

## **Healthy Start vitamin analysis, 2 September 2016.**

### Background

The Healthy Start (HS) scheme provides some low income families with vouchers to buy foods such as milk and fruit and coupons to exchange for free vitamin supplements.

The vitamin content of the current HS vitamin supplement products are:

#### *Vitamin drops for children*

Vitamin A – 233µg; Vitamin C – 20mg; Vitamin D – 7.5 µg

These drops are provided for all HS-eligible children from 6 months to 4 years of age. In addition, health professionals may advise that they be given from 1 month of age to healthy breastfed infants born at term if there is any doubt about the mother's vitamin D status during pregnancy.

#### Vitamin tablets for pregnant or breastfeeding women

Vitamin C – 70mg; Vitamin D – 10µg; Folic Acid – 400µg

The policy lead for Healthy Start lies with the Department of Health (DH). DH is about to start the process of re-procuring the HS vitamin supplement products and has asked for advice on whether it is still necessary to include vitamins A and C in the children's product and vitamin C in the women's product.

Given the recent change in Government advice on vitamin D, which states that breastfed babies from birth to 12 months of age should be given a vitamin D supplement, DH's current intention is that a single HS vitamin supplement product should be suitable for infants from birth. In the discussion below, we therefore comment on the current vitamin A content of the product in relation to consumption by infants in the first month of life.

#### Primary aim of this analysis

To assess the impact on intakes of women, infants and children eligible to benefit from the HS scheme if vitamins A and C are removed from the HS vitamins for children and vitamin C removed from the HS vitamins for women. We have done this by analysing data from the Diet and Nutrition Survey of Infants and Young Children (DNSIYC) Healthy Start boost sample and from the Low Income Diet and Nutrition Survey (LIDNS) to provide information about intakes of vitamins A and C in infants and children and intakes of vitamin C in adolescents and women of childbearing age, in relevant low income groups.

#### Secondary aim of this analysis

Current Government advice is that all children aged six months to five years should take a supplement containing vitamins A, C and D unless they are consuming 500ml or more of formula milk/day. We have assessed what the impact on intakes of vitamins A and C for infants and young children, other than those eligible for HS, might be if they were no longer advised to take supplemental vitamins A and C. We did this by analysing data from DNSIYC and from the National Diet and Nutrition Survey (NDNS) to provide information about intakes of vitamins A and C in infants and children in the wider UK population.

Mean daily vitamin intakes were assessed, as were the percentage of infants, young children, adolescents and women of childbearing age with intakes below the Lower

Reference Nutrient Intake (LRNI) for vitamins A and C. For infants and children aged 4 months to 4 years the percentage with intakes above the TUL for vitamin A were also calculated.

### Definitions

The *Reference Nutrient Intake (RNI)* represents the amount (intake) of a nutrient that is likely to meet the needs of 97.5% of the population. It is defined as two notional standard deviations above the *Estimated Average Requirement (EAR)* which is a notional mean requirement<sup>1</sup>.

The *Lower Reference Nutrient Intake (LRNI)* is defined as two notional standard deviations below the EAR and represents an intake that will meet the needs of only 2.5% of the population<sup>1</sup>.

The *Tolerable Upper Intake Level (TUL)* refers to the highest level of daily nutrient intake that is likely to pose no risk of adverse health effects for almost all individuals in the general population<sup>2</sup>

Note: some of the figures presented in these analyses are different from those in published reports of the dietary surveys. This is because the current analyses have been performed in a slightly different way or have, for example, defined supplement consumers slightly differently.

## **RESULTS**

### **INFANTS AND CHILDREN - Vitamin A**

#### Infants aged 4 to 11 months (Table 1 and Table 3)

RNI for infants 4-11 months is 350 µgRE/day; LRNI is 150 µgRE/day; TUL is 200 µgRE/kg body weight/day.

#### *DNSIYC Healthy Start boost*

- Mean intake (excluding supplements) in this sample was 845 µgRE/day (241% RNI). No infants had intakes below the LRNI<sup>3</sup>.

#### *DNSIYC*

- Mean intake for infants (excluding supplements) consuming more than 500ml of milk<sup>4</sup> was 1005 µgRE/day (287% RNI) and 880 µgRE/day (251% RNI) for those

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<sup>1</sup> Definition obtained from the Dietary Reference Values for Food Energy and Nutrients for the United Kingdom, 1991.

