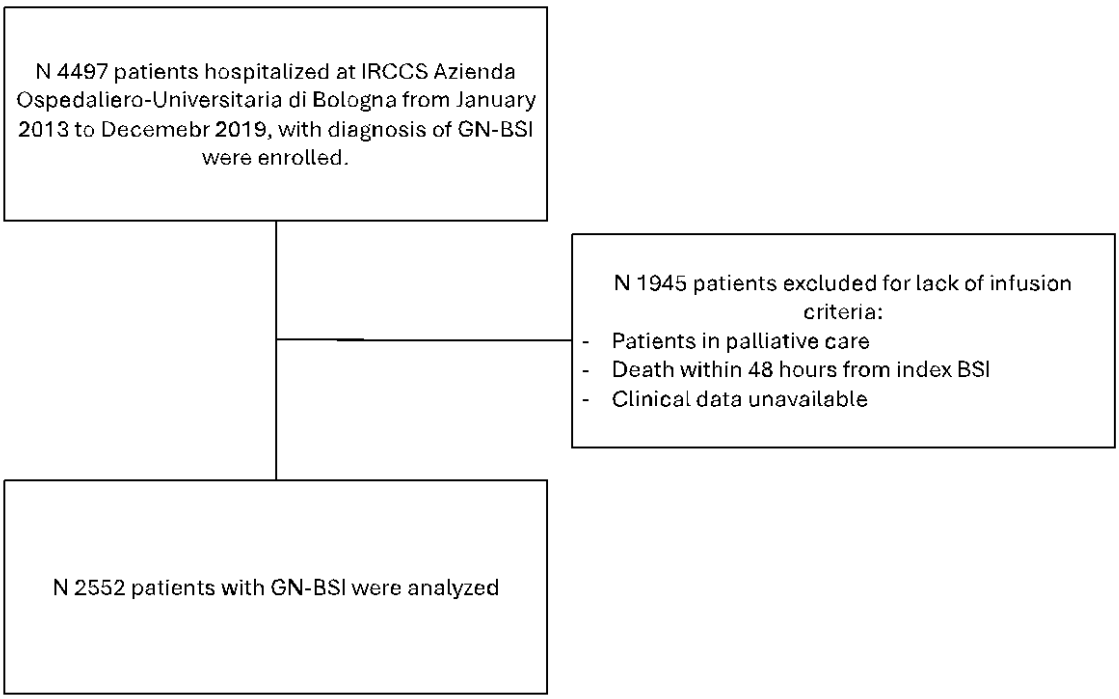
Supplementary Figure 1.

