

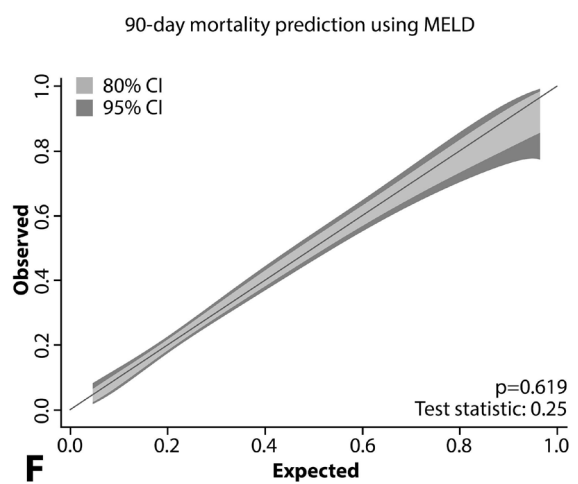
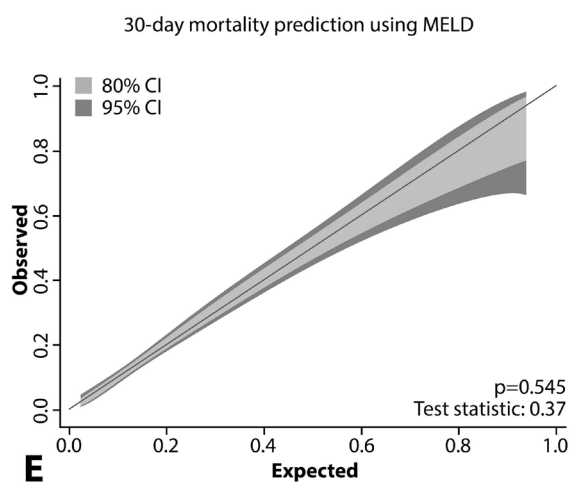
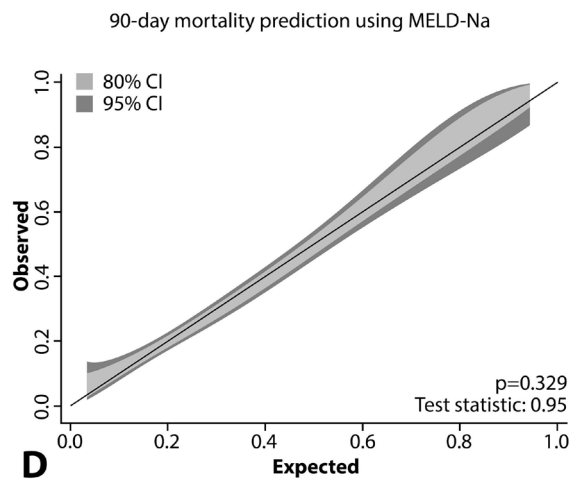
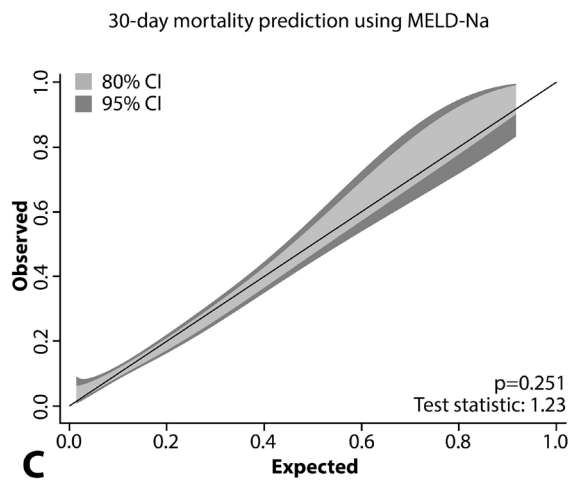
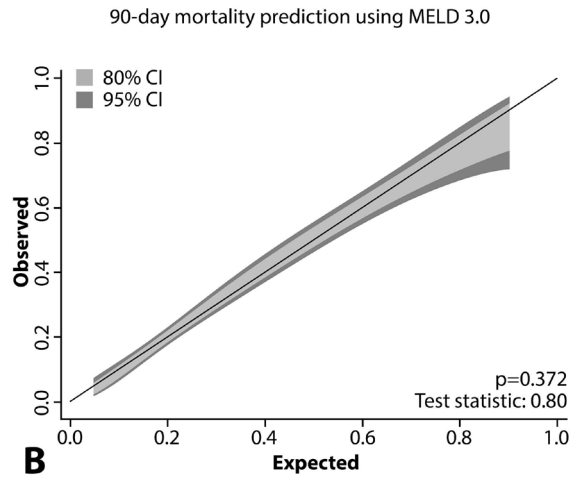
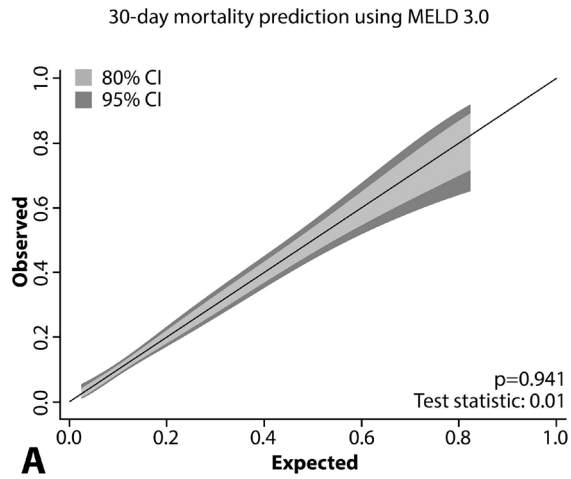
# **MELD 3.0 adequately predicts mortality and renal replacement therapy requirements in patients with alcohol-associated hepatitis**