<sup>2</sup> TULs for ages 1 year and upwards were established by the Scientific Committee on Food:

[http://ec.europa.eu/food/fs/sc/scf/out145\\_en.pdf](http://ec.europa.eu/food/fs/sc/scf/out145_en.pdf). A TUL for infants was established by the Committee on Toxicity of chemicals in food, consumer products and the environment: Statement on the potential risks from high levels of vitamin A in the infant diet <https://cot.food.gov.uk/sites/default/files/cot/cotstavita.pdf>

<sup>3</sup> Figures for % below LRNI are not available for intakes excluding supplements. However, mean intakes with and without supplements are similar therefore it can be assumed that the % with intakes excluding supplements below the LRNI would be similar.

<sup>4</sup> Throughout, 'milk' refers to any infant formula or follow-on formula and/or breast milk. The small number of exclusively breastfed babies were included in the group of individuals consuming less than 500ml formula.

consuming less than 500ml of milk. Note that throughout this analysis, 'milk' refers to any infant formula or follow-on formula and/or breast milk.

- No infants had intakes below the LRNI.
- No infants had intakes above the TUL. Note that intakes in relation to the TUL were only calculated for infants with a valid record of body weight in the DHSIYC database.

#### Children aged 12 to 18 months (Table 1 and Table 4)

RNI for children 12-18 months is 400 µgRE/day; LRNI is 200 µgRE/day; TUL is 800 µgRE/day.

#### *DNSIYC Healthy Start boost*

- Mean intake (excluding supplements) was 590 µgRE/day (147% RNI).
- 3% children had intakes below the LRNI.

#### *DNSIYC*

- Mean intake for children (excluding supplements) consuming more than 500ml of milk was 920 µgRE/day (230% RNI) and 641µgRE/day (160% RNI) for those consuming less than 500ml of milk.
- No children consuming more than 500ml of milk had intakes below the LRNI for vitamin A.
- 3% children consuming less than 500ml of milk had intakes below the LRNI.
- 3% children consuming more than 500ml of milk had intakes above the TUL for vitamin A. However, note that intakes in relation to the TUL were only calculated for those children with a valid record of body weight in the DHSIYC database.

#### Children aged 2-10 years (Table 2) and 18 months-4 years (Table 5)

For children 2-6 years, the RNI is 400 µgRE/day, the LRNI is 200 µgRE/day.

For children 7-10 years, the RNI is 500 µgRE/day, the LRNI is 250 µgRE/day.

The TUL for children 18 months - 3 years is 800 µgRE/day and for children aged 4 years is 1,100 µgRE/day.

#### *LIDNS*

- Mean intake was 527 µgRE/day (120% RNI) for girls and 733 µgRE/day (165% RNI) for boys aged 2-10 years.
- 11% boys and 14% girls had intakes below the LRNI.

#### *NDNS*

- Mean intake for children aged 18 months to 4 years was 526µgRE/day (132% RNI).
- 7% children had intakes below the LRNI.
- No children (0%) had intakes above the TUL. However, the 0% figure needs to be verified.

## **INFANTS AND CHILDREN - Vitamin C**

#### Infants aged 4-11 months (Table 1 and Table 3)

RNI for infants 4-11 months is 25mg/day; LRNI is 6mg/day.

#### *DNSIYC Healthy Start boost*

- Mean intake was 73mg/day (292%RNI).
- No infants had intakes below the LRNI.

#### *DNSIYC*

- Mean intake of vitamin C for infants consuming more than 500ml of milk was 83mg/day (332%RNI) and 65mg/day (260% RNI) for those consuming less than 500ml of milk.
- No infants consuming more than 500ml of milk or less than 500ml of milk had intakes below the LRNI.

#### *Children aged 12 to 18 months (Table 1 and Table 4)*

RNI for children 12-18 months is 30mg/day; LRNI is 8mg/day.

#### *DNSIYC Healthy Start boost*

- Mean intake (excluding supplements) was 56mg/day (186% RNI).
- No children had intakes below the LRNI.