Title: Flow-chart of the study population

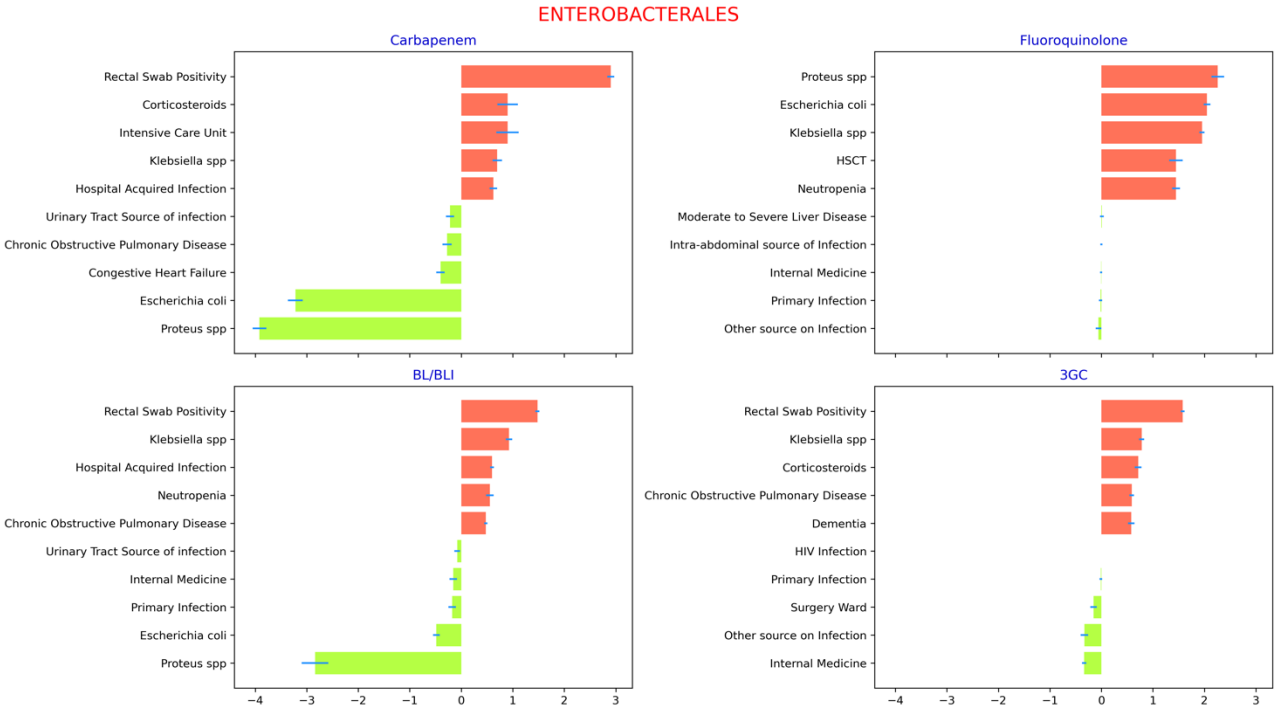
Body: Flow-chart of the study population, highlighting enrolling and exclusion criteria leading the final sample size of 2552 patients.



Supplementary Figure 2.

Title: Mean values of the most relevant coefficients of the logistic regressions, over the 10 iterations of the outer cross-validation, for the four antibiotic resistances, in the Enterobacterales GN-BSI subset.

