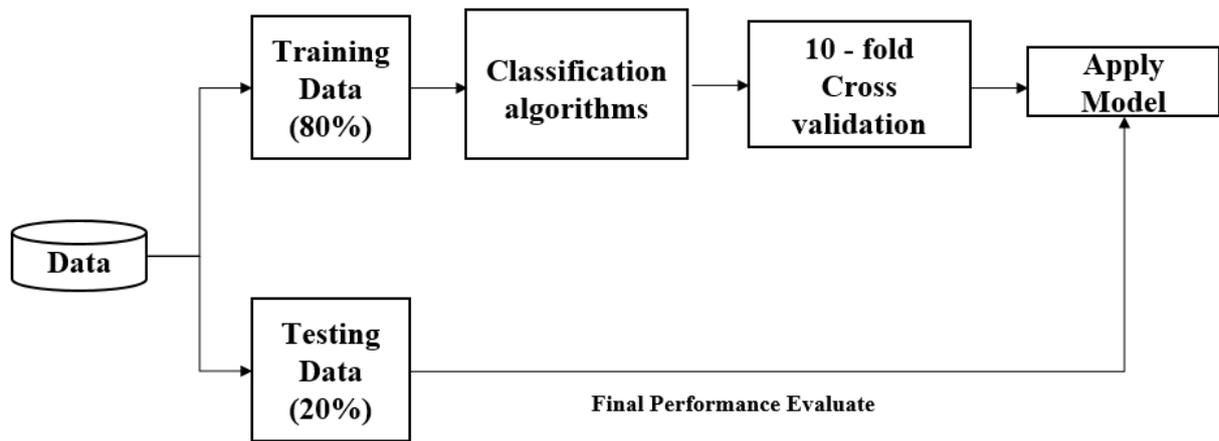


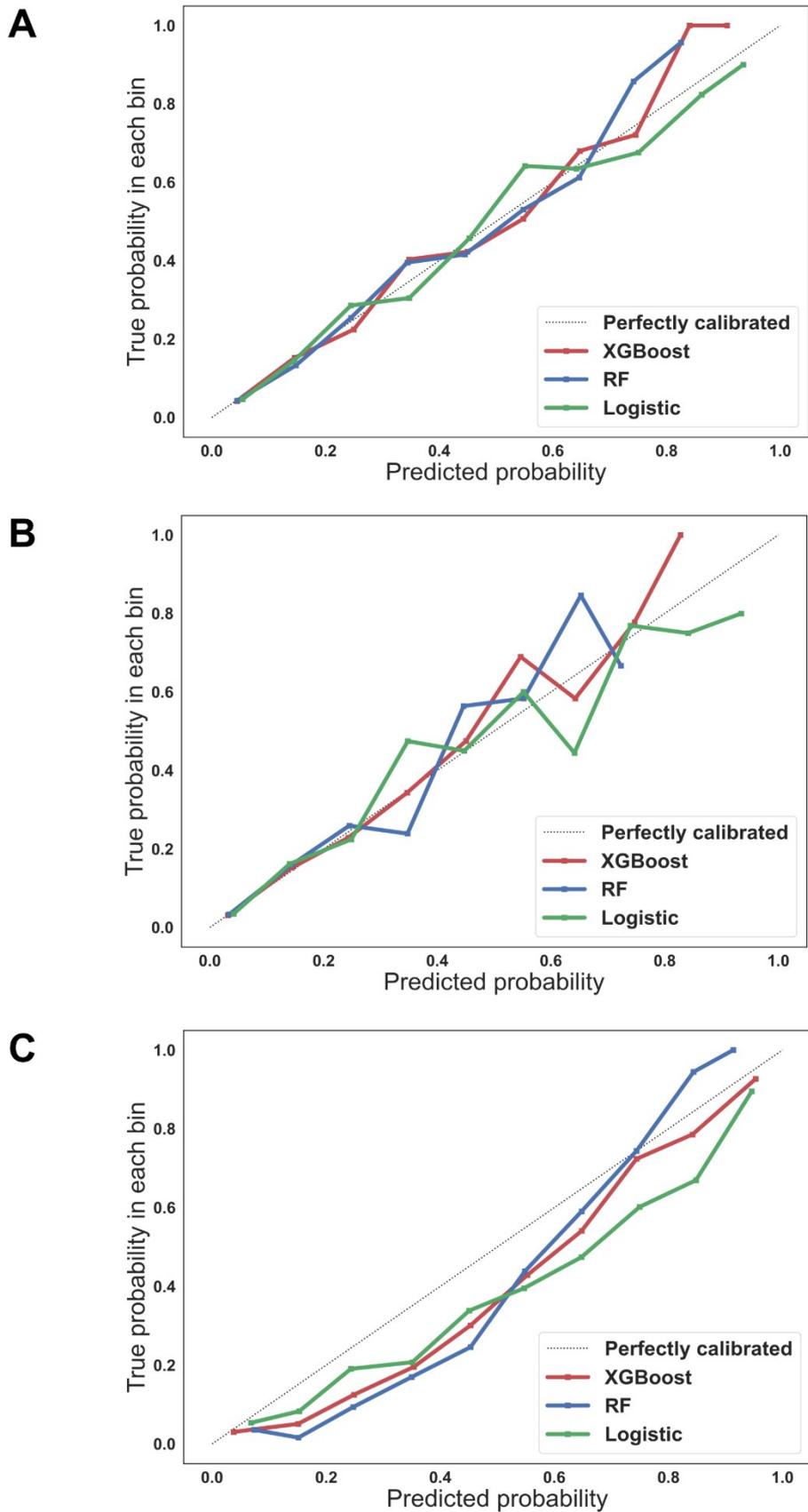
**Supplemental table 1. Metrics of performance of the three machine learning models to predict 30-day, 90-day and one-year mortality**

|                |          | <b>Precision</b> | <b>Sensitivity</b> | <b>F1-Score</b> | <b>Specificity</b> | <b>Brier-Score</b> | <b>Accuracy<sup>a</sup></b> |
|----------------|----------|------------------|--------------------|-----------------|--------------------|--------------------|-----------------------------|
| <b>XGBOOST</b> | 30-day   | 0.96             | 0.75               | 0.87            | 0.80               | 0.137              | 0.798                       |
