

**Supplemental Table 1: Model Fit of Disease Specific Prediction Equations for Actical and Actigraph Accelerometers**

Diagnosis	Device	Prediction Equation Model Fit	
		<i>ICC (95% Confidence Interval)</i>	<i>Standard Error</i>
<b>CHD (heart rate modelled)</b>	Actigraph	0.78 (0.76- 0.80)	0.64
<b>CHD</b>	Actigraph	0.74 (0.72-0.76)	0.71
<b>CHD (heart rate modelled)</b>	Actical	0.82 (0.81-0.83)	0.52
<b>CHD</b>	Actical	0.79 (0.78-0.80)	0.57
<b>CF (heart-rate model)</b>	Actigraph	0.82 (0.81-0.82)	0.46
<b>CF</b>	Actigraph	0.77 (0.76-0.78)	0.54
<b>CF (heart-rate modelled)</b>	Actical	0.71 (0.70-0.72)	0.46
<b>CF</b>	Actical	0.78 (0.77-0.79)	0.55
<b>HE (heart rate modelled)</b>	Actigraph	0.88( 0.87-0.89)	0.47
<b>HE</b>	Actigraph	0.85 (0.85-0.86)	0.52
<b>HE (heart rate modelled)</b>	Actical	0.85 (0.84-0.86)	0.52
<b>HE</b>	Actical	0.81 (0.80-0.82)	0.62
<b>IMD (heart rate modelled)</b>	Actigraph	0.68 (0.66-0.70)	0.45
<b>IMD</b>	Actigraph	0.71 (0.70-0.72)	0.52
<b>IMD (heart rate modelled)</b>	Actical	0.78 (0.77-0.79)	0.52
<b>IMD</b>	Actical	0.74 (0.73-0.75)	0.62
<b>JDM(heart rate modelled)</b>	Actigraph	0.74 (0.72-0.75)	0.57
<b>JDM</b>	Actigraph	0.62 (0.60-0.63)	0.76
<b>JDM(heart rate modelled)</b>	Actical	0.80 (0.79-0.81)	0.50
<b>JDM</b>	Actical	0.78 (0.77-0.79)	0.55

<b>JA (heart rate modelled)</b>	Actigraph	0.84 (0.83-0.85)	0.57
<b>JA</b>	Actigraph	0.70 (0.69-0.71)	0.57
<b>JA (heart rate modelled)</b>	Actical	0.85 (0.84-0.86)	0.53
<b>JA</b>	Actical	0.75 (0.74-0.76)	0.73

CF = Cystic Fibrosis; CHD = Congenital Heart Disease; HE= Hemophilia; IMD=Inherited Muscle Disease; JA = Juvenile Arthritis; JDM = Juvenile Dermatomyositis

**Supplemental Table 2: Cross-Validation Prediction Diagnostics by Device and Disease Group**

<b>Diagnosis</b>	<b>Device</b>	<b>Root Mean Square Error</b>	<b>Mean Absolute Error</b>
CHD	Actical	0.81	0.54
CHD	Actigraph	1.15	0.81
CF	Actical	0.81	0.59
CF	Actigraph	0.77	0.56
HE	Actical	0.79	0.55
HE	Actigraph	0.70	0.49
IMD	Actical	0.83	0.54
IMD	Actigraph	0.83	0.55
JDM	Actical	0.97	0.69
JDM	Actigraph	1.15	0.84
JA	Actical	0.87	0.63
JA	Actigraph	0.86	0.60

CF = Cystic Fibrosis; CHD = Congenital Heart Disease; HE= Hemophilia; IMD=Inherited Muscle Disease; JA = Juvenile Arthritis; JDM = Juvenile Dermatomyositis

**Supplemental Table 3: Sensitivity (Se%) and Specificity (Sp%) values for classification of Evenson et al. cut points for sedentary, moderate and vigorous physical activity**

		Actigraph		Actical	
		Se%	Sp%	Se%	Sp%
<b>Chronic Disease</b>	<i>Sedentary</i>	78	94	77	97
	<i>Moderate</i>	54	87	46	92
	<i>Vigorous</i>	62	92	81	92
<b>CF</b>	<i>Sedentary</i>	80	96	78	92
	<i>Moderate</i>	71	85	51	91
	<i>Vigorous</i>	33	91	100	89
<b>CHD</b>	<i>Sedentary</i>	100	95	100	98
	<i>Moderate</i>	42	85	41	94
	<i>Vigorous</i>	62	92	50	93
<b>HE</b>	<i>Sedentary</i>	91	98	91	94
	<i>Moderate</i>	53	92	49	92
	<i>Vigorous</i>	67	91	66	89
<b>IMD</b>	<i>Sedentary</i>	75	91	80	97
	<i>Moderate</i>	81	90	47	96
	<i>Vigorous</i>	0	92	0	96
<b>JDM</b>	<i>Sedentary</i>	77	90	80	92

	<i>Moderate</i>	41	90	37	94
	<i>Vigorous</i>	50	95	62	95
<b>JA</b>	<i>Sedentary</i>	75	90	72	92
	<i>Moderate</i>	41	90	49	94
	<i>Vigorous</i>	50	95	100	92

Based on 15 second cut points derived for the Actigraph 7164 and Actical. Actigraph (7164) cut points <25 counts for sedentary, 574-1002 counts for moderate, and  $\geq 1003$  counts for vigorous physical activity. Actical cut points < 11 counts for sedentary, 508 to 718 counts for moderate and  $\geq 719$  counts for vigorous physical activity.