A Study Design and Multicenter Cohorts

Fujian Hospital
(Retrospective Validation, 2020-2024, n=505)

Ruijin Hospital
(Derivation Cohort, 2022-2023, n=150)

Model Derivation

Fuyang Hospital
(Prospective Validation, 2025-2026, n=340)

Clinically Recognized ARDS
(Total n=995)

B Dynamic Phenotype-plus-Trajectory Framework

Day 0 - Biology

Day 3 - Clinical Expression

Biomarkers
(IL-6, TNFR1, PCT, Lactate)

Hyper-inflammatory phenotype

Lower-inflammatory phenotype

Time evolution over 72 hours

Day 0 | 24h | 48h | 72h

Phenotype Plasticity

Clinical Deterioration

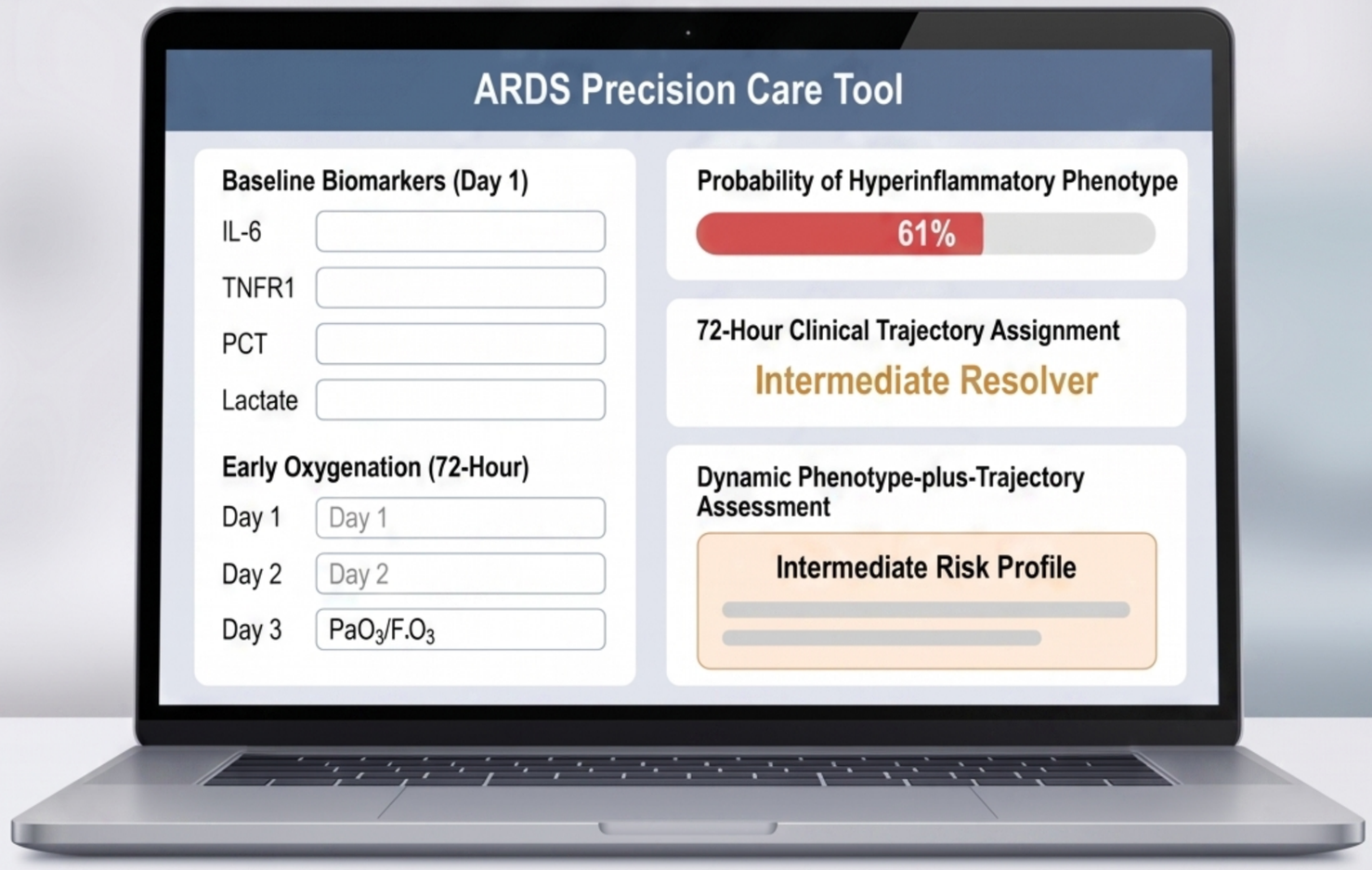
Rapid improvers
(Rapid resolution, Mortality ~15%)

