This supplementary material presents all hyperparameters selected by grid search cross-validation, and results (mean and standard deviations) of models evaluated on test set.

Admissions during chemotherapy, including PROMS:

LogisticRegression:
Best Parameters: {'C': 10, 'max_iter': 10000, 'penalty': 'l2', 'solver': 'newton-cg'}

Accuracy: Mean=0.964, Std=0.003
Precision: Mean=0.881, Std=0.011
Recall: Mean=0.944, Std=0.017
F1-Score: Mean=0.911, Std=0.008
ROC AUC: Mean=0.988, Std=0.002
AUC-PR: Mean=0.842, Std=0.013
Specificity: Mean=0.969, Std=0.004
Balanced Accuracy: Mean=0.956, Std=0.008

RandomForestClassifier:
Best Parameters: {'criterion': 'entropy', 'max_depth': 18, 'min_samples_split': 8, 'n_estimators': 500}

Accuracy: Mean=0.985, Std=0.007
Precision: Mean=0.987, Std=0.008
Recall: Mean=0.938, Std=0.034
F1-Score: Mean=0.961, Std=0.019
ROC AUC: Mean=0.999, Std=0.000
AUC-PR: Mean=0.938, Std=0.030
Specificity: Mean=0.997, Std=0.002
Balanced Accuracy: Mean=0.967, Std=0.017

MLPClassifier:
Best Parameters: {'activation': 'tanh', 'alpha': 0.01, 'early_stopping': True, 'hidden_layer_sizes': (150, 60, 30), 'max_iter': 10000, 'solver': 'adam'}

Accuracy: Mean=0.957, Std=0.010
Precision: Mean=0.848, Std=0.036
Recall: Mean=0.952, Std=0.015
F1-Score: Mean=0.897, Std=0.022
ROC AUC: Mean=0.988, Std=0.004
AUC-PR: Mean=0.817, Std=0.037
Specificity: Mean=0.958, Std=0.012
Balanced Accuracy: Mean=0.955, Std=0.010

XGBClassifier:

Best Parameters: {'learning_rate': 0.1, 'max_depth': 7, 'min_child_weight': 4, 'subsample': 1}

 Accuracy: Mean=0.992, Std=0.003
 Precision: Mean=0.978, Std=0.011
 Recall: Mean=0.983, Std=0.008
 F1-Score: Mean=0.981, Std=0.007
 ROC AUC: Mean=1.000, Std=0.000
 AUC-PR: Mean=0.965, Std=0.014
 Specificity: Mean=0.995, Std=0.003
 Balanced Accuracy: Mean=0.989, Std=0.004

Admissions during chemotherapy, excluding PROMS:

LogisticRegression:
Best Parameters: {'C': 0.1, 'max_iter': 10000, 'penalty': 'l2', 'solver': 'newton-cg'}

 Accuracy: Mean=0.677, Std=0.018
 Precision: Mean=0.340, Std=0.017
 Recall: Mean=0.683, Std=0.044
 F1-Score: Mean=0.453, Std=0.020
 ROC AUC: Mean=0.746, Std=0.026
 AUC-PR: Mean=0.294, Std=0.015
 Specificity: Mean=0.675, Std=0.026
 Balanced Accuracy: Mean=0.679, Std=0.019

RandomForestClassifier:
Best Parameters: {'criterion': 'gini', 'max_depth': 18, 'min_samples_split': 2, 'n_estimators': 500}

 Accuracy: Mean=0.947, Std=0.006
 Precision: Mean=0.940, Std=0.017
 Recall: Mean=0.781, Std=0.022
 F1-Score: Mean=0.853, Std=0.018
 ROC AUC: Mean=0.987, Std=0.003
 AUC-PR: Mean=0.777, Std=0.027
 Specificity: Mean=0.988, Std=0.004
 Balanced Accuracy: Mean=0.885, Std=0.012

MLPClassifier:
Best Parameters: {'activation': 'tanh', 'alpha': 1e-05, 'early_stopping': True, 'hidden_layer_sizes': (150, 60, 30), 'max_iter': 10000, 'solver': 'adam'}

 Accuracy: Mean=0.883, Std=0.015
 Precision: Mean=0.667, Std=0.045
 Recall: Mean=0.820, Std=0.027
 F1-Score: Mean=0.734, Std=0.021

ROC AUC: Mean=0.942, Std=0.003
AUC-PR: Mean=0.582, Std=0.028
Specificity: Mean=0.898, Std=0.023
Balanced Accuracy: Mean=0.859, Std=0.009

XGBClassifier:
Best Parameters: {'learning_rate': 0.1, 'max_depth': 7, 'min_child_weight': 4, 'subsample': 1}

Accuracy: Mean=0.957, Std=0.013
Precision: Mean=0.938, Std=0.024
Recall: Mean=0.834, Std=0.048
F1-Score: Mean=0.883, Std=0.036
ROC AUC: Mean=0.988, Std=0.005
AUC-PR: Mean=0.816, Std=0.054
Specificity: Mean=0.987, Std=0.005
Balanced Accuracy: Mean=0.911, Std=0.026

