

Supplementary table1. Variable screened by LASSO analysis

Variables	lambda. 1se	lambda. min
Sex	/	-0.306572624
Gestational age	0.01835114	0.094357886
Birth weight	/	/
Delivery mode	/	-0.001872392
Amniotic fluid turbidity	/	/
1min Apgar	-0.02261943	-0.020576024
5min Apgar	/	/
Intubation in DR	/	0.027654815
Compression in DR	/	0.137442399
PS using in DR	/	/
Mother's age	/	/
Home address	/	/
GDM	/	/
PROM	/	-0.056730264
Hypertension	/	/
Prenatal fever	/	/
Admission age	/	0.008956482
Intubation age	/	/
HFV	0.12276089	0.573931903
Inhaled NO	0.92045057	1.568384269
PS using times	/	/
PH	-0.15591172	-0.414158953
PaO ₂	/	/
PaCO ₂	/	/
PDA	/	0.008963279
MAS	/	0.037288125
Sepsis	/	0.351683830
IMV duration	-0.01200405	-0.021704736
HIE	/	0.353076537

Abbreviation: DR, delivery room; GDM, gestational diabetes mellitus; PROM, premature rupture of membranes; HFV, high frequency ventilation; PS, pulmonary surfactant; PaO₂, arterial oxygen partial pressure; PaCO₂, arterial carbon dioxide partial pressure; NO, nitric oxide; PDA, patent ductus arteriosus; MAS, meconium aspiration syndrome; HIE, hypoxic-ischemic encephalopathy

Supplementary table2. Model constructed using variables screened by LASSO lambda. min and lambda. 1se

Model method	Including numbers	variable	Likelihood ratio test	Exp(Coef)	95%CI(Coef)	Concordance	SE(Concordance)
LASSO lambda.min	16		$P<2e-16$	3.788	3.060-4.689	0.879	0.026
LASSO lambda.1se	6		$P<2e-16$	9.837	6.649-14.550	0.865	0.027

Abbreviation: CI, confidence interval; SE, standard error; LASSO, least absolute shrinkage and selection operator

Supplementary table3. Variance inflation factor and tolerance in Cox regression

Term	VIF	VIF_CI_low	VIF_CI_high	SE_factor	Tolerance	Tolerance_CI_low	Tolerance_CI_high
1min Apgar	1.197017	1.106701	1.363779	1.094083	0.8354102	0.7332567	0.9035863
HFV	1.196715	1.106466	1.363467	1.093945	0.8356207	0.7334244	0.9037784
Inhaled NO	1.217059	1.122429	1.384832	1.103204	0.8216530	0.7221094	0.8909250
PH	1.319591	1.204897	1.498487	1.148735	0.7578105	0.6673399	0.8299464
IMV duration	1.149038	1.070058	1.317055	1.071932	0.8702935	0.7592695	0.9345290

Abbreviation: HFV, high frequency ventilation; NO, nitric oxide; IMV, invasive mechanical ventilation; VIF, variance inflation factor; CI, confidence interval; SE, standard error.

Supplementary table4. Interaction effect between high frequency ventilation and other variables based on multivariate Cox regression

Variables	<i>n</i> (%)	Without HFV	HFV	HR (95%CI)	<i>P</i>	Interaction term	P for interaction
Inhaled NO						Inhaled NO ^ HFV	0.058
No	351 (71.05)	20/266	12/85	3.07 (1.44–6.54)	0.004		
Yes	143 (28.95)	19/98	16/45	1.32 (0.60–2.89)	0.489		
GA median						Gestational age ^ HFV	0.026
<38.785weeks	247 (50.00)	11/190	11/57	4.60 (1.84–11.48)	0.001		
≥38.785weeks	247 (50.00)	28/174	17/73	1.21 (0.61–2.41)	0.588		
IMV duration median						IMV duration ^ HFV	0.889
<117hours	246 (49.80)	32/194	22/52	1.88 (0.99–3.57)	0.053		
≥117hours	248 (50.20)	7/170	6/78	1.58 (0.50–4.96)	0.433		

Adjusted by HFV, Inhaled NO, GA (as a continuous variable), 1min Apgar (as a continuous variable), PH, and IMV duration (as a continuous variable).

