

Maternal and child nutrition

[E] Evidence reviews for interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice

NICE guideline NG247

Evidence reviews underpinning recommendations 1.1.10 to 1.1.14 in the NICE guideline

January 2025

Final

*These evidence reviews were developed by
NICE*

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Interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice

Review question

What interventions are effective to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice for pregnant women, breastfeeding women, babies and children up to 5 years?

Introduction

The UK government recommend that women who are pregnant or breastfeeding, and babies and children under 5 years of age, take appropriate vitamin supplements to meet heightened nutritional requirements during these periods of rapid growth and development. For pregnant women the necessary supplements are folic acid and vitamin D, and breastfeeding women should take vitamin D. Vitamin D supplementation is recommended particularly during winter months, unless there are other risk factors. Under 5s should be given vitamin D from birth, and vitamins A and C from 6 months (with the exception of babies drinking more than 500ml of infant formula a day, given that this already contains vitamins). The government provides free vitamins to eligible women, babies and children under the Healthy Start scheme; including pregnant teenagers under 18 and those on very low incomes. These individuals are more likely to have poor quality diets which do not provide all the nutrients they need, and the vitamin supplements are intended to help address this. However, vitamin supplement use in line with government recommendations is generally low, including for those eligible for the Healthy Start scheme.

Understanding what interventions may be effective to increase uptake of government guidance on vitamin supplement use, including the supplements provided via Healthy Start, would enable healthcare professionals to give appropriate advice to parents and carers. The aim of this review is to find out what interventions are effective in increasing the uptake of vitamin supplements in line with government advice.

Summary of the protocol

See Table 1 for a summary of the Population, Intervention, Comparison and Outcome (PICO) characteristics of this review.

Table 1: Summary of the protocol (PICO table)

Population	<ul style="list-style-type: none">• women in a single or multiple pregnancy• breastfeeding women• babies ≤1 year• children between 1 year and 5 years
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Intervention	<ul style="list-style-type: none"> • intervention group 1: Interventions using information provision and/or education • intervention group 2: Interventions using alternative forms of vitamin supplementation (drops or tablets) • intervention group 3: Interventions aimed at improving access to vitamin supplementation (that is, provision of vitamin supplementation in different settings or incorporation of vitamin in welfare schemes) • intervention group 4: Interventions using psychological or behavioural techniques • intervention group 5: Multicomponent interventions (interventions that combine more than 1 intervention listed above). <p>The committee anticipated that, along with the intervention, studies would report at least 1 component of each of the groups noted below. Sensitivity analyses will be done according to these if enough data is available.</p> <ul style="list-style-type: none"> • component 1: Mode of delivery • component 2: Intervention aimed at individuals or groups • component 3: Individualised or tailored interventions • component 4: Who delivers the intervention • component 5: Where is the intervention delivered • component 6: Behaviour change models, techniques and theories
Comparison	<ul style="list-style-type: none"> • one of the above interventions (within the same group or different group interventions will be considered) • status quo/treatment as usual (as defined by study authors, includes no treatment) • time (before and after)
Outcome	<p>Critical</p> <ul style="list-style-type: none"> • changes in vitamin supplementation uptake rate (self-reported or objective measured) <p>Important</p> <ul style="list-style-type: none"> • changes in attitude, confidence, and knowledge as part of people's intention to change behaviour. • unintended consequences: <ul style="list-style-type: none"> ○ increase in inequalities ○ supplementation wastage

For further details see the review protocol in appendix A.

Methods and process

This evidence review was developed using the methods and process described in [Developing NICE guidelines: the manual](#). Methods specific to this review question are described in the review protocol in appendix A and the methods document (supplementary document 1).

Declarations of interest were recorded according to [NICE's conflicts of interest policy](#).

Effectiveness evidence

Included studies

Four studies were included for this review, 2 randomised controlled trials (RCTs; de Nooijer 2012 and Evans 2014), 1 cluster randomised trial (Madar 2009), and 1 retrospective cohort study (Cawley 2020).

As per protocol studies were from high-income countries and were conducted in the USA, The Netherlands or Norway.

The included studies are summarised in Table 2.

Two studies compared interventions using information/education provision to status quo treatment (Cawley 2020 and Evans 2014), 1 study compared multicomponent interventions of information/education provision and vitamin D drops supply to status quo (Madar 2009) and 1 study compared multicomponent interventions of information/education provision and psychological or behavioural technique (implementation intention instruction) to information/education provision only (de Nooijer 2012).

