School Fruit Scheme
Accompanying Measures

Reflection paper from the Group of Experts for technical advice on the School Fruit Scheme

Executive Summary

The primary aim of the School Fruit Scheme (SFS) is to produce sustained increases in children's consumption of fruit and vegetables. The literature, however, shows that bringing about long-lasting improvements in children's eating habits is not easy or straightforward. The challenge is all the greater because children are continually bombarded with very attractive marketing and ready availability of sweet, salty, and fatty foods, which compete to displace fruit and vegetables. However, as is outlined in this document, the literature also shows that there are interventions that can help children make healthy choices and greatly increase their consumption of fruit and vegetables. The recommendations for MSs that have emerged from consideration of this evidence are as follows:

Based on the available scientific evidence, the Group of Experts (GREX) suggests that all measures and activities should be eligible for EU aid as accompanying measures (AMs) which are directly linked to the objectives of the SFS in increasing fruit and vegetables consumption, short and long term, and shaping healthy eating habits. The measures should be founded on evidence-based principles, such as repeated tasting, role-modelling, rewards, branding, and appearance. All measures shall be subject to evaluation for effectiveness.

RECOMMENDATION 1: Presented in isolation, printed education materials or other traditional forms of nutritional education addressed to children, are not in themselves sufficient to bring about sustained changes in children's eating habits. These activities alone are not therefore recommended; if they are offered, it should be in combination with other evidence-based interventions

RECOMMENDATION 2: It is important to use interventions with constituent components that have sound evidence to show they bring about sustained changes in children's consumption of fruit and vegetables. Evaluation that assesses the effectiveness of each AM is essential.

RECOMMENDATION 3: The main focus of evaluations must be firmly upon children's eating habits and their actual consumption of fruit and vegetables (see the Grex recommendations on evaluation).

RECOMMENDATION 4: In the development of AMs, all MSs adopting the SFS should use good scientific expertise.

RECOMMENDATION 5: AMs should ensure that children participating in the SFS repeatedly taste, up to 15 times, a set number of fruit and vegetables so that the taste for these foods is acquired. This requires that programmes are of sufficient duration to enable this to happen.

RECOMMENDATION 6: AMs should provide effective role-modelling for children which will ensure that eating fruit and vegetables becomes the behavioural norm and a part of the culture. This can be done with real-life models, particularly teachers and parents, or with visual media characters, or most effectively with real-life and media models combined.

RECOMMENDATION 7: AMs should employ attractive tangible rewards, as well as social recognition, as consequences for healthy eating. Rewards, which may have other benefits (e.g. for education or physical activity), are a very effective component of any intervention.

RECOMMENDATION 8: AMs should be designed to enhance the branding and attractiveness to children of the fruit and vegetables that are provided. The European Commission should consider developing a European logo and branding to appeal to children.

RECOMMENDATION 9: If the primary objective is to increase children's consumption of fruit and vegetables, and particularly if there are limited resources, then MSs should focus efforts on evidence-based interventions (Recommendations 5-8). On the other hand, if schools are already running cooking, gardening, or farm visit schemes, or nutritional education classes, then such schemes can be combined to good effect with those interventions that do change eating habits.

RECOMMENDATION 10: AMs should help parents become fully engaged with the SFS and encourage them to support their children's efforts to eat more fruit and vegetables.

RECOMMENDATION 11: AMs should be coherent multi-component programmes that combine the evidence-based interventions outlined in this document.

Why Are Accompanying Measures (AMs) Needed?

- Even when fruit and vegetables are available, most children do not eat them in sufficient quantities to sustain their health and wellbeing[1].

- Surveys of children's food preferences conducted in recent years show that vegetables are the least liked food category[2,3,4], and dislike of fruit and vegetables is particularly apparent in the 20–30% of young children with high scores on a ''neophobia'' scale[5,6].

- Simply giving children a piece of fruit or a vegetable once or twice a week may have little impact on their eating habits. Even giving these foods every school day may not bring about sustained change[7].

- Availability of fruit and vegetables is, of course, necessary, but it is not sufficient. Given that many children show little inclination to eat these foods, it is important to find ways to encourage them to do so. It is essential also to have AMs that will ensure children learn to like these foods.

- Research shows that children can be helped to make healthier choices and to increase their consumption of fruit and vegetables, but this requires concerted and effective behaviour change interventions.