Abbreviation: HFV, high frequency ventilation; HR, Hazard Ratio; CI, Confidence Interval; NO, nitric oxide; GA, gestational age; IMV, invasive mechanical ventilation.

Supplementary table5. Interaction effect between invasive mechanical ventilation and other variables based on multivariate Cox regression

Variables	<i>n</i> (%)	IMV<117hours	IMV≥117hours	HR (95%CI)	<i>P</i>	Interaction term	<i>P</i> for interaction
Inhaled NO						Inhaled NO ^ IMV	0.048
No	351 (71.05)	24/197	8/154	3.36 (0.88—12.79)	0.075		
Yes	143 (28.95)	30/49	5/94	1.74 (0.41—7.35)	0.449		
HFV						HFV ^ IMV	0.889
No	364 (73.68)	32/194	7/170	3.17 (0.81—12.38)	0.096		
Yes	130 (26.32)	22/52	6/78	1.83 (0.46—7.31)	0.395		
GA median						Gestational age ^ IMV	0.536
<38.785weeks	246 (49.80)	15/121	7/126	3.51 (0.70—17.53)	0.125		
≥38.785weeks	248 (50.20)	39/125	6/122	2.22 (0.56—8.85)	0.256		

Adjusted by HFV, Inhaled NO, GA (as a continuous variable), 1min Apgar (as a continuous variable), PH, and IMV duration (as a continuous variable).

Abbreviation: NO, nitric oxide; GA, gestational age; HFV, high frequency ventilation; IMV, invasive mechanical ventilation; HR, Hazard Ratio; CI, Confidence Interval.

Supplementary table6. Interaction effect between inhaled nitric oxide and other variables based on multivariate Cox regression

Variables	<i>n</i> (%)	Without inhaled NO	Inhaled NO	HR (95%CI)	<i>P</i>	Interaction term	P for interaction
IMV duration median						IMV duration ^ Inhaled NO	0.048
<117hours	246 (49.80)	24/197	30/49	8.12 (4.41—14.97)	<.001		
≥117hours	248 (50.20)	8/154	5/94	0.89 (0.26—3.06)	0.857		
HFV						HFV ^ Inhaled NO	0.058
No	364 (73.68)	20/266	19/98	7.59 (3.87—14.87)	<.001		
Yes	130 (26.32)	12/85	16/45	3.60 (1.55—8.35)	0.003		
GA median						Gestational age ^ Inhaled NO	0.328
<38.785weeks	247 (50.00)	13/178	9/69	2.85 (1.04—7.79)	0.042		
≥38.785weeks	247 (50.00)	19/173	26/74	8.13 (3.98—16.59)	<.001		

Adjusted by HFV, Inhaled NO, GA (as a continuous variable), 1min Apgar (as a continuous variable), PH, and IMV duration (as a continuous variable).
Abbreviation: IMV, invasive mechanical ventilation; HFV, high frequency ventilation; GA, gestational age; NO, nitric oxide; HR, Hazard Ratio; CI, Confidence Interval.

