Using artificial intelligence for predicting overall survival in colon cancer patients using National Cancer Database (NCDB)

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Introduction and Objectives

Cancer is the second leading cause of death worldwide.
Colon cancer is one of the most prevalent types in the U.S.
The overall lifetime risk of developing colon cancer is:
1 in 23 for men and 1 in 25 for women
The model highlights the impact of various clinical metrics on overall survival through AI-driven analysis.

Methods

The **National Cancer Database (NCDB)** was used for the study.
Two models were developed:
- Model#1 included all patients regardless of the year of diagnosis.
- Model#2 excluded patients diagnosed between 2016-2019 to assess 5-year survival.

	Model #1 (Overall Survival)	Model #2 (5-year Survival)
Age, Mean(SD)	**68.07 (13.56)**	**68.38 (13.55)**
Sex, N(%)		
Female	**435,696 (50.63%)**	**307,671 (51.15%)**
Male	**424,767 (49.37%)**	**293,824 (48.85%)**
Race, N(%)		
White	**709,314 (83.14%)**	**709,314 (83.86%)**
Black	**108,873 (12.76%)**	**108,873 (12.54%)**
Asian	**24,351 (2.87%)**	**(2.59%)**
American Indian	**2,536 (0.30%)**	**2,536 (0.26%)**
Other	**8,008 (0.93%)**	**(0.75%)**

Results

Model#1 **Overall survival**
n: 860,463

Model#2 **5-year survival**
n: 601,495

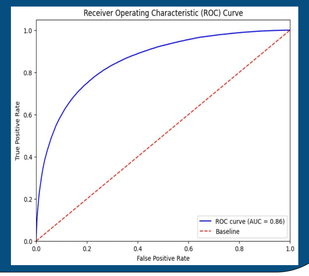
Randomly split into:

70% Training
15% Testing
15% Validation

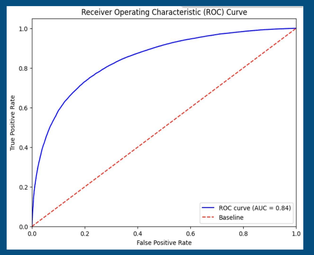
XGBoost Library

Most impactful features:
- Surgical margins
- Pathologic TNM staging
- Age
- Year of diagnosis
- Liver metastasis
- Charlson-Deyo score

Accuracy: 77.5%
Precision: 78.5%
Recall: 76.7%
ROC AUC: 0.86



Accuracy: 76.7%
Precision: 79.5%
Recall: 80.4%
ROC AUC: 0.84



Least impactful features:
- Regional lymph node dissection
- MSI score
- Intraoperative conversion to open surgery
- Brain metastasis
- Primary site of the tumor

Conclusion

▪Predicting survival is feasible using artificial intelligence and can be a helpful tool for clinicians in future. Models can be improved with more diverse clinical data and ones that are developed should be tested using other databases for validation.

Disclosure

▪No relevant financial disclosures