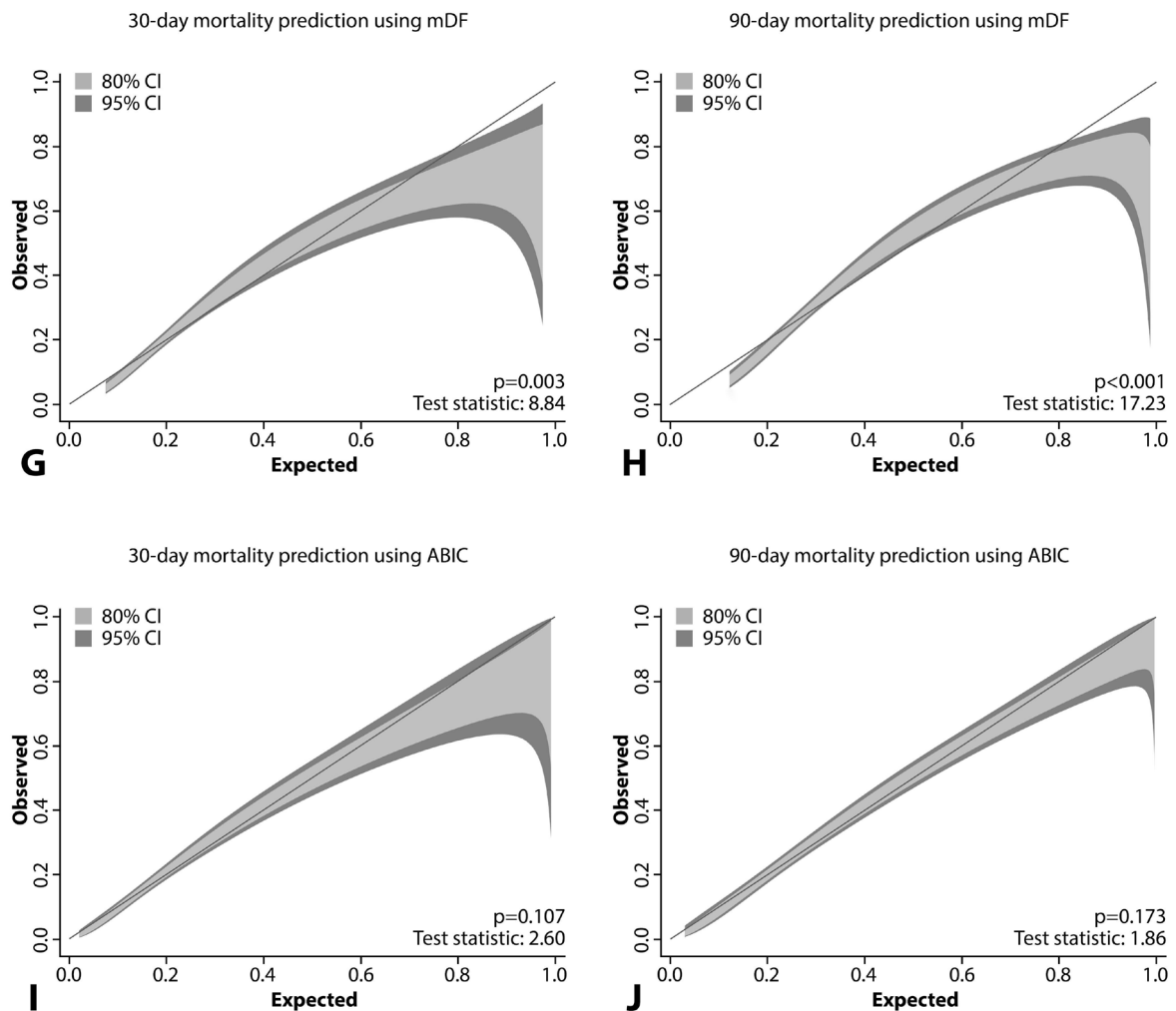
Luis Antonio Díaz, Eduardo Fuentes-López, Gustavo Ayares, Francisco Idalsoaga, Jorge Arnold, María Ayala Valverde, Diego Perez, Jaime Gómez, Rodrigo Escarate, Alejandro Villalón, Carolina A. Ramírez, Maria Hernandez-Tejero, Wei Zhang, Steve Qian, Douglas A. Simonetto, Joseph C. Ahn, Seth Buryska, Winston Dunn, Heer Mehta, Rohit Agrawal, Joaquín Cabezas, Inés García-Carrera, Berta Cuyàs, Maria Poca, German Soriano, Shiv K. Sarin, Rakhi Maiwall, Prasun K. Jalal, Saba Abdulsada, Fátima Higuera-de-la-Tijera, Anand V. Kulkarni, P Nagaraja Rao, Patricia Guerra Salazar, Lubomir Skladaný, Natália Bystrianska, Ana Clemente-Sanchez, Clara Villaseca-Gómez, Tehseen Haider, Kristina R Chacko, Gustavo A. Romero, Florencia D. Pollarsky, Juan Carlos Restrepo, Susana Castro-Sanchez, Luis G. Toro, Pamela Yaquich, Manuel Mendizabal, Maria Laura Garrido, Sebastián Marciano, Melisa Dirchwolf, Victor Vargas, César Jiménez, Alexandre Louvet, Guadalupe García-Tsao, Juan Pablo Roblero, Juan G. Abralde, Vijay H. Shah, Patrick S. Kamath, Marco Arrese, Ashwani K. Singal, Ramon Bataller, Juan Pablo Arab

