

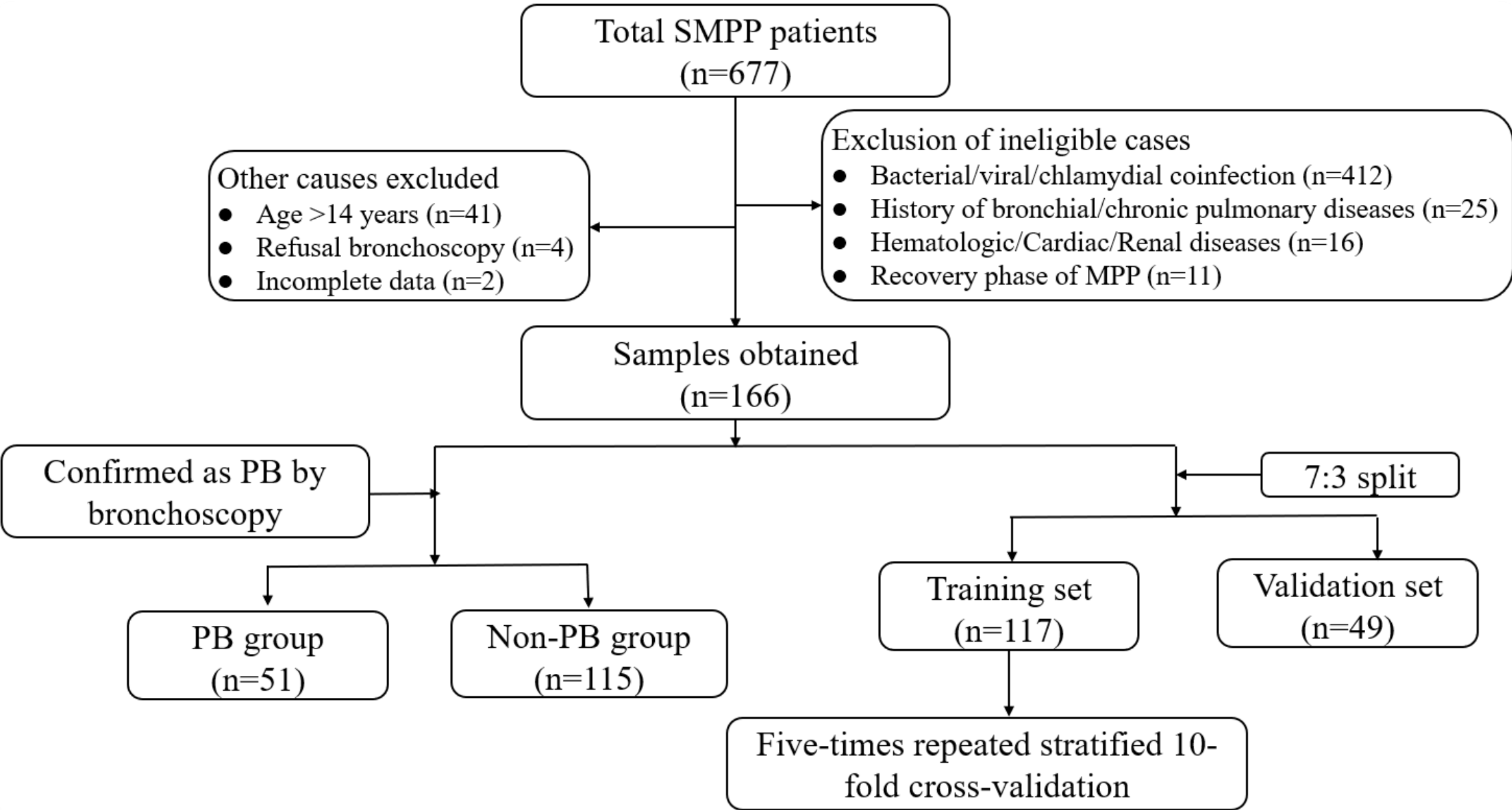


Figure S1 Flowchart of patient screening, grouping and dataset division for this predictive model study. Flowchart illustrating enrollment, exclusion criteria, case grouping, stratified 7:3 train-validation split and five-times repeated stratified 10-fold cross-validation based on eligible children with SMPP. n, number of patients; PB, **plastic bronchitis**; SMPP, severe *Mycoplasma pneumoniae* pneumonia.