One study included a population of pregnant and postpartum women (Cawley 2020), 1 study included pregnant women only (Evans 2014), 1 study examined outcomes in children aged between 1 and 5 years (de Nooijer 2012) and 1 study examined outcomes in babies from birth to 1 year (Madar 2009).

Three studies reported on the critical outcome changes in vitamin supplementation uptake rate (Cawley 2020, de Nooijer 2012 and Madar 2009) and 1 study reported on the important outcome changes in attitudes, confidence and knowledge as part of people's intention to change behaviour (with a focus on attitudes) (Evans 2014). No evidence was found that reported on the important outcome unintended consequences as it relates to increase in inequalities and supplementation wastage.

Meta-analysis was not performed as the studies had different interventions/comparisons or they did not report the same outcome of interest.

Sensitivity analysis on the following component domains along with the interventions were planned if there was enough data available: component 1 mode of delivery, component 2 intervention aimed at individuals or groups, component 3, individualised/tailored interventions or general, component 4 who delivers the intervention, component 5 where the intervention is delivered, component 6 behaviour change models, techniques and theories. However, sensitivity analysis could not to be performed by component as there were not more than two studies per analysis.

None of the studies reported information on any of the subgroups prespecified in our protocol: Women and parents with disabilities, including learning disabilities and other physical and mental health conditions; women going through assisted conception; LGBTQ+ women and parents; children with developmental problems; geographical variation, for example, places without adequate provision of primary care (outside cities).

See the literature search strategy in appendix B and study selection flow chart in appendix C.

Excluded studies

Studies not included in this review are listed, and reasons for their exclusion are provided in appendix J.

Summary of included studies

Summaries of the studies that were included in this review are presented in Table 2.

Table 2: Summary of included studies.

Study	Population	Intervention	Comparison	Outcomes
Cawley 2020 Retrospective cohort study USA	N=567 Women who gave birth to a live infant in the previous 4 – 6 months Mean age in years (SD): Not reported, but age >18	<u>Information/ education provision</u> Circle app: Personalised health information for prenatal and postpartum care and paediatric care up to 18 years	<u>Status quo treatment</u> No Circle app	<ul style="list-style-type: none"> • vitamin supplementation uptake in pregnant and postpartum women (Follow-up unclear)
de Nooijer 2012 RCT The Netherlands	N = 171 Parents of children aged 1 to 3½ years Child mean age in years (SD): 2.3 (0.8)	<u>Multicomponent intervention (information/ education provision and behavioural intervention)</u> Implementation intention instruction: Parents were asked to formulate an implementation intention toward giving their child 10µg vitamin D daily. In addition, parents were provided with written information on vitamin D supplementation, why it is important in children and the required amount.	<u>Information provision only</u> No implementation intention instruction: Parents were provided with written information on vitamin D supplementation, why it is important in children and the required amount, but with no request to formulate an implementation intention.	<ul style="list-style-type: none"> • vitamin supplementation uptake in children (4 weeks follow-up)
Evans 2014 RCT	N = 943 Women who presented for prenatal care	<u>Information/ education provision</u> Text4baby: Receipt of distinct prenatal	<u>Status quo</u> Usual care	<ul style="list-style-type: none"> • attitudes towards prenatal vitamins in pregnant women (4 weeks follow-up)

Study	Population	Intervention	Comparison	Outcomes
USA	prior to 14 weeks gestation Mean age in years (SD): Not reported, but age 18-45	information via text messaging		
Madar 2009 Cluster RCT Norway	N = 51 Number of clusters = 8 Women who attended 6-week check of their infants Infants' age, mean (SD), weeks Intervention = 7 (1.7) Control = 6.9 (1.8)	<u>Multicomponent interventions (information/education provision and vitamin D drops supply)</u> Free Vitamin D2 drops: Free vitamin drops in addition to brochure describing importance of vitamin D and instructions on how to administer the drops	<u>Status quo</u> Usual care: Oral information about vitamin D and recommendation of vitamin D supplementation to the infants	<ul style="list-style-type: none"> • vitamin D supplementation uptake (Approximately 6 weeks follow-up)

RCT: randomised controlled trial; USA: United States of America

See the full evidence tables in appendix D. No meta-analysis was conducted (and so there are no forest plots in appendix E).

