# PPA Response to SACN Draft Carbohydrates and Health Report

Date: 29 August 2014**. Not for further distribution.**

This consultation response is made by the Potato Processors' Association (PPA); the trade association that represents the interests of UK manufacturers of processed potato products. Currently 90% of all potatoes processed – principally frozen chips, potato crisps, potato based snack products and dehydrated potato. In 2013, the retail sales value of the UK market for processed potato products amounted to £3.9 billion. With about 57% of the UK consumption of potatoes in processed form, this accounts for approximately 3.2 million tonnes of potatoes annually.

The PPA welcomes the opportunity to provide scientific comment on the Scientific Advisory Committee on Nutrition's (SACN) comprehensive draft report on carbohydrates and health. The PPA supports the development of evidenced-based public health policy, underpinned by robust and up to date science.

Following consultation with Members and drawing upon their internal expert knowledge and (scientific) resource, this response focuses on references made to potato consumption and associations with Cardiovascular Disease (CVD) and Type 2 Diabetes Mellitus (T2DM).

In relation to the following points, we request that SACN consider altering the language used to ensure consistency throughout the Report in reaching summary conclusions. In particular we refer to:

- **The recommendation that 50% energy consumption should come from carbohydrates**
- **The summary statements in Tables 7.1 (concluding insufficient evidence exists for the role of potatoes in Stoke, T2DM, Impaired glucose tolerance, glycaemia and coronary effects) and**
- **Table 7.3 (highlighting inconsistent evidence for a role for potatoes in CVD).**

**We request that SACN gives consideration to modifying the language used elsewhere in the report to reflect these statements, based on the comments and scientific analysis we provide below.**

**1. CVD**

**Summary**

Our Members have further examined the cohort studies, which are summarised on page 110, paragraphs 7.18 and 7.19. The analysis presented below indicates there is no substantive link between CVD and potato consumption. From the information provided in the Systematic Literature Review (SLR) and the Report, we also believe that the cohort studies were also too divergent to be able to combine the data and calculate a pooled risk estimate.

While we commend the SACN for recognising the lack of evidence relating potatoes to CVD in the overall conclusions section, the statements inferring an association of greater potato intake with increased risk of CVD in section 7.18 are misleading. **We request that this language be modified to reflect the true results of these studies, which indicate no association of potatoes with CVD risk.**

**Scientific analysis of evidence presented**

The study by Joshipura et al., 2009 examined whether carbohydrate intake affected the association between fruit and vegetable intake and cardiovascular disease (CVD) in 2 cohort studies; the Nurses' Health Study (NHS) and the Health Professionals' Follow-up Study (HPFS). The populations were segmented into low (<40% of energy from carbohydrate), moderate (>40-55%) and high (>55%) carbohydrate intake groups. While the association of potatoes with CVD are not mentioned at all in the results and discussion sections of the paper, the multivariate relative risk (RR) for each cohort is presented separately (without confidence intervals (CI)) in Table 2 along with a RR and CI for pooled analyses of the 2 cohorts. The RR for quintile 5 vs. quintile 1 in the low, moderate and high carbohydrate groups for the HPFS are 1.16, 1.32 and 1.10, respectively and in the NHS are 1.25, 0.99, and 1.15. While these RR scores are all >1, without CI one cannot determine if the associations are significant at the 95% CI level and therefore cannot draw any conclusions as to the association of potatoes in these individual cohorts to

CVD risk. The reported RR (and CI) for quintile 5 vs. quintile 1 in the pooled analyses are RR 1.21 (CI 0.93, 1.56) with a RR for trend of 1.15 (CI 0.87, 1.52) for the low carbohydrate intake group, RR 1.14 (CI 0.86, 1.52) with RR for a trend of 1.17 (CI 0.94, 1.46) for the moderate group and RR 1.12 (CI 0.86, 1.47) with a RR for a trend of 1.26 (CI 0.93, 1.69) for the high carbohydrate intake group. As the CI for the associations of potatoes with CVD risk and for the trends for risk crosses 1 in all carbohydrate intake groups studied, no evidence of an effect is presented.

The Panagiotakos et al., 2009 study evaluated the association of specified dietary patterns with 5-year incidence of CVD. Potatoes were evaluated as part of a dietary pattern that included cereals, potatoes and bread. Therefore, the association of potatoes alone with CVD cannot be determined from this paper. The RR and CI of the cereals, potato and bread dietary pattern with CVD was RR 1.02 (CI 0.72, 1.42) for the fully adjusted model, indicating no association with CVD. In addition, applied cluster analysis identified dietary patterns that were healthy dietary choices (group 1), unhealthier dietary choices (Group 3) and in between choices (Group 2). Group 1 (Healthier dietary choices) included potatoes (13servings / week) and was associated with a lower risk of CVD compared to group 3. Participants classified in group 3 had a 2x greater risk of CVD compared to those classified in group 1.

**We request that SACN reviews the summaries of these studies in the context of this analysis and considers modifying the language used on page 110 to be consistent with the wording used in the summaries on page 112, in paragraph 7.20 and Table 7.3, which clearly state there is no association with potato consumption and CVD.**

**2. T2DM**

**2.1 Summary**

Our reanalysis of the studies put forward as evidence of a link between potato consumption and T2DM (see below) suggests there is a limited and very weak body of evidence from cohort studies, which does not support the proposed conclusion regarding potatoes and risk of T2DM or any other health outcome. **We request that the statements regarding the direction of association and biological relevance be removed from the conclusions to more appropriately reflect the data presented. Specifically, we request that SACN considers modifying the language used on the following pages:**

The summary on page 111, paragraph 7.22, states 'The direction of association indicates that greater consumption of potatoes is detrimental to health, but it is not possible to exclude confounding by other variables, e.g. cooking methods such as frying' and 'The association is biologically relevant.' These statements are incongruous with the suggestion of a 'borderline association' at the start of paragraph 7.22 and with Table 7.1, which states there is insufficient evidence of an association with T2DM. This is both confusing and inflammatory and taken out of context could deter consumers from eating potatoes. This is also at odds with the SACN report's overall conclusions, which highlight the importance of basing diets on starchy foods and the need for people to consume more fibre, or which potatoes are a good source.

