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Title: Predicting VO_2max in elderly: Could equations established in younger subjects be used?

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Body: Background: Equations recommended by the ERS/ATS for estimating maximal oxygen consumption (VO_2max or peak) have been established in population samples with few subjects > 70 years. As a result, predicted values (pred) for elderly are largely extrapolated from linear models. We aimed to determine if VO_2max values measured in people aged >70 years diverged from pred using recommended equations. Methods: We measured VO_{2peak} in 184 subjects (40% women and 60% men) aged 69-89 years and used Hansen's equations for estimating VO_2max. Results: There were 49 non-diseased (ND) males and 62 with at least one disease (D) (COPD, cancer, coronary disease). In females, 34 were ND, and 39 had at least one D. VO_{2peak} was 1.82 (0.44) L/min, 106% of pred, in ND males and 1.34 (0.45) L/min, 82% of pred, in D males. In ND females, VO_{2peak} was 1.17 (0.29) L/min, 111% of pred, and was 1.07 (0.26) L/min, 102% of pred, in D females (NS).

4% of ND males and 3% of ND females had VO_{2peak} < 70% of pred. The mean difference between pred VO_2max and measured VO_{2peak} was -0.09 L/min in ND males and -0.11 L/min in ND females. 90% of (predicted-measured VO_2max) differences ranged between -0.77 and +0.58 L/min in ND males, and -0.57 and +0.36 L/min in ND females. Subjects with higher level of activity/week had higher VO_2max ($p<0.001$. Conclusions: These results support the use of Hansen's equations in elderly in populations comparable to ours.