Summary of the evidence

Comparison 1: Interventions using information/education provision versus status quo (including no treatment) in pregnant women– Combined components

Two studies were included in this comparison. Results from 1 study in pregnant women showed that interventions using general information/education provision, delivered using digital/electronic interventions, aimed at individuals, delivered by peer and delivered on mobile devices showed no important difference for prenatal vitamin supplementation uptake in pregnant women when compared with status quo. Results from 1 study in pregnant women showed that interventions using general information/education provision, delivered using face to face and digital/electronic interventions, aimed at individuals, delivered by peer, on mobile devices and based on the health belief model and social cognitive theory showed an important benefit over status quo for change in attitudes towards prenatal vitamins in pregnant women based on the statement "Strongly agree that taking a prenatal vitamin will improve the health of my developing baby". However, there was no evidence of important differences found between the same intervention and comparator group for attitudes reflecting the statement "Strongly agree that taking a prenatal vitamin is important to the health of my developing baby".

The quality of the evidence was very low.

Comparison 2: Multicomponent interventions (information/education provision and Vitamin D drops supply) versus status quo (including no treatment) in babies aged 3 months– Combined components

One study in babies aged 3 months was included in this comparison. Multicomponent interventions involving general information/education provision and supply of vitamin D drops delivered using face to face and printed interventions, aimed at individuals and delivered by public health nurses in child health clinics showed an important benefit over status quo for vitamin D supplementation uptake rate in babies aged 3 months.

The quality of the evidence was very low.

Comparison 3: Multicomponent interventions (information/education provision and psychological or behavioural technique) versus control (information/education provision only) in children 1 to 3.5 years– Combined components

One study in children 1 to 3.5 years was included in this comparison. Multicomponent interventions involving general information/education provision and psychological or behavioural technique, delivered using face to face and printed interventions, aimed at individuals and delivered on an internet panel showed no evidence of important difference over information/education provision only for vitamin D supplementation uptake rate in children aged 1 to 3.5 years.

The quality of the evidence was low.

See appendix F for full GRADE tables.

Economic evidence**Included studies**

Three economic studies were identified which were relevant to this question (Filby 2014, Filby 2015, Floreskul 2020). There was also one study reporting utility data that was identified in this review (Aguilar 2020), which could be used in economic modelling.

See the literature search strategy in appendix B and economic study selection flow chart in appendix G.

Excluded studies

Economic studies not included in this review are listed, and reasons for their exclusion are provided in appendix J.

Summary of included economic evidence

See Table 3 and Table 4 for the economic evidence profiles of the included studies.

Table 3: Economic evidence profile for interventions aiming to increase uptake of vitamin D in pregnant women, infants and children up to 5 years of age

Study and country	Limitations	Applicability	Other comments	Incremental costs ¹	Incremental effects	ICER	Uncertainty
Filby 2014 UK	Potentially serious ¹	Partially applicable ²	Population: Pregnant women up to 12 months post-partum and children aged <5 years Free vitamin D supplementation and information aiming to increase uptake of vitamin D, vs. no intervention Outcomes: (a) number of people taking vitamin D supplements; (b) number of people with symptomatic vitamin D deficiency Time horizon NR Cost year: 2012-13 In the estimation of ICER, only respective costs for each sub-population were considered	£0.99	(a): 20/100 women 17/100 children (b): -0.07/100 women -0.06/100 children	£10.15/extra woman taking vitamin D £2,859/deficiency averted in women £4.62/extra child taking vitamin D £1,229/deficiency averted in children	Intervention not cost-saving even at 0% supplementation without intervention or 50% supplementation following intervention
Floreskul 2020 UK	Potentially serious ³	Directly applicable ⁴	Population: pregnant women and children <4 years of age, stratified by skin tone: dark, medium, light Intervention: free vitamin D supplementation vs no intervention Outcome: QALY Time horizon: 4 years Cost year: 2016-17	Dark: -£1.23 Medium: £9.33 Light: £10.87	Dark: 0.001 Medium: 0.0005 Light: 0.00003	Dark: intervention dominant Medium: £20,222/QALY Light: £423,340/QALY	Probability of intervention being cost-effective at £20,000/QALY: Dark: 0.99 Medium: 0.52 Light: 0.00 Medium results sensitive to the risk of having rickets,

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Study and country	Limitations	Applicability	Other comments	Incremental costs ¹	Incremental effects	ICER	Uncertainty
							rickets duration, intervention costs, supplementation rates. Assuming life-long consequences did not affect conclusions.

