hospital discharge records
- Stroke was isolated using All Payer Refined Diagnostic Related Groups (APRDRG) 044 and 045
- Predictive models were built for each APRDRG based on machine learning, artificial intelligence, and statistics
- Models trimmed until all variables included in the models were independently statistically significant

CONCLUSIONS

- These results can be used to inform interventions and policy for individuals at the greatest risk for stroke mortality. The method can also be duplicated for other disease processes.



References available upon request.