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## Supplementary Figure





**Fig. S1-** Calibration curves of MELD 3.0 (A–B), MELD-Na (C–D), MELD (E–F), mDF (G–H), and ABIC (I–J) scores in predicting 30-day and 90-day mortality. We used calibration plots, where a second logit regression model was formulated to assess the relationship of predictions to the true probabilities of the event. The calibration belt's deviation from the identity line was reported with a  $p$ -value. The figures denote that both the 80% and 95% calibration belts encompass the bisector over the whole range of the predicted probabilities.

## Supplementary Tables

**Table S1.-** Participant centers and recruited patients in the study.

<b>Country</b>	<b>Center (n)</b>
<b>Argentina</b>	Hospital San Luis (6)
	Hospital Universitario Austral de Buenos Aires (6)
	Hospital Italiano de Buenos Aires (5)
	Hospital Privado de Rosario (6)
	Hospital Dr. Carlos Bonorino Udaondo (11)
<b>Bolivia</b>	Instituto de Gastroenterología Boliviano-Japonés (24)
<b>Canada</b>	University of Alberta (33)
<b>Chile</b>	Hospital El Pino (32)
	Pontificia Universidad Católica de Chile (25)
	Hospital San Juan de Dios (7)
<b>Colombia</b>	Hospital Pablo Tobón Uribe (9)
	Hospital de San Vicente Fundación (9)
<b>Spain</b>	Hospital de la Santa Creu i Sant Pau (67)
	Hospital Gregorio Marañón (20)
	Hospital Universitario Marqués de Valdecilla (73)
	Hospital Universitari Vall d'Hebron (49)
<b>India</b>	Asian Institute of Gastroenterology, Hyderabad (26)
	Institute of Liver and Biliary Sciences, New Delhi (442)
<b>Mexico</b>	Hospital General de México "Dr. Eduardo Liceaga" (36)
<b>Slovakia</b>	Faculty Hospital FD Roosevelt (22)
<b>United States</b>	Baylor College of Medicine, Houston (30)
	University of South Dakota (139)
	Mayo Clinic, Rochester (148)
	Cook County Hospital, Kansas (93)
	Montefiore Medical Center, Bronx NY (14)
	University of Florida (178)
	University of Kansas Medical Center (589)
	Yale University (25)

**Table S2.-** Cut-points of MELD 3.0 score to predict 30-day and 90-day mortality, and their respective sensitivity and specificity. *The values were obtained from Receiver operating characteristic (ROC) curves.*

Cutpoint	30-day mortality		90-day mortality	
	Sensitivity (%)	Specificity (%)	Sensitivity (%)	Specificity (%)
6	100	0.0	100	0.0
7	100	0.5	100	0.6
8	100	1.3	100	1.5
9	99.7	2.2	99.8	2.6
10	99.7	3.0	99.6	3.5
11	99.7	3.9	99.6	4.5
12	99.7	5.0	99.4	5.7
13	99.1	6.5	98.9	7.5
14	97.8	8.3	97.7	9.4
15	97.5	9.9	97.5	11.4
16	97.2	12.9	96.6	14.6
17	97.2	16.7	96.6	18.9
18	96.2	20.5	95.3	23.1
19	95.9	24.8	94.1	27.7
20	95.0	28.0	91.7	31.1
21	91.5	32.6	89.2	36.1
22	90.3	37.6	87.7	41.6
23	87.1	41.8	84.8	46.0
24	86.2	46.8	82.8	51.0
25	83.3	51.3	79.5	55.6
26	78.6	56.3	74.8	60.9
27	79.1	61.3	70.6	65.4
28	73.0	64.8	66.5	68.5
29	68.9	68.7	62.5	72.4
30	67.0	72.3	60.0	76.1
31	65.4	75.2	57.8	78.9
32	62.6	55.3	55.1	80.7
33	59.1	80.3	50.4	82.8
34	53.1	82.1	44.9	84.2
35	49.7	85.2	41.3	87.2
36	47.5	87.4	39.0	89.2
37	44.3	88.7	36.2	90.4
38	41.2	89.5	33.7	91.1
39	38.1	91.1	29.9	92.0
40	33.7	92.9	25.9	93.5