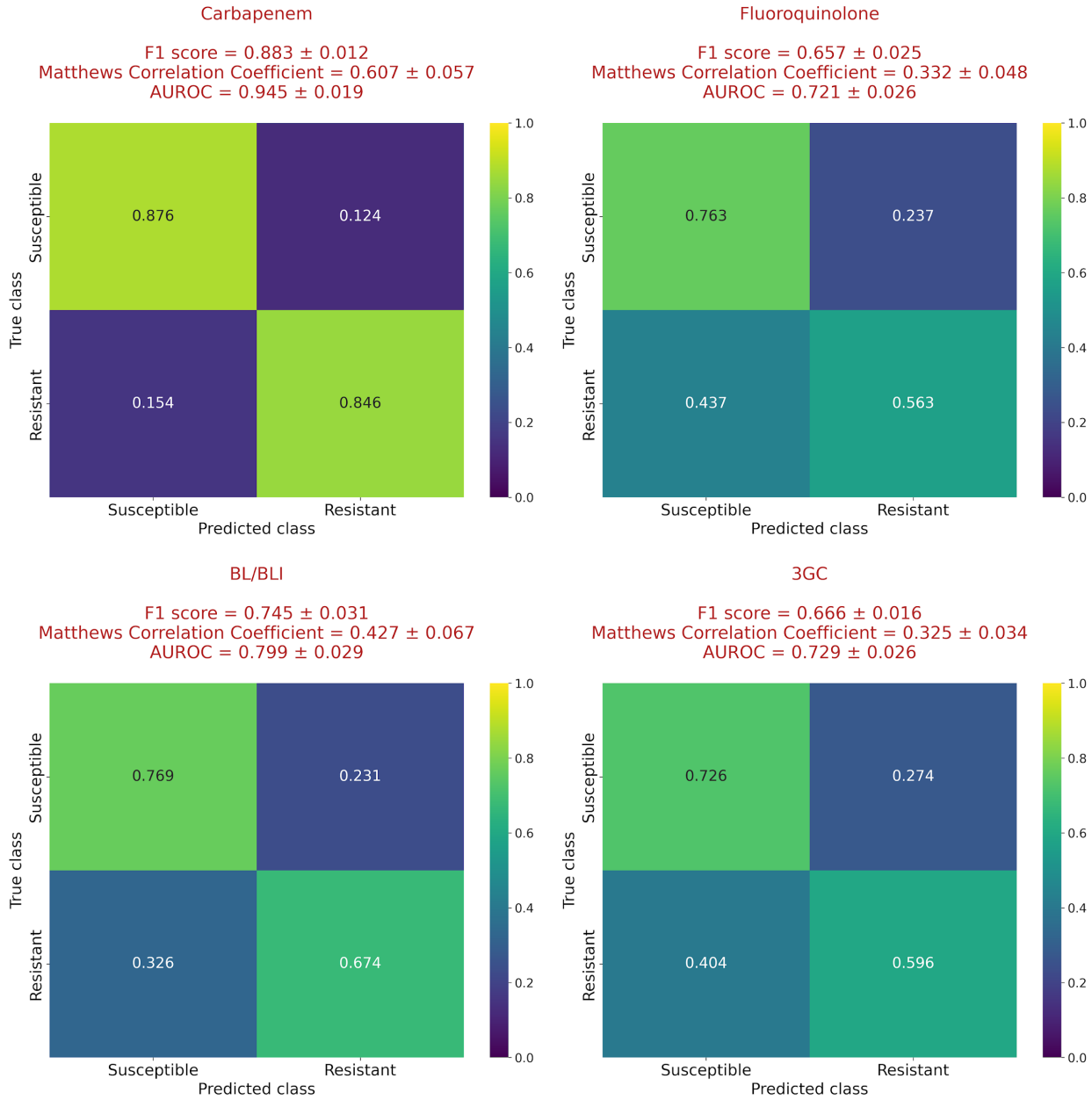
Figure legend body: Each panel shows the mean values of the 10 largest coefficients (in module, the positive ones, related to resistance, represented in red, the negative ones in green) of the logistic regressions, over the 10 iterations of the outer cross-validation. There is one panel for each of the four antibiotic resistances. The blue error bar of each coefficient represents its standard deviation value over the 10 cross-validation iterations.



Supplementary Figure 3.

Title: Mean confusion matrices over the outer cross-validation iterations for different types of antibiotic resistance, for the Enterobacterales GN-BSI subset

