



**The effects of the danish tax on saturated fat on nutrient intake and modelled health outcomes for different socio-demographic groups**

**An econometric and comparative risk assessment evaluation**

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*Published in:*

Annals of Nutrition and Metabolism

*Publication date:*

2017

*Document version*

Publisher's PDF, also known as Version of record

*Citation for published version (APA):*

Smed, S., & Jensen, J. D. (2017). The effects of the danish tax on saturated fat on nutrient intake and modelled health outcomes for different socio-demographic groups: An econometric and comparative risk assessment evaluation. *Annals of Nutrition and Metabolism*, 71(Suppl. 2), 321-322.

AGP-adjusted ID (<15 µg/L) 15.0% (95%CI 11.60, 19.2); serum folate deficiency (<14 nmol/L) 11.0 (95%CI 8.3, 14.4); RBC folate deficiency (<624 nmol/L) 35.1% (95%CI 30.8, 39.8); RBC folate insufficiency (<748 nmol/L) 50.3% (95%CI 45.4, 55.1); and vitamin B-12 deficiency (<221 pmol/L) 49.8% (95%CI, 45.0, 54.6). We estimated that 30.2% (95%CI 20.4, 41.3); 8.0% (95%CI 1.9, 17.8) and 1.8% (95%CI 0, 11.4) of anemia cases were attributable to iron deficiency, serum folate and vitamin B-12 deficiency, respectively. We also estimated that 13.9% (95%CI 4.1, 24.0) and 6.2% (95%CI 2.8, 10.8) of RBC folate insufficiency cases were attributed to vitamin B-12 and serum folate deficiency, respectively.

**Conclusions:** To our knowledge, this is the first national study to present data on the substantial contribution of iron deficiency, folate deficiency and vitamin B-12 deficiency to the reduction of anemia and RBC folate insufficiency among women of childbearing-age in a low or medium income country.

**Keywords:** Population-attributable risk fractions, Micronutrient deficiencies, Anemia, Iron deficiency, Folate deficiency and insufficiency

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## IMPLEMENTING FOOD-BASED DIETARY GUIDELINES TO GUIDE POLICIES, PROGRAMMES AND NUTRITION EDUCATION

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**Background and objectives:** The need for food-based dietary guidelines (FBDGs) to guide national food-related policies and programmes including nutrition education programmes is increasingly recognized. Several sources such as the Framework for Action from the Second International Conference on Nutrition, the Global Nutrition Report 2015, and the Foresight Report, 2016, published by the Global Panel on Food Systems for Nutrition have highlighted the potential role for FBDGs in shaping healthy diets. However, there has been a lack of information on how FBDGs are actually implemented by national entities, and a lack of guidance on carrying out implementation. The aim of this study was to obtain a snapshot of country actions of FBDGs implementation.

**Methods:** To explore if current implementation covers the different levels of influence on people's food choices, namely personal/interpersonal factors, institutional/community, and the enabling environment, the "social-ecological" framework was used. A literature review covering key scientific databases and grey literature was carried out in 2016. The findings helped shape questions for a key informant survey. Responses were received from 47 key informants in 27 of the 34 countries contacted, mostly from de-

veloped countries. Key informants included staff and researchers in government ministries, national nutrition organizations and academia. Responses therefore built a picture mainly of government-led activity rather than of informal actions and impacts.

**Results:** Implementation activities that had a direct link to the FBDGs were identified from various countries. These included some policy actions (such as school meal/institutional food standards and vending machine/cafeteria food standards in line with FBDGs), programmes (e.g. food assistance programmes, two examples of agriculture programmes, examples of food labelling/food advertising guided by the FBDGs, and reformulation of food to comply with the FBDGs), and many consumer education programmes. Information on evidence of effectiveness was collected, where available.

**Conclusions:** Some preliminary recommendations on how to maximize the impact of FBDGs are given, which include the need for a consumer-centred approach; an implementation plan with built in monitoring, evaluation, and funding; the need to target all policies/programmes that influence food, and the need to target policymakers as well as educators and the general public.

