

TABLE S1. AUROC for prediction of shock by each machine-learning method, shock index, and adjusted shock index

<b>Time Before Shock (hour)</b>	<b>RNN</b>	<b>MLP</b>	<b>RF</b>	<b>LR</b>	<b>Shock Index</b>	<b>Adjusted Shock Index</b>
<b>24</b>	0.610	0.621	0.528	0.594	0.637	0.685
<b>23</b>	0.600	0.614	0.552	0.603	0.602	0.622
<b>22</b>	0.675	0.685	0.577	0.632	0.602	0.632
<b>21</b>	0.706	0.701	0.594	0.659	0.584	0.620
<b>20</b>	0.708	0.713	0.608	0.686	0.567	0.625
<b>19</b>	0.671	0.685	0.618	0.672	0.564	0.590
<b>18</b>	0.622	0.698	0.624	0.698	0.576	0.556
<b>17</b>	0.687	0.689	0.629	0.690	0.564	0.610
<b>16</b>	0.687	0.691	0.638	0.708	0.559	0.610
<b>15</b>	0.704	0.716	0.654	0.720	0.572	0.605
<b>14</b>	0.687	0.713	0.657	0.724	0.542	0.673
<b>13</b>	0.713	0.704	0.666	0.723	0.562	0.573
<b>12</b>	0.715	0.740	0.679	0.735	0.554	0.568
<b>11</b>	0.727	0.743	0.682	0.743	0.559	0.586
<b>10</b>	0.731	0.728	0.703	0.752	0.580	0.597
<b>9</b>	0.741	0.747	0.713	0.757	0.538	0.617
<b>8</b>	0.763	0.765	0.732	0.771	0.579	0.619
<b>7</b>	0.775	0.778	0.764	0.785	0.562	0.612
<b>6</b>	0.779	0.790	0.782	0.788	0.580	0.660
<b>5</b>	0.783	0.802	0.807	0.802	0.565	0.609
<b>4</b>	0.797	0.819	0.826	0.812	0.531	0.557
<b>3</b>	0.822	0.841	0.852	0.830	0.546	0.732
<b>2</b>	0.853	0.864	0.877	0.854	0.518	0.658
<b>1</b>	0.881	0.899	0.903	0.878	0.544	0.493

RNN, Recurrent Neural Network; MLP, Multi-layer perceptron; RF, Random forest; LR, Logistic regression; SI, Shock index; ASI, Adjusted shock index.

**FIG. S1. Interval of bolus hydration and hypotensive shock event. The number is the time between hypotensive shock event and hydration.**