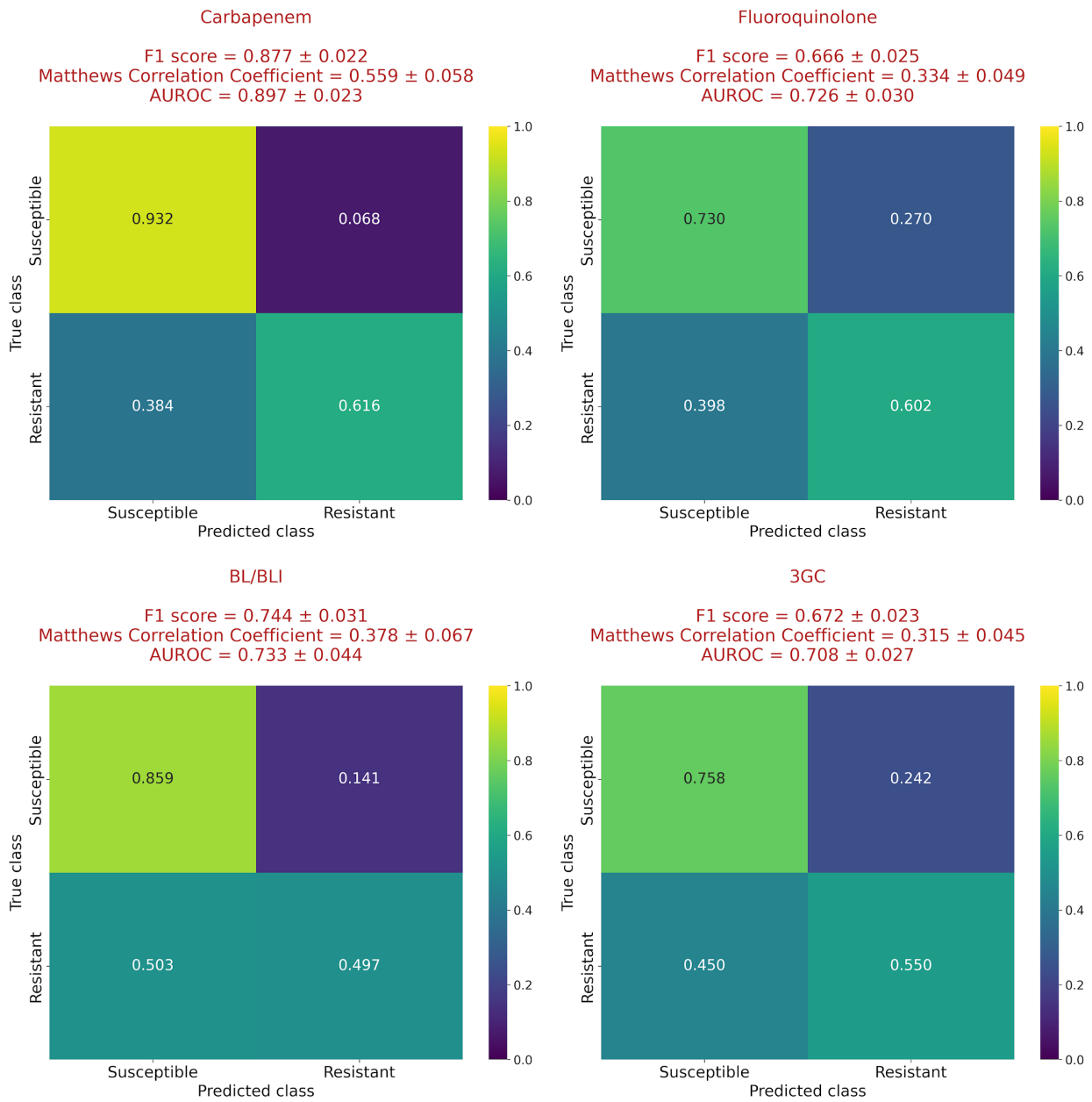
Body: Each panel shows the mean row-normalized confusion matrices over the 10 iterations of the outer cross-validation for the subset of Enterobacterales GN-BSI. The mean value of the weighted F1-score, Matthews Correlation coefficient and Area Under Receiver Operating Characteristic Curve (AUROC) are reported for each antibiotic resistance; the associated uncertainty is the standard deviation of the metrics over the above mentioned 10 iterations.



Supplementary Figure 4.

Title: Mean confusion matrices over the outer cross-validation iterations for different types of antibiotic resistance for the multi-layer perceptron