Why Do Children Eat Too Little Fruit and Vegetables?

- Food choice is driven by both biological and psycho-social factors.

- Children today are under immense pressures to eat energy-dense and nutrient-poor foods. All the sophisticated techniques of modern marketing are employed to make these foods attractive. Foods that are sweet, salty and/or fatty also appeal to human evolutionary tendencies[8]. These factors, added to the now ready availability of such foods in many retail outlets, mean that they exert a potent influence on children's food consumption.

- It is important to counter these influences with effective interventions that are just as potent in helping children make healthy choices.

Determinants of Behaviour Change

There is now a great deal of interest internationally in the area of behaviour change, not least because many of modern society's ills, be they health, social, or environmental problems, would be lessened if we could all change our behaviour in particular ways.

An innovative approach has been developed in recent years that focuses on the environmental and social events that influence human behaviour and how these events can be altered to help people make better choices for their health and well being[9-11]. Because this is a positive and non-restrictive approach, which is nevertheless effective in dealing with a variety of health and social issues, it has been very influential in Government circles, not least in the USA and the UK.

According to this account, two basic brain systems are said to be involved in human behaviour:

- The first system is characterised by the *reflective*/conscious or explicit processes, that may be influenced by education and explicit information. Most traditional attempts at health education focus upon these processes — and they very often fail to achieve their objectives. We humans know what we should do, but often don't do it.

- The second, *impulsive*, brain system in which most of our habitual behaviour is driven by unconscious, implicit and emotional factors about which we often have little or no awareness. Many of the cues and consequences that have a profound impact on our everyday lives, including our eating habits, operate within this second system, which is often not amenable to information, instruction and exhortation. This is the system with which AMs must engage in order to change eating habits.

- This is all the more true because the focus of the SFS is upon the behaviour of children, whose reflective/conscious systems are even less well developed than those of adults. So, to engage effectively with children's psychology and help them make healthier choices, we should not rely on serious, albeit well-meaning, health education messages and materials, but instead work on more implicit levels and **make all things to do with fruit and vegetables attractive, enjoyable, and fun**.

Key Criteria for Accompanying Measures

1. *AMs for children need to be based on an understanding of children's psychology*.

- In attempts to improve children's diets, traditional interventions have often focussed on provision of information that aims to increase knowledge about healthy eating. Children are given, for example, educational materials, brochures, posters etc. **But there is little or no evidence to show that such interventions alone have any sustained effects**[12-18].

- Indeed, there is evidence[19,20] that greater nutritional knowledge among parents and children does not necessarily lead to higher consumption of healthy foods on the part of the children. In fact, in some cases warning

children about the dire effects on their future health prospects of not eating healthy food, or just telling them that a food is "healthy", may even reduce their acceptance of such food[19-21].

- To take another example, **telling children that a particular meal is the "healthy option" may not result in increased consumption of that meal.** On the other hand, telling them that it is the favoured food of their favourite media character, or giving it some other attractive name, results in their eating more of it[22,23].

RECOMMENDATION 1: Presented in isolation, printed education materials such as flyers, posters, and brochures, or other traditional forms of nutritional education addressed to children, are not in themselves sufficient to bring about sustained changes in children's eating habits. These activities alone are not therefore recommended for children; if they are offered, it should be in combination with other activities in the field of behaviour change.

Actions: Brochures on the nutrient content of foods should be tailored to appeal to children and include, for example, games, stories, and practical suggestions about how to taste fruit and vegetables..

2*. AMs need to be founded on evidence-based principles.*

Because behaviour change in this domain is not easy, and because much of what may seem to be effective is not so in practice, it is crucial to use interventions for which there is an established scientific base. If this is not done, there is a high risk that resources will be expended to no good effect. Interventions employed by MSs should have a sound scientific foundation, particularly in behaviour change and behavioural economics research.

It is also crucial that programmes are regularly evaluated to both measure outcomes and also modify procedures to enhance effectiveness. The effectiveness of the components that make up interventions should also be assessed.

RECOMMENDATION 2: It is important to use interventions with constituent components that have sound evidence to show they bring about sustained changes in children's consumption of fruit and vegetables. Evaluation that assesses the effectiveness of each AM is essential. (see the GREX recommendations on evaluation).