We understand that the SACN report follows a predefined format in which any exposures and outcomes where there are too few studies to meet the inclusion criteria for the review are detailed in tables at the end of each section (such as in table 7.1). However, we believe that there is an inconsistency in that SACN has included T2DM and potatoes in table 7.1 (indicating insufficient evidence, i.e. ' too few studies or trials that meet the inclusion criteria') but the report does in fact review evidence for 4 studies earlier in the chapter (sections 7.21 and 7.22), suggesting there was sufficient evidence (albeit described as 'limited') to justify consideration of these studies. **It would be helpful if SACN could review this apparent inconsistency.**

There is also no context provided in the summary table on page 111, to clarify what 'greater consumption' means. With regard to the levels consumed, there is a limited amount of data available in the Report (e.g. for one study it refers to <283 vs. >132g/day; the others presented information in servings per day and it appears that the SACN Report has assumed a serving is 200g based on the NDNS. Could SACN provide additional context here?

On pages 113 (paragraph 7.26) and 213 (paragraph 12.14), as above, the language suggests a higher consumption of potatoes is associated with a risk of T2DM; could SACN review the language used here and modify it to reflect that there is insufficient evidence of an association as reported in Table 7.1, Page 112.

**2.2 Scientific analysis of evidence presented.**
The study by Hodge et al. examined the associations between type 2 diabetes and fibre, glycaemic index, glycaemic load and fibre-rich foods. In this cohort potatoes were consumed 3-4 times a week and potato fibre intake ranged from 0.6-0.8 grams per day across the quartiles of glycaemic index. The results showed no association between potato fibre (g/d) and type 2 diabetes (OR 1.04; CI 0.92-1.17, p = 0.57) in the multivariate adjusted model and no association or trend in potato consumption across quartiles of consumption. The author concluded, "that a diet with high carbohydrate content and a low GI may reduce the risk of type 2 diabetes. White bread was the food most strongly related to diabetes incidence and was also the most strongly associated with GI."

The cohort study conducted by Montonen et al., 2005 has serious limitations. The researchers examined consumption of different foods in predicting incidence of T2DM based on pre-selected dietary patterns. Relative risk of developing T2DM was estimated across quartiles of foods. Differences in potato consumption were miniscule with non-cases and cases consuming 220 and 232 g potato per day, respectively. It seems implausible that a difference of 12 grams (~3.7 teaspoons) of potato a day would have any effect on the relative risk of developing T2DM. In a multivariate regression analysis, the authors found an increased risk of T2DM and potato consumption. The fully adjusted model that included additional variables – smoking, family history of diabetes and geographic area – did not attenuate the association suggesting the functional form of the models was not appropriate and that the models may have been miss-specified or the variables were imprecise in measuring relative risk. Furthermore, although the researchers controlled for family history of diabetes, they did not control for weight gain in their adjusted model. Both of these variables are strongly associated with risk of type 2 diabetes. It, therefore, would appear that the regression models did not control for an important risk factor that could attenuate the weak trend observed in the analysis.

The study by Halton et al., 2006 makes assumptions in their modelling that are hypothetical at best. Using data from the Nurses' Health Study, the researchers examined the association between potato consumption and risk of T2DM. The participants in the study were placed into quintiles, according to frequency of potato consumption. Intake of potatoes ranged from 0.07 servings per day in quintile 1 to 0.63 servings per day in quintile 5. French fry consumption ranged from 0 to 0.14 servings per day from quintile 1 to quintile 5. This illustrates very low intake of potatoes and French fried potatoes even at the highest quintiles of consumption and again begs the question of plausibility of the results. Across the quintiles of potato consumption, participants also report greater consumption of energy, cereal fibre, fruit and vegetable servings, red meat, whole grains, and refined grains. This demonstrates the complexity of the diet and the many interactions between and among foods and food groups, making predictions of disease tenuous. An additional analysis was conducted to estimate relative risk of a hypothetical consumption of potatoes and French fries. The authors speculate that consuming one serving of potatoes per day would impose a relative risk of 1.18; the highest quintile of potato consumption was 0.63 servings per day. Similarly, the authors speculate that consuming two servings of French fries per week would lead to a relative risk of 1.16; the highest quintile of French fry consumption was 0.14 servings per day or about one serving per week. These predictions, therefore, are not based on actual consumption patterns. Further, in a stratified analysis of obese and non-obese women, the association between potato consumption was observed among obese women only. There was no association between French fry consumption and relative risk of T2DM among obese or non-obese women. Of interest is that even though the dataset tracks the participants over multiple years, the investigators did not control for weight gain in any of their statistical models. Weight gain is an important risk factor in T2DM.

The 3 studies reviewed above, with their weak associations and implausible estimates of relative risk based on low consumption of French fried potatoes and potatoes were included in a meta-analysis and results of that non-peer reviewed unpublished meta-analysis are presented in section 7.22 of the draft report. The RR and 95% CI for an association of potatoes with incidence of type 2 diabetes mellitus was RR 1.07; CI 1.00, 1.15. As the CI includes 1, no evidence of an effect is presented.

**The limited and very weak body of evidence from cohort studies does not support the proposed conclusion regarding potatoes and risk of T2DM or any other health outcome. We request that the statements regarding the direction of association and biological relevance be removed from the conclusions to more appropriately reflect the data presented.**

**References**


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