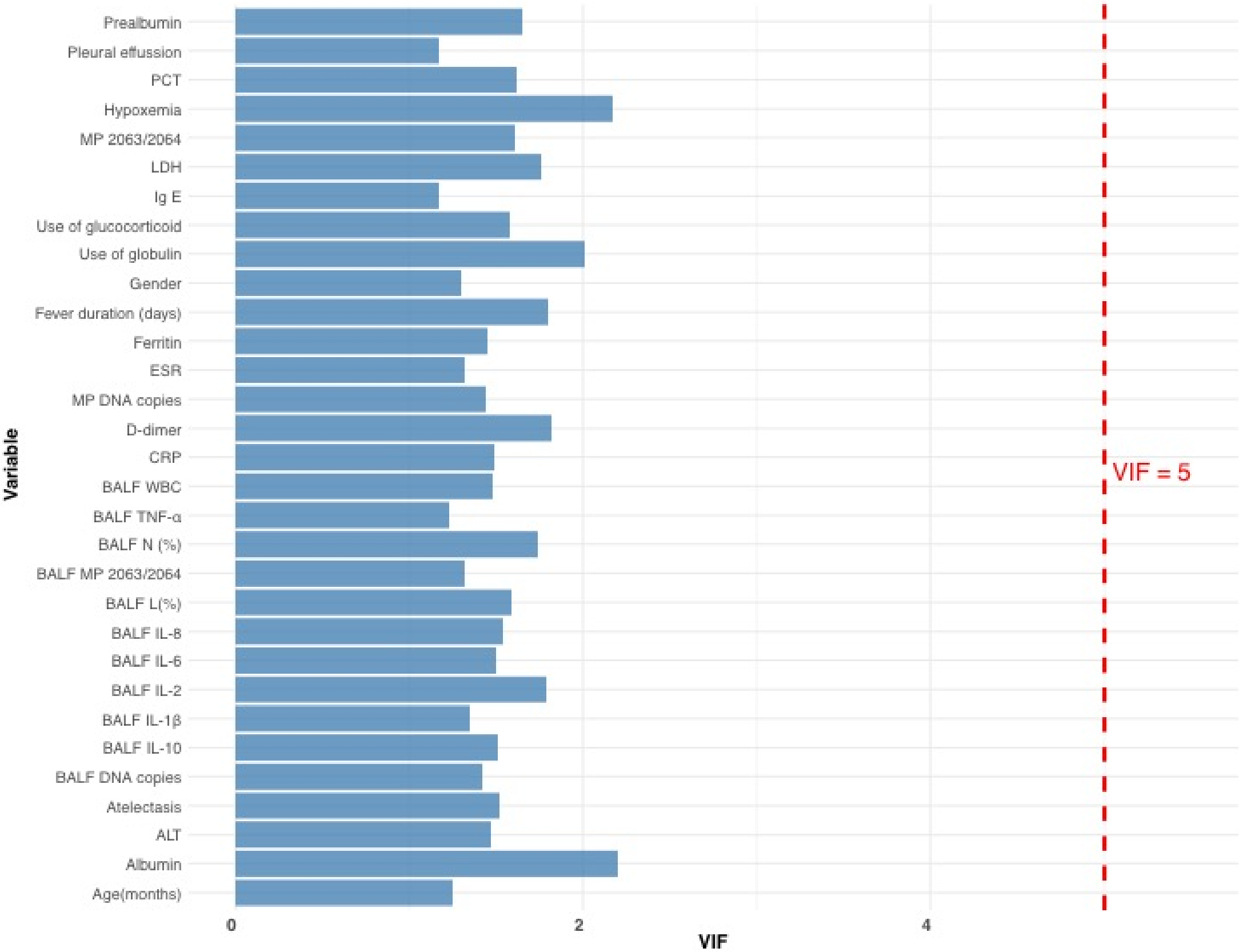


Figure S2 VIF distribution of individual candidate features. A threshold of VIF =5 was used to identify severe multicollinearity. Variables with VIF >5 were removed; those with VIF $\leq$ 5 were retained. ALT, alanine aminotransferase; BALF, bronchoalveolar lavage fluid; CRP, C-reactive protein; DNA, deoxyribonucleic acid; ESR, erythrocyte sedimentation rate; IgE, immunoglobulin E; IL, interleukin; L, lymphocyte; LDH, lactate dehydrogenase; MP, *Mycoplasma pneumoniae*; N, neutrophil; PCT, procalcitonin; TNF- α , tumor necrosis factor-alpha; VIF, variance inflation factor; WBC, white blood cell.

