Can adherence to dietary guidelines address excess caloric intake? An empirical assessment for the UK

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A B S T R A C T

The facilitation of healthier dietary choices by consumers is a key element of government strategies to combat the rising incidence of obesity in developed and developing countries. Public health campaigns to promote healthier eating often target compliance with recommended dietary guidelines for consumption of individual nutrients such as fats and added sugars. This paper examines the association between improved compliance with dietary guidelines for individual nutrients and excess calorie intake, the most proximate determinant of obesity risk. We apply quantile regressions and counterfactual decompositions to cross-sectional data from the National Diet and Nutrition Survey (2000–01) to assess how excess calorie consumption patterns in the UK are likely to change with improved compliance with dietary guidelines. We find that the effects of compliance vary significantly across different quantiles of calorie consumption. Our results show that compliance with dietary guidelines for individual nutrients, even if successfully achieved, is likely to be associated with only modest shifts in excess calorie consumption patterns. Consequently, public health campaigns that target compliance with dietary guidelines for specific nutrients in isolation are unlikely to have a significant effect on the obesity risk faced by the population.

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1. Introduction

Faced with the rising incidence of obesity in their populations, governments in both developed and developing countries are seeking to promote healthier food choices by consumers through a range of economic, regulatory and information measures. Promoting adherence to recommended dietary guidelines for key nutrients is an important element of the strategy for promoting healthier eating. It provides the rationale for a variety of public health campaigns such as the UK Government's "five a day"[1] campaign to increase fruit and vegetable consumption and the "Change4life – Eat Well, Move More, Live Longer"[2]

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[1] The UK's 5 A DAY campaign, introduced in 2002–03, aims to increase awareness of the health benefits of fruit and vegetable consumption, particularly targeting groups with the lowest intakes. For key messages and targeted action under the programme, see http://www.nhs.uk/LiveWell/5ADAY/Pages/5ADAYhome.aspx.

[2] Change4Life is the UK's national social marketing campaign started in 2009 that aims to prevent people from becoming overweight by encouraging them to eat better and move more. For current details of the campaign see http://www.nhs.uk/Change4Life/Pages/change-for-life.aspx.

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campaign, the European Commission's "Salt Campaign"[3] to reduce salt intake and the US Department of Agriculture's "MyPlate"[4] initiative to promote healthier eating. The desirability of conforming to recommended dietary guidelines for specific nutrients also underpins many initiatives for nutritional labelling and proposed fiscal interventions to combat obesity such as "fat" taxes and "thin" subsidies. In this paper, we develop a framework for examining the association between conformity to dietary guidelines for individual nutrients and excessive energy intake, which is the most proximate determinant of obesity risk (Jebb, 2007). Based on our empirical analysis for the UK, we argue that adherence to dietary guidelines for individual nutrients, even if successfully accomplished through public health campaigns and other measures, is likely to be associated with only modest changes in patterns of excessive energy intake, and consequently, with only small shifts in obesity risk in the population.[5]

2. Obesity and adherence to dietary guidelines in the UK

The Cabinet Office report *Food Matters* (Jarvis, 2008) identifies the promotion of healthier dietary choices by consumers as a key element in the UK Government's food strategy for the 21st century. This follows from the recognition of the enormous health gains that would accrue to the UK if diets matched nutritional guidelines on fruit and vegetable consumption, saturated fats, added sugars and salt intake. The Cabinet Office report estimates that adherence to nutritional guidelines would reduce the risks related to cancer, heart disease and other illnesses leading to 70,000 fewer people dying prematurely every year. Improved dietary choices are also crucial for meeting the challenge of obesity, with over a quarter of adults and 10% of children in the UK already classified as "obese". In addition to the social impacts, the economic burden of diet related ill-health is estimated at almost £6 billion a year by way of additional National Health Service costs alone.

