Supplemental Digital Content 2. METRMR (mean (± SD)) values of the cross-validation group for the Cosmed K4b2 (measured METRMR), the child vector magnitude 2-regression model (VM2RM), child vertical axis 2-regression model (VA2RM), and four single regression prediction equations (Freedson, Treuth, Trost, and Puyau), during 19 structured activities.

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| **Activity** | **Cosmed METRMR** | **Child VM2RM** | **Child VA2RM** | **Freedson Equation** | **Treuth Equation** | **Trost Equation** | **Puyau Equation** |
| Supine Rest | 1.0 (0.0) | 1.1 (0.3) | 1.2 (0.6) | 1.4 (0.3)\* | 1.6 (0.4)\* | 1.4 (0.9) | 2.5 (0.4)\* |
| Watching Television | 1.0 (0.4) | 1.1 (0.2) | 1.0 (0.0) | 1.3 (0.3) | 1.5 (0.4)\* | 1.4 (0.6) | 2.5 (0.2)\* |
| Searching Internet | 1.1 (0.2) | 1.0 (0.0) | 1.0 (0.0) | 1.4 (0.2) | 1.6 (0.3)\* | 1.8 (0.8) | 2.4 (0.3)\* |
| Reading | 1.0 (0.2) | 1.0 (0.0) | 1.0 (0.0) | 1.3 (0.4) | 1.5 (0.4) | 1.3 (1.1) | 2.6 (0.5)\* |
| Workout Video | 2.5 (0.6) | 2.6 (0.9) | 2.8 (1.1) | 2.1 (0.8) | 2.2 (0.6) | 2.5 (0.8) | 2.9 (0.5) |
| Nintendo Wii | 2.5 (1.3) | 2.4 (1.2) | 2.3 (1.0) | 1.5 (0.6) | 1.7 (0.7) | 1.5 (1.3) | 2.8 (0.5) |
| Vacuuming | 2.8 (0.5) | 2.8 (0.7) | 2.6 (0.9) | 1.7 (0.4)\* | 1.9 (0.4)\* | 2.0 (0.9) | 2.7 (0.4) |
| Sweeping | 3.0 (1.4) | 2.7 (0.8) | 2.7 (0.9) | 1.7 (0.5) | 1.8 (0.6) | 1.7 (1.1) | 3.0 (0.5) |
| Slow Track Walking (avg. 75 m.min-1) | 3.2 (1.0) | 3.8 (0.6) | 3.8 (0.6) | 4.2 (1.9) | 3.8 (1.6) | 4.3 (1.9) | 4.8 (0.4)\* |
| Dance Dance Revolution | 3.0 (0.9) | 3.0 (0.6) | 3.4 (0.3) | 2.2 (0.7) | 2.2 (0.7) | 2.2 (0.8) | 3.2 (0.5) |
| Playing Catch | 3.5 (1.2) | 3.6 (0.6) | 3.4 (0.3) | 2.3 (0.6)\* | 2.3 (0.6)\* | 2.3 (0.7) | 3.2 (0.5) |
| Walk with 4.5 kg backpack (avg. 76 m.min-1) | 3.1 (0.4) | 3.6 (0.6) | 3.5 (0.4) | 4.0 (0.8) | 3.7 (0.8) | 4.0 (0.9) | 4.5 (0.5)\* |
| Brisk Track Walking (avg. 92 m.min-1) | 4.2 (1.1) | 4.4 (0.6) | 4.3 (0.9) | 5.0 (2.0) | 4.5 (1.8) | 5.2 (2.1) | 5.3 (0.6) |
| Trazer | 4.7 (1.6) | 5.0 (0.8) | 4.8 (1.0) | 4.8 (2.0) | 4.4 (1.7) | 4.9 (1.7) | 4.9 (1.3) |
| Floor Light Space | 4.5 (1.9) | 4.1 (0.7) | 3.7 (0.4) | 2.6 (0.8) | 2.6 (0.8)\* | 2.7 (1.0) | 3.7 (0.8) |
| Wall Light Space | 4.2 (1.2) | 4.2 (0.6) | 3.7 (0.3) | 2.7 (0.5)\* | 2.7 (0.4)\* | 2.8 (0.6)\* | 3.6 (0.5) |
| Sport Wall | 6.7 (2.3) | 4.9 (1.0) | 4.7 (0.8) | 4.6 (1.6)\* | 4.3 (1.5)\* | 4.8 (1.6)\* | 4.8 (1.0) |
| Track Running (avg. 120 m.min-1) | 6.8 (2.0) | 5.7 (0.8) | 5.7 (0.7) | 6.3 (1.5) | 5.6 (1.5) | 6.4 (1.4) | 6.1 (0.6) |
| Soccer Around Cones | 3.7 (0.9) | 3.9 (0.9) | 3.4 (0.7) | 2.9 (0.8) | 2.8 (0.7) | 3.0 (0.8) | 3.7 (0.7) |
| Total for all activities | 3.1 (2.0) | 3.0 (1.6) | 2.9 (1.5) | 2.7 (1.8)\* | 2.7 (1.5)\* | 2.8 (1.9) | 3.5 (1.2)\* |

METRMR, metabolic equivalents (measured VO2 for the activity divided by measured lying rest VO2). \*Significantly different from Cosmed K4b2, P < 0.05