Intake of free sugars and micronutrient status

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Technical meeting, 13 February 2018

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SUB-QUESTION 4

What is the relationship between the intake of free sugars from all dietary sources and micronutrient status?

Target	Disease endpoints	Surrogate endpoints
Micronutrient status	Clinical signs/symptoms of micronutrient deficiency	Biomarkers of micronutrient status Micronutrient intakes Micronutrient density of the diet (micronutrient intake/energy unit)

SUB-QUESTION 4 – PREVIOUS ASSESSMENTS

Guideline	Sugar fraction	Recommendation	Basis (endpoint)	Other endpoints assessed
EFSA, 2010	**Added sugars**	Consider when setting FBDGs	Dental caries, body weight, **micronutrient density**	Glucose homeostasis, risk of T2DM, BL, BP, CVD risk
GNS, 2012	SSBs	Limit consumption	Obesity, risk of T2DM	BP/hypertension, MS, CHD risk, cancer
NNR, 2012	**Added sugars**	<10E%	**Micronutrient density**	Dental caries (frequency of intake), weight gain and risk of T2DM (SSBs), glucose homeostasis, BL, BP, CVD risk, uric acid
SACN, 2015	Free sugars	≤ 5E%	Energy intake	Dental caries (frequency of intake), weight gain and risk of T2DM (SSBs), BL, BP, CHD, glucose homeostasis
ANSES, 2016 (adults)	Total sugars	100 g/day	Fasting triglycerides	Weight gain, glucose homeostasis, BL, intrahepatic lipids and risk of NAFLD, uric acid, BP
IoM, 2002	**Added sugars**	<25E%	**Micronutrient density**	CHD risk, energy intake, body weight, BL, cancer
DGA, 2015	**Added sugars**	<10E%	**Micronutrient density**	-
WHO, 2015	Free sugars	<10E% <5E% conditional	Body weight, dental caries	-
AHA, 2016 (children)	**Added sugars**	25 g/day ≥ 2 years Avoided < 2 years	Energy intake, adiposity, BL, CVD risk	**Micronutrient density**, BP, risk of NAFLD, glucose homeostasis, risk of T2DM
ESPGHAN, 2017 (children)	Free sugars	≤ 5E% ≥ 2 years (lower for < 2 years)	Dental caries Weight gain (SSBs) CVD and T2DM (fructose)	Preference for sweet taste

SUB-QUESTION 4 – PREVIOUS ASSESSMENTS

Guideline	Basis (endpoint)	Method
EFSA, 2010	Dental caries, body weight, **micronutrient density**	**Narrative review** *Rennie and Livingstone (2007)* *Studies in EU children and elderly nursing home residents*
NNR, 2012 [<10%E]	**Micronutrient density**	**Narrative review** *Rennie and Livingstone (2007)* *Studies in children and elderly nursing home residents (Nordic countries)* *Finnish STRIP project*
IoM, 2002 [<25%E]	**Micronutrient density**	US-wide **dietary survey** (NHANES III) %E from added sugars vs micronutrient intakes relative to DRVs
DGA, 2015 [<10%E]	**Micronutrient density**	**Food pattern modelling** to meet nutrient needs within calorie limits Definition of 3 healthy food patterns (US, Mediterranean, Vegetarian)

SUB-QUESTION 4 - FEASIBILITY

- Using food consumption surveys in the EFSA Food Consumption Database was considered **unfeasible** – many countries available but different methods used in different surveys, which may hamper comparability of results and conclusions to be drawn

- Using food pattern modelling was considered **unfeasible** – difficult to define one or more healthy eating patterns and recommended amounts of food per food group for different energy intake levels that will cover all European countries - not under EFSA's remit

SUB-QUESTION 4 - METHODS

Two different methods will be used:

1. A **questionnaire** to national representatives of European countries (28 EU Member States, Iceland and Norway, Switzerland and EU candidate countries) through:

- EFSA's Focal points
- EFSA's Food Consumption Data networks

2. An **extensive literature search** of the available evidence

SUB-QUESTION 4 – QUESTIONNAIRE - AIMS

To identify

- National food **composition data** (sub-Q 1) on total sugars AND added/free sugars, if available.
- **Micronutrients of public health concern** (i.e. intakes below reference values by one or more age groups) used to set national dietary recommendations and/or FBDGs.
- Data available at national (or regional) level on:
  - **Intake** of total/added/free sugars (also for sub-Q2 – quality check);
  - **Biochemical markers** of micronutrient status and/or micronutrient density of the diet in relation to the intake of total/added/free sugars.

SUB-QUESTION 4 – EXTENSIVE LITERATURE SEARCH

Aim

To investigate the relationship between the intake of free sugars, whether total or from one or more dietary sources (in amount per day, in amount per kg/bw/day, or as % of total energy intake), and micronutrient intake, micronutrient density of the diet, biochemical markers of micronutrient status and/or signs/symptoms of micronutrient deficiency

Databases

Embase, PubMed and Scopus - no time limits

SUB-QUESTION 4 – EXTENSIVE LITERATURE SEARCH (cont.)

Methods *(adapted from Rennie and Livingston, 2007*)*

Micronutrient inclusion criteria

- minerals and vitamins sourced from a few major foods, and/or
- minerals and vitamins in which deficiencies or sub-optimal status are more likely to occur (identified from the **questionnaire**)

- micronutrients with ubiquitous sources = **excluded** (Na, P, niacin, pantothenic acid, vitamins B_{12}, D and K) = unlikely to be displaced from the diet by free sugars

** Rennie KL, Livingstone MB, 2007. Associations between dietary added sugar intake and micronutrient intake: a systematic review. British Journal of Nutrition 97(5), 832-41.*

SUB-QUESTION 4 – SYNTHESIS OF THE EVIDENCE

Methods

To be defined at a later stage:

Not possible to anticipate the type/amount of data that will be gathered through the extensive literature search and/or the questionnaire sent to National Competent Authorities

MICRONUTRIENT STATUS