

Accuracy of Non-exercise Estimated Cardiorespiratory Fitness in Japanese Adults

Supplement S1

Correlations between independent variables and CRF

Male		Female	
Variable	Pearson's correlation coefficient	Variable	Pearson's correlation coefficient
Age	-0.29	Age	-0.24
SBP	-0.29	SBP	-0.31
DBP	-0.30	DBP	-0.29
Resting Heart Rate	-0.38	Resting Heart Rate	-0.38
BMI	-0.34	BMI	-0.43
Smoker	0.08	Smoker	0.07

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Male eCRF equation

$$\begin{aligned}
 eCRF = & -1.92 \frac{Age - 48.51}{7.87} - 1.69 \frac{Wt - 68.02}{8.79} - 2.68 \frac{rHR - 70.61}{9.75} - 0.82 \frac{BMI - 23.58}{2.65} \\
 & - 0.36 \frac{SBP - 124.96}{16.73} + 0.30 \left(\frac{Age - 48.51}{7.87} \right)^2 \\
 & + 0.02 \left(\frac{Age - 48.51}{7.87} \right) \left(\frac{Ht - 169.76}{5.61} \right) - 0.38 \left(\frac{Age - 48.51}{7.87} \right) \left(\frac{rHR - 70.61}{9.75} \right) \\
 & - 0.01 \left(\frac{Age - 48.51}{7.87} \right) \left(\frac{BMI - 23.59}{2.65} \right) + 0.09 \left(\frac{Wt - 69.02}{8.79} \right)^2 \\
 & + 0.14 \left(\frac{Wt - 69.02}{8.79} \right) \left(\frac{DBP - 78.54}{10.73} \right) - 0.14 \left(\frac{Ht - 169.76}{5.61} \right) \left(\frac{rHR - 70.61}{9.75} \right) \\
 & + 0.09 \left(\frac{Ht - 169.76}{5.61} \right) \left(\frac{BMI - 23.59}{2.65} \right) + 0.29 \left(\frac{rHR - 70.61}{9.75} \right)^2 \\
 & + 0.34 \left(\frac{rHR - 70.61}{9.75} \right) \left(\frac{BMI - 23.59}{2.65} \right) - 0.06 \left(\frac{rHR - 70.61}{9.75} \right) \left(\frac{SBP - 124.96}{16.73} \right) \\
 & - 0.07 \left(\frac{BMI - 23.59}{2.65} \right) \left(\frac{SBP - 124.96}{16.73} \right) + 0.27 \left(\frac{SBP - 124.96}{16.73} \right)^2 \\
 & - 0.04 \left(\frac{DBP - 78.54}{10.73} \right) + 0.74(1 - Smoking) + 37.78
 \end{aligned}$$

