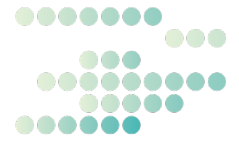


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FACT SHEET 2 ENERGY AND PROTEIN NEEDS (FOR PROFESSIONALS)



Energy and protein needs

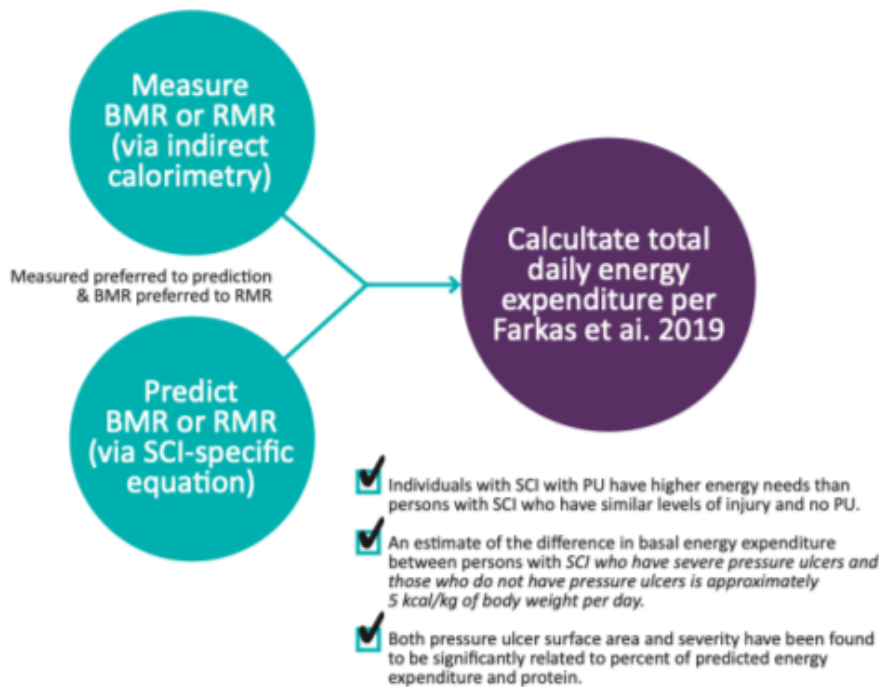
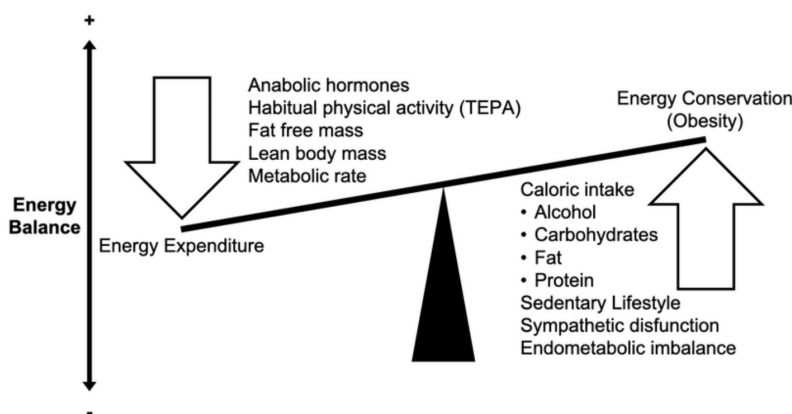


Figure 1: Energy expenditure and nutrient intake after spinal cord injury. Adapted from: Farkas GJ, Sneij A, McMillan DW, Tiozzo E, Nash MS, Gater DR. Energy expenditure and nutrient intake after spinal cord injury: a comprehensive review and practical recommendations. *British Journal of Nutrition*. 2022;128(5):863–87. doi:10.1017/S0007114521003822. Permission for reuse is granted.



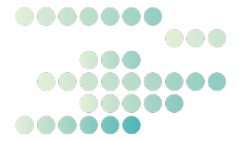
TEPA: Thermic effect of physical activity.

Figure 2: The relationship between energy expenditure and energy intake, and the components that influence them after spinal cord injury.