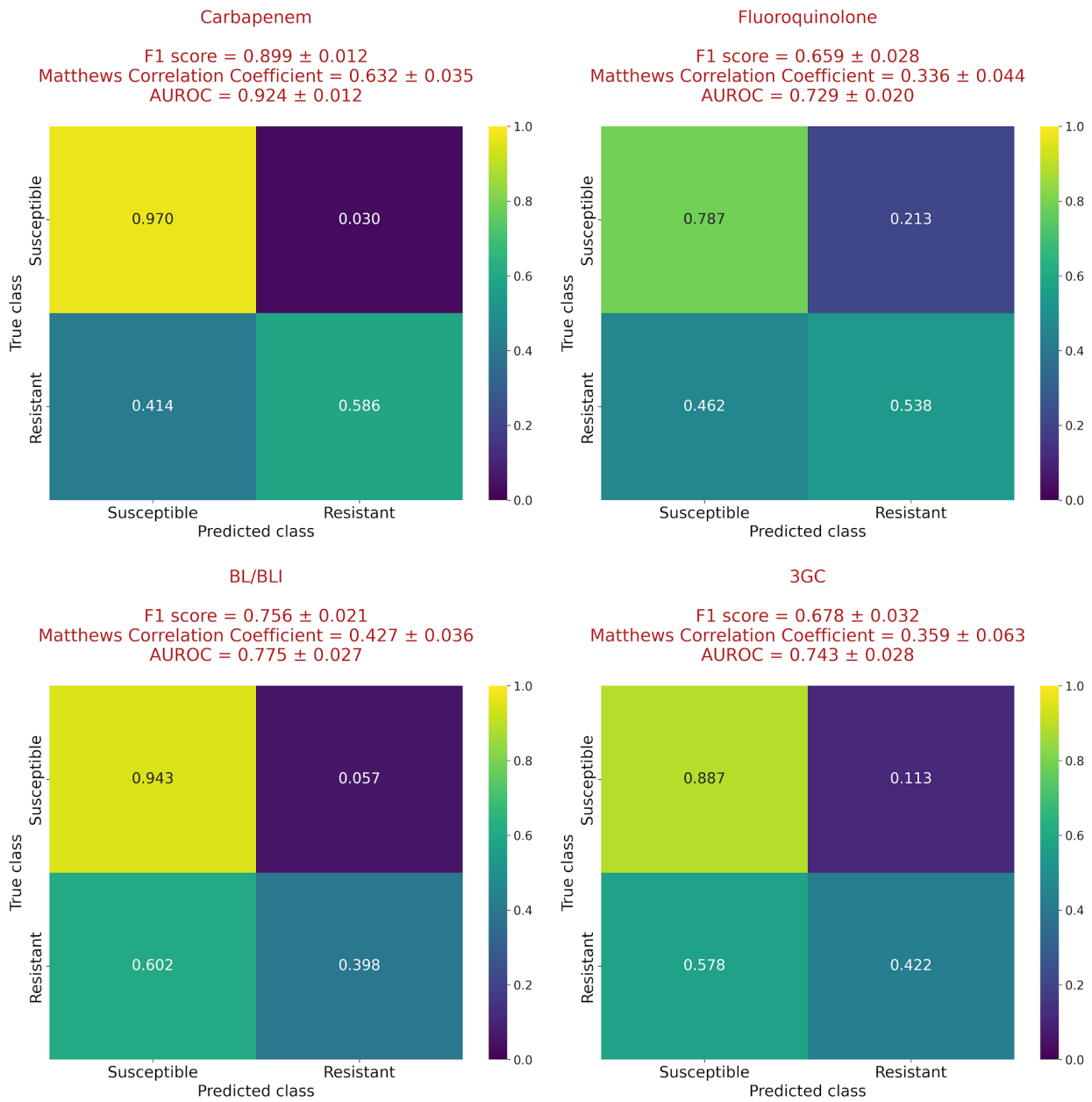
Body: Each panel shows the mean row-normalized confusion matrices over the 10 iterations of the outer cross-validation. The mean value of the weighted F1-score, Matthews Correlation coefficient and Area Under Receiver Operating Characteristic Curve (AUROC) are reported for each antibiotic resistance; the associated uncertainty is the standard deviation of the metrics over the above mentioned 10 iterations.



Supplementary Figure 5.

Title: Mean confusion matrices over the outer cross-validation iterations for different types of antibiotic resistance for the extreme gradient boosting classifier

Body: Each panel shows the mean row-normalized confusion matrices over the 10 iterations of the outer cross-validation. The mean value of the weighted F1-score, Matthews Correlation coefficient and Area Under Receiver Operating Characteristic Curve (AUROC) are reported for each antibiotic resistance; the associated uncertainty is the standard deviation of the metrics over the above mentioned 10 iterations.

