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LETTER TO THE EDITOR

Response Letter to: "Next Steps for Measures of Physical Activity in Pregnancy"

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We thank the authors (L. Chasan-Taber and K. R. Evenson) for their reply to our *Current Opinion* paper on physical activity measurement in pregnancy and are delighted that it has stimulated academic discussion. Similar to the Physical Activity Guidelines Advisory Committee Scientific Report (2018 Physical Activity Guidelines Advisory Committee 2018), the No. 367-2019 Canadian Guideline for Physical Activity throughout Pregnancy by the Society of Obstetricians and Gynaecologists of Canada (SOGC) endorses an active pregnancy in the absence of contraindications (Mottola et al. 2018). In this guideline, which was supported by extensive systematic reviews of the literature, an active pregnancy was associated with maternal health benefits and fewer newborn complications. These included a reduction in preeclampsia, gestational hypertension, gestational diabetes, depression, operative and instrumental deliveries, urinary incontinence, and excessive gestational weight gain (eGWG). Importantly, the review showed that physical activity was not associated with miscarriage, stillbirth, neonatal death, preterm birth, preterm/prelabour rupture of membranes, neonatal hypoglycemia, low birth weight, birth defects, induction of labour, or birth complications. From a public health standpoint, these findings are encouraging and provide physicians with evidence to support clinical recommendations that promote health benefits over potential harms of physical activity engagement.

Furthermore, we do agree with the author's assertion and support the call for more research elucidating the optimal type, mode, dose, and intensity of physical activity that yields benefits to maternal, fetal, and child health. A clinical phrase that is often used to summarize available evidence is 'some is better than none, and more is better than some', concerning health benefits. However, from a clinical perspective, we must strike a balance between ensuring that pregnant women's physical activity levels meet the threshold associated with maternal–fetal health benefits and that their participation in physical activity remains within recommended levels so as not to cause harm.

To the authors' point regarding self-reported assessment, we appreciate the value of a ranking individuals using the Pregnancy Physical Activity Questionnaire (PPAQ) and relating this to maternal–fetal outcomes in epidemiological studies. We agree that doing so can categorically discriminate disease risk. However, it is of utmost importance in an era of inactivity and positive energy balance (e.g., obesity and eGWG) to improve the quantification of energy expenditure in a way that is clinically meaningful and provide quantifiable behavior data that will inform personalized physical activity counselling. Numbers matter in medicine and help provide benchmarks for targeted improvement for patients who need and/or want them and the physicians entrusted with their care.

In an evolving academic climate where researchers have access to new technologies, big data and artificial intelligence, there is a tremendous opportunity for advancing the validation of energy metabolism. Recent findings demonstrate that current energy expenditure models overestimate activity by roughly 400 kcal/day in pregnant women with obesity (Most et al. 2018) and that wearable physical activity devices show moderate/strong reliability and moderate validity when measuring activity in pregnancy/postpartum (Conway et al. 2018). Moving forward, we also advocate that

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determining the ideal body location of the accelerometer to ensure compliance and to validate prediction models in pregnancy is required. In the interim, we agree with the authors and understand the utility of both measures of physical activity. While validation studies are underway, researchers may benefit from using both questionnaires and wearable devices to assist in understanding the purpose, type, and context of physical activity, in addition to quantifying volume and intensity. Together, when the merits of both modalities of data-capture are employed, the design and application of health interventions will improve.

We thank the authors for their insight and commentary. Indeed, current position statements and advisory reports acknowledge both the precision of accelerometry and the discriminatory use of questionnaires. In the end, research collaboration and the design of innovative behavior tools to quantify energy metabolism during pregnancy will benefit maternal, fetal and child health.

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