Dear Editor,

We would like to thank Dr. Brownstein for her interest in our study. She expressed concerns about statistical effects of within-person variation in baseline nutrient intake and follow-up biological measurements on our estimates of disease risk (1). Dietary assessment in MESA was performed using a FFQ that has been validated for use in a multi-ethnic population with unique dietary patterns and ranges of intakes (2). In addition, macronutrient intakes estimated using the MESA FFQ were compared to plasma lipid concentrations to evaluate the criterion validity of this instrument (3). Results from other studies using approaches comparable to ours have also reached conclusions that agree with our report (4–7), which adds further confidence in these findings. Nevertheless, we do acknowledge that within-person variation in self-reported measures of diet and other lifestyle covariates is a common limitation in observational studies and undoubtedly exists in our data. Methods of measurement-error adjustment, such as that suggested by Brownstein, typically require repeat longitudinal measurements of dietary intake. Aside from correction for within-person variation, repeated measurements can be used to update dietary intake estimates or to estimate cumulative mean intakes (which also increase the precision of exposure estimates) (8,9). However, many studies do not have access to such information, given the time and cost required to assess diet. This underscores that repeated measures of diet is a desirable design feature. MESA did not collect any short-term repeat dietary measures at the baseline examination for reasons of cost and participant burden. MESA did recently complete an examination 10 y after baseline where diet was again measured; the relevance of these data to short-term within-person variation is likely to be limited. Nevertheless, we look forward to making use of this information in the years to come as MESA continues to mature.

We do agree with all statistical points made by Brownstein and that within-person variation is an issue that affects estimates generally in nutritional epidemiology. Her list of alternate analyses constitutes an alternate solution to the questions we posed. However, we note that she, like many others, refers to within-person variation as “error,” which, in statistical terms, equates to an imperfect model. In contrast, the term “error” in the epidemiologic realm suggests a flaw in study design or analysis. As Dr. Brownstein points out, the “true” risk estimates may move in either direction, depending on whether the within-person variation is in the variable of interest or in covariates. Even with repeated measures of dietary intakes, the estimates of within-person variation are themselves measured imprecisely. In principle, altering estimates by correcting for within-person error removes bias (moves the estimate in the right direction), but the loss of precision can be severe. Thus, we assert that the “naive” estimates (as published in our paper) continue to have an important place in epidemiologic research.

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Literature Cited