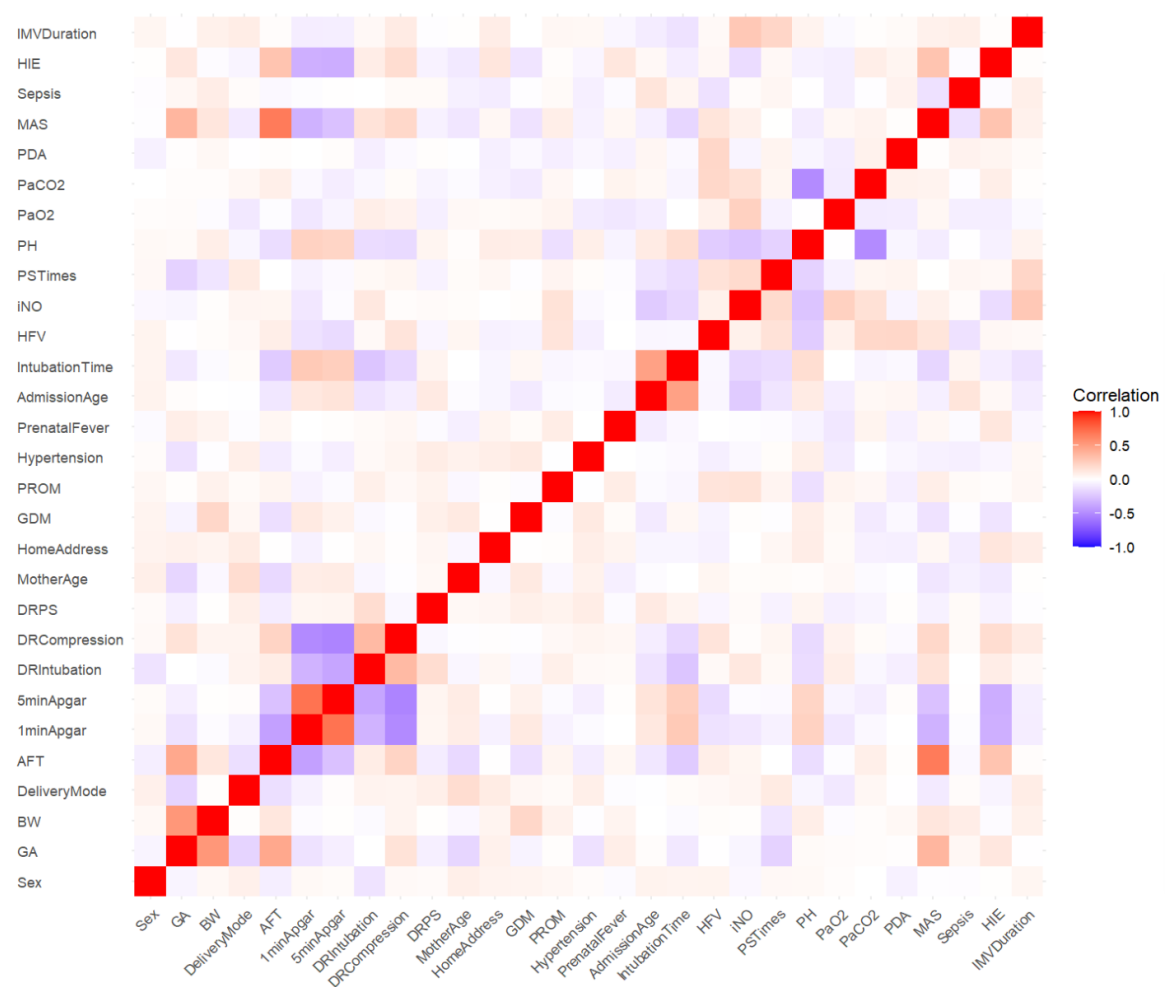
Supplementary table7. Interaction effect between gestational age in newborns and other variables based on multivariate Cox regression

Variables	<i>n</i> (%)	GA<38.785weeks	GA≥38.785weeks	HR (95% CI)	<i>P</i>	Interaction term	P for interaction
IMV duration median						IMV duration ^ GA	0.536
<117hours	246 (49.80)	15/121	39/125	1.31 (0.44—3.85)	0.628		
≥117hours	248 (50.20)	7/126	6/122	0.76 (0.10—5.79)	0.788		
Inhaled NO						Inhaled NO ^ GA	0.328
No	351 (71.05)	13/178	19/173	1.88 (0.54—6.50)	0.320		
Yes	143 (28.95)	9/69	26/74	1.27 (0.29—5.60)	0.755		
HFV						HFV ^ GA	0.026
No	247 (50.00)	11/190	28/174	2.36 (0.65—8.54)	0.191		
Yes	247 (50.00)	11/57	17/73	0.25 (0.06—1.04)	0.057		

Adjusted by HFV, Inhaled NO, GA (as a continuous variable), 1min Apgar (as a continuous variable), PH, and IMV duration (as a continuous variable).