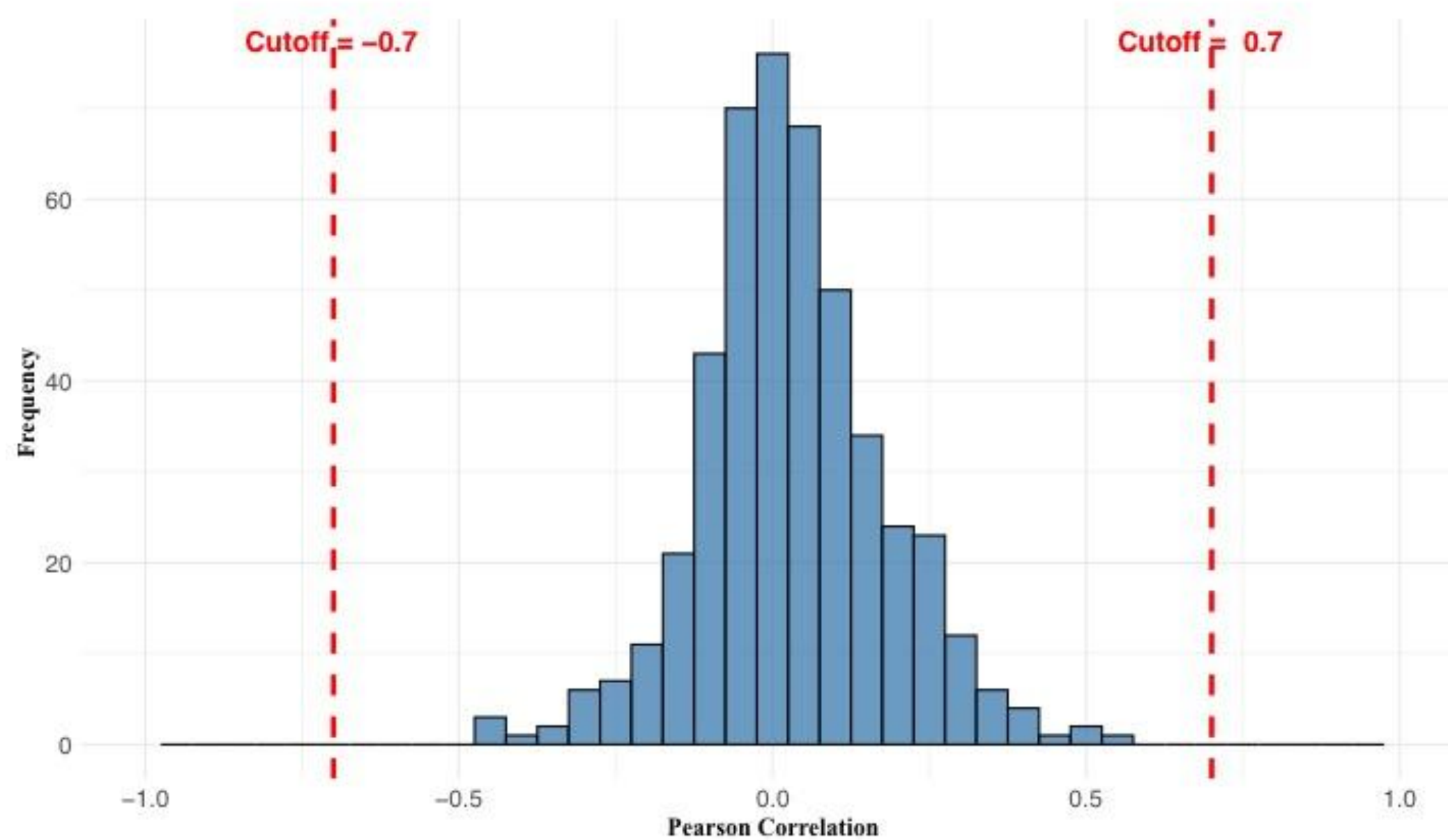


Figure S3 Distribution of Pearson correlation coefficients among candidate predictive variables. Histogram showing the distribution of Pearson correlation coefficients between all pairs of candidate predictive variables for PB in children with SMPP. The vertical dashed line indicates the predefined correlation cutoff ($r=0.7$) used for variable screening. PB, plastic bronchitis; SMPP, severe *Mycoplasma pneumoniae* pneumonia.

