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Unsupervised Phenotyping of Asthma: Integrating Serum Periostin with Clinical and Inflammatory Profiles: Supplementary File

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This table reports calibration and internal validation statistics for the periostin-only Firth logistic regression model used to discriminate asthma vs. healthy controls. Metrics were generated using 1,000-bootstrap resampling (rms package). Calibration slope, intercept, discrimination index (Dxy), and calibration error (Emax, MAE) quantify how well predicted probabilities match observed asthma outcomes (Table S1).

Table S1. Calibration, and Internal Validation Metrics (Periostin-Only Model) for Asthma

Metric	Value	Interpretation
Calibration slope (bootstrap-corrected)	0.883	Slight overfitting, acceptable
Calibration intercept	−0.005	Near-perfect alignment
Dxy (index.orig)	0.9749	Equivalent to c-statistic ~0.987
Dxy (optimism-corrected)	0.9506	Strong discrimination
R^2 (optimism-corrected)	0.788	Good explanatory power
Emax (Calibration error)	0.217	Acceptable
MAE (from calibration)	0.042	Good agreement between predicted/observed

Abbreviations: Dxy: Somers' D rank-correlation index; R^2: Coefficient of determination; Emax: Maximum absolute calibration error; MAE: Mean absolute error

This table shows the relative importance of predictors from a gradient boosting machine (GBM) model built to evaluate internal stability of the asthma diagnosis model. Repeated 10-fold cross-validation (caret package) was performed. Higher percentages indicate stronger contribution to distinguishing asthma vs. controls (Table S2).

Table S2. Variable Importance from Gradient Boosting Model (Stability Analysis) for Asthma

Predictor	Relative Importance (%)
Periostin	100.0
BMI	3.38
Pre-FEV_1 (% predicted)	2.33
Age	0.97
Gender	0.00
Smoker	0.00

Abbreviations: FEV_1: Forced Expiratory Volume in 1 second; BMI: Body Mass Index

This table provides calibration and validation statistics for the periostin-only model used to classify moderate vs. severe asthma. Metrics were obtained using 1,000-bootstrap resampling. Results show poor model discrimination and weak calibration, indicating periostin is not a reliable predictor of asthma severity (Table S3).

Table S3. Calibration, and Internal Validation Metrics (Periostin-Only Model) for Asthma Severity

Metric	Value	Interpretation
Calibration slope (bootstrap-corrected)	0.571	Poor calibration; underfitting likely
Calibration intercept	0.005	Nearly unbiased overall prediction
Dxy (index.orig)	0.1246	Weak discrimination (AUC ≈ 0.562)
Dxy (optimism-corrected)	0.1058	Very weak discrimination
R^2 (optimism-corrected)	−0.0114	No explained variance
Emax (Calibration error)	0.378	High calibration error
MAE (from calibration)	0.069	Moderate miscalibration

Abbreviations: Dxy: Somers' D rank-correlation index; R^2: Coefficient of determination; Emax: Maximum absolute calibration error; MAE: Mean absolute error

This table presents predictor importance from a GBM model assessing internal stability of the asthma severity model (moderate vs. severe). Repeated 10-fold cross-validation was used. Age and systemic inflammatory mark ers were the strongest contributors, while periostin had relatively low predictive value (Table S4).

Table S4. Variable Importance from Gradient Boosting Model (Stability Analysis) for Asthma Severity

Predictor	Relative Importance (%)
Age in years	100.000
SII	69.055
BMI	61.115
PLR	52.789
Periostin	36.077
NLR	33.176
Gender (Male)	2.825
Eosinophilia (Yes)	0.000

Abbreviations: SII: Systemic Immune-Inflammation Index; BMI: Body Mass Index; NLR: Neutrophil-to-Lymphocyte Ratio; PLR: Platelet-to-Lymphocyte Ratio