Intermediate resolvers
(Limited recovery, Mortality ~34%)

Refractory
(Persistent severe, Mortality ~62%)

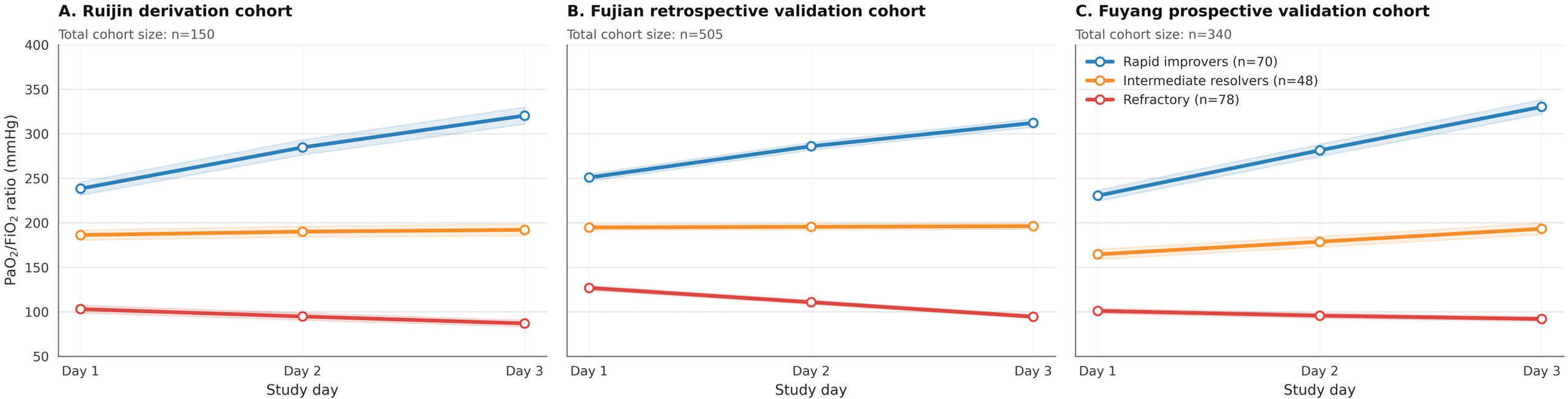
C Clinical Translation & Web-based Application

