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Title: Cell phone based physical activity monitoring: A validation study

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Body: Background Accelerometers are accurate and useful for monitoring Physical Activity (PA) in people with chronic lung disease (eg. COPD) and can help motivate clients to comply with rehabilitation. However, they are expensive and largely limited to research. Similar motion sensors are embedded within the majority of newer mobile phones, which are widely accessible. Aim This study investigated whether the built-in accelerometers within mobile phones may be valid and reliable for monitoring PA. Method A mobile phone application to record real time tri-axial acceleration was developed. The accelerometer integrated within 2 mobile phones (HTC Wildfire and HTC Desire HD) was compared to a validated accelerometer (ActiGraph GT3X). Wearing all 3 devices, 7 healthy adults performed 7 different activities, paced with a metronome, each repeated 7 times. Absolute values of 3D acceleration signals were summed and averaged over each time period. Reliability was evaluated using Intra-class Correlation Coefficients (ICC). Concurrent validity was assessed using a general linear model for repeated measures (GLM) and Pearson correlation. Results The ICC for both phone devices ranged between 0.82 and 0.98. GLM and Pearson coefficient confirmed good correlation between phones and ActiGraph in all activities (Figure 1). Conclusion Mobile phone accelerometers appear to be reliable and valid for measuring PA. Further research is needed to confirm these data in a patient population.