

Table 16.7. Advantages and disadvantages of predictive equations for estimating energy targets in critically ill patients (adapted from Segaran, 2014).

Equation	Advantages	Disadvantages
<p>Penn State University (Frankenfield et al. 2009; Frankenfield and Ashcraft, 2011) Measured energy expenditure (MEE)</p>	<ul style="list-style-type: none"> Accounts for age, gender and height. Incorporates physiological factors e.g. temperature, ventilator mode. ICU specific. 67% accuracy when compared to Measure Energy Expenditure (MEE) (all patients). 70% accuracy when compared to MEE (obese <60 years) 80% accuracy for BMI >45kg/m² when compared to MEE (Frankenfield et al. 2013). 	<ul style="list-style-type: none"> Time required. Complex equations. 24hr variability due to changes in temperature and ventilation. Does not account for physical activity. 58% accuracy when BMI <20.5kg/m² when compared to MEE (Frankenfield et al. 2013).
<p>20-25 kcal/kg/day (catabolic phase)</p>	<ul style="list-style-type: none"> Quick and easy. 	<ul style="list-style-type: none"> Does not account for age, gender or condition. Based on consensus opinion rather than clinical evidence. No clear guidance on what weight should be used. 35% accuracy when compared to MEE (Frankenfield et al. 2009). Does not incorporate physiological factors. Difficult to define catabolic vs anabolic phase.
<p>25-30 kcal/kg/day (anabolic phase) (Cerra et al. 1997; Singer et al. 2009)</p>	<ul style="list-style-type: none"> ICU specific. Accounts for age and gender. Includes factors for trauma and burns. 	<ul style="list-style-type: none"> Developed on burns and trauma patients. Overestimates in non-obese and underestimates in obese patients. 46% accuracy when compared with MEE (Frankenfield et al. 2009).
<p>Ireton-Jones (Ireton-Jones et al. 1992; Ireton-Jones and Jones, 2002)</p>	<ul style="list-style-type: none"> Accounts for gender, age, weight and height. Used in conjunction with stress (disease state) and activity factors. 	<ul style="list-style-type: none"> Use of stress factors adds substantial error. Does not incorporate physiological factors. 34% accuracy when compared with MEE (Frankenfield et al. 2009).
<p>Harris Benedict (Harris and Benedict, 1919)</p>		