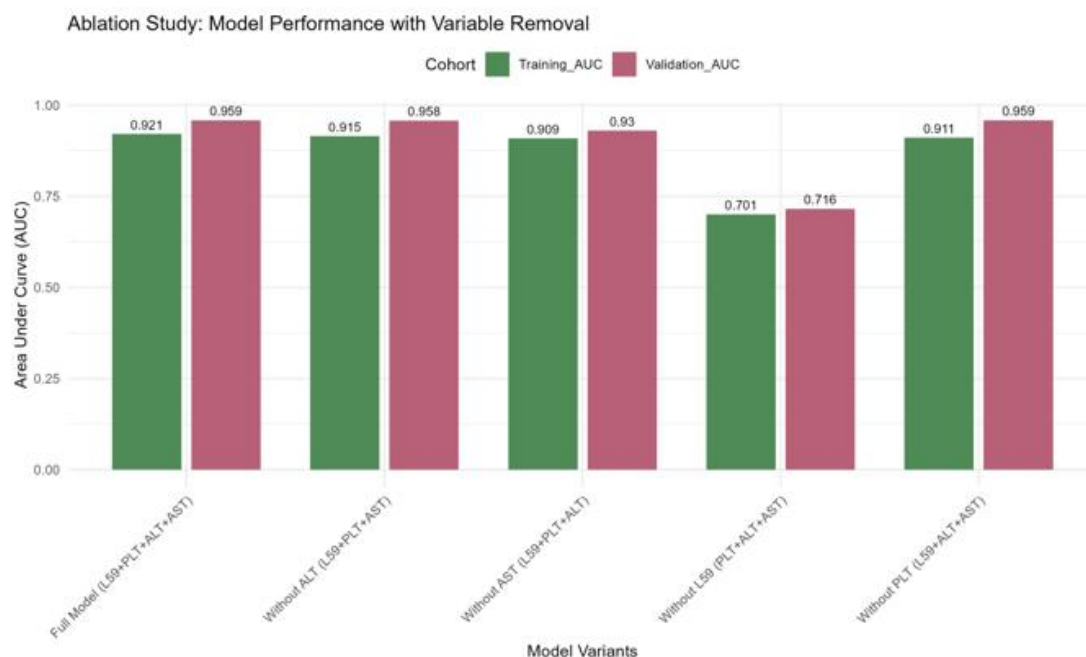


**Supplementary Figure 1** Feature selection by the LASSO logistic regression. (A) Lasso coefficient profiles of 15 features. A coefficient profile plot was produced *vs* the  $\log(\lambda)$  sequence. Vertical line was drawn at the value selected where optimal  $\lambda$  resulted in 4 nonzero coefficients. (B) Tuning parameter ( $\lambda$ ) selection in Lasso model used ten-fold cross-validation *via* minimum criteria. LASSO: Least Absolute Shrinkage and Selection Operator.



Supplementary Figure 2 Ablation Study of the Predictive Model. This figure illustrates the performance (Area Under the Curve, AUC) of the full model and four ablated models on the training and validation cohorts. The full model includes four variables (L59, PLT, ALT, AST). Each ablated model removes one variable.

Supplementary Table 1 Comprehensive Performance Metrics of Predictive Models

	Cohort	AUC	Accuracy	Sensitivity	Specificity	Precision	F1 Score
Our Model	Training	0.921	0.868	0.819	0.908	0.881	0.849
	Validation	0.959	0.938	0.963	0.919	0.897	0.929
L59 Only	Training	0.891	0.862	0.792	0.920	0.891	0.838
	Validation	0.912	0.906	0.815	0.973	0.957	0.880
FIB-4	Training	0.813	0.792	0.917	0.690	0.710	0.800

LSM	Validation	0.756	0.719	0.963	0.541	0.605	0.743
	Training	0.993	0.975	1.000	0.954	0.947	0.973
APRI	Validation	0.997	0.984	1.000	0.973	0.964	0.982
	Training	0.615	0.648	0.292	0.943	0.808	0.429
CHI3 L1	Validation	0.570	0.625	0.296	0.865	0.615	0.400
	Training	0.704	0.667	0.486	0.816	0.686	0.569
	Validation	0.728	0.750	0.667	0.811	0.720	0.692

---