

## Management summary

(by Luc Tappy and Beatrice Baumer, 31st December 2019)

This evaluation was performed with the specific aim of assessing whether, based on the present scientific evidence, changes in the Swiss food pyramid recommendations are warranted to reduce the risk of non-communicable diseases (NCDs) in the general population. In order to address this question, experts were asked to review the relevant literature starting from 2012 (date of the previous similar assessment by the SSN + EEK) to 2017. NCD represent a very large group of diseases, and a literature search for all NCDs-related terms was obviously not possible, thus, the focus was put on NCDs with high prevalence in the Swiss population and with known links to nutrition, i.e. obesity, diabetes type 2, cardiovascular diseases, and cancer.

## General summary

Based on recent scientific evidence, it has been possible to identify the following, previously unrecognized or controversial, associations between the intake of specific food groups and the risk of NCD.

- No recent information regarding the association between the total fluid intake and NCD has been retrieved.
- However, several meta-analyses have reported that that coffee consumption (including decaffeinated coffee) up to 4 cups/day (400 mg caffeine/day) has no identified deleterious effects on health, and may even be associated with reduced NCD risk. These conclusions are restricted to healthy adult male and non-pregnant females, and do not extend to women during pregnancy and children. Tea consumption has not been assessed in this expertise, but has recently been shown to bear similar relationships as coffee to NCD (Revision of Dutch food group guidelines).
- The recent literature provides robust evidence that consumption of sugar-sweetened beverages (SSBs) such as sugar-sweetened sodas, energy drinks, sport drinks, nectars, and sugar-sweetened milk-based drinks, is dose-dependently associated with body weight gain in children and adults. SSBs intake is also significantly associated with increased risk for diabetes and most cardiovascular diseases. There is however only weak evidence for an association with cancer. The relationships between fruit juices consumption and NCD have not been comprehensively addressed. Many studies indicate that consumption of fruit juices at large (i.e. without distinguishing between fruit juice with added sugar and 100% fruit juices) is associated with increased risk of NCD. Few studies specifically assessed the effect of 100% fruit juices, and yielded discrepant results.
- The protective effects of fruit and vegetable consumption on NCD risk have been largely corroborated. There is strong evidence that the consumption of fruits and vegetables is associated with reduced risk of diabetes, cardiovascular diseases, and some type of cancers. There is a strong effect of consuming 1 or 2 fruits servings per day compared to no fruit, but consumption of more than 2 fruit servings/day does not further reduce the risk. In contrast, consumption of vegetables is associated with a continuous risk decrease until four servings/day. Consumption of 100% fruit juice has been inconsistently associated with

increased or neutral risk of obesity and diabetes type 2. No study reported a protective effect of 100% fruit juice consumption on NCDs, however.