**Table S3.-** Cut-off points of MELD-Na score to predict 30-day and 90-day mortality, and their respective sensitivity and specificity. *The values were obtained from Receiver operating characteristic (ROC) curves.*

Cutpoint	30-day mortality		90-day mortality	
	Sensitivity (%)	Specificity (%)	Sensitivity (%)	Specificity (%)
6	100	0.0	100	0.0
7	100	0.0	100	0.0
8	100	0.0	100	0.0
9	100	0.0	100	0.0
10	100	0.2	110	0.2
11	99.7	0.2	99.8	0.3
12	99.7	0.5	99.8	0.6
13	99.7	0.7	99.8	0.8
14	99.7	1.0	99.8	1.2
15	99.7	2.0	99.8	2.3
16	99.4	2.8	99.6	3.4
17	98.5	4.3	99.0	5.1
18	97.6	6.2	97.7	7.0
19	96.7	8.0	96.7	9.0
20	96.4	9.7	96.3	10.7
21	96.1	12.7	95.9	14.1
22	95.2	16.2	95.0	18.1
23	93.6	20.4	93.8	23.0
24	93.0	26.4	91.3	29.2
25	91.5	32.5	88.4	35.2
26	87.0	38.3	84.3	41.4
27	85.2	44.8	81.2	48.0
28	82.1	51.9	77.1	55.3
29	79.1	57.6	72.3	60.6
30	74.6	62.5	67.8	65.3
31	69.1	67.9	62.8	70.7
32	63.6	71.7	56.0	73.5
33	59.4	76.4	51.9	78.5
34	53.3	80.7	46.7	82.8
35	47.9	84.8	51.5	86.8
36	41.5	87.8	35.7	89.6
37	37.0	90.0	31.0	91.3
38	32.7	92.3	26.0	93.1
39	27.3	94.6	21.3	95.3
40	23.6	96.4	17.8	96.6

**Table S4.-** Cut-off points of traditional MELD score to predict 30-day and 90-day mortality, and their respective sensitivity and specificity. *The values were obtained from Receiver operating characteristic (ROC) curves.*

Cutpoint	30-day mortality		90-day mortality	
	Sensitivity (%)	Specificity (%)	Sensitivity (%)	Specificity (%)
6	100	0.0	100	0.0
7	99.5	0.6	99.5	0.6
8	99.5	0.9	99.3	0.8
9	99.3	1.2	99.2	1.2
10	99.3	1.6	99.2	1.8
11	98.8	2.0	98.7	2.2
12	98.6	2.8	98.2	2.9
13	98.3	4.1	98.0	4.2
14	98.1	5.4	97.8	5.8
15	97.4	8.0	97.2	8.5
16	96.7	10.4	96.5	11.2
17	95.5	13.2	95.5	14.3
18	94.6	16.2	94.2	17.5
19	93.8	20.3	93.4	22.1
20	92.7	24.7	92.2	26.9
21	90.5	30.4	89.9	33.2
22	88.2	36.0	86.5	40.0
23	85.6	43.2	82.4	46.3
24	82.2	49.5	78.4	52.8
25	77.7	55.0	74.1	58.4
26	74.4	61.1	69.3	64.3
27	71.1	66.0	65.5	69.0
28	67.5	71.0	61.0	73.6
29	62.8	74.6	56.0	76.8
30	58.3	79.0	51.2	80.7
31	54.0	82.8	47.5	84.9
32	51.4	84.8	44.7	86.7
33	45.5	87.1	39.7	88.9
34	42.4	88.2	36.9	90.0
35	38.6	90.2	32.7	91.5
36	33.7	91.7	28.4	92.9
37	30.3	93.2	24.9	94.0
38	27.0	94.6	21.9	95.4
39	24.2	95.5	19.6	96.3
40	21.5	96.3	17.3	96.9

