

Measured resting energy expenditure via indirect calorimetry of critically ill patients: A comparison with predictive equations

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Supplementary Table 1. Predictive equations for resting energy consumption in ICU

Name	Male	Female
Harris-Benedict (H-B)	$66.473 + 13.751W + 5.003H - 6.755A$	$655.096 + 9.563W + 1.849H - 4.675A$
Adjusted Harris-Benedict	†stress coefficient was multiplied based on H-B	
Mifflin-St Jeor	$10 \times W + 6.25 \times H - 5 \times A + 5$	$10 \times W + 6.25 \times H - 5 \times A - 161$
WHO/FAO/UNU	$88.362 + (13.397 \times W) + (4.799 \times H) - (5.677 \times A)$	$447.593 + (9.247 \times W) + (3.098 \times H) - (4.330 \times A)$
Owen	$879.06 + 10.28 \times W$	$794.93 + 7.17 \times W$
Henry	$(58 \times W + 1741 \times H - 14 \times A + 227) / 4.184$	$(58 \times W + 1741 \times H - 14 \times A - 470 + 227) / 4.184$
Weight-kilogram	$25 \times W$	

W is weight (kilogram), H is height (meter for Henry and others for centimeters), A is age (years), and the unit of calculation results is kilocalorie per day (kcal/d).

†The stress coefficient of adjusted H-B formula: Major surgery without complications (1.0-1.1), Moderate trauma or peritonitis (1.25), Severe trauma, infection and organ failure (1.3-1.5), Burns greater than 40% of body surface area (2), Body temperature increases by 1°C (1.1), Body temperature increases by 2°C (1.2).

Supplementary Table 2. Characterization of critical ill patients undergoing resting energy expenditure assessment

Variables	APACHE II ≥ 15	APACHE II < 15	p value
Age (Years)	66.9 ± 12.6	71.0 ± 13.9	0.237
Body weight (kg)	56.6 ± 8.97	55.6 ± 11.1	0.702
Height (cm)	165 ± 6.23	162 ± 7.49	0.101
BMI (kg/m ²)	20.8 ± 3.34	21.1 ± 3.80	0.736
Nutrition intake (kcal)	1241 ± 213	1135 ± 223	0.065
Sex (Male/Female)	15/15	15/15	
First clinical diagnosis			
Pulmonary infection	3 (10.0%)	4 (13.3%)	
Sepsis	5 (16.7%)	3 (10.0%)	
Tumour	5 (16.7%)	3 (10.0%)	
Encephalorrhagia	3 (10.0%)	4 (13.3%)	
Others	14 (46.7%)	15 (53.3%)	
Oxygen delivery method			
Mechanical ventilation	11 (36.7%)	8 (26.7%)	
Oxygen inhalation	19 (63.3%)	22 (73.3%)	

BMI: body mass index; APACHE II: Acute Physiology and Chronic Health Evaluation II; NRS2002: Nutritional Risk Screening 2002.

The study included a total of 60 patients. APACHE II Score estimates ICU mortality based on a number of laboratory values and patient signs taking both acute and chronic disease into account. Age, body weight, height, BMI, NRS2002 score and nutrition intake are described as mean $\pm$ standard deviation of measured values, and types clinical diagnosis and oxygen delivery are described as ratio (N%).

Supplementary Table 3. The comparison of resting energy expenditure measured by indirect calorimetry and calculated via seven equations in subgroups