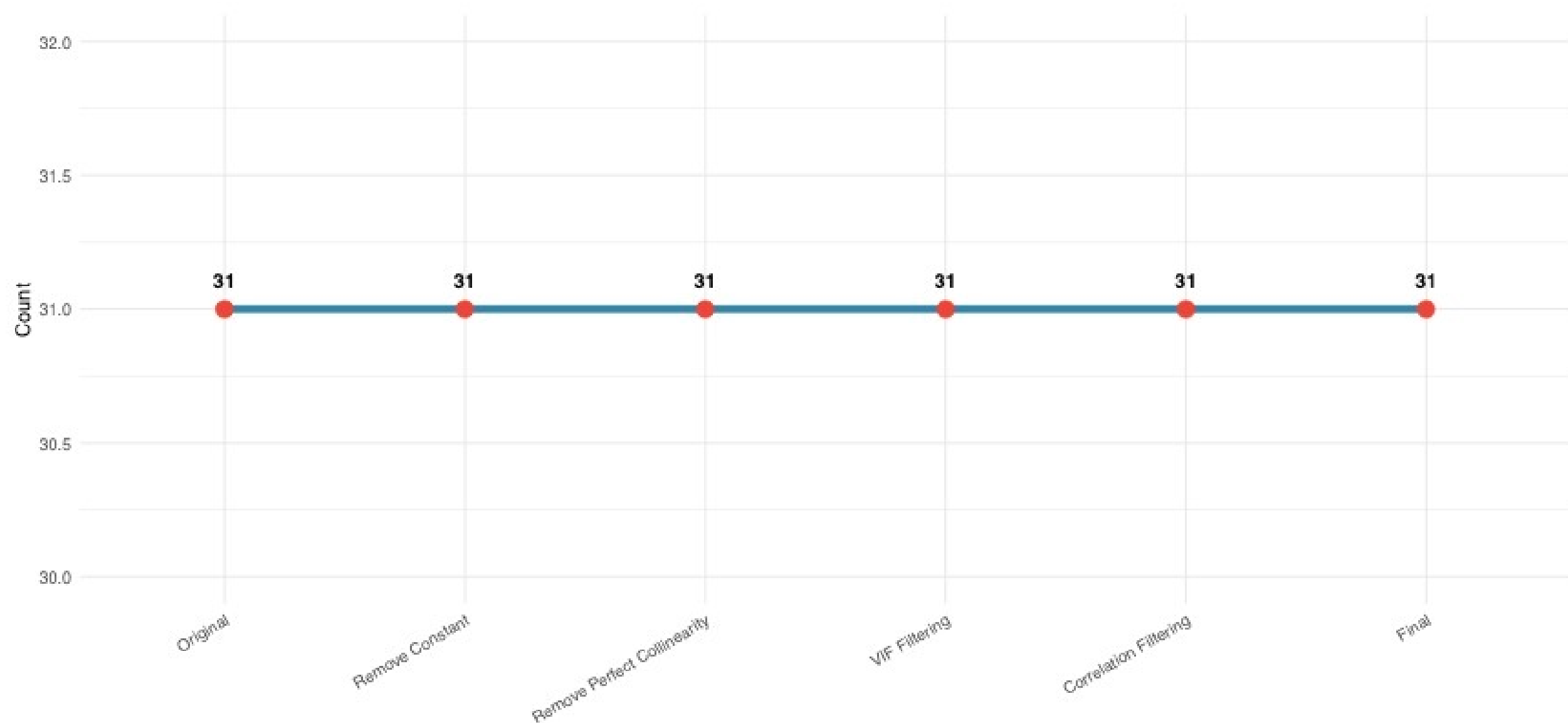


Figure S4 Sequential processing of candidate variables for multicollinearity reduction. Bar plot showing the number of candidate variables retained after each sequential step of multicollinearity handling, including the removal of constant variables, elimination of perfect collinearity, exclusion of variables with high VIF, and deletion of highly correlated variables. A final set of 31 variables was included for machine learning model construction. VIF, variance inflation factor.