**Table S5.-** Cut-points of modified Maddrey’s discriminant function (mDF) score to predict 30-day and 90-day mortality, and their respective sensitivity and specificity. *The values were obtained from Receiver operating characteristic (ROC) curves.*

Cutpoint	30-day mortality		90-day mortality	
	Sensitivity (%)	Specificity (%)	Sensitivity (%)	Specificity (%)
4	100	0.9	100	1.1
8	99.8	2.0	99.8	2.4
12	99.8	3.3	99.8	3.9
16	99.5	4.6	99.2	5.2
20	98.6	6.4	98.3	7.2
24	97.4	8.6	97.0	9.5
28	96.7	12.1	96.2	13.5
32	95.5	15.2	94.7	16.8
36	93.1	20.5	92.1	22.7
40	90.0	28.4	88.5	31.4
44	88.1	35.5	85.6	39.0
48	84.7	42.2	81.3	46.0
52	81.2	48.5	76.4	56.2
56	76.9	53.9	71.4	57.6
60	71.1	59.6	65.6	63.2
64	66.1	64.3	61.0	68.1
68	62.1	68.1	57.7	71.8
72	58.2	71.6	53.7	75.2
76	54.7	75.2	49.8	78.9
80	51.8	78.9	46.3	82.2
84	47.3	82.0	42.3	84.9
88	43.2	84.4	38.3	86.8
92	39.9	86.8	34.1	88.8
96	37.2	88.2	31.6	89.8
100	34.6	89.3	29.6	90.9
104	31.0	90.5	26.1	91.6
108	29.1	91.9	24.3	93.1
112	26.7	92.9	22.4	94.1
116	24.8	94.0	20.6	95.0
120	22.7	94.9	18.2	95.6



**Table S6.-** Different cut-off points of Age-Bilirubin-International Normalized Ratio-Creatinine (ABIC) score to predict 30-day and 90-day mortality, and their respective sensitivity and specificity. *The values were obtained from Receiver operating characteristic (ROC) curves.*

Cutpoint	30-day mortality		90-day mortality	
	Sensitivity (%)	Specificity (%)	Sensitivity (%)	Specificity (%)
4.0	100	0.0	100	0.0
4.5	100	0.6	100	0.6
5.0	99.8	1.8	99.8	2.2
5.5	99.5	5.3	99.7	6.4
6.0	98.6	12.0	98.3	13.9
6.5	96.2	20.1	96.2	22.5
7.0	91.9	30.2	91.0	33.6
7.5	84.3	44.1	83.1	48.7
8.0	75.7	57.0	72.3	61.0
8.5	67.5	70.5	61.6	73.9
9.0	53.9	81.3	47.8	84.2
9.5	43.7	88.0	37.6	90.1
10.0	31.0	92.5	26.9	94.2
10.5	21.5	96.0	18.5	97.0
11.0	16.2	97.6	13.7	98.0
11.5	11.9	98.2	10.2	98.9
12.0	8.6	98.9	7.5	99.4
12.5	5.7	99.5	4.7	99.7
13.0	3.8	99.5	3.2	99.7
13.5	1.4	99.6	1.2	99.7
14.0	1.0	99.7	0.7	99.7

**Table S7.-** Reclassification of patients between MELD-Na and MELD 3.0. (A) the number of deaths and (B) the proportion of deaths at 90 days. *Red-filled cells indicate up-scoring (MELD 3.0 category higher than MELD-Na), and blue-filled cells are the opposite.*

A Patients (N)		MELD 3.0				
		6-9	10-19	20-29	30-39	40+
MELD-Na	6-9	0	-	-	-	-
	10-19	2	11	5	-	-
	20-29	-	19	104	12	-
	30-39	-	7	41	147	41
	40+	-	-	-	2	81

