



Draft report: Feeding in the First Year of Life; *Scientific consultation*

Dear SACN secretariat

Thank you for the opportunity to comment on the SACN draft report 'Feeding in the First Year of Life' and the interpretation of the scientific evidence presented within it. We welcome this report and are particularly encouraged to see the inclusion of Chapter 8 'Eating and feeding of solid foods' which discusses the behavioural aspects of complementary feeding.

While the report generally provides a comprehensive overview of the current evidence base, we propose that the importance of introducing a variety of *vegetables* during the early complementary feeding period warrants discussion. The current report tends to group fruits and vegetables together, despite acknowledging the difference between infants' acceptance of sweet versus more bitter foods. We suggest that a 'vegetables first' approach (Chambers et al., 2017) during complementary feeding should be mentioned in this report since there is sufficient evidence to indicate this approach can help to establish liking and acceptance of vegetables when it matters most, namely in the early stages of complementary feeding.

As children generally prefer sweet fruits to more bitter tasting vegetables it may be beneficial to delay introducing fruits and instead offer vegetables as first foods. Two experimental studies cited by the report (Barends et al., 2013 and Fildes et al., 2015) demonstrated, in the Netherlands and the UK, that exposure to vegetables at the start of weaning, while delaying introduction of fruits, facilitated vegetable acceptance without negatively impacting on fruit preference.

These studies also suggest, along with previous evidence (Birch et al., 1998), that the impact of repeated exposure to fruit does not generalise to other foods, for example repeated exposure to fruit does not lead to increased liking for vegetables. This is an important point to make when emphasising the need for repeated exposure to a variety of flavours during the complementary feeding period, for later food acceptance. Variety in itself, without specific exposure to vegetables, may not be sufficient to increase acceptance of these commonly rejected but important, nutrient-dense foods. Thus, vegetables first and in a variety is proposed to encourage acceptance of vegetables from the early stages of complementary feeding. (Chambers et al., 2017).

On page 102 (.440) of the report it is stated that data from DNSIYC suggests 'Baby rice and pureed fruit or vegetables were the most common first foods consumed by infants (65% and 21%, respectively)' but it is not clear what proportion of children received fruit compared to vegetables as first foods. Data from the Euro growth study (Freeman et al., 2000) suggested the most common first foods given to UK infants were fruits and baby rice. Vegetables are offered less frequently and often combined with sweet-tasting fruits to mask the underlying distinctive vegetable flavour. Commercial baby foods are frequently sweet-tasting. A study by Garcia and colleagues (2013) found almost two-thirds (65%) of foods aimed at the early stage of complementary feeding (i.e. from 4 months) were sweet foods. A second study by the same author (Garcia et al., 2015) reported that the fruit and vegetable content of UK commercial baby foods predominantly comprised fruits and relatively sweet vegetables (e.g. carrot rather than broccoli). In an effort to encourage their children to eat them, parents may also try to hide vegetables in dishes or mix them with other more liked foods (Caton et al. 2011). While these approaches may increase infants' intake of these vegetables in the short-term, combining vegetables with fruits, or even mixing more bitter tasting vegetables

with sweeter ones is unlikely to encourage preferences for bitter-tasting vegetables or other non-sweet foods in the longer term. As a result infants may not experience the benefits of single vegetable flavour exposure and could fail to acquire liking for these foods. We propose that the report make the clear distinction between fruits (which tend to be sweet and readily accepted) and vegetables, particularly dark green or bitter-flavoured varieties, when discussing the benefits of repeated exposure and variety during early complementary feeding.

The suggested benefits of exposure to a variety of vegetables for later acceptance of these foods has been discussed in the report. However we would like to highlight some more recent evidence, published after 2015. A recent observational study from Australia found that not only did children who had tried a greater number of vegetables before the age of 14 months like a wider range of vegetables and eat more of them at three years of age, these children were also found to display less fussy eating behaviour at three years (Mallan et al., 2016). Another recent study reported that French children exposed to a high level of vegetable variety during complementary feeding had higher intakes of, and greater liking for vegetables at 6 years of age (Maier-North et al., 2016). These findings indicate that exposure to a variety of vegetables from the start of weaning may impact on children's vegetable acceptance and diet quality with long lasting effects.

We commend the authors for a thorough review of the literature relating to the issue of a 'sensitive window' for the introduction of complementary foods. While we agree there is insufficient evidence to support a narrow 'critical window' for the acceptance of solid foods, the report does present evidence highlighting the importance of introducing a variety of foods early in the complementary feeding process, and specifically the need to offer children a variety of vegetables.

In summary, we propose that following the consultation process the following changes are made to the report:

- a) Vegetables first and in variety is recommended based on the current, available observational and experimental evidence of the benefits to children of early, repeated and varied exposure
- b) Vegetables are identified separately from fruits where possible, to make the point that fruits are generally favoured, and given their sweet taste require less experience to be liked than vegetables

Signed

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Barends, C., de Vries, J., Mojet, J. et al. *Effects of repeated exposure to either vegetables or fruits on infant's vegetable and fruit acceptance at the beginning of weaning*. Food Quality and Preference, 2013. 29(2): 157-165.

Birch, L. L., Gunder, L., Grimm-Thomas, K., & Laing, D. G. *Infants' consumption of a new food enhances acceptance of similar foods*. Appetite, 1998. 30: 283-295.



Caton, S.J., S.M. Ahern, and M.M. Hetherington, *Vegetables by stealth. An exploratory study investigating the introduction of vegetables in the weaning period*. *Appetite*, 2011. 57(3): 816-25.

Chambers L (2016) *Complementary feeding: vegetables first, frequently and in variety*. *Nutrition Bulletin* 41: 142–6.

Fildes, A., Lopes, C., Moreira, P. et al. *An exploratory trial of parental advice for increasing vegetable acceptance in infancy*. *Br J Nutr*, 2015. 114(2):328-36.

Freeman, V., M. van't Hof, and F. Haschke, *Patterns of milk and food intake in infants from birth to age 36 months: the Euro-growth study*. *J Pediatr Gastroenterol Nutr*, 2000. 31(Suppl 1): S76-85.

García A.L., Raza S, Parrett A and Wright C.M. *Nutritional content of infant commercial weaning foods in the UK*. *Arch Dis Child*. 2013. 98(10):793-7.

Garcia A.L., McLean K and Wright C.M. *Types of fruits and vegetables used in commercial baby foods and their contribution to sugar content*. *Matern Child Nutr*. 2015. 12(4):838-47.

Maier-Noth, A., Schaal B., Leathwood P. and Issanchou S. *The Lasting Influences of Early Food-Related Variety Experience: A Longitudinal Study of Vegetable Acceptance from 5 Months to 6 Years in Two Populations*. *PLoS One*, 2016. 11(3): e0151356.

Mallan, K.M., Fildes, A., Magarey, A.M. and Daniels, L.A. *The Relationship between Number of Fruits, Vegetables, and Noncore Foods Tried at Age 14 Months and Food Preferences, Dietary Intake Patterns, Fussy Eating Behavior, and Weight Status at Age 3.7 Years*. *J Acad Nutr Diet*, 2016. 116(4): 630-7.