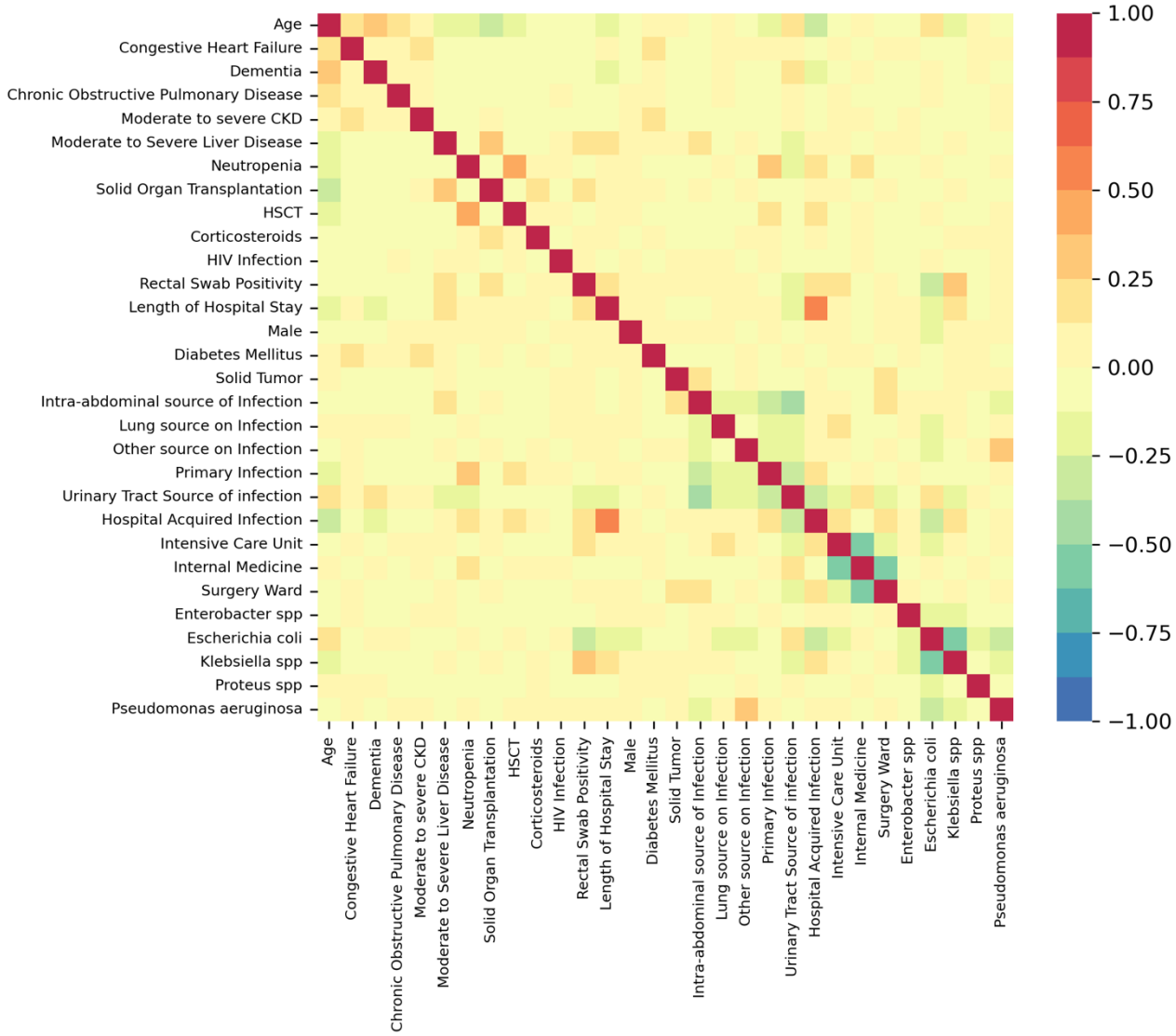


Supplementary Figure 6.