CHU: child health utility; DSA: Deterministic sensitivity analysis; ICER: Incremental cost-effectiveness ratio; NR: not reported; PSA: probabilistic sensitivity analysis

¹ Study based on decision-analytic modelling; effectiveness and costs based on published studies; only intermediate data on vitamin D deficiency modelled; national unit costs used; time horizon not reported; DSA conducted.

² UK study, no QALYs used, perspective not reported but likely healthcare (& public sector where relevant for intervention delivery), discounting not reported

³ Study based on decision-analytic modelling; effectiveness based on published study and trust observational dataset; costs taken from trust administrative data and published evidence; 4-year time horizon; PSA conducted, collection of some data funded by industry.

⁴ UK study, QALYs based on EQ-5D and CHU-9D were used (UK values), NHS+PSS perspective, discounting not reported but time horizon fairly short

Table 4: Economic evidence profile for intervention aiming to increase uptake of Healthy Start vitamin programme in women planning a pregnancy, pregnant women, infants and children up to 5 years of age

Study and country	Limitations	Applicability	Other comments	Incremental costs ¹	Incremental effects	ICER ¹	Uncertainty
Filby 2015 UK	Potentially serious ¹	Directly applicable ²	Interventions: Universal offering of Healthy Start Vitamin programme to a. pregnant women from 10 weeks; women with a child aged <12 months; children aged 6 months - 4 years b. all women planning a pregnancy; pregnant women; women with a child aged <12 months; infants aged 0-6 months; children aged 6 months – 5 years versus Comparator:	(a): £2.06 (b): £0.82 Women planning a pregnancy + <10 weeks pregnant: - £0.89 Pregnant women <10 weeks: £2.35	(a): 0.000003 (b): 0.000126 Women planning pregnancy + <10 weeks pregnant: 0.000663 Pregnant women <10 weeks: 0.000320	(a): £620,898 (b): £6,528 Women planning pregnancy + <10 weeks pregnant: dominant Pregnant women <10 weeks: £7,126	(b): Intervention not cost-effective if • probability NTD in pregnant women >10 weeks is <0.15% • probability of vitamin D deficiency in infants and children aged 6 months - 4 years receiving intervention >0.2%

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Study and country	Limitations	Applicability	Other comments	Incremental costs ¹	Incremental effects	ICER ¹	Uncertainty
			<p>Current offering of Healthy Start Vitamin programme to pregnant women from 10 weeks aged <18 years, low-income (in receipt of qualifying income-related benefits or tax credits) adult pregnant women from 10 weeks & low-income women with a child aged <12 months; children from low-income families aged 6 months - 4 years.</p> <p>Outcome: QALY</p> <p>Time horizon: lifetime for NTDs</p> <p>Cost year: 2014</p>				<ul style="list-style-type: none"> uptake of folic acid in women planning a pregnancy + <10 weeks pregnant receiving intervention <30% proportion of NTD-affected terminations >92%

DSA: Deterministic sensitivity analysis; ICER: Incremental cost-effectiveness ratio; NTD: neural tube defect; QALY: quality-adjusted life year

¹ Study based on decision-analytic modelling; effectiveness and costs based on published study, national surveys and a primary online survey, government and local data, other published evidence; national and local unit costs used; lifetime horizon; DSA conducted.

² UK study, QALYs used, perspective NHS and public (local and central government), discounting 3.5%

Economic model

This area was prioritised for de novo economic modelling. The committee selected to assess the cost-effectiveness of health technologies (such as apps), because these are the only interventions they considered for a recommendation which have promising evidence but are not currently in routine use in England. However, there was no adequate effectiveness evidence on health technologies to allow a meaningful and informative economic analysis to be carried out. Therefore, no economic model was developed for this review question.