#### *DNSIYC*

- Mean intake of vitamin C (excluding supplements) for infants consuming more than 500ml of milk was 98mg/day (326% RNI) and 56mg/day (186% RNI) for those consuming less than 500ml of milk.
- No children consuming more than 500ml of milk or less than 500ml milk had intakes below the LRNI.

#### *Children aged 2-10 years (Table 2) and 18 months-4 years (Table 5)*

RNI for children 2-10 years is 30mg/day; LRNI is 8mg/day.

#### *LIDNS*

- Mean intake of vitamin C was 77mg/day for boys (256% RNI) and 90 mg/day (299% RNI) for girls aged 2-10 years.
- No children aged 2-10 years had intakes below the LRNI.

#### *NDNS*

- Mean intake for children aged 18 months to 4 years was 71mg/day (237% RNI).
- No children had intakes below the LRNI for vitamin C.

### **WOMEN - Vitamin C**

#### *Adolescents 11 to 18 years (Table 2 and Table 6)*

RNI for girls 11-14 years is 35mg/day; LRNI is 9mg/day. RNI for girls 15-18 years is 40mg/day; LRNI is 10mg/day.

#### *LIDNS*

- Mean intake of vitamin C (excluding supplements) was 78 mg/day (213% RNI).
- 1% had intakes below the LRNI.

#### NDNS

- Mean intake was 72mg/day. %RNI has not been calculated for this group since the RNIs for 11-14 and for 15-18-year olds are different.
- 2% had intakes below the LRNI.

#### Women aged 19 to 34 years (Table 2) and 19-24 years (Table 6)

RNI for women 19-34 years is 40mg/day; LRNI is 10mg/day.

#### LIDNS

- Mean intake was 71 mg/day (177% RNI) for women aged 19-34 years.
- 1% had intakes below the LRNI.

#### NDNS (19-24)

- Mean intake was 70mg/day (175% RNI).
- 2% had intakes below the LRNI.

#### NDNS (25 to 34 years)

- Mean intake was 75mg/day (188% RNI).
- 1% had intakes below the LRNI.

#### Women aged 35 to 49 years (Table 2 and Table 6)

RNI for women 35-49 years is 40mg/day; LRNI is 10mg/day.

#### LIDNS

- Mean intake of vitamin C (excluding supplements) was 63 mg/day (158% RNI).
- 1% had intakes below the LRNI.

#### NDNS

- Mean intake was 76mg/day (190% RNI).
- 1% had intakes below the LRNI.

### Summary

To assess whether intakes of vitamin A or vitamin C would be inadequate if vitamin A or vitamin C was removed from the HS vitamin supplements or if the recommendation to supplement the diet of infants and young children was changed, the key information to consider is the proportion of individuals not taking supplements, in the relevant age groups in DNSIYC / DNSIYC HS boost / LIDNS / NDNS with intakes below the LRNI.

#### *Healthy Start: infants and young children, vitamin A*

Mean intakes were above the RNI in all groups. 3% 12-18 month-old children in the DNSIYC HS boost sample and 11% boys and 14% girls aged 2-10 years in LIDNS had intakes of vitamin A below the LRNI.

#### *General Population: infants and young children, vitamin A*

Mean intakes were above the RNI in all groups. 3% 12-18 month-old children in DNSIYC consuming less than 500ml milk/day and 7% children 18 months – 4 years old in NDNS had intakes below the LRNI. 3% children aged 12-18 months, not consuming supplements but consuming more than 500ml milk, had intakes above the TUL for vitamin A. 0% children 18 months – 4 years had vitamin A intakes above the TUL but this figure is still to be verified.

### *Healthy Start: infants and young children, vitamin C*

Mean intakes were above the RNI in all groups. In all age groups (4-11 months, 12-18 months, 2-10 years) in DNSIYC HS boost and in LIDNS, there were no individuals with daily intakes below the LRNI.

### *General Population: infants and young children, vitamin C*

Mean intakes were above the RNI in all groups. In both age groups (4-11 and 12-18 month olds) in DNSIYC and in the 18 month-4 year age group in NDNS, no individuals had intakes below the LRNI.