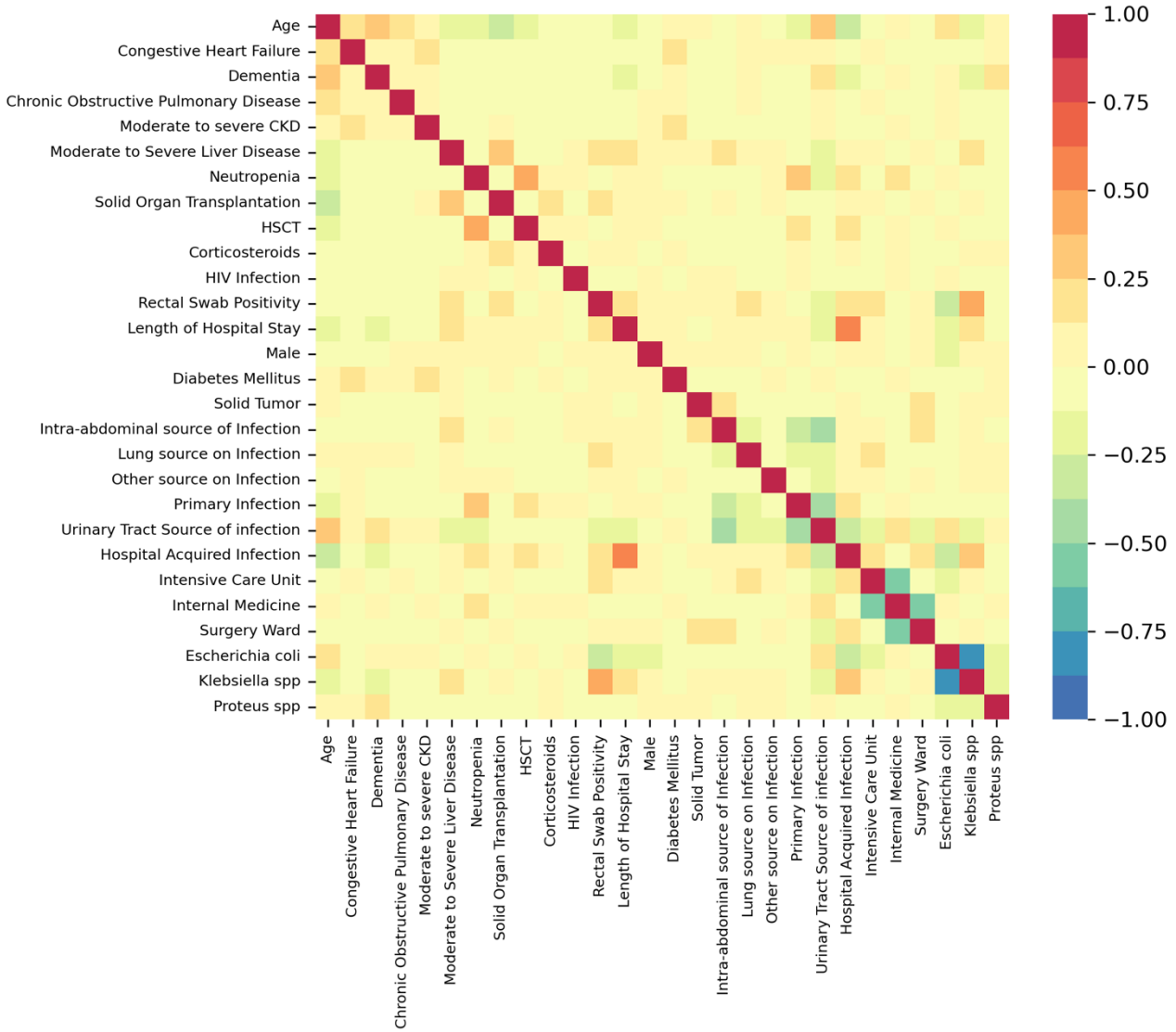
Title: Correlation heatmap among variable for whole dataset (a) and Enterobacterales (b).