3. *AMs need to change what children eat.*

It is essential that the primary objective of the SFS be realised, namely, that it should result in children's increased consumption of fruit and vegetables. Other activities, such as increased knowledge about fruit and vegetables, cooking skills, gardening skills, or knowledge of farming are beneficial in terms of general education about food and agriculture but, in isolation, may have little or no impact on food choice and consumption. Such programmes need to include measures that produce changes in eating habits that are sustained over time.

RECOMMENDATION 3 : The main focus of evaluations must be firmly upon children's eating habits and their actual consumption of fruit and vegetables (see the Grex recommendations on evaluation).

An Evidence-Based Approach to AMs

In this section we will consider the evidence for some of the key behaviour change interventions that could be employed to change children's eating habits. The main focus will be on children aged 2-11 years old. It is this evidence and these interventions, along with other relevant data, that MSs should consider carefully when developing their own schemes.

- It is strongly recommended that each MS use good scientific advice in the design of effective AMs.

- In what follows, consideration will be given to a range of evidence-based principles that affect food choices. However, the list is not meant to be exhaustive and, indeed, MSs should consider all evidence-based influences that may enhance the effectiveness of interventions.

RECOMMENDATION 4: In the development of AMs, all MSs adopting the SFS should use good scientific expertise.

Evidence-Based Interventions for Changing Children's Eating Behaviour.

1. *Repeated tasting*

- There is a wealth of evidence showing that the more we taste a novel food the more we learn to like and eat it[24-29]. This is a biological phenomenon that can be very helpful for any behavioural intervention designed to change eating habits.

- How many tastes are required to establish liking for a particular food vary across foods and individuals, and may range from just a few tastes

to 15 or more.

- It is important, therefore, that interventions are designed to ensure that children get the opportunity to taste repeatedly the same set of fruit and vegetables.

- To ensure that children get to like both fruit and vegetables, both should be made available and, as vegetables are often less liked than fruits, MSs should put more efforts to strengthen the presence of vegetables in the SFS.

The most crucial factor, however, is to help children overcome any initial "neophobia" (i.e. fear of novel foods) or resistance to tasting known fruit and vegetables. **The intervention must therefore ensure: (i) that children begin to taste the foods; (ii) that the overall experience is enjoyable; and (iii) that they continue to taste, and then eat whole portions, until taste acquisition is fully established.**

RECOMMENDATION 5: AMs should ensure that children participating in the SFS repeatedly taste, up to 15 times, a set number of fruit and vegetables so that the taste for these foods is acquired. This requires that programmes are of sufficient duration to enable this to happen.

Actions: Encourage children to eat fruit and vegetables at school, both in class and outside of class. It may be possible to have "Fruit & Veg Ambassadors" helping children to peel and cut fruit and vegetables. The aim should be to make the overall Fruit and Vegetables experience enjoyable and fun.

2*. Role-Modelling and Imitation*

- Children are very influenced by what they see others do, either in real life or on media of various kinds. Research shows that children are likely to imitate a particular behaviour when they (i) like or admire the person performing it, (ii) see that person being rewarded for that behaviour, (iii) are themselves rewarded for imitating the behaviour, and (iv) see it modelled by more than one person. A number of studies have found that children's acceptance of new foods can be increased when they see their parents[37,38], teachers[39], other adults[37,40], or other children[30,32,41,42], modelling consumption of those foods.

- However, peers are often more effective models than adults[39], and children are more likely to shift their own food preferences in line with peers who are older than themselves[41,43], or have higher social status[44].

- Although peers can influence acceptance of new foods, they are even more effective at establishing food rejection and this may be difficult to

reverse[42,45].It is important, therefore, to ensure that children are not exposed to social environments where rejection of fruit and vegetables is the norm.

RECOMMENDATION 6: AMs should provide effective role-modelling for children which will ensure that eating fruit and vegetables becomes the behavioural norm and a part of the culture. This can be done with real-life models, particularly teachers and parents, or with visual media characters, or most effectively with real-life and media models combined.