Economic evidence statement

- Evidence from 1 UK modelling study was unclear as to whether free vitamin D supplementation and information aiming to increase uptake of vitamin D to pregnant women up to 12 months post-partum and children aged <5 years was cost-effective versus no intervention, as the study did not use the QALY as the measure of outcome, so it was difficult to assess whether additional benefits (number of people taking vitamin D supplements and number of people with symptomatic vitamin D deficiency averted) were worth the extra costs incurred. The evidence is partially applicable to the NICE decision-making context as the study it did not use the QALY as the measure of outcome, and is characterised by potentially serious limitations.
- Evidence from 1 UK modelling study suggests that, compared with no intervention, free vitamin D supplementation to pregnant women and children <4 years of age is likely to be cost-effective if the study population has dark skin tone, may be cost-effective if the study population has medium skin tone, but is highly unlikely to be cost-effective if the study population has light skin tone. The evidence is directly applicable to the UK context and is characterised by potentially serious limitations.
- Evidence from 1 UK modelling study suggests that universal offering of the Healthy Start Vitamin programme to pregnant women from 10 weeks, women with a child aged <12 months, and children aged 6 months - 4 years is not cost-effective compared with the current offering of Healthy Start Vitamin programme (which involves pregnant women from 10 weeks aged <18 years, low-income adult pregnant women from 10 weeks, low-income women with a child aged <12 months, and children from low-income families aged 6 months - 4 years). On the other hand, universal offering of the Healthy Start Vitamin programme and extension to all women planning a pregnancy, all pregnant women regardless of month in pregnancy, women with a child aged <12 months, infants aged 0-6 months and children aged 6 months – 5 years is likely to be cost effective compared with the current offering of Healthy Start Vitamin programme. Universal offering of the Healthy Start Vitamin programme is particularly cost-effective when it is focused to all women planning a pregnancy and pregnant women within 10 weeks into pregnancy. The evidence is directly applicable to the UK context but is characterised by potentially serious limitations.

The committee's discussion and interpretation of the evidence

The outcomes that matter most

Changes in vitamin supplementation uptake rate was prioritised as the critical outcome by the committee because it is the most appropriate measure that directly answers the review question. The committee considered that both subjective and objective measures of vitamin

supplementation uptake will be useful to determine the effectiveness of interventions aimed at improving uptake of vitamins in line with government advice.

The committee agreed that changes in attitude, confidence and knowledge as part of people's intention to change behaviour and unintended consequences such as supplementation wastage and increase in inequalities should be important outcomes. This was because they are common factors to measure and target in an intervention and can ultimately impact on behaviour. In addition, inequalities are reported as part of the studies on Healthy Start in England.

No evidence was found that reported on the outcome unintended consequences.

The quality of the evidence

The quality of the evidence for outcomes was assessed using GRADE and the majority of the evidence was very low in quality. The main issues with the quality were due to bias arising from the methodological quality of the studies, indirect interventions due to broader intervention aims than the protocol for this review and imprecision.

Individual studies were assessed for methodological quality based on their study design. Randomised controlled trials were assessed using the Cochrane RoB 2.0 tool, cluster randomised studies were assessed using the Cochrane RoB 2.0 tool for cluster randomised trials and retrospective cohort studies were assessed using the Risk Of Bias In Non-randomized Studies of Interventions (ROBINS-I) tool. Concerns towards risk of bias for randomised control trials related to attrition, randomisation process, concealment of allocation, outcome measurement and analysis method. Concerns towards risk of bias for the cluster randomised trial related to measurement of outcome and missing outcome data. Concerns towards risk of bias for the retrospective cohort studies primarily related to retrospective classification of intervention groups, unclear details on initiation, adherence and deviations from intended interventions and unclear bias in selection of reported results.

Benefits and harms

The committee considered the current government advice from the Scientific Advisory Committee on Nutrition (SACN) for vitamins uptake in the different populations included in the review – pregnant women, breastfeeding women, babies <1 year and children between 1 and 5 years and agreed that all health professionals working with any of these populations should provide the key messages from the government advice on vitamins intake during pregnancy, breastfeeding and in children from birth to 5 years (SACN 2016). The committee discussed that it is crucial to increase awareness on the importance of vitamin supplements in various settings as all these contacts would provide opportunities to counsel women about the benefits of vitamins for themselves and their babies and young children. In the evidence, this information was discussed during antenatal care, appointments or checks or at baby development check. The committee agreed that this setting and time point was appropriate for providing information and also used the qualitative evidence (see evidence report P) to suggest additional timepoints and settings for this to occur such as during antenatal and postnatal care appointments or checks, vaccination appointments (during pregnancy and after birth), at pharmacies, appointments in specialist clinics for pre-existing medical conditions (such as diabetes or epilepsy), within multi-agency health and social care hubs, at visits to young people's services and at breastfeeding support group sessions.