### *Healthy Start: adolescents and women, vitamin C*

Mean intakes were above the RNI in all groups. In each age group (11-18, 19-34, 35-49 years) 1% women had intakes below the LRNI. To note, in the NDNS sample, there were similar proportions of individuals with intakes below the LRNI: 2%, 2%, 1%, and 1% respectively in the 11-18, 19-24, 25-34 and 35-49 year age groups.

## **Discussion**

### Vitamin A

In the low income groups of infants and children (DNSIYC HS boost and LIDNS) and in the general population groups of children (DNSIYC and NDNS) analysed here, mean intakes of vitamin A were above the RNI. However, there were proportions of individuals with intakes below the LRNI in both the low income and general populations, most notably 11% boys and 14% girls aged 2-10 years in LIDNS and 7% of children aged 18 months to 4 years in NDNS.

Similar findings were commented upon by SACN<sup>5</sup> which noted that 10% children aged 18 months-18 years had vitamin A intakes below the LRNI.

The LRNI for a vitamin or mineral is set at the level of intake considered likely to be sufficient to meet the needs of only 2.5% of the population. In its 2008 analysis, SACN<sup>6</sup> pays particular attention to nutrients for which a relatively high proportion of adults had intakes below the LRNI. SACN states that it is not possible to give a single precise figure above which the percentage is considered a 'high proportion' due to the variability of nutrient intake across age groups and sexes. Conventionally<sup>6</sup>, a figure of 5% is used.

The fact that 3% of 12-18 month-old children in DNSIYC and DNSIYC HS boost had intakes below the LRNI does not raise a health concern. However, careful consideration should be given to the fact that 11% boys and 14% girls aged 2-10 years in LIDNS and 7% children 18 months – 4 years in NDNS had intakes below the LRNI.

Plasma retinol is related to long-term dietary intake of vitamin A. The plasma concentration is homeostatically controlled and there is little variation either within or between individuals. For adults, concentrations below 0.35µmol/L are considered to reflect severe deficiency and concentrations between 0.35µmol/L and 0.70µmol/L to reflect mild deficiency. Results from the National Diet and Nutrition Survey Rolling Programme years 1-4 showed that there were no cases of children who had a retinol concentration below the level

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<sup>5</sup> Nutritional Wellbeing of the British Population, 2008

<sup>6</sup> For example in 'Healthier and more sustainable catering: nutrition principles'

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/347883/Nutrition\\_principles.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/347883/Nutrition_principles.pdf)

associated with severe deficiency ( $0.35\mu\text{mol/L}$ ) in an adult population. The proportion of children aged 4 to 10 years who had a retinol concentration at a level associated with mild deficiency in an adult population ( $0.35\text{-}0.70\mu\text{mol/L}$ ) was 0.1%, whilst there were no cases for children aged 1.5 to 3 years.

Diet is recorded for only four days in the NDNS, LIDNS and DNSIYC therefore estimated intake values may not represent intakes over the longer term for micronutrients, such as vitamin A, which are not widely distributed in foods. The status data, which reflect long-term dietary intake, indicate that there is not a widespread problem of vitamin A deficiency in young children. However, considering that this current analysis of vitamin A intakes focusses on infants and young children, including those in low income families, the percentages of individuals with intakes below the LRNI merit careful consideration in respect of the Government's recommendations for, and provision of, supplementation. This analysis suggests that, from a nutritional point of view, it could be useful to continue to provide vitamin A in the HS vitamins.

#### Potential risks of HS supplemental intake

Data presented in Table 4 indicate that 3% children aged 12-18 months, not consuming supplements but consuming more than 500ml milk, had a daily intake of vitamin A above the TUL during the survey period. We need to verify the figure (0%) for the percentage of children aged 18 months-4 years with intakes above the TUL.

It is important to note the following points about the TUL:

- There are two dietary sources of vitamin A: pre-formed vitamin A and provitamin A carotenoids e.g. beta-carotene. The TUL is set in relation to pre-formed vitamin A rather than provitamin A carotenoids. To assess risks related to intakes about the TUL, we need to know how much of the total measured intake is from pre-formed vitamin A.
- It is not possible to say, definitively, how much above the TUL an intake might be to be of concern as this will depend on how long the TUL was exceeded and the size/age of the individual. It is also important to bear in mind that dietary patterns vary so that any one individual is not very likely to be a high consumer all the time.
- The TUL is intended to reflect long term exposure and is not a threshold above which adverse effects will definitely occur; thus, an occasional exceedance above the TUL would not be concern. However, the higher and/or more sustained the exceedance, the greater the risk of adverse effects occurring.