Actions: Provide fruit and vegetables free for teachers so that they are able to eat with the children. Use role-models and celebrity figures , for example, well known national or local sports personalities, and media figures, to show that eating fruit and vegetables is cool

3. *Rewards*

- There is now a growing body of evidence showing that rewards can be highly effective in helping to bring about sustained changes in children's eating habits[30-32, 46-49].
- Demonstrating the power of tangible rewards, a study by Remington (2012) compared the effectiveness of (i) tangible rewards and taste exposure, (ii) social praise as a reward, and taste exposure, and (iii) no-treatment controls. They found that only the combination of tangible rewards and taste exposure brought about sustained increases in children's liking and intake of previously disliked vegetables[47].
- The evidence indicates that, to be effective, rewards need to be really attractive to children. As new eating habits are established, rewards can be "faded out" as repeated tastings help to put the child in touch with the intrinsically rewarding properties of fruit and vegetables themselves[31,32].
- However, all school-based interventions should endeavour to provide, on an on-going basis, an environment in which eating fruit and vegetables is encouraged with social praise and rewarded as much as is possible and logistically feasible.

RECOMMENDATION 7: AMs should employ attractive tangible rewards, as well as social recognition, as consequences for healthy eating. Rewards, which may have other benefits (e.g. for education or physical activity), are a very effective component of any intervention.

Actions: Children should be rewarded for their effort to try and taste fruit and vegetables

4*. Appearance, Branding, and Display*

- It has long been known, particularly in the marketing domain, that attractive displays, packaging and branding can have a major impact on consumer behaviour. Children are certainly susceptible to these cues, which are all too often used to promote energy-dense nutrient-poor foods. It is important that these influential approaches should now be used to help children make healthier choices[50].

- If food packaging includes images of known and loved cartoon characters, children are more inclined to ask their parents to purchase such items, and to then consume them[51]. If foods are given attractive names they are more likely to be eaten[22,23].

- In contrast to effectively marketed junk food, healthyfoods are often seen by children as being dull and boring because of the way they are presented[52]. If **eye-catching and attractive branding** were used in the promotion of healthy food, it would help children learn to notice, eat, and enjoy fruit and vegetables[51].

- Visually appealing presentations of fruit and vegetables lead to higher consumption by children when compared with regular arrangements [53,54]. Cutting fruit and vegetable items into shapes, rather than simply offering them in plain slices or as whole items, leads children to notice, accept and consume the fruit and vegetable portions in greater quantities[55,56].

RECOMMENDATION 8: AMs should be designed to enhance the branding and attractiveness to children of the fruit and vegetables that are provided. The European Commission should consider developing a European logo and branding to appeal to children.

Actions: Retailers and school caterers should present fruit and vegetables in an eye-catching way. For example, fruit and veg containers could be attractively designed to appeal to children and feature illustrations of their favourite media characters. Create a common European logo to actively promote the SFS with children.

Interventions Lacking Good Evidence for Changing Eating behaviour.

1. Increasing Awareness, Knowledge and Skills: Cooking, Gardening, Farm Visits and Traditional Nutritional Education

- Cooking and gardening are very valuable life skills and, like farm visits, can contribute to children's knowledge of food and the environment in

which it grows. However, whether children engaging in these activities will in itself lead to their eating more fruit and vegetables is less clear and will probably depend on other components of such programmes[57-62].

- Simply visiting a farm, or doing some gardening or cooking with fruit and vegetables, may not be sufficient to change eating habits, nor is it clear what the psychological mechanisms would be to make this happen. But if programmes including these elements also include other behaviour change elements (as outlined in the preceding sections above), then they might succeed in increasing actual consumption of fruit and vegetables.

- For example, if a programme entailed not just planting seeds and nurturing plants, but also cooking the vegetables or preparing the fruit to be eaten, then there would be opportunities for repeated tasting, for role-modelling by teachers and others, for parental involvement and for social praise and reward. Such multi-component programmes can be successful in changing eating habits.

- To ensure that such programmes, and the resources expended on them, are effective in changing diets, it is important that behaviour change procedures are well embedded[61,63] and the interventions properly evaluated.

- In their review of the literature on the effects of nutritional education and gardening clubs, Ransley *et al.* (2010) have reported some evidence of more consumption of vegetables (but not fruit) in schools that had gardens compared to those that did not. But they also noted that more vegetables were eaten in those schools where there was a high degree of parental involvement in promoting fruit and vegetables to children, and point to the importance of adults modelling and encouraging appropriate eating behaviour.

