The association between total carotenoids (expressed as quartiles) and MetS binary outcome was mostly confounded by TC, serum vitamin C, retinol+retinyl esters, serum folate, TG, age, serum 25(OH)D, total energy intake, PIR, fiber intake and supplement use, upon serial backward elimination of covariates (|change-in-estimate of Log\(_e\)OR|>5%).

Similarly, the inverse association between serum vitamin C and MetS binary outcome was mostly confounded by serum total carotenoids, TG, serum folate, race, 25(OH)D, dietary vitamin C, serum retinol+retinyl esters, PIR, supplement use, age, dietary fiber and vitamin E intake (|change-in-estimate of Log\(_e\)OR| range: 6%-26%).

For the retinol+retinyl exposure, backward elimination of covariates indicated that the main confounders were TG, serum folate, serum 25(OH)D, race, serum total carotenoids, sex, PIR, total energy intake, dietary vitamin C (|change-in-estimate of Log\(_e\)OR| range: 5.6%-49.6%).

Finally, for vitamin E, all covariates included had an appreciable confounding effect on its association with MetS binary outcome (|change-in-estimate of Log\(_e\)OR| range: 8%-1,455%), except for serum vitamin B-12 and fiber intake.