**Keywords:** Food-based dietary guidelines, implementation, food-systems.

### Further collaborators:

We are very grateful to all those who participated in the key informant survey. We would also like to thank the working group made up of FAO staff and external experts (Jeanette Andrade, Minna Huttunen, Sarah Levesque, Ellen Meuhlhoff, Veronica Molina-Barra, Celeste Naude, Sonia Olivares, Aileen Robertson and Fernanda Villamarin), who have been reviewing the resource documents FAO is preparing, on FBDGs implementation possibilities for various sectors and settings. We would also like to acknowledge useful review comments provided by others who were not part of the working group, in particular Karen Fukofuka, Ann Hayman and Sirpa Sarlio-Lähteenkorva, and other colleagues from FAO. Following review by a wider group of experts, these materials will be made available free to countries. For FAO work on FBDGs, see: <http://www.fao.org/nutrition/education/food-dietary-guidelines/home/en/>

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## THE EFFECTS OF THE DANISH TAX ON SATURATED FAT ON NUTRIENT INTAKE AND MODELLED HEALTH OUTCOMES FOR DIFFERENT SOCIO-DEMOGRAPHIC GROUPS: AN ECONOMETRIC AND COMPARATIVE RISK ASSESSMENT EVALUATION

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**Background and objectives:** The WHO recommends the use of fiscal policies to promote healthy eating, but underline that the use of fiscal instruments might have potential regressive effects. However, there is very limited real-life evidence of the effect of food taxation, and even less on the potential regressive effects,

as most evidence is based on simulation studies. The objective of this study is to evaluate the effect of the Danish tax on saturated fat in terms of changes in nutritional quality of the diet i.e. changes in saturated fat consumption as well as other non-targeted dietary measures and to model the associated changes in NCD mortality for different socio-demographic groups.

**Methods:** Based on household scanner data we estimate the impact of the tax on consumption of saturated and unsaturated fat, salt, fruit, vegetables and fiber. The resultant changes in dietary quality are then used as inputs into a comparative risk assessment model (PRIME) to estimate the effect of these changes on Non-Communicable Disease mortality. We estimate the effects for four different educational groups; no education, vocationally trained, short tertiary education and long to medium tertiary education, using education as a proxy for socio-demographic status.

**Results:** The tax resulted in a 4.0% reduction in saturated fat intake on average with largest decrease among those with no education or medium to long tertiary education. Vegetable consumption increased especially for vocational trained and short educated. Salt consumption increased for most individuals, but mostly for short educated. We find a modelled reduction in annual NCD mortality per 100.000 persons of 3 lives saved for those with no education, 5.1 lives saved for the vocationally trained, 1.7 lives extra lost for the short educated and no change for the medium to long educated. All educational groups experience an increase in food-expenditure due to the tax. Largest increases are found for short and medium to long educated.

**Conclusions:** Modelling the effect of the changes in diet on health outcomes suggests that the saturated fat tax made a positive contribution to public health in Denmark. The effects are regressive in terms of NCD mortality, but progressive economically

**Keywords:** Fat tax, progressivity, NCD mortality

**Conflict of Interest Disclosure:** None of the authors have financial relationships with any organization, that might have had an interest in the submitted work in the previous three years and no other relationships or activities that could appear to have influenced the submitted work.

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144/1647

## SERUM PENTADECANOIC ACID, A BIOMARKER OF DAIRY FAT INTAKE, IS ASSOCIATED WITH LOWER RISK OF INCIDENT CARDIOVASCULAR DISEASE AND ALL-CAUSE MORTALITY IN SWEDISH MEN AND WOMEN

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**Background and objectives:** Dairy food is a major energy and nutrient source in many cultures. Studies assessing associations of milk and dairy intake with mortality and cardiovascular disease (CVD) have been inconsistent, in part possibly due to poor intake estimation. Circulating pentadecanoic acid (15:0) is commonly utilized as an objective biomarker of dairy fat intake. Here we evaluated associations of serum 15:0 with incident CVD and all-cause mortality in a Swedish population-based cohort study.

**Methods:** Serum cholesterol ester 15:0 was measured at baseline in 60-year-old men (n=2017) and women (n= 2133). With use of national registers, 578 incident CVD events and 568 deaths were identified during a median follow-up of 16.6 y in participants with no prevalent CVD at baseline (n=3785, 53% women). Associations of 15:0 with incident CVD and all-cause mortality were evaluated using Cox proportional hazard models. Serum 15:0 (expressed as proportion of total fatty acids) was assessed as a continuous variable and in quintiles. Nonlinear associations were evaluated by using restricted cubic splines.

**Results:** In multivariable-adjusted models (including sex, BMI, physical activity, smoking habits, alcohol intake, education, prevalent type-2 diabetes, and drug treated hypertension and hyperlipidemia), serum 15:0 was inversely associated with incident CVD in a linear dose-response manner: hazard ratio (95% CI) of the top vs bottom quintile, 0.75 (0.57-0.98). A nonlinear associa-



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## **21st International Congress of Nutrition**

Buenos Aires, Argentina, October 15–20, 2017

### **Abstracts**

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