In order to assess whether intakes above the TUL for the population group(s) identified here are likely to pose a risk to health we need to do further analyses. These are underway and we hope to have the results later this month.

#### Vitamin A content of HS vitamin supplement and consumption by babies 0 to 4 months old

We understand that it is DH's current intention to provide a single HS children's vitamin supplement product for infants from birth. Current Government nutrition advice to the general population does not recommend that infants under 6 months of age should be given supplemental vitamin A or vitamin C. In the following paragraphs, we consider whether there might be risks associated with this approach.

The UK's nutrition and diet surveys do not provide information on vitamin A intake or status for infants below 4 months of age. Therefore, from the nutritional point of view, we cannot assess whether or not it is important to provide vitamin A to infants from birth to 4 months.

The Committee on Toxicity (COT) considered potential risks from high levels of vitamin A in the infant diet in its statement published in January 2014<sup>2</sup>.

COT concluded that the brand of dietary multivitamin supplement with the highest recommended dosage marketed for infants in the UK [at the time of drafting the COT statement] *“could produce an estimated exposure of more than half the TUL. This could result in total intake above the TUL for exclusively breastfed infants, and increase the potential for exceedance of the TUL for formula-fed infants, and high consumers of complementary foods rich in vitamin A. The recommended dosage provided under the Healthy Start Scheme would provide a lower exposure, and any resultant exceedances of the TUL are likely to be minor.”* COT's overall conclusion is that *“there is potential for some infants to exceed the TUL under the following circumstances:*

- *if exclusively breastfed by mothers taking dietary supplements containing high levels of vitamin A*
- *if fed with infant formula at the upper limit of the retinol content allowed by regulation*
- *if given high dose vitamin A supplements*
- *if consuming liver more than once per week.*

*The possibility of adverse effects from such exceedances cannot be excluded, but if they do occur, it is likely to be in only a very small proportion of infants.”*

The COT statement concludes that the possibility of infants having intakes exceeding the TUL for vitamin A cannot be excluded. However, in relation to the second bullet point above, recent reconsideration of the data<sup>7</sup> suggests that only high consumers of infant formula between ages 0-4 months, with vitamin A present at the maximum legally permitted level, would exceed the TUL.

### Vitamin C

In the low income groups of infants and children (DNSIYC HS boost and LIDNS) and in the general population groups of children (DNSIYC and NDNS) analysed here, mean intakes of vitamin C were above the RNI and there were no individuals with intakes of vitamin C below the LRNI.

In the low income groups of adolescents and women (LIDNS) mean intakes of vitamin C were above the RNI and 1% individuals had mean daily intakes below the LRNI.

Plasma vitamin C concentration reflects recent dietary intake of the vitamin; a value of less than 11 µmol/L indicates biochemical depletion. For children, there were no measurements of plasma vitamin C in DNSIYC, in the DNSIYC HS boost sample or in LIDNS. For children 18 months – 3 years old in NDNS, mean plasma vitamin C was 72.5 µmol/L and 4% individuals had a concentration below 11 µmol/L. For boys and girls aged 4-10 years in NDNS, mean plasma vitamin C was 71.1 µmol/L and there were no individuals with a concentration below 11 µmol/L.

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<sup>7</sup> Personal communication from the COT Secretariat, 31 August 2016.



For women in LIDNS mean plasma vitamin C concentrations (and % individuals with concentrations below 11 µmol/L) were 53.4 µmol/L (18%) and 64.7 µmol/L (13%) for 19-34 year-olds and 35-49 year-olds respectively. In NDNS, plasma concentrations (and % individuals with a concentration below 11 µmol/L) for women aged 11-18 years and 19-64 years were 56.7 µmol/L (1%) and 53.5 µmol/L (3%).

These data show that the proportions of low income women with plasma vitamin C concentrations below the level indicating biochemical deficiency are considerably higher than the proportions in groups of women in the general population.

