Determining Calorie and Protein Needs for Pediatric Patients with Overweight/Obesity[1,7]

Age	BMI Category	Weight Goal to Improve BMI percentile	Equations: TEE or *REE (use actual body weight)
<2	Weight for height	N/A	DRI
2-5 y	85-94th percentile with no co-morbidities	Weight velocity maintenance	TEE or REE x 1.4
	85-94th percentile with co-morbidities	Weight maintenance or slow weight gain	TEE or REE x 1.2 -1.4
	>/= 95th percentile	Weight maintenance	TEE or REE x 1.2
		Weight loss of up to 1 lb/mo may be acceptable if BMI is >21	TEE – 125 or REE x 1.0-1.2
6-11 y	85-94th percentile with no co-morbidities	Weight velocity maintenance	TEE or REE x 1.2
	85-94th percentile with co-morbidities	Weight maintenance	TEE or REE x 1.0-1.2
	95-99th percentile	Gradual weight loss 1 lb/mo or 0.5 kg/mo	TEE – 125 to 250 or REE x 1.0
	>99th percentile	Weight loss (maximum is 2 lb/wk)	TEE – 250 to 1000
12-18 y	85-94th percentile with no co-morbidities	Weight velocity maintenance; after linear growth is complete, weight maintenance	TEE or REE x 1.0-1.2 (use closer to REE x 1.0 if pt is done growing)
	85-94th percentile with co-morbidities	Weight maintenance	TEE or REE x 1.0
	95-99th percentile	Weight loss (maximum 1 lb/wk)	TEE – 500 or REE x 1.0 -250 to 500
	>99th percentile	Weight loss (maximum 2 lb/wk)	TEE – 500 to 1000 or REE x 1.0 -250 to 1000

Estimating Calorie Needs Using REE[2]

	Premature	Infant	Infant	Child	Child	Child	Female	Female	Male	Male
	<37wks GA	0-6mo	6 - 12mo	1-3yrs	4-6yrs	7-10yrs	11-14yrs	15-24yrs	11-18yrs	19-24yrs
REE (kcal/kg/d) WHO & Pellet		55	55	55	47	40	30	25	30	25

*REE equations provided in chart are roughly equivalent to TEE recommendations.

Calorie Needs:
Determine the goal for weight trajectory using the chart above. Use equations column to guide your recommendation.

TEE equations:
Boys: $114 - (50.9 \times \text{age [y]}) + PA \times (19.5 \times \text{weight [kg]} + 1161.4 \times \text{height [m]}) = \text{kcal/day}$
Girls: $389 - (41.2 \times \text{age [y]}) + PA \times (15.0 \times \text{weight [kg]} + 701.6 \times \text{height [m]}) = \text{kcal/day}$

PA = 1.00 if PAL is estimated to be ≥ 1.0 < 1.4 (sedentary)
  Recommend using 1.0 as a starting point for the majority of patients.
PA = 1.18 if PAL is estimated to be ≥ 1.4 < 1.6 (low active)
PA = 1.35 if PAL is estimated to be ≥ 1.6 < 1.9 (active)
PA = 1.60 if PAL is estimated to be ≥ 1.9 < 2.5 (very active)

> When determining a nutrition prescription or creating calorie-controlled meal plans for this population, it is important to **use clinical judgment**. For example, if a patient's 24 hour recall or diet history reveals average consumption of 2,500 calories per day, prescribing a 1,200 calorie meal plan may not be practical or achievable. As a patient loses weight or becomes more active, their calorie needs may also change, so it is important to **reassess needs at each visit**.

Protein Needs[3,4]:
At a minimum, use RDA or DRI using actual body weight for protein recommendation

	7-12mo*	1 - 3 yrs	4 - 8 yrs	9 - 13yrs	14 - 18yrs	> 18yrs
DRI	1.2	1.05	0.95	0.95	0.85	0.8
WHO safe level of protein intake	1.31	1.01	0.9	0.91	0.87	0.83

Overweight and Obese Patients in Critical Care[5,6]:
Calculating energy needs:
- If patient is expected to be in ICU for >3 days, order metabolic cart to determine energy needs
- If patient does not meet criteria for metabolic cart, use calculations from chart above and adjust based on weight goals

Calculating protein needs:
- Start with 1.5g/kg ABW
- Patients with BMI 95-99th %ile
  - Provide 2 grams/kg IBW
- Patients with BMI >99th%ile
  - Provide 2.5 grams/kg IBW
- Monitor BUN as part of the overall clinical picture. If highly elevated, consider reducing protein intake.

References:
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5. Jesuit, C., Dillon, C., Compher, C. (2010) A.S. P.E.N. Clinical Guidelines: Nutrition Support of Hospitalized Pediatric Patients With Obesity. *JPEN.* 34(1).13-20.
6. McClave, et al. (2016) Guidelines for the Provision and Assessment of Nutrition Support Therapy in the Adult Critically Ill Patient: Society of Critical Care Medicine (SCCM) and American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.). JPEN. 40(2), 159-211
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