Open-access Web Calculator



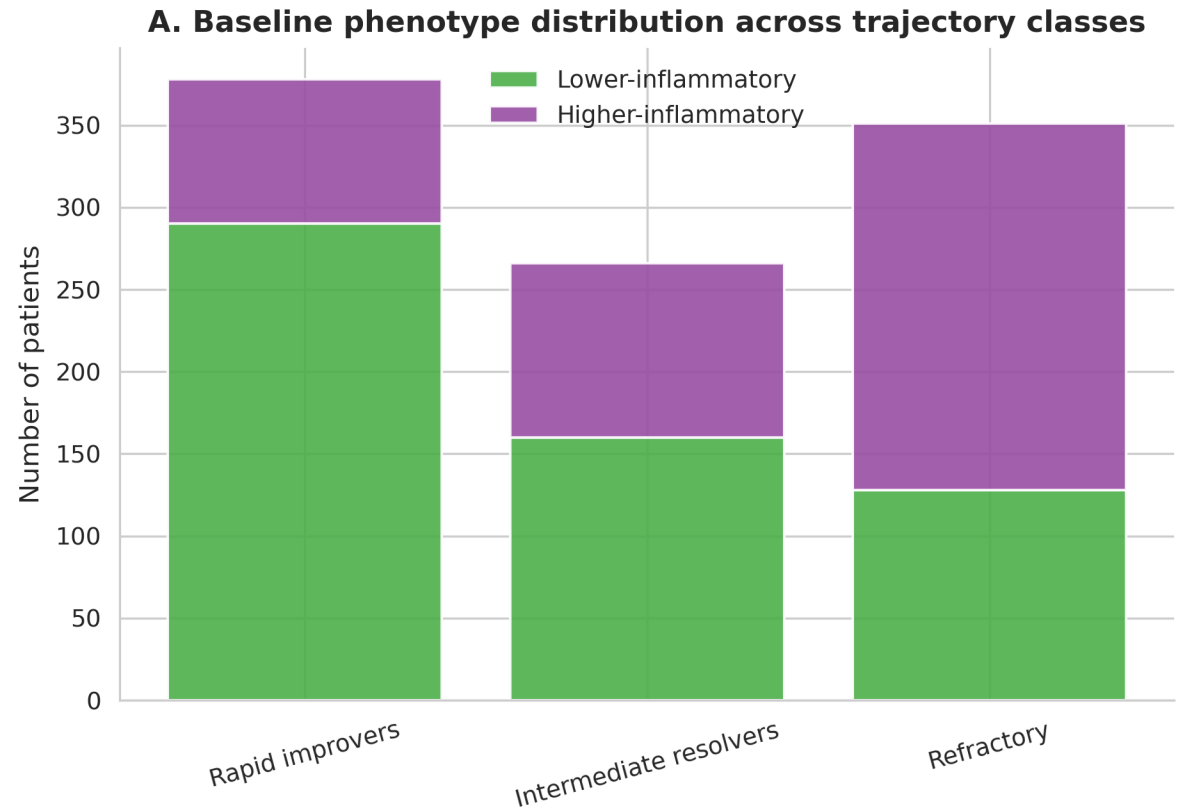
Real-time bedside risk stratification

Figure 2. Early 72-hour oxygenation trajectories in derivation and validation cohorts



Lines show mean PaO_2/FiO_2 values and shaded bands indicate SEM. Dashed reference lines mark PaO_2/FiO_2 thresholds of 100 and 200 mmHg.

Figure 3. Association between baseline inflammatory phenotype and early trajectory class