|                | 90-day   | 0.91             | 0.74               | 0.84            | 0.77               | 0.159              | 0.764                       |
|                | One-year | 0.84             | 0.74               | 0.78            | 0.73               | 0.176              | 0.732                       |
| <b>RF</b>      | 30-day   | 0.96             | 0.74               | 0.85            | 0.77               | 0.162              | 0.767                       |
|                | 90-day   | 0.91             | 0.75               | 0.82            | 0.74               | 0.171              | 0.743                       |
|                | One-year | 0.84             | 0.73               | 0.78            | 0.73               | 0.184              | 0.726                       |
| <b>LR</b>      | 30-day   | 0.95             | 0.73               | 0.87            | 0.79               | 0.155              | 0.785                       |
|                | 90-day   | 0.91             | 0.73               | 0.84            | 0.77               | 0.169              | 0.763                       |
|                | One-year | 0.83             | 0.71               | 0.78            | 0.73               | 0.184              | 0.723                       |

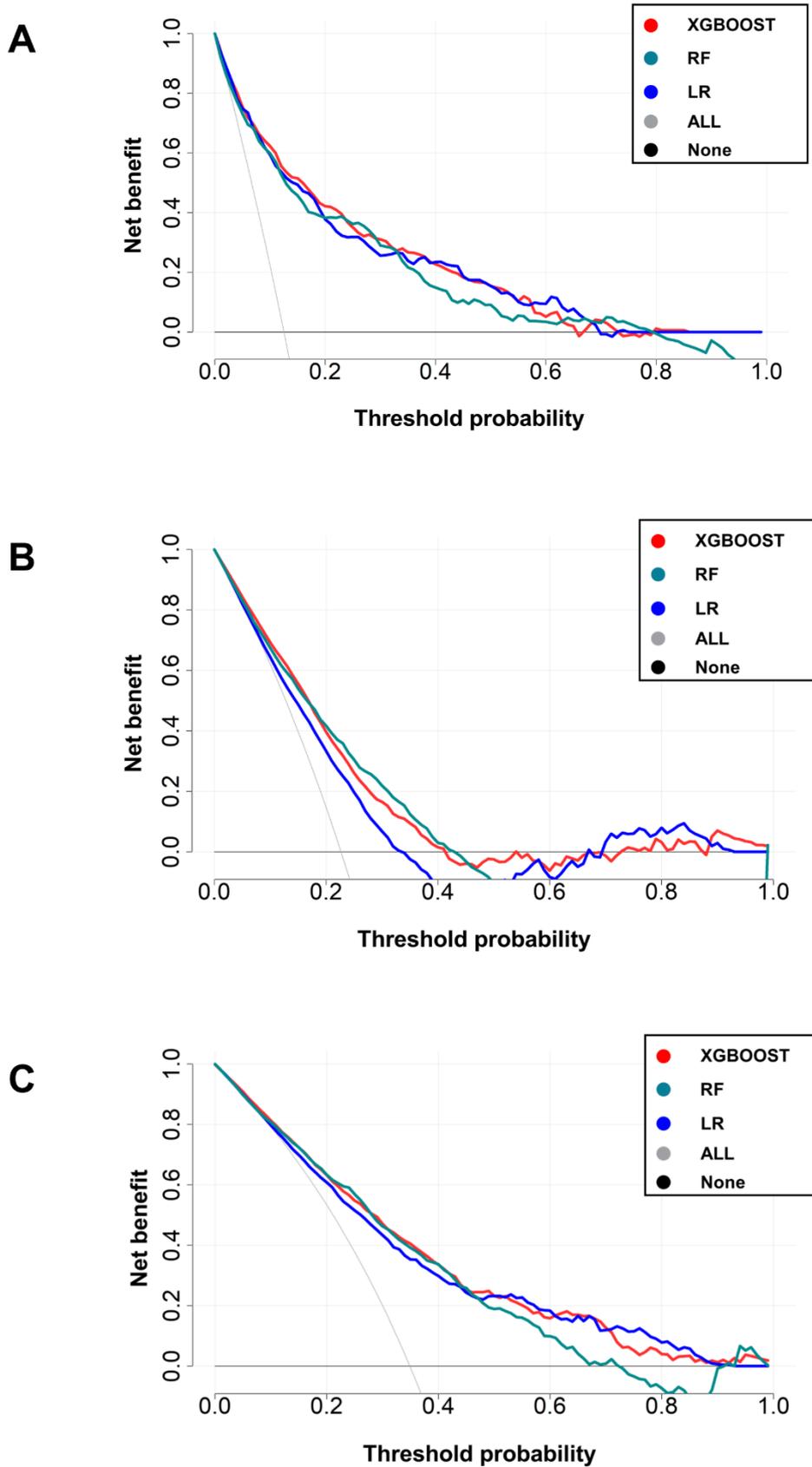
<sup>a</sup>(TP+TN) / (TP+FN+TN+FP). Abbreviation: Extreme gradient boosting, XGBoost; random forest, RF; logistical regression, LR.