In each age group of children considered here, mean daily intakes of vitamin C are above the RNI and there are no individuals with intakes below the LRNI. NDNS data show 4% children aged 18 months – 3 years had plasma vitamin C concentrations below the level indicating biochemical depletion. We do not have plasma measurements for children in the low income groups. However, considering that there are higher percentages of women in LIDNS with plasma vitamin C concentrations below 11 µmol/L than in NDNS, it may be that more than 4% children in low income groups have plasma vitamin C concentrations below 11 µmol/L.

Therefore, while dietary survey information about vitamin C intakes alone does not raise concern, information on plasma vitamin C concentrations should also be carefully considered when deciding whether population intakes are likely to be nutritionally adequate. This analysis suggests that, from a nutritional point of view, it could be useful to continue to provide vitamin C in the HS vitamins.

Vitamin C is of low toxicity, with the only documented adverse effects in humans being gastrointestinal effects such as diarrhoea in individuals consuming large doses (at least 3 grams) of supplemental vitamin C; there is no evidence in the literature of adverse effects occurring as a result of long term intake of more moderate quantities, though it should be noted the available data are limited. Neither the European Food Safety Authority nor the Scientific Committee on Food has set any upper levels; the UK's Expert Group on Vitamins and Minerals<sup>8</sup> established a guidance level of 1000 mg/day or 17 mg/kg bw/day for a 60 kg adult. At the levels present in Healthy Start supplements, vitamin C would not be expected to have adverse health effects.

## **Recommendations**

From a precautionary point of view, vitamin A could be retained in the HS vitamin supplements for children.

From a precautionary point of view, the Government recommendation that all children aged six months to five years are given supplemental vitamin A unless they are consuming 500ml or more of formula milk/day, could be retained

From a precautionary point of view, vitamin C could be retained in the HS supplements for women and in the HS vitamin supplements for children

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<sup>8</sup> <https://cot.food.gov.uk/committee/committee-on-toxicity/cotreports/cotjointreps/evmreport>

From a precautionary point of view, the Government recommendation that all children aged six months to five years are given supplemental vitamin C unless they are consuming 500ml or more of formula milk/day, could be retained.

**Table 1:** Mean daily intakes of vitamins A and C and percentage of the groups with intakes below the LRNI for infants aged 4 to 11 and children aged 12-18 months. Data from DNSIYC Healthy Start boost 2011, a boosted sample of 580 children whose mothers were receiving Healthy Start vouchers

	Vitamin A		Vitamin C	
	Mean intake (ugRE/day) from food sources excluding supplements (%RNI)	% below LRNI (intake from sources including supplements) <sup>a</sup>	Mean intake (mg/day) from food sources excluding supplements (%RNI)	% below LRNI (intake from food sources including supplements) <sup>a</sup>
4-11 months	845 (241%)	0	73 (292%)	0
12-18 months	590 (148%)	3	56 (187%)	0

(a) Figures for % below LRNI are not available for intakes excluding supplements. However, mean intakes with and without supplements are similar therefore it can be assumed that the % with intakes excluding supplements below the LRNI would be similar.

**Table 2:** Mean daily intakes of vitamins A and C and percentage of the groups with intakes below the LRNI for children aged 2 to 10 years and for adolescent girls and women aged 11-49 years. Data from LIDNS.

	Vitamin A		Vitamin C	
	Mean intake (ugRE/day) from food sources excluding supplements (%RNI)	% below LRNI (intakes from food sources excluding supplements)	Mean intake (mg/day) From food sources excluding supplements (%RNI)	% below LRNI (intakes from food sources excluding supplements)
Boys 2-10 years	733 (165%)	11	77 (256%)	0
Girls 2-10 years	527 (120%)	14	90 (299%)	0
Girls 11-18 years			78 (213%)	1
Women 19-34 years			71 (177%)	1
Women 35-49 years			63 (158%)	1

**Table 3:** Mean daily intakes of vitamins A and C and percentage of the group with intakes below the LRNI and above the TUL for infants aged 4 to 11 months not consuming supplements. Data from DNSIYC.