Body: Heatmap representing the correlation matrix, where each correlation is computed pairwise between variables. Panel (a) refers to the whole dataset while panel (b) focuses on the Enterobacterales subset.

a



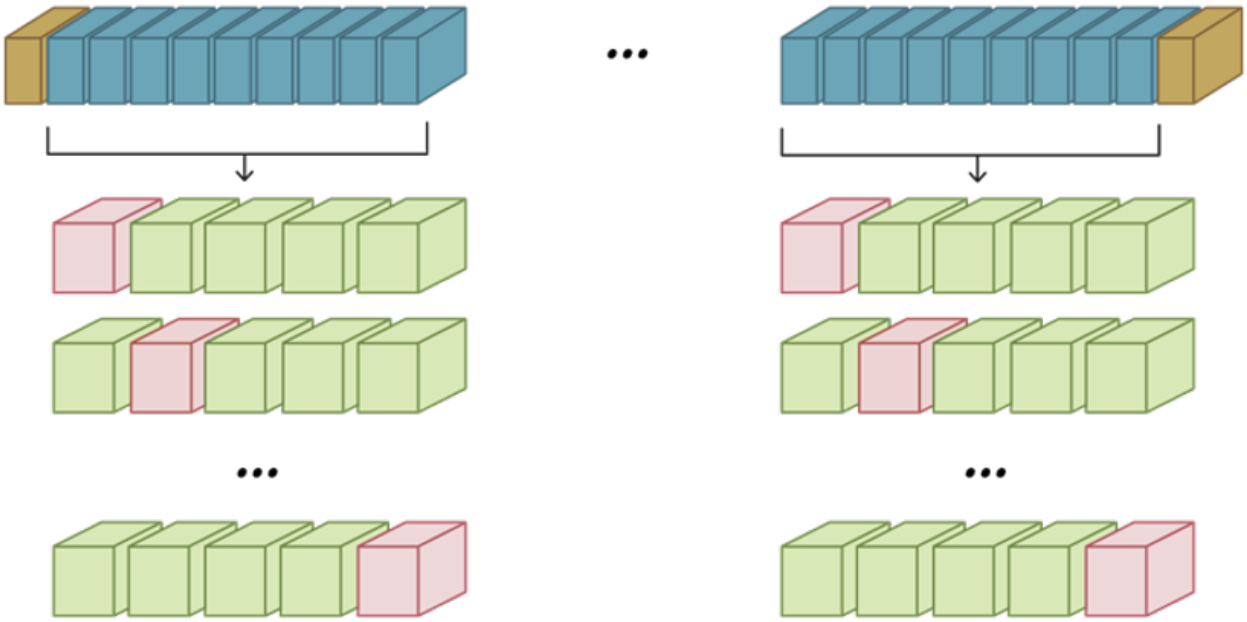
b



Supplementary Figure 7.

Title: Structure of the nested cross-validation

Figure legend body: Structure of the nested cross-validation with a 10-fold outer cross-validation used for the validation of model's robustness and a 5-fold cross-validation for hyper-parameters tuning.



Supplementary Table 1.

Title: Table with the set of hyper-parameters used within the inner cross-validation.

Body: Table reporting the considered set of hyper-parameters for the logistic regression model. Specifics of the models' implementation are: max number of iterations 5000, tolerance factor 10-4 and solver saga.

Hyper-parameter	**Used options**
Penalty factor	6 values between 10^{-1} and 10^{4}, evenly spaced on a log space
Penalisation	none, L1 (lasso), L2 (ridge), equally-balanced elastic-net