Validation of the firefighter WFI treadmill protocol for predicting VO$_2$ max

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	The Wellness-Fitness Initiative submaximal treadmill exercise test (WFI-TM) is recommended by the US National Fire Protection Agency to assess aerobic capacity (VO$_2$ max) in firefighters. However, predicting VO$_2$ max from submaximal tests can result in errors leading to erroneous conclusions about fitness.
Aims	To investigate the level of agreement between VO$_2$ max predicted from the WFI-TM against its direct measurement using exhaled gas analysis.
Methods	The WFI-TM was performed to volitional fatigue. Differences between estimated VO$_2$ ted< 0.01). The mean bi which WFI-TM overestimated VO
	$_2$ max was 0.9 ml/kg/min with a 95% prediction interval of ±13.1. Prediction errors for 22% of subjects were within ±5%; 36% had errors greater than or equal to ±15% and 7% had greater than ±30% errors. The correlation between predicted and measured VO$_2$ max was $r = 0.55$ (standard error of the estimate = 2.8 ml/kg/min).
Conclusions	WFI-TM predicts VO$_2$ max with 11% error. There is a tendency to overestimate aerobic capacity in less fit individuals and to underestimate it in more fit individuals leading to a clustering of values around 42 ml/kg/min, a criterion used by some fire departments to assess fitness for duty.
Key words	Firefighters; fitness tests; physical fitness.