Vitamin A ( $\mu$ gRE/day)	Mean (%RNI)	% below LRNI	% above TUL <sup>9</sup>
Milk consumption <sup>10</sup>			
Above 500mls	1005 (287%)	0	0
Below 500mls	880 (251%)	0	0
Vitamin C (mg/day)	Mean (%RNI)	% below LRNI	
Milk consumption			
Above 500mls	83 (332%)	0	
Below 500mls	65 (260%)	0	

<sup>9</sup> Intake in relation to the TUL only calculated for individuals with a valid weight (kg) in the DNSIYC database.

<sup>10</sup> 'Milk' refers to any infant formula or follow-on formula and/or breast milk.

**Table 4:** Mean daily intakes of vitamins A and C and percentage of the group with intakes below the LRNI and above the TUL for children aged 12 to 18 months not consuming supplements. Data from DNSIYC.

Vitamin A (µgRE/day)	Mean (%RNI)	% below LRNI	% above TUL <sup>9</sup>
Milk consumption <sup>2</sup>			
Above 500mls	920 (230%)	0	3
Below 500mls	641 (160%)	3	0
Vitamin C (mg/day)	Mean (%RNI)	% below LRNI	
Milk consumption			
Above 500mls	98 (327%)	0	
Below 500mls	56 (187%)	0	

**Table 5:** Mean daily intakes (excluding supplements) of vitamins A and C and percentage of the group with intakes below the LRNI and above the TUL for infants aged 18 months to 4 years not consuming supplements. Data from NDNS.

	Mean (%RNI)	% below LRNI	% above TUL
Vitamin A ( $\mu$ /day RE)	526 (132%)	7	0 <sup>z</sup>
Vitamin C (mg/day)	71 (237%)	0	

<sup>z</sup> This figure is still to be verified.

	Vitamin A ( $\mu$ g retinol equivalent/day)		Vitamin C (mg/day)	
0-12 months	LRNI 150	RNI 350	LRNI 6	RNI 25
1 – 3 years	LRNI 200	RNI 400	LRNI 8	RNI 30
4 – 6 years	LRNI 200	RNI 400	LRNI 8	RNI 30

**Table 6:** Mean daily intakes (excluding supplements) of vitamin C and percentage of each group with intakes below the LRNI for women aged 11 to 49 years. Data from NDNS.

Age Group	Mean (%RNI)	% below LRNI
11 – 18 years	72 <sup>a</sup>	2
19 – 24 years	70 (175%)	2
25 – 34 years	75 (188%)	1
35 – 49 years	76 (190%)	1

<sup>a</sup>%RNI has not been calculated for this group since the RNIs for 11-14 and for 15-18-year olds are different

	Vitamin C (mg/day)	
11 – 14 years	LRNI 9	RNI 35
15 – 18 years	LRNI 10	RNI 40
19 – 50 years	LRNI 10	RNI 40

## Healthy Start Scheme - Vitamins for all pregnant women

### Key messages

We want to ensure every new child gets the best start in life and there is clear evidence of the benefits of a universal vitamin supplement promoting a healthy pregnancy that is why we will invest in a Universal vitamin scheme for pregnant women.

health professionals will be supported in promote important discussions around preconception and health in pregnancy because we know that women who have an adequate intake of the essential vitamins allows proper foetal growth and development as well as maintaining her own health.

### Sensitivities

- Welfare Foods powers are due to be devolved as part of the Scotland Act 2016. The Healthy Start Scheme is part of Welfare Foods. As part of the Healthy Start Scheme, eligible pregnant women, mothers and children can received the Healthy Start vitamins at no cost. This announcement will be to deliver the Healthy Start Vitamins universally to all pregnant women, but we do not need to the Welfare Foods powers devolved to allow us to do this.

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### Cost

1. Estimated annual costs (based on 55,000 births annually, 3 packs per women and cost of £0.91) £325,000 pa
2. Number of pregnancies annually in Scotland : live births=54,000; terminations=12,000; still births approx. 700/annum.

