

Rapid response to:

# Body mass index cut offs to define thinness in children and adolescents: international survey

*BMJ* 2007 ; 335   doi: <https://doi.org/10.1136/bmj.39238.399444.55> (Published 26 July 2007)  
Cite this as: *BMJ* 2007;335:194

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- Rapid responses
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Rapid Response:

New criteria for thinness are very close to Dutch criteria for (severe) underweight

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**06 August 2007**  
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Cole et al. (2007) present new cut off values for three classes of thinness. In their motivation, the authors state that “There are no valid BMI cut offs for assessing underweight or wasting in adolescents or children over 5 years” and “There are no suitable thinness cut offs for this age group”.

I like to point out that some years ago I published criteria for underweight and severe underweight for children 2-18 years (van Buuren, 2004). This work appears to be somewhat unknown, presumably because it appeared in Dutch. I used a similar approach as in Cole et al (2007), and derived cut off values that were anchored at BMI-values of 17 and 18.5. However, having no access to the references of all six studies, I restricted the analysis to the data from the Third Dutch Growth study only (Roede & Van Wieringen, 1985), for which Cole and Roede (1999) had published BMI references.

It is of interest to study the differences between the criteria. [Figure 1](#) plots the cut offs as published by Van Buuren (2004) and Cole et al (2007). Despite the differences in methodology, the values are very similar across the entire age range. The new cut offs for thinness are virtually always located within 0.2 BMI points of the “Dutch cut offs” for (severe) underweight. In clinical work, such differences easily fall within the bounds of measurement error. Differences in prevalence estimates are likely to be minor, and will nearly always be swamped by sampling variation. The differences between both sets of cut offs are considerably smaller than those observed between the centile curves of the six international studies as portrayed in figures 1 and 2 of Cole et al (2007). All in all, it appears that the cut off values proposed by Van Buuren (2004) and Cole et al (2007) are remarkably similar.

This begs the question what cut offs to use. Evidently, the large exposure of BMJ combined with Cole’s authority will be a major factor in the worldwide adoption of the cut offs, which in itself would be a good thing. On the other hand, we should not be blind to the shortcomings of the new thinness cut offs. In the process of combining data from different studies, Cole et al. average centile curves. There is no statistically defensible rationale for this averaging operation, and it results in an intractable statistical distribution. Consequently, as noted by the authors, it is not possible to calculate Z-scores related to the new thinness cut offs. The criteria derived by Van Buuren (2004) do not have this problem. The cut offs correspond to a set of fixed centiles from a well defined reference distribution. The availability of such a distribution allows for the calculation of Z-scores. Thus, in addition to establishing cut offs, it is possible to assess BMI corrected for age and sex in a continuous way. The possibility to calculate Z-scores may well give the edge to the “Dutch” criteria for underweight and severe underweight.

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Competing interests:  
None declared

**Competing interests:** No competing interests

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