- Ransley *et al.* (2010) also found no relation between the number of school lessons promoting fruit and vegetables and actual consumption of these foods. The authors propose that such lessons fail because they lack any behaviour change components such as modelling, repeated tasting and direct experiences with fruit and vegetables.

RECOMMENDATION 9: If the primary objective is to increase children's consumption of fruit and vegetables, and particularly if there are limited resources, then MSs should focus efforts on evidence-based interventions (Recommendations 5-8). On the other hand, if schools are already running cooking, gardening, or farm visit schemes, or nutritional education classes, then such schemes can be combined to good effect with those interventions that do change eating habits.

Influences on the Consumption of Fruit and Vegetables by Children Outside of School: the Role of Parents

Though the main focus of the SFS is school, what happens outside school also has a major bearing on this effort. Parents have a key role to play. Within the home environment, as well as in restaurants and other retail outlets, they can do much to consolidate the gains made at school and to support their children as they learn to eat and enjoy more fruit and vegetables. Parents can also help by providing fruit and vegetables to be taken to school or, in some cases, helping prepare these foods in schools.

AMs should provide guidance for parents which draws on all the principles and influences described in this paper and help ensure that parents are fully engaged as effective influencers of behaviour change. This can bring benefits to the entire family.

By way of illustration, here are some suggested “Tips for Parents”:

- Start with small, easy-to-achieve changes, such as offering more fruit and vegetables at meals and as snacks.
- Make a wide variety of fruit and vegetables available in the home.
- Eat fruit and vegetables together as a family as often as possible.
- Be good role models. Practise the eating habits you would like your children to have. Your example is your child's most powerful learning tool.
- When trying new fruit and vegetables at a meal, be sure to also include a fruit or vegetable that your child likes. Don't be discouraged if it takes several tries before your child actually eats a new fruit or vegetable. It may take as many as 15 tastes or more before your child learns to like it.
- Even though your child may not eat the fruit or vegetable, it is important to keep serving it so that your child can see other family members enjoying it.
- Involve your child in grocery shopping and help guide choices toward fruit and vegetables.
- A little creativity can go a long way to get kids more interested in fruit and vegetables. For example, cut fruit and vegetables into amusing shapes, like carrot flowers or watermelon stars, or into funny faces to put on open-faced sandwiches or bowls of cereal. Calling broccoli "trees" or carrots "X-ray vision makers" can make them seem less intimidating to children. It is exploring the possibilities of fruit and vegetables, and the fun aspect of them, that is important.

- You don't have to eat a big bowl of broccoli to get the benefits of fruit and vegetables. Try mixing them into your family's favorite meals. Put vegetables like spinach, courgettes, celery, and carrots into stews and casseroles. Add spinach, green pepper, or carrots to omelettes, lasagne, and spaghetti sauce.

- Get children into the kitchen**.** Take them to farmers' markets or shops and have them pick out the vegetables. Let them wash, peel, and slice the vegetables and help choose how to cook and flavour them. Get them to touch, smell and taste what they prepare.

- Take advantage of peer pressure. Does your child have a friend who is an adventurous eater? Invite him/her over for dinner and serve up some new vegetables. Peer pressure may work in a good way and your child may be more likely to try a new food if his/her friend is bold enough to try the new food first.

RECOMMENDATION 10: AMs should help parents become fully engaged with the SFS and encourage them to support their children's efforts to eat more fruit and vegetables.

A Systematic Approach to AMs

- Although the effectiveness of each factor or influence can be considered separately, it is clear that the most effective dietary interventions should include most, if not all, of the procedures and influences that have well established efficacy: Repeated Tasting, Role-Modelling, Rewards, Branding and Appearance.

- In addition, this approach will be most effective if it is not confined just to one eating occasion when a piece of fruit or vegetable is presented during the school week, for however many days, but when it is extended to the whole school food environment. To effect substantial and sustained increases in consumption of fruit and vegetables requires that behaviour be changed across eating occasions, both within and outside of school.

- It is the combined power of these influences, within integrated and systematic interventions, that will really make an impact on eating habits[30-36,49].

RECOMMENDATION 11: AMs should be coherent multi-component programmes that combine the evidence-based components outlined in this document.

Actions: The evidence-based interventions listed here should be implemented in each programme, adding where possible other activities

such as those that promote physical contact with fruit and vegetables (e.g., gardening, cooking and farm visits).

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