Female eCRF equation

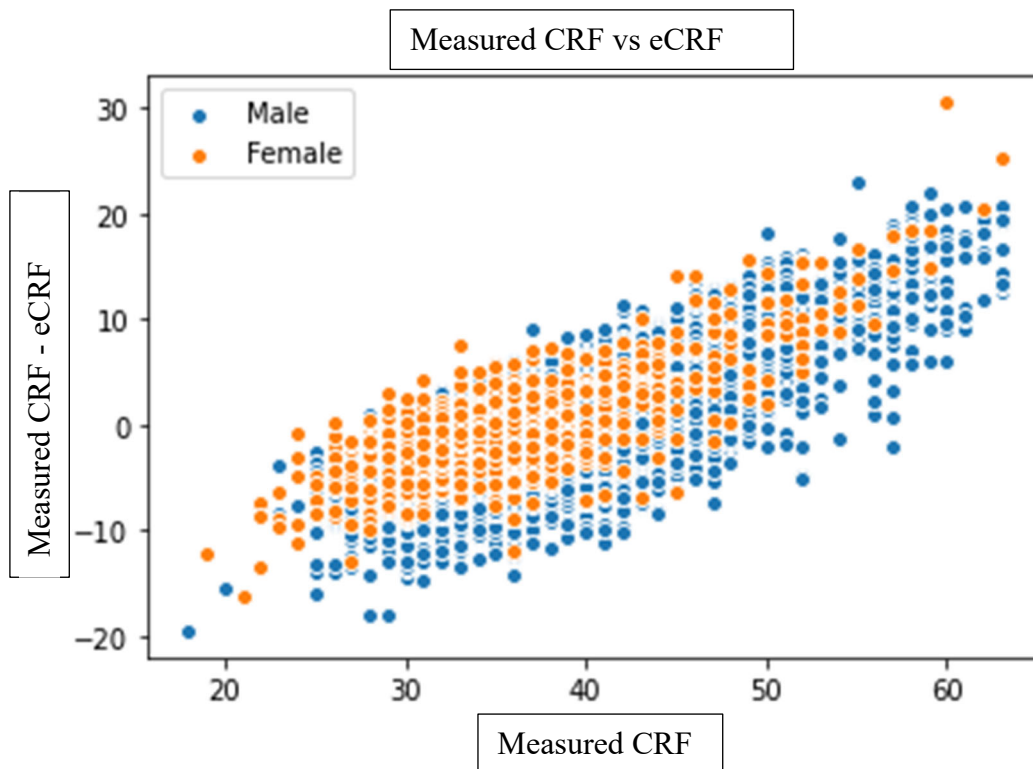
$$\begin{aligned}
 eCRF = & -1.08 \frac{Age - 46.29}{8.29} - 1.53 \frac{Wt - 51.90}{6.63} - 2.51 \frac{rHR - 73.60}{9.45} - 1.57 \frac{BMI - 20.94}{2.54} \\
 & - 1.56 \frac{SBP - 115.22}{16.26} + 1.08 \frac{DBP - 70.71}{10.09} + 0.36 \left(\frac{Age - 46.29}{8.29} \right)^2 \\
 & - 0.46 \left(\frac{Age - 46.29}{8.29} \right) \left(\frac{Wt - 51.90}{6.63} \right) + 0.49 \left(\frac{Age - 46.29}{8.29} \right) \left(\frac{Ht - 157.44}{5.17} \right) \\
 & - 0.31 \left(\frac{Age - 46.29}{8.29} \right) \left(\frac{rHR - 73.60}{9.45} \right) - 0.48 \left(\frac{Age - 46.29}{8.29} \right) \left(\frac{SBP - 115.22}{16.26} \right) \\
 & + 0.78 \left(\frac{Age - 46.29}{8.29} \right) \left(\frac{DBP - 70.71}{10.09} \right) - 1.06 \left(\frac{Wt - 51.90}{6.63} \right)^2 \\
 & + 1.39 \left(\frac{Wt - 51.90}{6.63} \right) \left(\frac{Ht - 157.44}{5.17} \right) + 0.20 \left(\frac{Wt - 51.90}{6.63} \right) \left(\frac{rHR - 73.60}{9.45} \right) \\
 & - 1.76 \left(\frac{Wt - 51.90}{6.63} \right) \left(\frac{SBP - 115.22}{16.26} \right) - 0.24 \left(\frac{Wt - 51.90}{6.63} \right) \left(\frac{DBP - 70.71}{10.09} \right) \\
 & - 0.04 \left(\frac{Ht - 157.44}{5.17} \right) \left(\frac{rHR - 73.60}{9.45} \right) + 0.60 \left(\frac{Ht - 157.44}{5.17} \right) \left(\frac{BMI - 20.94}{2.54} \right) \\
 & + 0.54 \left(\frac{Ht - 157.44}{5.17} \right) \left(\frac{SBP - 115.22}{16.26} \right) + 0.50 \left(\frac{Ht - 157.44}{5.17} \right) \left(\frac{DBP - 70.71}{10.09} \right) \\
 & + 0.09 \left(\frac{rHR - 73.60}{9.45} \right)^2 + 0.55 \left(\frac{rHR - 73.60}{9.45} \right) \left(\frac{BMI - 20.94}{2.54} \right) \\
 & - 0.45 \left(\frac{rHR - 73.60}{9.45} \right) \left(\frac{SBP - 115.22}{16.26} \right) + 0.41 \left(\frac{rHR - 73.60}{9.45} \right) \left(\frac{DBP - 70.71}{10.09} \right) \\
 & + 1.30 \left(\frac{BMI - 20.94}{2.54} \right)^2 + 1.24 \left(\frac{BMI - 20.94}{2.54} \right) \left(\frac{SBP - 115.22}{16.26} \right) \\
 & + 0.57 \left(\frac{BMI - 20.94}{2.54} \right) \left(\frac{DBP - 70.71}{10.09} \right) + 0.85 \left(\frac{SBP - 115.22}{16.26} \right)^2 \\
 & - 0.85 \left(\frac{SBP - 115.22}{16.26} \right) \left(\frac{DBP - 70.71}{10.09} \right) + 0.17 \left(\frac{DBP - 70.71}{10.09} \right)^2 - 1.71Smoking \\
 & + 36.51
 \end{aligned}$$

Google sheet link:

<https://docs.google.com/spreadsheets/d/1lnYl4u62AMSUxkzyzKsKBHe8vr3WzLVRYxGyYE7xoGQ/edit#gid=1558519083>

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Residual plot



The model was most accurate when eCRF was in the 30 – 40 mL/kg/min range.