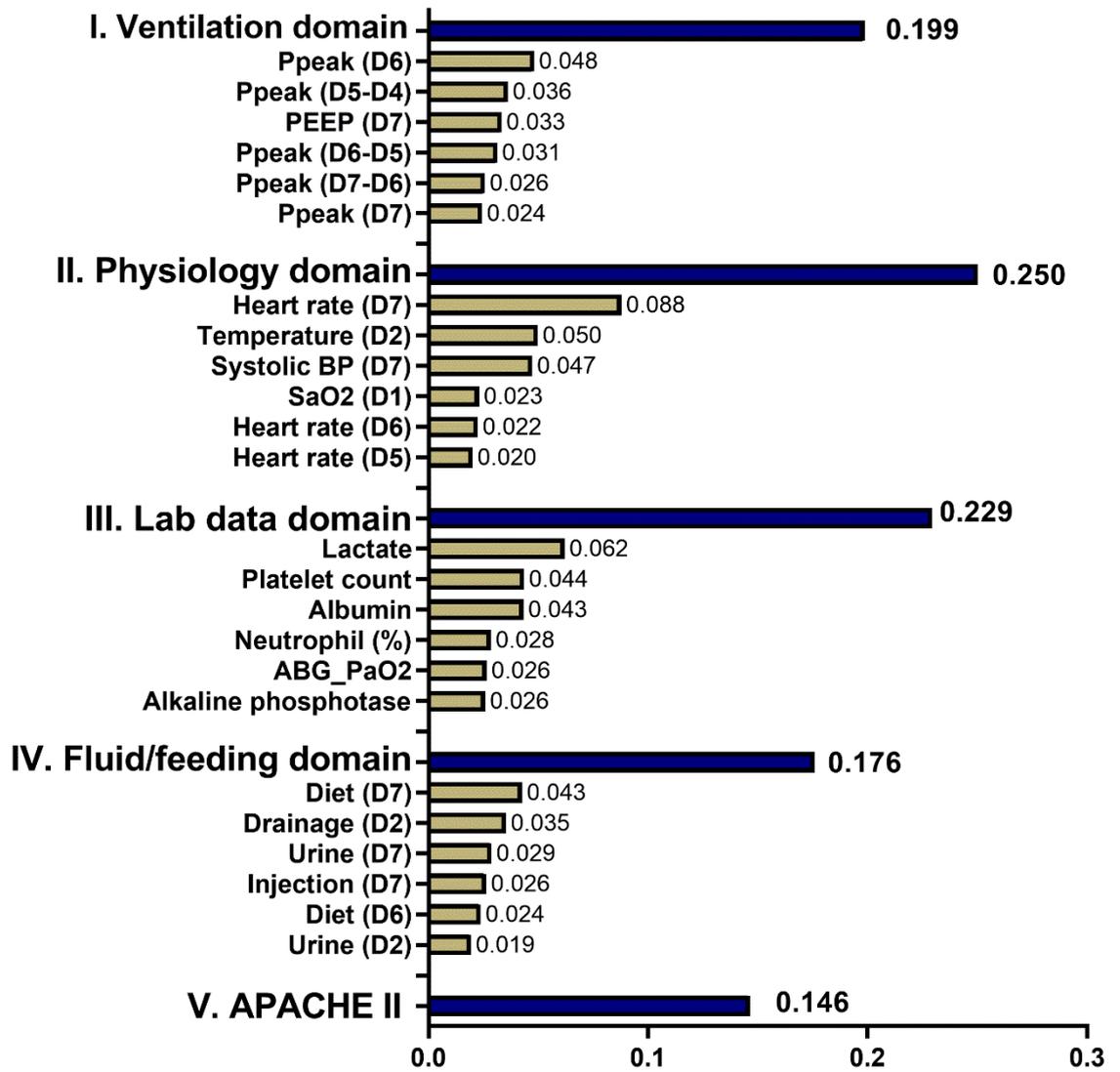
**Supplemental Figure 1. Flow diagram of the analytic pipeline in the study**



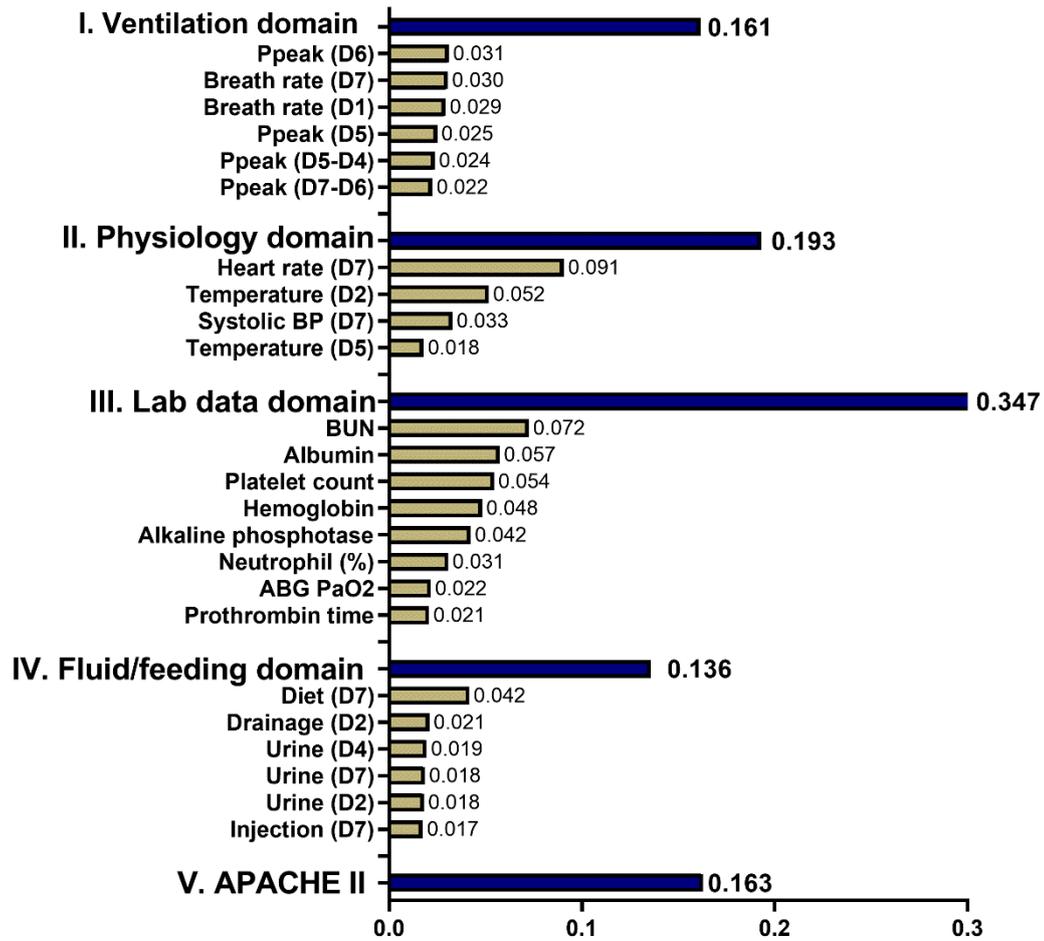
**Supplemental Figure 2. Calibration curves of the three machine learning models for predicting the mortality at 30-day (A), 90-day (B), and one-year (C).**



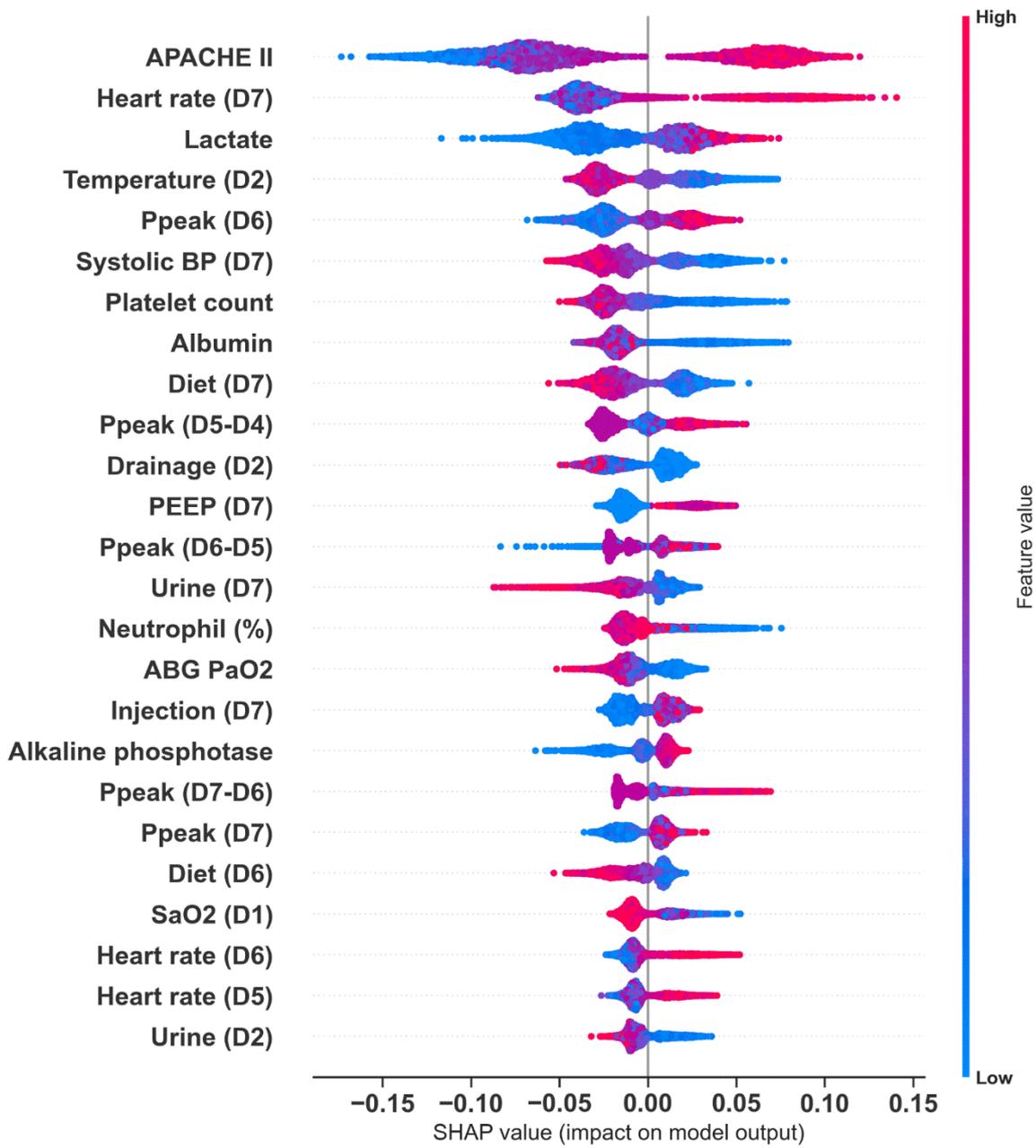