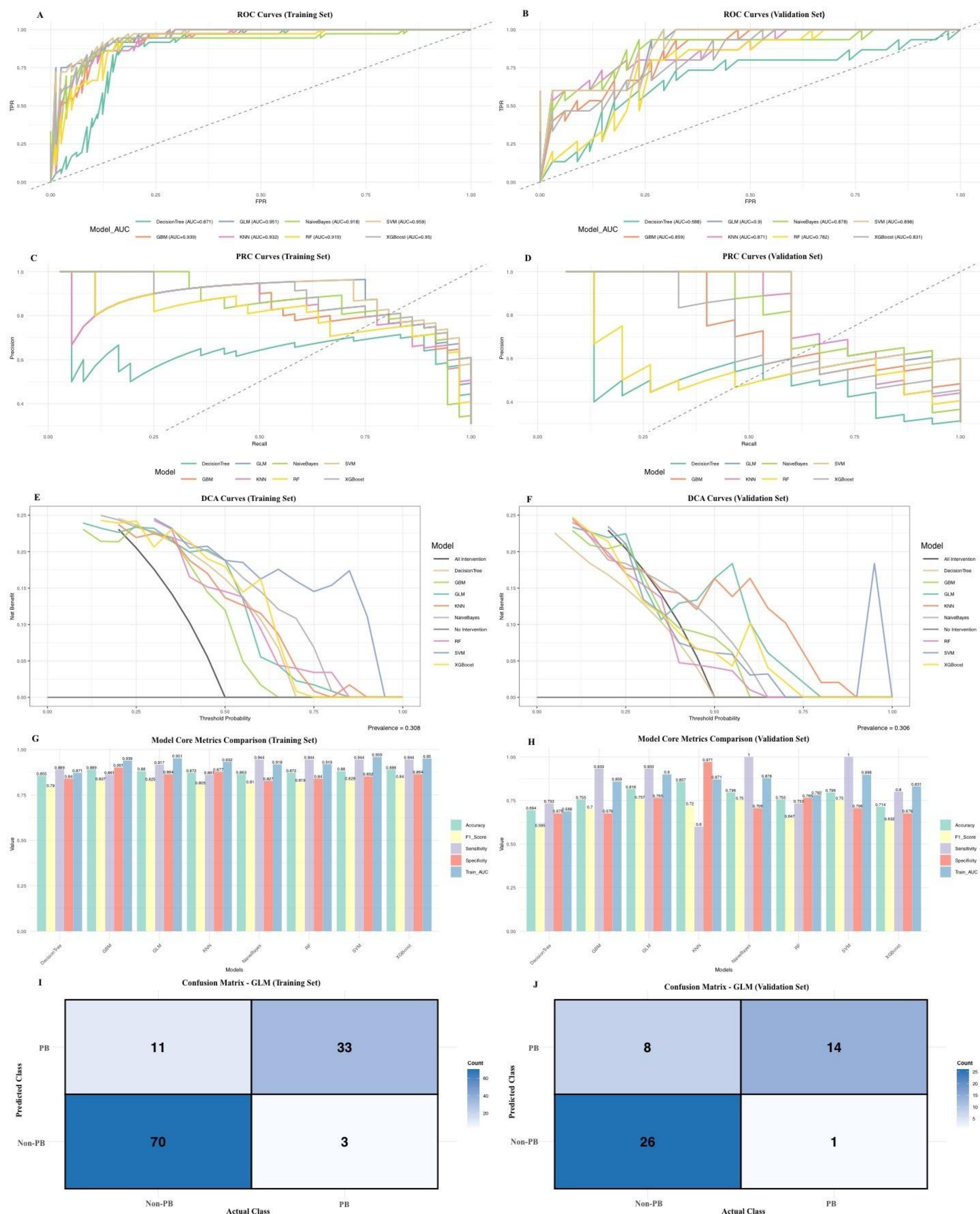


Figure S5 Performance comparison of eight machine learning models. ROC curves and AUC values of the eight models in the training (A) and validation (B) sets. PRC and AUPRC values of the eight models in the training (C) and validation (D) sets. DCA and net benefit values of the eight models in the training (E) and validation (F) sets. Bar plots comparing accuracy, sensitivity, specificity, and F1-score of the eight models in the training (G) and validation (H) sets. (H) Confusion matrix heatmaps of the GLM model in the training (I) and validation (J) sets. AUC, area under the curve; AUPRC, area under the precision-recall curve; DCA, decision curve analysis; DT, decision tree; GBM, gradient boosting machine; GLM, generalized linear model; KNN, k-nearest neighbors; NB, naive Bayes; PRC, precision-recall curve; RF, random forest; ROC, receiver operating characteristic; SVM, support vector machine; XGBoost, extreme gradient boosting.

Table S1 Demographic, clinical, radiologic, and laboratory characteristics of children with SMPP with and without PB