### Health Benefits

3. The evidence on the benefits of vitamin supplementation in pregnancy is strong, with the most benefit being received through folic acid supplementation pre-pregnancy and before 12 weeks gestation. NICE were asked to undertake a cost-benefit review but could only assess the cost/benefit of universal provision of folic acid supplementation and advised the pre pregnancy period was key. We do not know the cost effectiveness of Vitamin D (nor Vitamin C) but we are aware of the benefits.
4. Women's vitamin (tablets) contain:
  - Folic acid: reducing the chance of the baby having spina bidifa
  - Vitamin C: helping to maintain healthy tissue in the body
  - Vitamin D: helping to absorb calcium to support bone developmentThe shelf life is two years from manufacture.
5. Universal provision of Healthy Start vitamins (Folic Acid, D and C) is currently being trialled for all pregnant women and children under 4, as part of improvement work for the current Healthy Start Scheme (to be devolved as part of Welfare Foods)
6. This is partially funded by the current Healthy Start Scheme (for eligible beneficiaries – around £55k pa) and through the Maternal and Infant Nutrition bundle funding (majority

of NHS Boards use some of this funding to provide vitamins for women not eligible for Healthy Start Scheme) with a small amount required for distribution

7. We are waiting on SACN (Scientific Advisory Committee on Nutrition – who are commissioned by DH to advise the UK Government on nutrition) reporting their recommendations on Vit D supplementation for pregnant women and children. This is unlikely to be radically different from what the current evidence is, and we see very low risk in taking forward this initiative prior to them announcing (I have agreement from the SG Diet Team that they are content for this to happen).
8. We do not need to wait for the commencement of powers from Welfare Foods to be able to deliver this scheme, even though the vitamins are provided through the current UK wide scheme. The only caveat is that all women who are eligible under the current Healthy Start Scheme retain their eligibility (they are the most vulnerable, low income families so we would target them anyway). We have had some advice that we can deliver a scheme with public health benefits through NHS Boards under existing regulations, without the need to create new ones.
9. It is partially the process of devolution of the WF powers that has prompted us to think differently about vitamin provision and how we can improve on the existing scheme. Early output from the current testing across NHSScotland suggests that reaching all pregnant women is highly probable.
10. Once the SACN recommendations (Autumn 16?) are available, we would propose how we could expand this scheme to encompass all children, as one of strategies to improve child health and development. One of the challenges with the current children's Healthy Start vitamins is that they have an extremely short shelf life, so managing distribution is complex. We need time to review the current formulation, procurement and manufacturing options, which would be triggered by the SACN review.
11. Develop messaging for professionals and other care providers and parents and, update Scottish vitamin site of the feedgoodfactor website, update other Health Scotland materials and develop a social marketing plan for all vitamin interventions.
12. There is wide professional and voluntary sector support for moving from the current targeted system to provision of free vitamin supplements for all pregnant women
13. We are developing options for the Healthy Start Food Voucher Scheme and nursery milk under new devolved powers. The devolved Healthy Start Scheme will be improved to provide better outcomes for mothers and young children



## ANNEX A

### Background to Healthy Start

14. The current Healthy Start (HS) Scheme entitles low-income pregnant women and families with young children to receive vouchers for vitamins and certain foods. Beneficiaries are means tested, except for pregnant teenagers (under 18) who are automatically entitled to the scheme.
15. Welfare foods (WF) is UK-wide government scheme to improve the health and nutrition of pregnant women and young children, currently administered by Department of Health, and paid for by the Scottish Government through transfer of funds through the health budget. We currently do not contribute to administration costs.
16. WF is comprised of two separate schemes: the Nursery Milk Scheme and the Healthy Start scheme (vitamins and vouchers).
17. The Nursery Milk Scheme is a universal entitlement for all children under the age of five on days where they have spent two or more hours in a day care or early years setting to receive a drink of fresh cow's milk (1/3 pint). Uptake is around 50%.
18. The Healthy Start Scheme entitles low-income pregnant women and families with young children to receive vouchers for vitamins and certain foods. Beneficiaries are means tested, except for pregnant teenagers (under 18) who receive the scheme on a universal basis.
19. Healthy Start Vitamins are aimed at pregnant women and young children and are distributed through NHS Boards.
20. Uptake for Healthy Start vouchers is around 74% with significant fluctuation across health boards. Uptake for the Healthy Start vitamins is much lower with progress being made through the Community Pharmacy Vitamin pilot scheme and improvement work carried out by the Early Years Collaborative.