**Supplemental Figure 3. Decision curve analyses of the three machine learning models to predict the mortality at 30-day (A), 90-day (B), and one-year (C).**



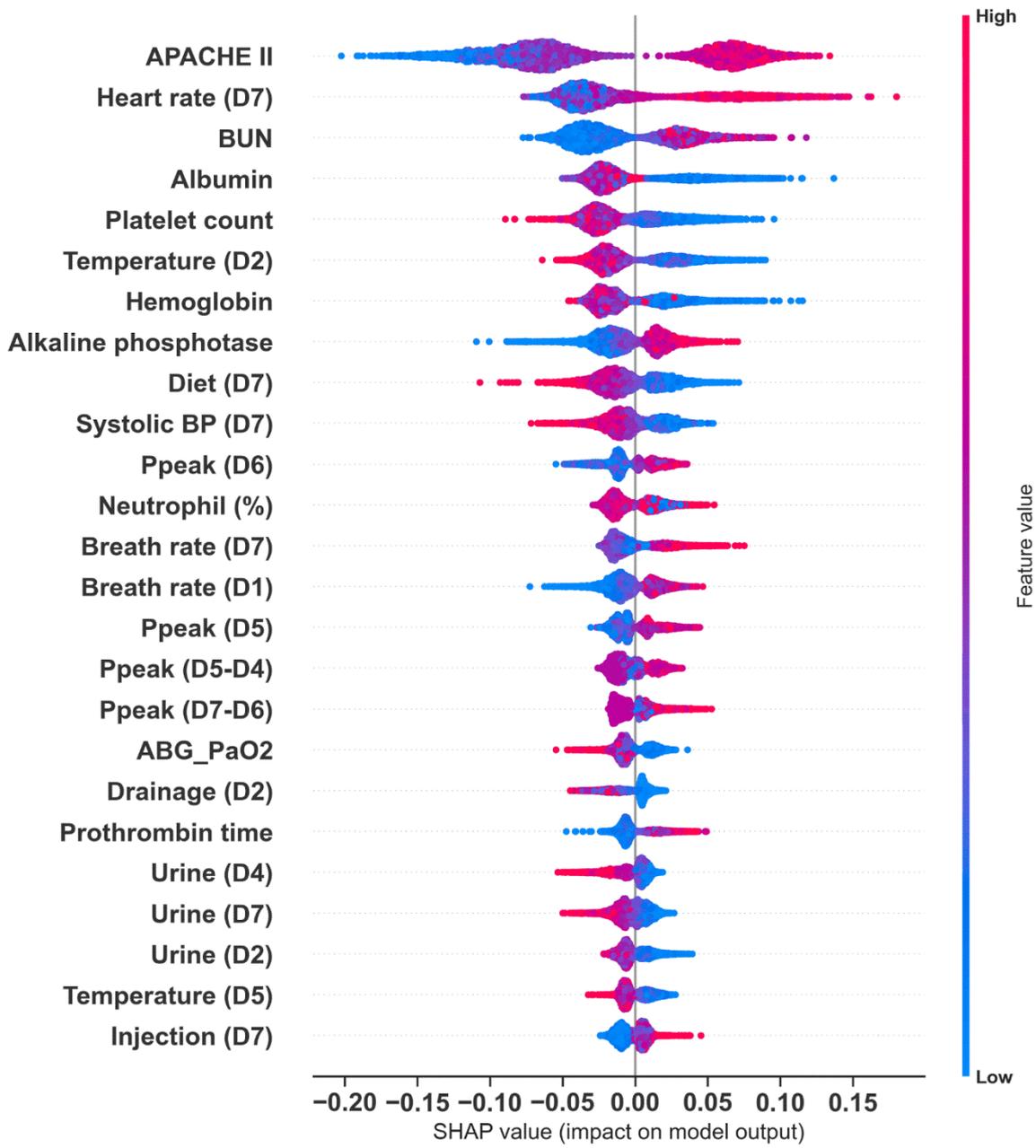
Supplemental Figure 4. Cumulative relative feature importance of top 25 features categorised