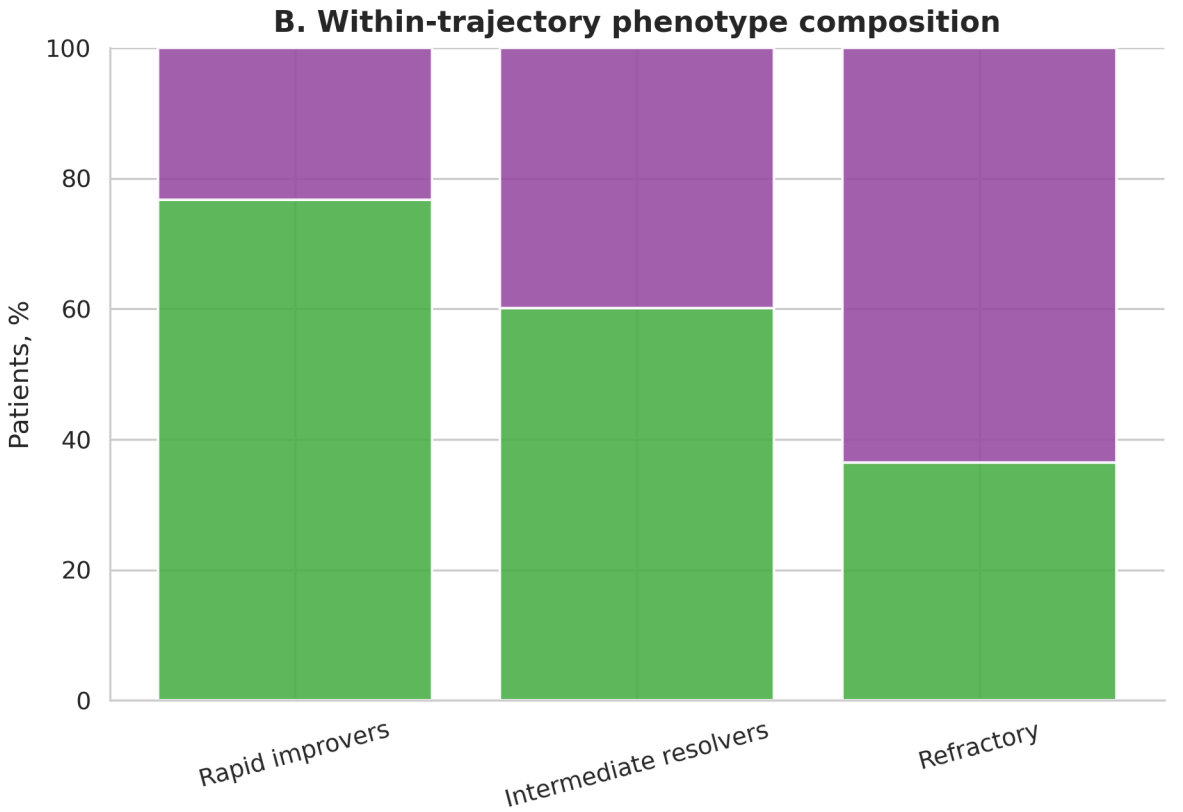
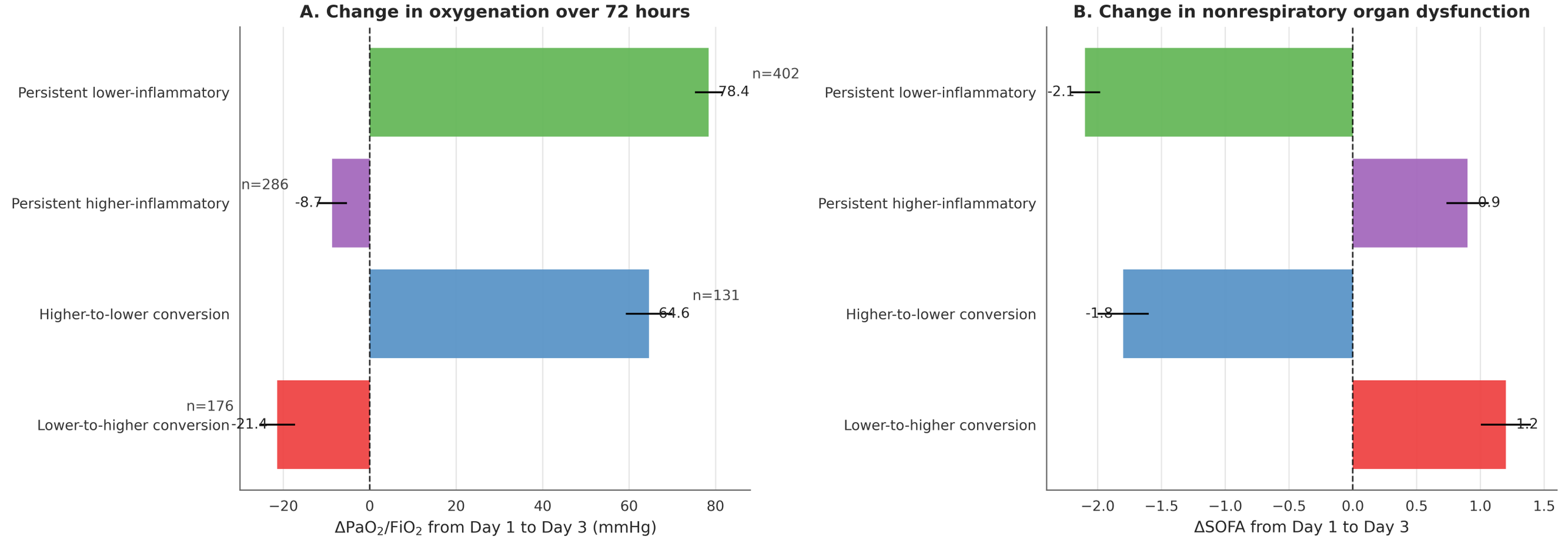
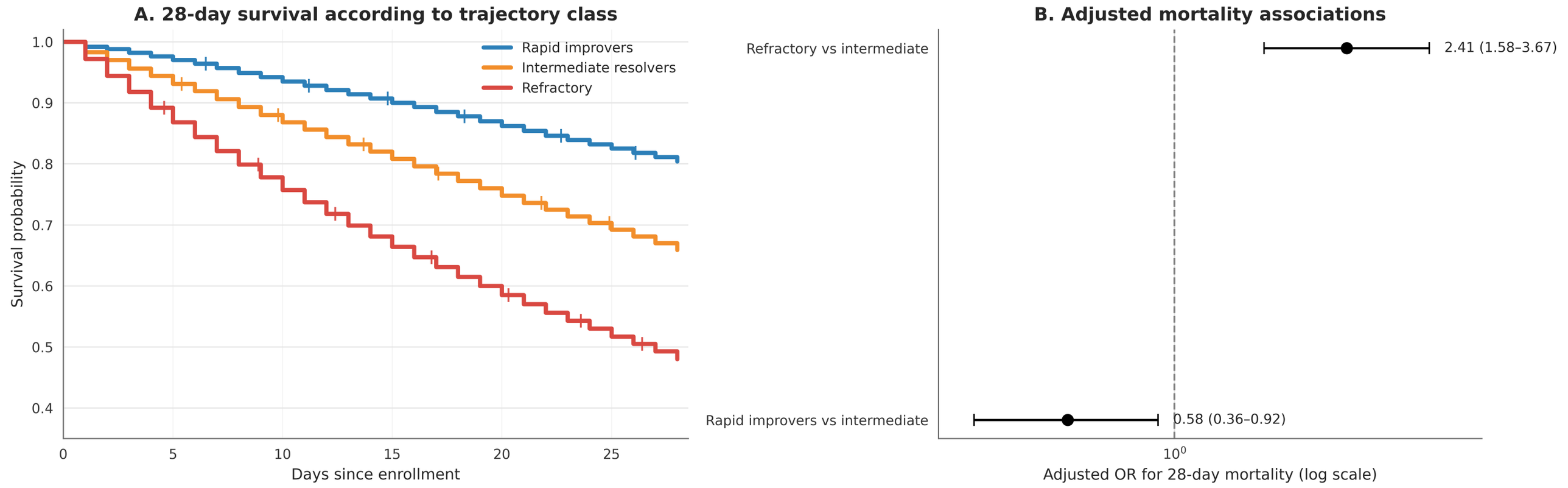


