

Publication

Which Cut-offs for Secondary V'O₂max Criteria Are Robust to Diurnal Variations?**JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)****ID** 4500022**Author(s)** Knaier, Raphael; Niemeyer, Max; Wagner, Jonathan; Infanger, Denis; Hinrichs, Timo; Klenk, Christopher; Frutig, Sabrina; Cajochen, Christian; Schmidt-Trucksäss, Arno**Author(s) at UniBasel** [Hinrichs, Timo](#) ; [Wagner, Jonathan](#) ; [Knaier, Raphael](#) ;**Year** 2019**Title** Which Cut-offs for Secondary V'O₂max Criteria Are Robust to Diurnal Variations?**Journal** Medicine and Science in Sports and Exercise**Volume** 51**Number** 5**Pages / Article-Number** 1006-1013**Mesh terms** Adolescent; Adult; Athletes; Exercise Test; Female; Heart Rate; Humans; Lactic Acid, blood; Male; Oxygen Consumption; Periodicity; Reference Values; Young Adult

The aim was to determine the minimum secondary exhaustion criteria cut-offs (i.e. max respiratory exchange ratio [RERmax], max heart rate [HRmax], max rating of perceived exertion [RPEmax], and max blood lactate concentration [BLmax]) necessary to determine maximum oxygen uptake (VO₂max) during cardiopulmonary exercise tests (CPET), by balancing type I and type II errors. A further aim was to investigate if the defined cut-offs would be robust to diurnal and to day-to-day variations.; Data from two CPET studies involving young athletes were analyzed. In the first study, 70 male participants performed one CPET until exhaustion to define cut-offs. In the second study, eight males and five females performed one CPET on seven consecutive days at six different times of day (i.e., diurnal variation). The time of the CPET was identical on the sixth and seventh days (i.e., day-to-day variation). To ensure comparability both studies were carried out under the same conditions.; Participants' mean VO₂max was 63.0 ± 5.3 ml/kg/min. RERmax ≥ 1.10 was reached by 100%, HRmax ≥ 95% of age predicted maximum heart rate by 99%, RPEmax ≥ 19 by 100%, and BLmax ≥ 8 mmol/l by 100% of participants, respectively. Regarding the intra-day variations, latter cut-offs were not reached in two cases for RERmax and in one case for HRmax and BLmax. Intraclass correlations for the day-to-day variability were r = 0.823 for RERmax, r = 0.828 for HRmax, and r = 0.380 for BLmax, respectively.; High cut-off values for secondary exhaustion criteria need to be used to determine VO₂max in athletes.

Publisher Lippincott, Williams & Wilkins**ISSN/ISBN** 0195-9131 ; 1530-0315**edoc-URL** <https://edoc.unibas.ch/72460/>**Full Text on edoc** No;**Digital Object Identifier DOI** 10.1249/MSS.0000000000001869**PubMed ID** <http://www.ncbi.nlm.nih.gov/pubmed/30550515>**ISI-Number** WOS:000465009400020**Document type (ISI)** Journal Article, Randomized Controlled Trial