B Patients (%)		MELD 3.0				
		6-9	10-19	20-29	30-39	40+
MELD-Na	6-9	0%	-	-	-	-
	10-19	0.4%	2.3%	1.1%	-	-
	20-29	-	4.0%	22.0%	2.5%	-
	30-39	-	1.5%	8.7%	31.2%	8.7%
	40+	-	-	-	0.4%	17.2%

**Table S8.-.** Comparisons between MELD 3.0, MELD-Na, MELD, modified Maddrey’s discriminant function (mDF), and Age-Bilirubin-International Normalized Ratio-Creatinine (ABIC) scores in predicting 30- and 90-day mortality using time-dependent AUC with competing risks analysis. *Estimations were made using inverse probability of censoring weighted.*

Model	30-day mortality		90-day mortality	
	AUC (95%CI)	p-value	AUC (95%CI)	p-value
<b>MELD 3.0</b>	0.757 (0.724–0.790)	Reference	0.739 (0.711–0.768)	Reference
<b>MELD-Na</b>	0.737 (0.703–0.772)	0.028	0.722 (0.692–0.752)	0.032
<b>MELD</b>	0.739 (0.708–0.770)	0.514	0.725 (0.698–0.752)	0.195
<b>mDF</b>	0.717 (0.687–0.748)	0.042	0.693 (0.666–0.721)	0.001
<b>ABIC</b>	0.737 (0.707–0.766)	0.689	0.73 (0.707–0.758)	0.740

**Table S9.-** Performance of MELD 3.0, MELD-Na, MELD, modified Maddrey’s discriminant function (mDF), and Age-Bilirubin-International Normalized Ratio-Creatinine (ABIC) scores in predicting 30-day mortality in AH. *We evaluated the country's incremental value by comparing the AUC for logistic models predicting 30-day mortality when including or not the country of each patient.*

Models	30-day mortality		
	AUC (95%CI)	<i>p-value</i>	<i>p-value</i> for testing the incremental predicting value of each country
<b>MELD 3.0</b>	0.762 (0.732–0.791)	Reference	0.079
<b>MELD-Na</b>	0.744 (0.712–0.775)	0.035	0.089
<b>MELD</b>	0.753 (0.724–0.783)	0.290	0.047
<b>mDF</b>	0.723 (0.692–0.756)	0.013	0.272
<b>ABIC</b>	0.756 (0.726–0.787)	0.710	0.012

**Table S10.-** Comparison of AUC from MELD 3.0, MELD-Na, MELD, modified Maddrey’s discriminant function (mDF), and Age-Bilirubin-International Normalized Ratio-Creatinine (ABIC) scores in predicting 30 or 90-day mortality among patients with alcohol-associated hepatitis who underwent corticosteroid treatment. *Comparisons were made using DeLong’s method.*

Model	30-day mortality		90-day mortality	
	AUC (95%CI)	p-value	AUC (95%CI)	p-value
<b>MELD 3.0</b>	0.728 (0.681–0.776)	Reference	0.720 (0.679–0.760)	Reference
<b>MELD-Na</b>	0.703 (0.651–0.754)	0.089	0.687 (0.645–0.729)	0.013
<b>MELD</b>	0.704 (0.652–0.757)	0.130	0.693 (0.651–0.735)	0.049
<b>mDF</b>	0.681 (0.628–0.733)	0.048	0.681 (0.637–0.725)	0.067
<b>ABIC</b>	0.734 (0.686–0.781)	0.833	0.718 (0.678–0.758)	0.943

**Table S11.-** Comparison of AUC between MELD 3.0, MELD-Na, MELD, modified Maddrey’s discriminant function (mDF), and Age-Bilirubin-International Normalized Ratio-Creatinine (ABIC) scores in predicting response to corticosteroid treatment at day 7 among patients with severe alcohol-associated hepatitis. *Comparisons were made using DeLong’s method.*