- There is strong evidence that starchy foods differ in the way they alter NCD risk. Consumption of unrefined cereals is associated with reduced risk of cardiovascular diseases, diabetes type 2 and some cancer forms and with lower overall mortality, while consumption of refined cereals appears to have a neutral effect. Consumption of whole grains, defined as cereals minimally processed or processed in a way that the cereal's components (endosperm, germ and bran) are present in the same relative proportions as they exist in the intact grain, is consistently associated with beneficial effects on cardiovascular and diabetes risk and on total mortality.
- There is a positive association between processed meat and red meat consumption and risk of NCDs. Based on recent meta-analyses and reappraisals by other expert groups, adverse effects are observed with intake higher than 50 g/day for processed meat and higher than 100 g/day for red meats.
  - There is an inverse relationship between fish consumption and overall mortality. Recently, there has also been increasing concern regarding intake of contaminants (heavy metals) associated with fish consumption. This regards mainly carnivorous fish (at the end of the fish food chain), and deep-sea fishes. This has led several agencies to revise their guidelines and advise the consumption of one deep-sea fish and one other fish per week.
  - The literature does not support strong links between dairy products consumption and risk of NCDs. It however does not demonstrate any adverse effects of dairy products on mortality, incidence of cardiovascular diseases, diabetes, obesity or cancer. There is instead some evidence that consumption of fermented dairy products may offer some protection against obesity. Effects on bone health were not included in this evaluation.
- There is evidence that consumption of pulses decreases the risk of some chronic diseases (coronary heart disease, lung cancer). Intervention studies point towards a protective effect of vegetable proteins against NCDs
- A small but potentially important benefit regarding cardiovascular risk results from reduction of saturated fat when it is replaced by polyunsaturated fatty acids. Consumption of n-6 PUFAs has been associated with reduced cardiovascular morbidity and mortality. Seafood-derived n-3 PUFA supplements have also been shown to diminish cardiovascular and total mortality in cardiovascular high-risk patients. Based on these findings it appears that replacing animal fat with vegetable oils have overall protective effects on cardiovascular risk
- The recent literature provide strong evidence that unprocessed nut consumption is associated with decreased incidence of NCD and decreased total mortality. This conclusion is supported by prospective cohort studies and by a large number of randomized clinical trial showing that nut supplementation have short-term beneficial effects on cardiovascular risk factors, body weight, glucose homeostasis, and blood markers of inflammation.

## Conclusions

The re-evaluation of scientific evidence between diet and health at a food-based, instead of the previous nutrient-based perspective, does not lead to a big divergence from existing

recommendations. The main amendments consist in re-attributing some food groups to other levels of the pyramid (nuts, pulses, fruit juices). This evaluation did not take into account other dimensions of diet, in particular those of sustainability. Furthermore, the food-group approach is based on the evaluation of minimally processed food items. The impact of a regular consumption of highly processed food, composed of different ingredients, on health, still needs more research, as well as an evaluation of classification tools for this heterogeneous food group.

## **Recommendations**

No change on daily recommended amount of fluids is presently warranted. The recommended source of fluid is water. Water may be safely replaced by unsweetened coffee (up to a total intake of 400 mg caffeine/day) or by teas (including herbal teas) in healthy, non-pregnant adults.

Beneficial effects of consumption up to two servings of whole fruits and up to  $\geq$  three servings of vegetables/day are well supported by the current literature, and the existing recommendations should be more specific. Furthermore, the optional replacement of one fruit portion by fruit juice should be deleted.

Unsalted and minimally processed nuts (without sugar, salt or fat coatings) should be included at the fruit and vegetable level, albeit with smaller portion sizes (30g / day). A list of nuts should be provided.

The Swiss food intake guidelines should provide an adequate description of what corresponds to a whole grain product, and more emphasis could be made on the regular consumption of one to three servings of whole grain products.

The current Swiss recommendations regarding dairy products (2-3 portions per day) are reasonable on the basis of currently available information and scientific evidence. There is also no evidence supporting an additional recommendation for reduced-fat dairy products since there is no evidence indicating that whole-fat products are detrimental to health. A recommendation to diversify the consumption of dairy products should be added.

The pyramid level for protein sources should include pulses (ripe seeds of legumes), specifying that these should be minimally processed, without the addition of fats or salt. Tofu can still be mentioned as an example, pulses-based pasta alternatives is another. Peanuts should be mentioned as an exception (listing under nuts).

For the further elements of the protein levels: the literature on meat was not re-evaluated, based on the 2014 EEK/FCN report and more recent reviews, in particular the 2018 findings of the WCRF fund there is at the moment no evidence for amending the current recommendations. We recommend a re-evaluation of eggs in a separate report, due to the current number of review papers on the topic.

For fats we suggest recommending consumption of a variety of fat sources, with a preference for fats of plant origin. At the moment there is no evidence corroborating the benefits of fats such as coconut fat.

All sugar-sweetened beverages, fruit juices and smoothies, should be mentioned among the products at the top level of the pyramid (discretionary amounts of snacks/sweets), with portion size indications.