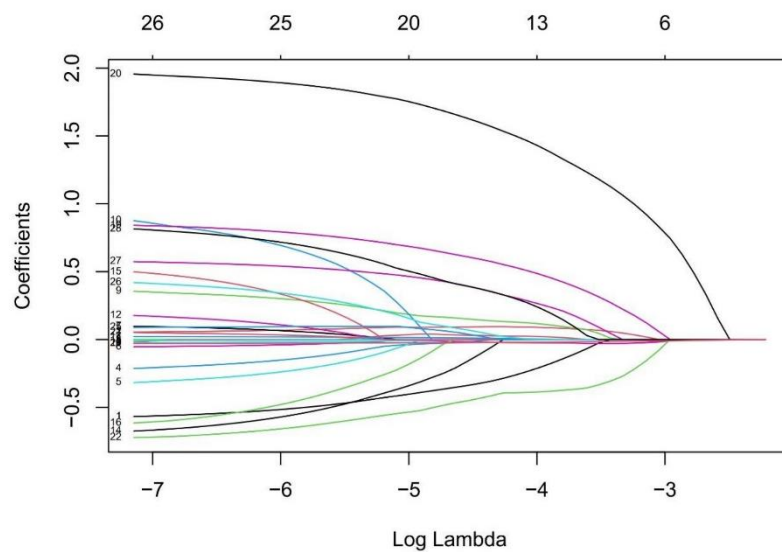
Abbreviation: IMV, invasive mechanical ventilation; NO, nitric oxide; HFV, high frequency ventilation; GA, gestational age; HR, Hazard Ratio; CI, Confidence Interval.

Supplementary figure 1. Correlation matrix diagram between included variables (low correlation = "blue", high correlation = "red", mid correlation = "white") (Abbreviations: IMV, invasive mechanical ventilation; HIE, hypoxic-ischemic encephalopathy; MAS, meconium aspiration syndrome; PDA, patent ductus arteriosus; PaO₂, arterial oxygen partial pressure; PaCO₂, arterial carbon dioxide partial pressure; PS, pulmonary surfactant; iNO, inhaled nitric oxide; HFV, high frequency ventilation; PROM, premature rupture of membranes; GDM, gestational diabetes mellitus; DR, delivery room; AFT, amniotic fluid turbidity; BW, birth weight; GA, gestational age)

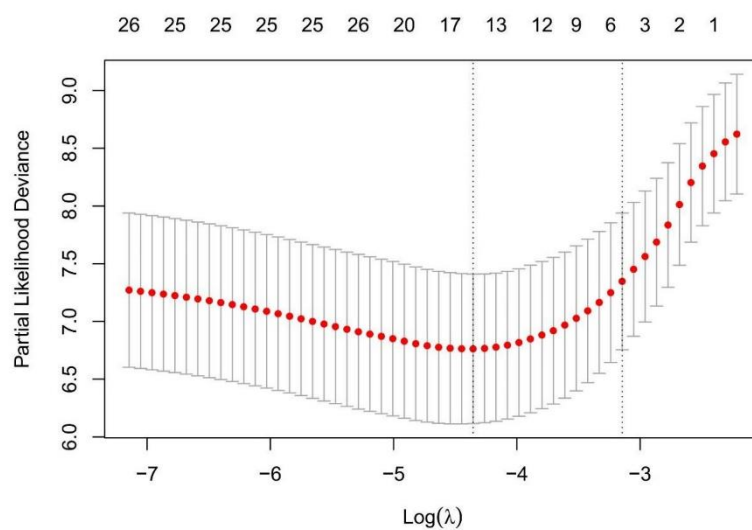


Supplementary figure 2. The variables screened by LASSO regression (A: Coefficient path plot. The horizontal axis represents the Log Lambda value. The vertical axis represents the coefficient; B: Cross validation curve. The horizontal axis represents the Log Lambda value. The vertical axis represents the mean squared error.)

