COMMENTS AND RESPONSES

Egg Consumption and Risk of Type 2 Diabetes in Men and Women

Response to Citrome and Holt

We would like to thank Drs. Citrome and Holt for their comments (1) on our article published in the February issue of *Diabetes Care* (2). Drs. Citrome and Holt raised the issue of residual confounding by bacon and hotdogs (frequently consumed with eggs) or our inability to distinguish between fried or boiled eggs. This is of particular concern in men studied, for whom we did not have nutrient data to control for energy intake and *trans*, saturated, and unsaturated fats. We agree that in the absence of random assignment of egg consumption, we cannot exclude residual confounding as partial or complete explanation of the reported findings. If our findings in men (where we did not have detailed nutrition data) were confounded by consumption of fried eggs and/or hotdogs, then we likely would not observe any association between egg consumption and diabetes in subjects not consuming fried foods and hotdogs. Among 3,268 men with infrequent intake of hotdogs or fried foods (<1 per week each), multivariable adjusted hazard ratios (95% CI) for diabetes were 1.0 (reference), 2.03 (0.90–4.55), 1.79 (0.83–3.86), 1.79 (0.83–3.84), 1.97 (0.88–4.42), and 2.39 (1.07–5.34) from the lowest to the highest category of egg consumption, respectively. The corresponding values for subjects who consumed both hotdogs and fried foods were 1.0 (reference), 1.17 (0.81–1.71), 1.23 (0.87–1.74), 1.25 (0.88–1.79), 1.72 (1.03–2.87), and 1.63 (1.02–2.60), respectively. We did not have enough cases for stable estimates in subjects consuming either hotdogs or fried foods only. Because we also observed a positive association between egg consumption and risk of diabetes in men with infrequent intake of hotdogs or fried foods, such foods were unlikely to be major confounders of the observed association. Further, although we cannot prove causality in our observational study, our observation of a positive association between dietary cholesterol and incident diabetes provides support for the hypothesis of a causal relation with egg consumption.

As to the second issue raised by Drs. Citrome and Holt, we concur that absolute effect measures may be easier for patients to understand than relative effect measures. Absolute effect measures also are valuable tools to measure the disease burden and allocate resources. Because the attributable risk and the number needed to treat or to harm are built under the assumption of a causal relation between exposure (eggs in this example) and disease, it is important to be aware of their potential misuse before establishing causality. For the egg-diabetes relation, additional studies are needed to determine whether egg consumption plays a role in the causal path of developing type 2 diabetes. We believe that the relative effect measure that we estimated is still useful, for example, in comparison of its magnitude with the relative risks for other risk factors.

LUC DJOUSSÉ, MD, DSC[1]
J. MICHAEL GAZIANO, MD[1,2,3]
JULIE E. BURING, SCD[1,2,4,5]
I-MIN LEE, MBBS, SCD[2,5]

From the [1]Division of Aging, Department of Medicine, Brigham and Women's Hospital, Harvard Medical School, Boston, Massachusetts; the [2]Division of Preventive Medicine, Department of Medicine, Brigham and Women's Hospital, Harvard Medical School, Boston, Massachusetts; the [3]Massachusetts Veterans Epidemiology and Research Information Center (MAVERIC), Boston Veterans Affairs Healthcare System, Boston, Massachusetts; the [4]Department of Ambulatory Care and Prevention, Harvard Medical School, Boston, Massachusetts; and the [5]Department of Epidemiology, Harvard School of Public Health, Boston, Massachusetts.

Corresponding author: Luc Djoussé, ldjousse@rics.bwh.harvard.edu.

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