Groups	N	m-REE	hb-REE	ahb-REE	msj-REE	wfu-REE
APACHE II ≥ 15						
Age ≥ 70	14	1342 $\pm$ 217	1102 $\pm$ 153 [†]	1323 $\pm$ 184	1134 $\pm$ 168 [†]	1144 $\pm$ 155
Age < 70	16	1719 $\pm$ 251	1324 $\pm$ 118 [†]	1581 $\pm$ 147	1342 $\pm$ 96.7 [†]	1351 $\pm$ 112 [†]
Mechanical ventilation	13	1559 $\pm$ 390	1195 $\pm$ 182 [‡]	1434 $\pm$ 218	1250 $\pm$ 145 [‡]	1236 $\pm$ 171 [‡]
Oxygen inhalation	17	1534 $\pm$ 246	1235 $\pm$ 173 [‡]	1475 $\pm$ 207	1242 $\pm$ 185 [‡]	1265 $\pm$ 171 [‡]
APACHE II < 15						
Age ≥ 70	19	892 $\pm$ 149	1058 $\pm$ 192 [§]	1164 $\pm$ 211 [§]	1064 $\pm$ 207	1096 $\pm$ 189 [§]
Age < 70	11	996 $\pm$ 120	1325 $\pm$ 158 [§]	1458 $\pm$ 174 [§]	1305 $\pm$ 186 [§]	1344 $\pm$ 161 [§]
Mechanical ventilation	8	882 $\pm$ 157	1165 $\pm$ 203 [¶]	1282 $\pm$ 224 [¶]	1140 $\pm$ 245	1188 $\pm$ 203 [¶]
Oxygen inhalation	22	957 $\pm$ 138	1177 $\pm$ 231 [¶]	1295 $\pm$ 255 [¶]	1178 $\pm$ 229 [¶]	1209 $\pm$ 223 [¶]

Groups	o-REE	h-REE	w-REE
APACHE II ≥ 15			
Age ≥ 70	1379 $\pm$ 158	1190 $\pm$ 178	1414 $\pm$ 175
Age < 70	1473 $\pm$ 106 [†]	1369 $\pm$ 110 [†]	1548 $\pm$ 171
Mechanical ventilation	1443 $\pm$ 91.4	1277 $\pm$ 157 [‡]	1434 $\pm$ 201
Oxygen inhalation	1420 $\pm$ 162	1291 $\pm$ 180 [‡]	1515 $\pm$ 170
APACHE II < 15			
Age ≥ 70	1331 $\pm$ 185 [§]	1131 $\pm$ 220 [§]	1381 $\pm$ 242 [§]
Age < 70	1441 $\pm$ 158 [§]	1353 $\pm$ 168 [§]	1510 $\pm$ 180 [§]
Mechanical ventilation	1344 $\pm$ 182 [¶]	1195 $\pm$ 222 [¶]	1425 $\pm$ 132 [¶]
Oxygen inhalation	1391 $\pm$ 181 [¶]	1239 $\pm$ 231 [¶]	1441 $\pm$ 252 [¶]

m-REE: REE measured by indirect calorimetry; hb-REE: REE calculated by Harris-Benedict; ahb-REE: REE calculated by adjusted H-B; msj-REE: REE calculated by Mifflin-St Jeor; wfu-REE: REE calculated by WHO/FAO/UNU; o-REE: REE calculated by Owen; h-REE: REE calculated by Henry; w-REE: REE calculated by Kilogram body weight equation; APACHE II: Acute Physiology and Chronic Health Evaluation II

The results were expressed as mean $\pm$ standard deviation. Welch ANOVA and Brown-Forsythe ANOVA for unequal variances with normal distribution. Dunnett's T3 test were used for pairwise comparisons.

[†] $p < 0.01$ vs m-REE when APACHEII ≥ 15 in the subgroups of age,

[‡] $p < 0.01$ vs m-REE when APACHEII ≥ 15 in the subgroups of breathing pattern.

[§] $p < 0.01$ vs m-REE when APACHEII < 15 in the subgroups of age,

[¶] $p < 0.01$ vs m-REE when APACHEII < 15 in the subgroups of breathing pattern.

Supplementary Table 4. The descriptive statistics value of serum hsCRP and PCT, the days in ICU and in hospital, and mortality

Groups	N	hsCRP (mg/L)	PCT (ng/mL)	ICU staying days	hospital length of stay	ICU mortality	28-day mortality
APACHEII ≥ 15	30	20.4 $\pm$ 18.5	4.25 $\pm$ 5.41	16.0 $\pm$ 8.9	30.2 $\pm$ 14.3	6.67%	10.0%
APACHEII < 15	30	11.0 $\pm$ 11.2	2.82 $\pm$ 4.68	5.00 $\pm$ 3.70	21.8 $\pm$ 10.2	3.33%	6.67%

PCT: procalcitonin; hsCRP: high-sensitivity C-reactive protein; APACHE II: Acute Physiology and Chronic Health Evaluation II

REE, hsCRP, and PCT are described as mean $\pm$ standard deviation of measured values. The days in ICU and in hospital were described as the mean $\pm$ standard deviation of the medical record statistics. ICU mortality and 28-day mortality are described as ratio (N%).