Admissions within 14 days, including PROMS:

LogisticRegression:
Best Parameters: {'C': 0.1, 'max_iter': 10000, 'penalty': 'l2', 'solver': 'liblinear'}

Accuracy: Mean=0.696, Std=0.018
Precision: Mean=0.099, Std=0.010
Recall: Mean=0.577, Std=0.084
F1-Score: Mean=0.169, Std=0.018
ROC AUC: Mean=0.668, Std=0.037
AUC-PR: Mean=0.081, Std=0.010
Specificity: Mean=0.703, Std=0.022
Balanced Accuracy: Mean=0.640, Std=0.035

RandomForestClassifier:
Best Parameters: {'criterion': 'entropy', 'max_depth': 14, 'min_samples_split': 8, 'n_esti mators': 100}

Accuracy: Mean=0.948, Std=0.004
Precision: Mean=0.565, Std=0.120
Recall: Mean=0.206, Std=0.038
F1-Score: Mean=0.296, Std=0.046
ROC AUC: Mean=0.848, Std=0.028
AUC-PR: Mean=0.158, Std=0.031
Specificity: Mean=0.990, Std=0.005
Balanced Accuracy: Mean=0.598, Std=0.018

MLPClassifier:

Best Parameters: {'activation': 'tanh', 'alpha': 1e-05, 'early_stopping': True, 'hidden_layer_sizes': (150, 60, 30), 'max_iter': 10000, 'solver': 'adam'}

Accuracy: Mean=0.854, Std=0.018
Precision: Mean=0.166, Std=0.038
Recall: Mean=0.417, Std=0.071
F1-Score: Mean=0.237, Std=0.049
ROC AUC: Mean=0.729, Std=0.049
AUC-PR: Mean=0.103, Std=0.025
Specificity: Mean=0.878, Std=0.017
Balanced Accuracy: Mean=0.648, Std=0.040

XGBClassifier:
Best Parameters: {'learning_rate': 0.1, 'max_depth': 7, 'min_child_weight': 4, 'subsample': 0.7}

Accuracy: Mean=0.944, Std=0.005
Precision: Mean=0.478, Std=0.122
Recall: Mean=0.171, Std=0.048
F1-Score: Mean=0.245, Std=0.055
ROC AUC: Mean=0.821, Std=0.022
AUC-PR: Mean=0.126, Std=0.030
Specificity: Mean=0.988, Std=0.006
Balanced Accuracy: Mean=0.580, Std=0.023

Admissions within 14 days, excluding PROMS:

LogisticRegression:
Best Parameters: {'C': 0.1, 'max_iter': 10000, 'penalty': 'l2', 'solver': 'newton-cg'}

Accuracy: Mean=0.678, Std=0.023
Precision: Mean=0.084, Std=0.011
Recall: Mean=0.503, Std=0.062
F1-Score: Mean=0.144, Std=0.018
ROC AUC: Mean=0.632, Std=0.017
AUC-PR: Mean=0.069, Std=0.007
Specificity: Mean=0.688, Std=0.024
Balanced Accuracy: Mean=0.595, Std=0.033

RandomForestClassifier:
Best Parameters: {'criterion': 'gini', 'max_depth': 14, 'min_samples_split': 2, 'n_estimators': 100}

Accuracy: Mean=0.947, Std=0.003
Precision: Mean=0.509, Std=0.125
Recall: Mean=0.131, Std=0.043
F1-Score: Mean=0.207, Std=0.061

ROC AUC: Mean=0.839, Std=0.014
AUC-PR: Mean=0.117, Std=0.028
Specificity: Mean=0.993, Std=0.002
Balanced Accuracy: Mean=0.562, Std=0.021

MLPClassifier:
Best Parameters: {'activation': 'tanh', 'alpha': 0.001, 'early_stopping': True, 'hidden_laye
r_sizes': (100, 50, 20), 'max_iter': 10000, 'solver': 'adam'}

Accuracy: Mean=0.894, Std=0.021
Precision: Mean=0.216, Std=0.076
Recall: Mean=0.349, Std=0.098
F1-Score: Mean=0.263, Std=0.080
ROC AUC: Mean=0.744, Std=0.062
AUC-PR: Mean=0.116, Std=0.037
Specificity: Mean=0.925, Std=0.022
Balanced Accuracy: Mean=0.637, Std=0.049

XGBClassifier:
Best Parameters: {'learning_rate': 0.1, 'max_depth': 7, 'min_child_weight': 4, 'subsampl
e': 1}

Accuracy: Mean=0.946, Std=0.003
Precision: Mean=0.495, Std=0.096
Recall: Mean=0.137, Std=0.021
F1-Score: Mean=0.213, Std=0.029
ROC AUC: Mean=0.795, Std=0.019
AUC-PR: Mean=0.115, Std=0.017
Specificity: Mean=0.992, Std=0.003
Balanced Accuracy: Mean=0.564, Std=0.011