OVAL's Impact on Health Care:

Cost Avoidance

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For each 1-MET increase in CRF, annual costs per subject (USD) were $1752 (95% CI, -2476 to -1,027, p < 0.001) lower among those with hypertension and $1025 (95% CI, -2047 to -2, p < 0.05) lower in those without hypertension.

Wang Y, Müller J, Myers J. Association between cardiorespiratory fitness and health care costs in hypertensive men. Atherosclerosis. 2021 Aug;331:1-5. doi: 10.1016/j.atherosclerosis.2021.06.914. Epub 2021 Jun 26. PMID: 34252836.

For each 1-MET increase in CRF, annual cost savings per person were $5,193 and $3,603 for individuals with and without diabetes, respectively.

Myers J, de Souza E Silva CG, Doom R, Fonda H, Chan K, Kamil-Rosenberg S, Kokkinos P. Cardiorespiratory Fitness and Health Care Costs in Diabetes: The Veterans Exercise Testing Study. Am J Med. 2019 Sep;132(9):1084-1090. doi: 10.1016/j.amjmed.2019.04.006. Epub 2019 Apr 29. PMID: 31047866.

For each 1-MET increase in CRF, annual cost savings per person were $3,272, $4,252, and $6,103 for normal-weight, overweight, and obese subjects, respectively.

de Souza de Silva CG, Kokkinos P, Doom R, Loganathan D, Fonda H, Chan K, de Araújo CGS, Myers J. Association between cardiorespiratory fitness, obesity, and health care costs: The Veterans Exercise Testing Study. Int J Obes (Lond). 2019 Nov;43(11):2225-2232. doi: 10.1038/s41366-018-0257-0. Epub 2018 Nov 20. PMID: 30459403.

How OVAL translates to VO2max and METs:

1) OVAL collects Power in Watts (W) achieved during a SMART Test and the mass of the participant in kilograms (kgs)
2) OVAL enters this data into the generalized cycle ergometry equation for predicting maximal oxygen uptake (Kokkinos et. al):

   VO2max = 1.74*(Watts*6.12/kgs)+3.5

3) OVAL converts VO2 into Metabolic Equivalents of Task (METs): VO2/3.5

How OVAL promotes Heath Care Cost Avoidance:

1) Example #1: 70kg Male (BMI 26) with an initial Peak Power Output of 45 Watts improving to 70 Watts

1) Given the FRIEND equation for cycling VO2 and the above de Souza de Silva study results
2) 45 Watts yields 3 METS
3) 70 Watts yields 4.3 METS
4) Net improvement of 1.3 METS
5) Overweight category (BMI 26) yields $4252/year cost avoidance per 1-MET improvement in fitness
6) Cost avoidance = 1.3 METS * $4252 = $5528/year

Example #2: 110kg Female (BMI 34) with an initial Peak Power Output of 30 Watts improving to 75 Watts

1) Given the FRIEND equation for cycling VO2 and the above de Souza de Silva study results
2) 30 Watts yields 2 METS
3) 70 Watts yields 3.1 METS
4) Net improvement of 1.1 METS
5) Obese category (BMI 34) yields $6103/year cost avoidance per 1-MET improvement in fitness
6) Cost avoidance = 1.1 METS * $6103 = $6713/year

Peter Kokkinos, Leonard A Kaminsky, Ross Arena, Jiajia Zhang, Jonathan Myers, A new generalized cycle ergometry equation for predicting maximal oxygen uptake: The Fitness Registry and the Importance of Exercise National Database (FRIEND), *European Journal of Preventive Cardiology*, Volume 25, Issue 10, 1 July 2018, Pages 1077–1082, https://doi.org/10.1177/2047487318772667