Clinical characteristics	Patients with PB (n=51)	Patients with non-PB (n=115)	P	Training set (n=117)	Validation set (n=49)	P
Gender			0.019			0.157
Male	30 (58.8)	45 (39.1)		57 (48.7)	18 (36.7)	
Female	21 (41.2)	70 (60.9)		60 (51.3)	31 (63.3)	
Age (months)	79.1±27.2	74.8±29.0	0.374	73±25.6	72±26.8	0.205
Fever duration (days)	11 [10–13]	8 [6–10]	<0.001	8.9±3.2	9.2±3.1	0.641
Hypoxemia			<0.001			0.549
Yes	19 (37.3)	6 (5.2)		15 (12.8)	10 (20.4)	
No	32 (62.7)	109 (94.8)		102 (87.2)	39 (79.6)	
Use of globulin			<0.001			0.273
Yes	16 (31.4)	4 (3.5)		12 (10.3)	8 (16.3)	
No	35 (68.6)	111 (96.5)		105 (89.7)	41 (83.7)	
Use of glucocorticoids			<0.001			0.603
Yes	46 (90.2)	54 (47.0)		69 (59.0)	31 (63.3)	
No	5 (9.8)	61 (53.0)		48 (41.0)	18 (36.7)	
Atelectasis (≥2 lung segments)			<0.001			0.071
Yes	26 (51.0)	19 (16.5)		27 (23.1)	18 (36.7)	
No	25 (49.0)	96 (83.5)		90 (76.9)	31 (63.3)	
Pleural effusion			0.144			0.632
Yes	16 (31.4)	24 (20.9)		27 (23.1)	13 (26.5)	
No	35 (68.6)	91 (79.1)		90 (76.9)	36 (73.5)	
MP DNA copies (10 ⁴ /mL)	6.5 [3.9–6.5]	5.6 [5.0–6.5]	0.458	5.0 [3.9–6.5]	6.5 [4.7–6.5]	0.778
MP 2063/2064			0.348			0.389
Yes	28 (54.9)	72 (62.6)		68 (58.1)	32 (65.3)	
No	23 (45.1)	43 (37.4)		49 (41.9)	17 (34.7)	
ESR (mm/h)	46 [35.5–54.0]	47 [36.5–59.5]	0.391	46 [34–58]	46 [38–56]	0.743
D-dimer (mg/L)	1.19 [0.93–2.95]	0.6 [0.45–1.05]	<0.001	0.89 [0.48–1.43]	0.93 [0.6–1.47]	0.166
CRP (mg/L)	17 [10.5–46.5]	12 [6–21.5]	<0.001	13 [7–25]	16 [6–33]	0.324
PCT (ng/mL)	0.18 [0.14–0.42]	0.09 [0.05–0.20]	<0.001	0.13 [0.05–0.25]	0.14 [0.07–0.34]	0.127
ALT (U/L)			<0.001			0.576
Albumin (g/L)	35.9±4.6	41.1±3.4	<0.001	40.1±3.9	39.2±3.8	0.362
Prealbumin (mg/L)	79.6 [59.4–105.8]	105.8 [105.8–114]	<0.001	105.8 [84–108]	105.8 [101.7–112.6]	0.398
LDH (U/L)	428 [379–629.5]	349 [309–429]	<0.001	372 [320–434]	422 [315–483]	0.178
