Response to Invited Commentary

Matthews et al. Respond to “A Challenge for Physical Activity Epidemiology”

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We are pleased to respond to Sesso’s insightful remarks entitled, “Invited Commentary: A Challenge for Physical Activity Epidemiology” (1), and agree completely on the need to systematically address lingering issues for physical activity epidemiology, that is, to identify the nonexercise activities that contribute to overall physical activity energy expenditure and to develop better methods to assess these behaviors in population-based studies.

Dr. Sesso’s question, “Do nonexercise components of physical activity contribute meaningfully to total daily physical activity levels?” (1, p. 1352), and proposed scenario in which exercise was the predominant source of energy expenditure merit comment. In our population-based study (2), exercise was only a modest source of overall activity energy expenditure. Among women reporting no regular exercise, the proportional contributions to overall activity were as follows: walking for transportation (52 percent), housework (37 percent), stair climbing (7 percent), and cycling (5 percent). Among women reporting regular exercise, the following proportions were found: walking (45 percent), housework (34 percent), exercise (13 percent), stair climbing (6 percent), and cycling (3 percent). Clearly, the contribution of nonexercise activities was substantial. Others have reported physical activity energy expenditures for nonexercise activities that are much greater than the current level of moderate to vigorous activity recommended for disease prevention (3, 4), although it should be noted that the activity recommendations were conceived as an adjunct to some base level of nonexercise activity. These studies suggest that, for most adults, nonexercise activities contribute substantially to overall physical activity levels and, to the extent that activity energy expenditure influences disease risk, these behaviors should be evaluated for their potential health effects.

Dr. Sesso provided an excellent review of the methods currently available for the assessment of physical activity, and we would like to highlight some emerging methods that may further advance our understanding of the health benefits of overall physical activity levels. Objective measurement methods are now reasonably good (e.g., accelerometers), and they are getting better (5). New devices that capture more varied and finely grained activity data, coupled with methods to extract more information from the raw data signals, are on the horizon, particularly for one-piece monitors that are more easily administered in large studies (6, 7). However, while we are on the cusp of a great leap forward with these devices, the financial and logistic resources needed to implement objective measures for all participants in studies with the size and scope of large prospective cohorts are still formidable.

For this reason, self-report will remain the primary method for the assessment of activity behaviors in large cohort studies. The question then becomes, “How do we obtain the information we need to understand the health effects of nonexercise activities, while minimizing the impact of the errors we know to be substantial in self-reports?” One approach is to develop methods to deal with the errors on the “back end” by imbedding measurement substudies into the primary measurement protocol and then using these data to apply measurement error correction methods (8) to improve our estimates of the association. The new generation of objective monitors may contribute importantly to such efforts. Another approach would be to minimize certain errors on the “front end” through use of multiple short-term recalls to assess habitual activity patterns, akin to current methods
being developed to estimate habitual dietary intake (9). We have found that 24-hour activity recalls provide useful information about sedentary and lower intensity nonexercise activities, and that they contain substantially less error than longer-term recalls (10). Development of cost-effective methods for acquiring multiple short-term recalls in large cohort studies may also yield important advances.

Although the differences in disease risk between sedentary and active nonexercise behaviors have been described for more than 50 years (11), there are a number of reasons to believe that we are now in a better position than ever to meet the current challenges for physical activity epidemiology.

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REFERENCES