The committee discussed that the available evidence did not show much benefit towards the use of digital or electronic means for providing information to pregnant women. While the

committee noted from their experience that there is an increased use of digital technology for providing information, they did not make any recommendations towards digital technologies based on the limited low quality evidence. The committee agreed not to prioritise this topic for a research recommendation but made a related research recommendation on digital technologies to increase uptake of folic acid before and during pregnancy, see evidence review C for more details. The evidence showed that there was an important benefit in improving uptake of vitamin D in children with the use of face-to-face information provision/education and provision of leaflets when compared with status quo treatment. As there was no robust evidence on different modes of delivery, the committee agreed that the information could be delivered in different formats depending on feasibility and the person's preference.

The committee discussed the low-quality evidence on behavioural intervention combined with providing information or education materials in relation to formulating an implementation intention for increasing uptake of vitamins in children. This showed no evidence of important difference and the committee agreed that no specific recommendation can be made in relation to behavioural interventions. The committee discussed techniques in the evidence that served as a helpful reminder to take vitamins. These included pairing a behaviour with a routine activity such as bedtime story or reminder through apps and in combination with the evidence from the qualitative report (evidence report P) came to the consensus that the health care provider should discuss ways to remember taking vitamin supplements each day.

The committee discussed current government advice on vitamin D supplementation. All pregnant or breastfeeding people are advised to take vitamin D supplement during the autumn and winter months when sunlight is not sufficient in the UK setting to provide enough vitamin D. However, vitamin D supplementation throughout the year is advised for people with reduced sun exposure, such as those who are not outdoors often or frequently cover their skin and people who are at a higher risk of not making sufficient vitamin D from sunlight, such as people with darker or medium skin tones. The committee wanted to highlight in the recommendations that the risk of vitamin D insufficiency during pregnancy may be increased in these populations. All young children are advised to take vitamin D supplementation throughout the year, except for infants who receive at least 500ml of formula milk per day.

There was very low-quality evidence on giving information along with supply of vitamin D drops for children that showed an important benefit. There was no clinical evidence found for interventions aimed at improving access to vitamin supplementation for pregnant or breastfeeding women or children. Evidence from an economic study among pregnant and breastfeeding women and their children showed free vitamin D provision to those with medium to dark skin to be cost-effective in preventing vitamin D deficiency and rickets. Based on the evidence the committee agreed that services should offer free vitamin D supplements for children under 5 years, pregnant and breastfeeding women if they are at increased risk of vitamin D deficiency because of their skin tone or because of lack of exposure to sunlight.

The committee discussed the free vitamin supplements that are offered to pregnant or breastfeeding people or children through the Healthy Start Scheme and agreed it is important that healthcare professionals discuss and provide information about the scheme, what the supplements contain, and refer people to the scheme if appropriate.

The committee also discussed eligibility in relation to free Healthy Start vitamins. The committee noted that Healthy Start scheme is income derived for those over 18 years of age (while all pregnant and/or breastfeeding teenagers under 18 are eligible) such that an individual needs to be in receipt of specific benefits to be eligible. However, the committee

were aware that Healthy Start vitamins were already available free of charge in some areas regardless of the family's income or their risk of vitamin D deficiency.

The committee came to the consensus that for households not eligible for free Healthy Start vitamins, advice should be provided in line with government advice. In addition, the committee came to the consensus that pregnant and breastfeeding people who are eligible for Healthy start vitamins should follow government advice on dosage, products or supplements to avoid ([Healthy Start vitamins](#) and [NHS advice on vitamins, supplements and nutrition in pregnancy](#)). The committee also discussed the needs of individuals who may be following a restricted diet, such as vegan or gluten-free diet, and came to the consensus that, following government advice, this population may also need to take a vitamin B12 supplement ([NICE guideline on vitamin B12 deficiency in over 16s](#), [NHS advice on being vegetarian or vegan and pregnant and NHS advice on B vitamins](#)).

The committee discussed that in line with government advice ([UK government advice about vitamins for babies](#) and [vitamins for children](#)), health care professionals should provide information and advice to parents and carers on vitamin supplementation such as which vitamins should be given and at what age, and how that is impacted if the baby is formula fed, and where to get the supplements.