Ferritin (ng/mL)	157.9 [157.4–243.4]	137 [89.1–170.5]	<0.001	157.9 [103–196]	136 [97.3–157.9]	0.1
IgE (IU/mL)	133 [99.4–282.0]	133 [96.3–279.5]	0.260	133 [96.6–300]	133 [96.4–264]	0.772
BALF WBC (10 ⁶ /L)	1,350 [885–2,074]	1,300 [520–2,076]	0.112	1,350 [630–2,100]	1,350 [540–2,051]	0.79
BALF N (%)	68.5 [59–72]	70 [60.5–79]	0.075	68.5 [57–75]	71 [67–78]	0.106
BALF L (%)	17 [12–28]	14 [10–20]	0.077	14 [11–22]	14 [10–20]	0.262
BALF MP DNA copies (10 ⁴ /mL)	101.9 [13.9–447.5]	65.7 [6.7–223.1]	0.371	54.6 [5–260]	101.9 [22.6–243]	0.313
BALF MP2063/2064			0.325			0.584
Yes	44 (86.3)	105 (91.3)		106 (90.6)	43 (87.8)	
No	7 (13.7)	10 (8.7)		11 (9.4)	6 (12.2)	
BALF IL-8 (10 ² pg/mL)	25.5 [16.9–42.9]	21.1 [9.9–33.8]	0.003	24.1 [11.7–38.6]	22.6 [12.9–33.6]	0.553
BALF IL-1β (pg/mL)	239.2 [60.8–484.2]	165.1 [55.9–527.9]	0.782	239.23 [54.6–498.15]	155.34 [60.81–507.99]	0.9
BALF IL-2 (pg/mL)	0.1 [0.1–0.1]	0.1 [0.1–0.1]	0.328	0.1 [0.1–0.1]	0.1 [0.1–0.1]	0.891
BALF IL-6 (pg/mL)	3.4 [0.1–136.4]	0.1 [0.1–41.6]	0.027	3.43 [0.1–73.44]	0.1 [0.1–38.6]	0.239
BALF IL-10 (pg/mL)	0.1 [0.1–0.1]	0.1 [0.1–2.7]	0.118	0.1 [0.1–0.1]	0.1 [0.1–3.5]	0.106
BALF TNF-α (pg/mL)	0.1 [0.1–0.1]	0.1 [0.1–0.1]	0.514	0.1 [0.1–0.1]	0.1 [0.1–0.1]	0.526

Data are presented as n (%), mean ± standard deviation, or median [interquartile range]. ALT, alanine aminotransferase; BALF, bronchoalveolar lavage fluid; CRP, C-reactive protein; DNA, deoxyribonucleic acid; ESR, erythrocyte sedimentation rate; IgE, immunoglobulin E; IL, interleukin; L, lymphocyte; LDH, lactate dehydrogenase; MP, *Mycoplasma pneumoniae*; n, number of patients; N, neutrophil; PB, plastic bronchitis; PCT, procalcitonin; SMPP, severe *Mycoplasma pneumoniae* pneumonia; TNF-α, tumor necrosis factor-alpha; WBC, white blood cell.