

EDITORIALS

Ultra-processed foods and cancer

The possibility of a link deserves further careful exploration

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In this week's *The BMJ* (doi:10.1136/bmj.k322), Fiolet and colleagues report a direct association between intake of ultra-processed food and incidence of total cancer and breast cancer.¹ They used data from a population based prospective cohort of 104 980 middle aged French women and men. This web based cohort study regularly evaluates habitual dietary intake through repeated dietary recalls, uses novel research methods to bypass the increasing challenges in recruiting and retaining study participants, and efficiently leverages administrative data to validate cancer outcomes.

As the global consumption of highly processed foods increases,² understanding the health impact of these foods has become a relevant and timely topic. Results from this study support the claim that the shift in the world's food supply to highly processed foods may partly account for increasing trends in the incidence of non-communicable diseases, including cancer.³ Given the complexity in defining the precise exposures relevant to cancer, as well as the methodological challenges associated with observational research, results from Fiolet and colleagues' analysis should be viewed as an initial step toward understanding the potential effect of processed foods on the health of human populations.

Firstly, "ultra-processed foods" is a broad (and potentially rapidly changing) food category that includes multiple foods prepared by a variety of methods and containing a myriad of nutrients and food additives. Such a broadly defined exposure affects the interpretation of results from epidemiologic analyses. What is the actual causal effect being estimated? Is the exposure causing the disease a specific food group (such as sugary products)? Or is it a macronutrient (such as fat)? Is it a food contaminant from packaging? What are the potential carcinogenic mechanisms driving the observed association? The new study was able to explore some but not all of these important questions.

The authors grouped foods into four food processing categories,⁴ including ultra-processed foods, based on "the nature, extent, and purpose of the industrial processing." Although the classification may be useful for descriptive purposes and for replication, this approach may not provide sufficient detail for consumers and decision makers in public health. Accordingly,

the authors evaluated different food groups and found no evidence that the overall association was driven by a specific food subgroup such as starchy foods. However, to quantify the effect of food processing on health accurately, we need to refine the causal question further by identifying more precisely the ultra-processed foods that could lead to cancer.

Secondly, as with any observational study, confounding by unknown factors common to consumption of ultra-processed foods and cancer outcomes cannot be excluded. Fiolet and colleagues adjusted their analyses for several well known risk factors for cancer, some of which seemed to be strongly related to ultra-processed food consumption. For example, cigarette smoking and low physical activity were far more common in participants who consumed a larger proportion of ultra-processed foods. Given the relatively weak association between intake of ultra-processed foods and incidence of cancer, and the known difficulties in measuring some important risk factors for cancer such as physical activity, the possibility remains that residual confounding could explain the observed association between ultra-processed foods and cancer. The authors did several analyses to try to evaluate the potential effect of residual confounding, underscoring the importance of striving for complete and accurate collection of information on risk factors in epidemiologic studies.

The ultimate goal of nutritional epidemiology is to generate evidence to provide sound actionable advice to individuals and shape evidence based public policy to lower the risk of disease and increase wellbeing. Fiolet and colleagues provide an initial insight into a possible link between ultra-processed food related exposures and cancer. The authors should be commended for collecting detailed dietary and cancer data and for conducting multiple secondary and sensitivity analyses to test different assumptions. Their interesting results require replication and further refinement.

The changing realities of the global food supply and the inherent limitations of epidemiologic studies call for more basic science, including data from animals, to inform further research on the effect of food processing on humans. We are a long way from understanding the full implications of food processing for health and wellbeing. Care should be taken to transmit the strengths

and limitations of this latest analysis to the general public and to increase the public's understanding of the complexity associated with nutritional research in free living populations.

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