by main clinical domains in predicting 30-day mortality



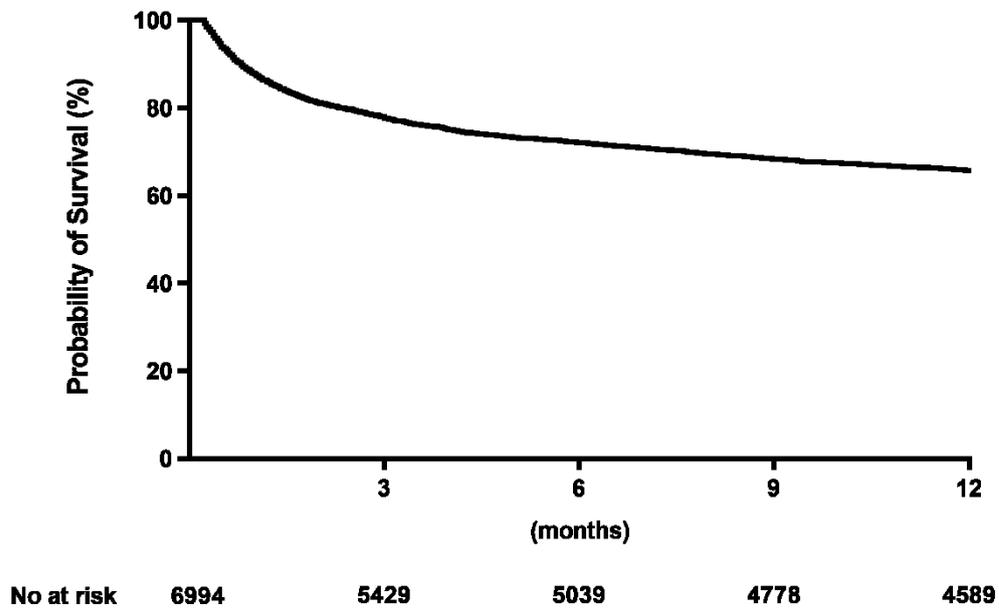
Supplemental Figure 5. Cumulative relative feature importance of top 25 features categorised by main clinical domains in predicting 90-day mortality



**Supplemental Figure 6. SHAP to illustrate the 30-day mortality prediction model in feature level.** Abbreviation: SHapley Additive exPlanation (SHAP)



**Supplemental Figure 7. SHAP to illustrate the 90-day mortality prediction model in feature level.** Abbreviation: SHapley Additive exPlanation (SHAP)



**Supplemental Figure 8. Survival curve of the enrolled critically ill ventilated patients**