Reproduced from: Farkas GJ, Sneij A, Gater DR Jr. Energy expenditure following spinal cord injury: A delicate balance. *Top Spinal Cord Inj Rehabil*. 2021;27(1):92-99. doi:10.46292/sci20-00030. Permission for reuse is granted.

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SCI-specific equations	Author	Equation
	Buchholz et al., 2003	M/F = $-3618 - 795 \times \text{age} - 731 \times \text{sex} + 3170 \times \text{wt} - 794 \times \text{T3} + 261 \times \text{metanephrine}$
		M/F = $10682 - 1238 \times \text{age} - 521 \times \text{sex} - 24 \times \text{ht} + 87 \times \text{FFM}$
	Chun et al., 2017	M/F = $24.5 \times \text{FFM} + 244.4$
	Nightingale-Gorgey, 2018	M = $23.469 \times \text{FFM} + 294.330$ (FFM alone)
		M = $23.995 \times \text{FFM} + 6.189 \times \text{SAD} + 6.384 \times \text{TAD} - 6.948 \times \text{TC} + 275.211$ (FFM with circumferences and diameters)
		M = $19.789 \times \text{FFM} + 5.156 \times \text{wt} + 8.090 \times \text{ht} - 15.301 \times \text{CC} - 860.546$ (FFM with anthropometrics)
		M = $13.202 \times \text{ht} + 11.329 \times \text{wt} - 16.729 \times \text{TAD} - 1185.445$ (anthropometrics alone)

Note: AT = adipose tissue; CC = calf circumference (cm); FM = fat mass; FFM = fat free mass (kg); F = female; Ht = height (cm); K = constant for metabolic rate of organ/tissue at resting state; LBM = lean body mass; M = male; metanephrine ($\mu\text{mol/L}$) = a biproduct of catecholamines breakdown; RM = residual = mass; RMR = resting metabolic rate; SAD = sagittal abdominal diameter (cm); SM = skeletal muscle; sex = 0 for men and 1 for women; T3 = triiodothyronine (nmol/L), a thyroid hormone; TAD = transverse abdominal diameter (cm); TC = thigh circumference (cm); Wt = weight (kg).

Figure 3: SCI-specific equations.

Reproduced from: Farkas GJ, Pitot MA, Gater Jr. DR. A Systematic Review of the Accuracy of Estimated and Measured Resting Metabolic Rate in Chronic Spinal Cord Injury. *Int J Sport Nutr Exerc Metab.* 2019 Sep 1;29(5):548-558. doi: 10.1123/ijsnem.2018-0242. Permission for reuse is granted.

Protein needs in pressure ulcer (PU) SCI patients:

Stage 1 and 2 PU - 1.2 a 1.5 g/kg body weight per day

Stage 3 and 4 PU - 1.5- 2.0 g/kg body weight per day



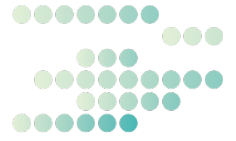
- Use specific oral nutritional supplements to prevent or treat PUs!
- Don't forget to supplement micronutrients, when needed!
- Check patient medication! (There are drugs that increase nutrient needs, reduce absorption and/or increase excretion)!
- In malnourished patients all nutrient needs are increased!
- Energy and protein calculations need to be adjusted to previous nutritional state, number and extension of PUs.**

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- Academy of Nutrition and Dietetics. Spinal Cord Injury Guideline [Internet]. 2009 [cited 2026 Feb 2]. Available from: https://scireproject.com/wp-content/uploads/2024/03/EAL_Spinal-Cord-Injury-Guideline-2009.pdf
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- Farkas GJ, Pitot MA, Gater DR Jr. A systematic review of the accuracy of estimated and measured resting metabolic rate in chronic spinal cord injury. *Int J Sport Nutr Exerc Metab.* 2019 Sep 1;29(5):548-558. doi:10.1123/ijsnem.2018-0242.
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- National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel, Pan Pacific Pressure Injury Alliance. Prevention and treatment of pressure ulcers: quick reference guide. Haesler E, editor. Osborne Park (WA): Cambridge Media; 2014.