

Physical Activity Monitors: Do More Sensors Mean Better Precision?

Kong Y. Chen, Ph.D., M.S.C.I., Megan P. Rothney, Ph.D.,
and Robert J. Brychta, Ph.D.

Abstract

Physical activity is essential to health. Accelerometry-based activity monitors are widely used in clinical and epidemiological research settings; however, only measuring body movement may prohibit accurate prediction of energy expenditure. Recent technological advancements allow synchronous measurements of heart rate, body temperature, acceleration, and other physiological responses and record them in detail (every minute or finer precision). Current multisensor devices are small, wireless, and capable of continuously recording data over several days or weeks, making them readily applicable in the free-living environment. Future studies should focus on developing strategies to optimize sensor data for accurate and robust predictions of clinically pertinent outcome parameters, such as total daily energy expenditure and physical activity energy expenditure. There is also a need for calibration instruments to allow users to standardize devices in their own laboratory or clinic. We also call for more transparency in publishing sensor properties and modeling algorithms, rather than proprietary or “black-box” prediction approaches.

J Diabetes Sci Technol 2007;1(5):768-770

Author Affiliation: Clinical Endocrinology Branch, National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health, Bethesda, Maryland

Keywords: accelerometers, calibration, modeling, energy expenditure

Corresponding Author: Kong Y. Chen, Ph.D., M.S.C.I., Clinical Endocrinology Branch, National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health, Building 10–CRC, Room 6-3940, 10 Center Drive, MSC 1613, Bethesda, MD 20892; email address chenkong@mail.nih.gov