The changing Body Mass Index (BMI) profile of the UK adult population based on data from the Diet and Nutritional Survey of British Adults 1986–87 (OPCS, 1991) and the National Diet and Nutrition Surveys of 2000–01 (ONS, 2005) and 2008–09 (Bates et al., 2010) is presented in Table 1 which summarises the quantiles of the BMI distribution in the three time periods. While the average BMI has steadily increased, what is significant and of greater concern is the rightward shift of the BMI

distribution. The proportion of adult individuals who are overweight (BMI ≥ 25 and <30) or obese (BMI ≥ 30) has increased from 40% to 62%, while the proportion of individuals who are obese has increased from 10% to 27%.

Obesity is a characteristic with a complex set of socio-economic, demographic, environmental and cultural determinants (Ulijaszek, 2007). A wide array of these factors has been examined in the literature, including access to food, lifestyle factors, fast-food consumption (Chou et al., 2004), economic well-being and security (Smith et al., 2009), food advertising (Andryeva et al., 2011), physical activity and the built environment (Salois, 2012; Sandy et al., 2012). The influence of these factors arises through their effect on the two most proximate determinants of body weight–food choice and the resultant nutrient and energy composition of diets and energy expenditure. In this paper, while recognising the wide array of determinants that influence obesity, we focus on the association between the nutrient composition of diets and excessive energy intake and the consequent risk of obesity.

The rising trend in the incidence of obesity has been associated with significant deviations from the recommended dietary guidelines suggested by the World Health Organization (2003) and national public health authorities. These dietary guidelines are chiefly related to the share of energy derived from macronutrients (fats and sub-components, sugars and protein) and the absolute intake levels of fruits and vegetables, fibre, salt and cholesterol. In the US, which reports the highest incidence of obesity in the developed world (OECD, 2012), Volpe and Okrent (2012) report that consumer diets are a long distance away from conformity with the *Dietary Guidelines for Americans* (US Department of Health and Human Services and US Department of Agriculture, 2005). Using the Healthy Eating Index (HEI) (US Department of Agriculture, 2010), an overall measure of diet quality based on adherence to the *Dietary Guidelines*, Volpe and Okrent (2012) find that the average HEI score for food-at-home purchases of US consumers was 56.4, far below the maximum score of 100, which would indicate perfect adherence to the *2005 Dietary Guidelines*. Similarly, Guenther et al. (2008) found a low average HEI score of 58.2 based on consumption data from the respondents of the National Health and Nutrition Examination Surveys. Dietary guidelines in the UK (Department of Health, 1991) are presented along with the dietary guidelines suggested by the World Health Organization (2003) in Table 2. Information on trends in adherence to key dietary guidelines in the UK over last the two decades is summarised in Table 3. For 2008–09, the average contribution to energy intake from all fats (34.8%), saturated fats (13.2%) and non-milk extrinsic sugars (13.5%) was clearly in excess of the prescribed guidelines, while the contribution of polyunsaturated fatty acids (PUFA) to energy (5.2%) and average cholesterol consumption were within the acceptable range. Average fruit and vegetable consumption fell well short of the recommended intake (400 g per day), as did the intake of dietary fibre. The average consumption of salt remained considerably higher than the recommended guideline (less than 2.36 g of sodium per day). The average figures, however, mask the true extent and severity of non-compliance with the

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[3] The European Union adopted a "Common Framework for National Salt Initiatives" in 2008 with the objective of reducing the salt content of food products, also encompassing salt consumed in restaurants and catering (European Commission, 2012). For details of implementation of the salt reduction initiative see http://ec.europa.eu/health/nutrition_physical_activity/high_level_group/nutrition_salt_en.htm.

[4] "MyPlate" is a communications initiative based on the *2010 Dietary Guidelines for Americans* (US Department of Agriculture and US Department of Health and Human Services, 2010) to help US consumers to make healthier food choices. See http://www.choosemyplate.gov/ for details of the initiative.

[5] It is important to note that we do not measure adherence to Dietary Reference Values (DRVs) for caloric intake in this paper.