Model	Response to corticosteroid treatment at day 7	
	AUC (95%CI)	P-value
<b>MELD 3.0</b>	0.685 (0.644–0.727)	Reference
<b>MELD-Na</b>	0.644 (0.601–0.687)	<0.001
<b>MELD</b>	0.659 (0.617–0.702)	0.041
<b>mDF</b>	0.625 (0.581–0.669)	0.003
<b>ABIC</b>	0.746 (0.708–0.784)	0.002

**Table S12.-** Comparison of MELD 3.0, MELD-Na, MELD, modified Maddrey’s discriminant function (mDF), and Age-Bilirubin-International Normalized Ratio-Creatinine (ABIC) scores in predicting mortality in AH according to sex. *Receiver operating characteristic curves and c-statistics were generated. Comparisons were made using DeLong's method.*

Sex	Models	30-day mortality		90-day mortality	
		AUC (95%CI)	p-value	AUC (95%CI)	p-value
Men	MELD 3.0	0.766 (0.730–0.801)	Reference	0.746 (0.713–0.778)	Reference
	MELD-Na	0.753 (0.716–0.789)	0.156	0.724 (0.691–0.758)	0.013
	MELD	0.765 (0.729–0.801)	0.945	0.738 (0.706–0.771)	0.401
	mDF	0.733 (0.695–0.770)	0.072	0.715 (0.681–0.749)	0.057
	ABIC	0.759 (0.722–0.795)	0.672	0.755 (0.723–0.786)	0.523
Women	MELD 3.0	0.748 (0.693–0.802)	Reference	0.737 (0.690–0.785)	Reference
	MELD-Na	0.723 (0.663–0.782)	0.162	0.715 (0.665–0.765)	0.157
	MELD	0.725 (0.667–0.782)	0.113	0.717 (0.668–0.765)	0.144
	mDF	0.701 (0.643–0.758)	0.069	0.686 (0.636–0.737)	0.031
	ABIC	0.748 (0.693–0.802)	0.940	0.726 (0.679–0.774)	0.625

**Table S13.-** Comparison of AUC between MELD 3.0, MELD-Na, MELD, modified Maddrey’s discriminant function (mDF), and Age-Bilirubin-International Normalized Ratio-Creatinine (ABIC) scores in predicting renal replacement therapy requirement among patients with severe alcohol-associated hepatitis. *Comparisons were made using DeLong’s method.*

Model	Renal replacement therapy requirement during admission	
	AUC (95%CI)	P-value
<b>MELD 3.0</b>	0.844 (0.805–0.883)	Reference
<b>MELD-Na</b>	0.820 (0.775–0.864)	0.005
<b>MELD</b>	0.820 (0.777–0.863)	0.004
<b>mDF</b>	0.701 (0.648–0.753)	<0.0001
<b>ABIC</b>	0.690 (0.638–0.741)	<0.0001



**Table S14.-** Different cut-off points of MELD 3.0 score to predict renal replacement therapy requirements during admission, and their respective sensitivity and specificity. *The values were obtained from Receiver operating characteristic (ROC) curves.*

<b>Cutpoint</b>	<b>Sensitivity (%)</b>	<b>Specificity (%)</b>
6	100	0.0
7	100	0.6
8	100	1.4
9	100	2.5
10	100	3.4
11	100	4.3
12	100	5.4
13	100	6.7
14	98.2	8.6
15	97.3	10.3
16	97.3	12.2
17	97.3	15.1
18	96.4	18.5
19	96.4	22.3
20	96.4	25.0
21	96.4	29.5
22	95.5	34.1
23	93.8	38.2
24	92.9	42.9
25	92.9	47.4
26	92.9	52.0
27	92.9	56.8
28	91.1	60.0
29	89.3	64.4
30	86.6	67.7
31	83.0	70.3
32	80.4	72.5
33	79.5	75.6
34	76.8	78.4
35	74.1	81.6
36	70.5	83.7
37	67.9	85.3
38	65.2	88.7
39	62.5	88.5
40	57.1	90.4