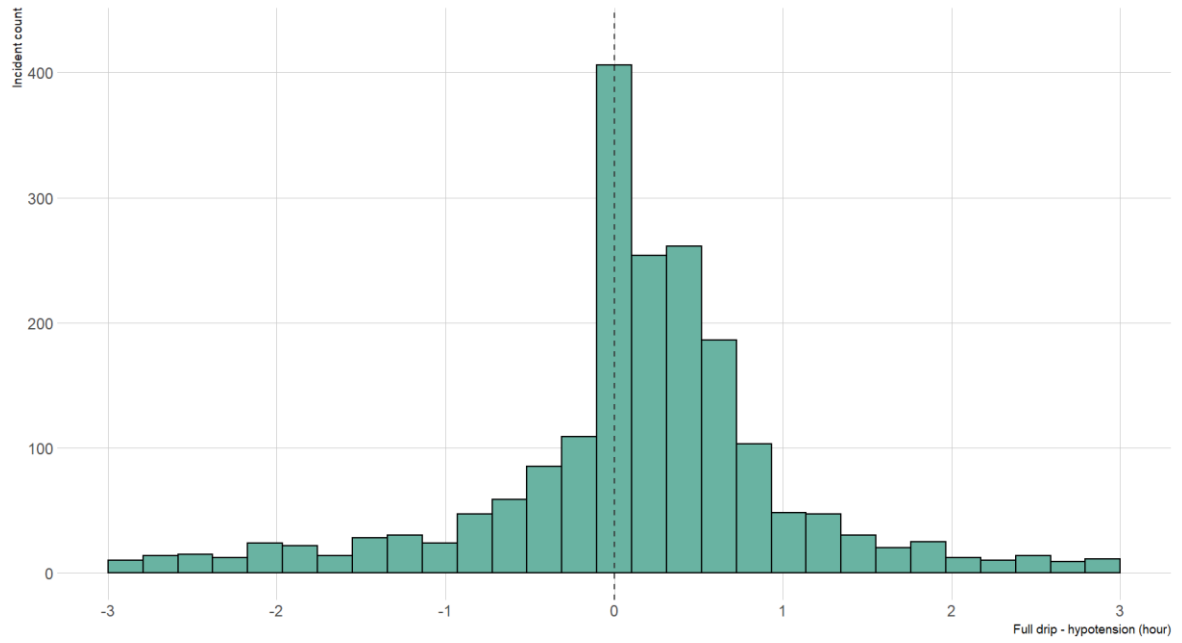


TABLE S2. Random forest model sensitivity analysis

<b>Time Before Shock (hour)</b>	<b>AUROC</b>	<b>Accuracy</b>	<b>Sensitivity</b>	<b>Specificity</b>
1	0.903	0.85	0.819	0.851
2	0.877	0.799	0.804	0.799
3	0.852	0.796	0.778	0.796
4	0.826	0.73	0.794	0.727
5	0.807	0.753	0.735	0.754
6	0.782	0.661	0.818	0.654
7	0.764	0.626	0.822	0.618
8	0.732	0.599	0.804	0.59
9	0.713	0.596	0.785	0.588
10	0.703	0.508	0.855	0.493
11	0.682	0.461	0.877	0.444
12	0.679	0.474	0.864	0.457
13	0.666	0.431	0.89	0.412
14	0.657	0.413	0.9	0.392
15	0.654	0.386	0.916	0.363
16	0.638	0.386	0.894	0.364
17	0.629	0.359	0.916	0.335
18	0.624	0.329	0.942	0.303
19	0.618	0.313	0.941	0.287
20	0.608	0.298	0.944	0.27
21	0.594	0.266	0.953	0.237
22	0.577	0.226	0.963	0.194
23	0.552	0.187	0.947	0.155
24	0.528	0.125	0.966	0.09

TABLE S3. Variation in vital signs

	SMC			MIMIC		
	<i>Latent shock</i>	<i>Non-Latent Shock</i>		<i>Latent shock</i>	<i>Non-Latent Shock</i>	
	Median [IQR]	Median [IQR]	p-value	Median [IQR]	Median [IQR]	p-value
<b><i>SBP</i></b>	105 [94,108]	122 [108, 125]	<0.001	110 [99, 125]	129 [115, 146]	<0.001
<b><i>DBP</i></b>	62 [55, 63]	74 [65, 75]	<0.001	60 [53, 70]	73 [63, 83]	<0.001
<b><i>SPO<sub>2</sub></i></b>	97 [95, 98]	98 [96, 98]	<0.001	98 [96, 100]	98 [96, 100]	<0.001
<b><i>RR</i></b>	20 [18, 20]	18 [17, 18]	<0.001	18 [16, 21]	18 [16, 19]	<0.001
<b><i>PR</i></b>	103 [86, 106]	85 [73, 88]	<0.001	87 [72, 105]	81 [70, 95]	<0.001
<b><i>BT</i></b>	37.5 [36.8, 37.7]	37.1 [36.7, 37.2]	<0.001	36.8 [36.5, 37.4]	36.7 [36.5, 37]	<0.001

TABLE S4. Variation of repeated measures in vital signs

	SMC			MIMIC		
	<i>Latent shock</i>	<i>Non-Latent Shock</i>		<i>Latent shock</i>	<i>Non-Latent Shock</i>	
	Median [IQR]	Median [IQR]	p-value	Median [IQR]	Median [IQR]	p-value
<b><i>SBP</i></b>	5 [3, 6]	5 [3, 5]	<0.001	4 [2, 5]	4 [3, 5]	<0.001
<b><i>DBP</i></b>	5 [3, 6]	5 [3, 5]	<0.001	4 [2, 5]	4 [3, 5]	<0.001
<b><i>SPO<sub>2</sub></i></b>	5 [3, 5]	4 [3, 5]	<0.001	3 [2, 5]	4 [2, 5]	<0.001
<b><i>RR</i></b>	5 [4, 6]	5 [3, 5]	<0.001	4 [2, 5]	4 [3, 5]	<0.001
<b><i>PR</i></b>	6 [4, 6]	5 [3, 5]	<0.001	4 [2, 5]	4 [3, 6]	<0.001
<b><i>BT</i></b>	3 [2, 4]	4 [3, 5]	<0.001	2 [2, 3]	3 [2, 4]	<0.001

TABLE S4. Proportion of vital sign information provided without missing

Length of stay	Patient n	DBP	SBP	BT	PR	RR	SpO2
24	19725	38	38	37.3	38.7	38.4	37
23	22496	32.5	32.5	31.2	33.4	33.1	31.6
22	25003	32.8	32.8	31.6	33.9	33.5	32.3
21	27282	32.9	32.9	31.8	33.8	33.5	32
20	29450	31	31	29.8	31.9	31.5	30.1
19	31531	30.3	30.3	29.2	31.4	31	29.6
18	33541	30.7	30.7	29.6	31.8	31.4	29.9
17	35581	31.1	31.2	30.2	32.2	31.9	30.4
16	37628	29.8	29.8	28.8	31	30.6	29.1
15	39900	29.7	29.7	28.7	30.8	30.4	29.1
14	42392	30.3	30.3	29.2	31.3	31	29.6
13	45206	30.8	30.8	29.7	31.9	31.6	30.1
12	48472	30.6	30.6	29.4	31.6	31.2	29.9
11	52571	29.2	29.2	28.2	30.4	30	28.5
10	57383	30.6	30.6	29.5	31.7	31.3	29.9
9	62468	35.1	35.1	33.7	36	35.6	34.2
8	67780	32.7	32.7	31.2	33.8	33.4	31.8
7	73167	32.8	32.8	31.1	33.9	33.3	31.7
6	78214	34.5	34.5	32.6	35.6	35.1	33.4
5	82595	34.6	34.6	32.4	35.8	35.2	33.4
4	86149	35.4	35.4	33.2	36.6	35.9	33.9
3	88506	34.4	34.4	32	35.8	34.9	32.7
2	89161	33.1	33.1	30.4	34.5	33.4	31.5
1	89250	24	24	19.2	25.3	22.3	20.8

Patient n, number of patient.