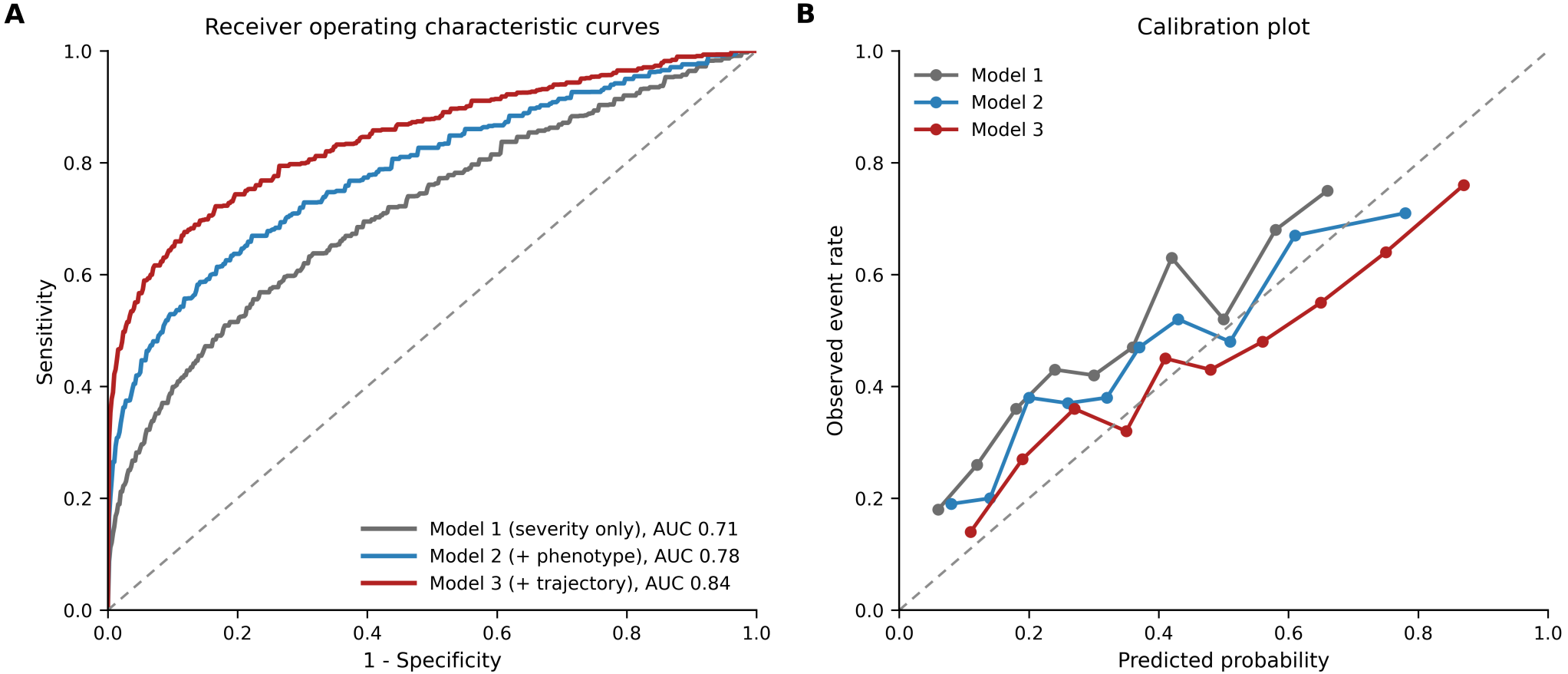
Figure 4. Early phenotype transition patterns and speed of change



Negative ΔSOFA indicates improvement.

Figure 5. Clinical outcomes across early trajectory classes




A
Receiver operating characteristic curves
Sensitivity
1 - Specificity
0.0
0.2
0.4
0.6
0.8
1.0
Model 1 (severity only), AUC 0.71
Model 2 (+ phenotype), AUC 0.78
Model 3 (+ trajectory), AUC 0.84
B
Calibration plot
Observed event rate
Predicted probability
Model 1
Model 2
Model 3