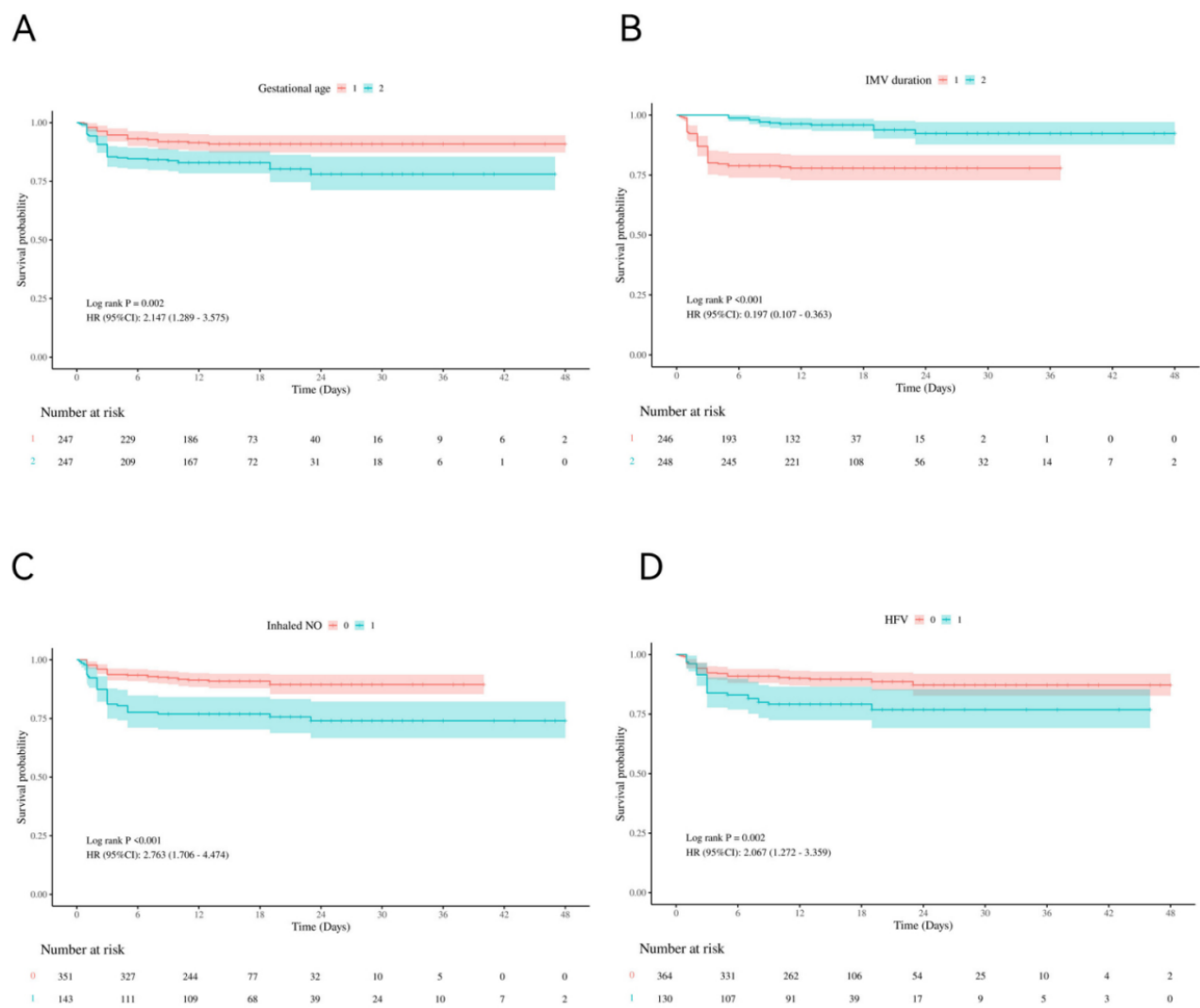
A



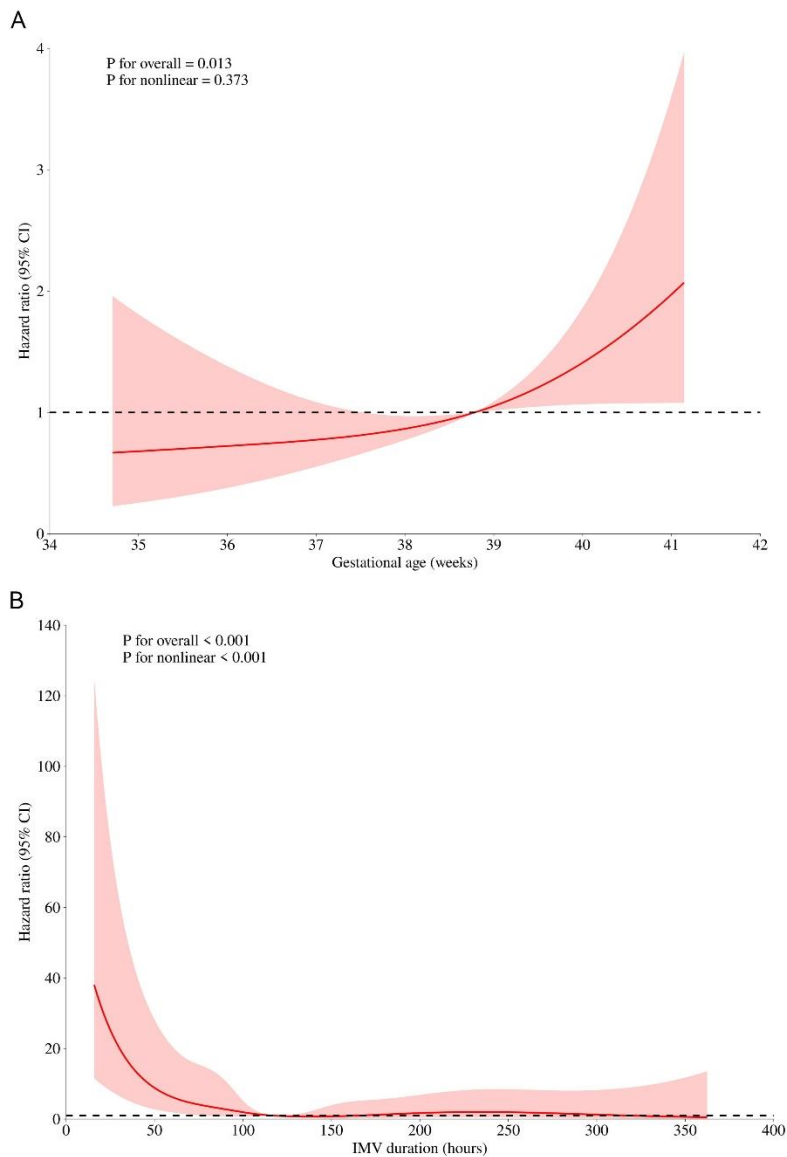
B



Supplementary figure 3. Kaplan-Meier curve with log-rank test (A: Gestational age (cut by median), 1: <38.785 weeks, 2: ≥38.785 weeks; B: IMV duration (cut by median), 1: <117 hours, 2: ≥117 hours; C: Inhaled NO, 0: Not used, 1: Used; D: HFV, 0: Not used, 1: Used.) (Abbreviations: IMV, invasive mechanical ventilation; NO, nitric oxide; HFV, high frequency ventilation)



Supplementary figure 4. Restricted cubic spline [A: RCS between different gestational ages and mortality risk; B: RCS between different IMV durations and mortality risk. Adjusted by gestational age (as a continuous variable), inhaled NO, PPHN, IMV duration (as a continuous variable), 1min Apgar (as a continuous variable)] (Abbreviations: IMV, invasive mechanical ventilation)



Supplementary figure 5. Distribution of mortality cases across distinct IMV time intervals (The median IMV duration was 117 hours.) (Abbreviations: IMV, invasive mechanical ventilation)

