

Table S1 Comparison of variables in existing infection prediction models versus proposed HCC-specific model

Variable category	General LT models	Surgical site infection models	Proposed HCC-specific model	Rationale for inclusion
Liver disease severity	MELD score, Child-Pugh	–	MELD, Child-Pugh + HCC-specific modifications	Accounts for discordance between oncologic & hepatic severity
Tumor-related factors	–	–	Prior bridging therapy history, tumor immunosuppressive markers	Captures healthcare exposure & tumor-mediated immunity
Inflammatory markers	CRP, WBC	CRP, WBC	NLR, SII, PIV, LMR	Reflects combined cirrhosis + tumor immune dysregulation
Surgical factors	Operation time, blood loss	Operation time, Blood loss	HCC-specific complexities (prior treatment adhesions, vascular reconstruction)	Addresses HCC-unique technique challenges
Immunosuppression	Basic immunosuppression regimen	–	Tacrolimus levels + tumor microenvironment effects	Incorporates dual iatrogenic + tumor immunosuppression
Microbiological factors	–	Local resistance patterns	MDR colonization risk from repeated hospitalizations	Accounts for HCC-specific exposure history

This comparison highlights that existing models overlook key HCC-specific risk dimensions, particularly tumor-mediated immunosuppression, cumulative healthcare exposures, and unique surgical challenges, which our model specifically incorporates. HCC, hepatocellular carcinoma; LT, liver transplantation; MELD, Model for End-Stage Liver Disease; CRP, C-reactive protein; WBC, white blood cell; NLR, neutrophil-to-lymphocyte ratio; SII, systemic immune-inflammation index; PIV, pan-immune-inflammation value; LMR, lymphocyte-to-monocyte ratio; MDR, multidrug-resistant.