All available evidence was in those with single pregnancies. There was no evidence for women with multiple pregnancies, hence the committee did not make any specific recommendations for this group. The committee referred to the section on diet, lifestyle and nutritional supplements in the NICE guideline on [Twin and triplet pregnancy](#), as this provides advice on nutritional supplements for multiple pregnancies.

Cost effectiveness and resource use

There was UK evidence that offering Healthy Start supplements universally to the current target group (pregnant women from 10 weeks, women with a child aged under 12 months and children over 6 months and under 4 years) was not cost-effective; however, if universal offering was extended to women who are planning a pregnancy, women less than 10 weeks pregnant, infants aged 0–6 months and children aged from 4 to 5 years, then it became cost-effective as it increased vitamin uptake, but only if the cost per head of including women planning a pregnancy and those who are less than 10 weeks pregnant was not considerably higher than the cost per head for women already in the scheme. However, a mechanism would need to be identified to deliver a universal scheme to these 2 groups, which would require a new route to target women this early on.

There was evidence from a recent UK study that free vitamin D supplementation to pregnant women and children up to 4 years of age with darker or medium tone skin (who are at higher risk for vitamin D deficiency) is cost-effective, by reducing the risk of vitamin D deficiency and, consequently, reducing the risk of developing rickets in children. In contrast, free vitamin D supplementation to a respective population with light tone skin was not cost-effective. The review question was originally prioritised for economic modelling, as the committee wished to assess the cost-effectiveness of health technologies in enhancing uptake of vitamins. However, clinical evidence around health technologies was too limited and uncertain to inform an economic model. The recommendations made overall reflect current practice and aim to reiterate government advice and harmonise practice across settings, by providing advice during routine or other planned appointments. Moderate resource implications (in terms of health professionals' time) are expected in settings where optimal advice on vitamin supplementation is currently not offered or is limited. The recommendation to offer free vitamin D supplements for women and people who are pregnant or breastfeeding, and for

children under 5 years of age, if they have darker skin or limited exposure to sun, may also have small to moderate resource implications to settings where this is not current practice, comprising the acquisition cost of the vitamin supplements. However, as reported above, offering free vitamin D supplementation to a population of pregnant women and children up to 4 years of age who have darker skin (and are thus at a higher risk for vitamin D deficiency) was found to be cost-effective in the UK, as it reduced the risk of rickets in children and therefore led to clinical benefits for the children and future cost-savings to the NHS. The recommendation was not expanded to the respective population with light skin tone because evidence suggested that this was highly unlikely to be cost-effective, due to this population's lower risk of vitamin D deficiency and, subsequently, for development of rickets in children.

Other factors the committee took into account

For this review question, in relation to vitamin supplementation during or after pregnancy, the population in the evidence was women and no evidence was identified or reviewed for trans men or non-binary people. The protocol and literature searches were not designed to specifically look for evidence on trans men or non-binary people but they were also not excluded. However, there is a small chance evidence on them may not have been captured, if such evidence exists. In discussing the evidence, the committee considered whether the recommendations could apply to a broader population, and used gender inclusive language to promote equity, respect and effective communication with everyone. Healthcare professionals should use their clinical judgement when implementing the recommendations, taking into account each person's circumstances, needs and preferences, and ensuring all people are treated with dignity and respect throughout their care.

Recommendations supported by this evidence review

This evidence review supports recommendations 1.1.10 to 1.1.14. Other evidence supporting these recommendations can be found in the evidence review P on facilitators and barriers to increase the uptake of government advice on folic acid and vitamin supplements.

References – included studies

Effectiveness

Cawley 2020

Cawley, Caroline, Buckenmeyer, Hannelore, Jellison, Trina et al. Effect of a Health System-Sponsored Mobile App on Perinatal Health Behaviors: Retrospective Cohort Study. *JMIR mHealth and uHealth* 8(7): e17183, 2020

de Nooijer 2012

de Nooijer, J.; Jansen, R.; van Assema, P. The use of implementation intentions to promote vitamin D supplementation in young children. *Nutrients* 4(10): 1454-1463, 2012

Evans 2014

Evans, WD, Wallace Bihm, J, Szekely, D et al. Initial outcomes from a 4-week follow-up study of the Text4baby program in the military women's population: randomized controlled trial. *Journal of medical Internet research* 16(5): e131, 2014

Madar 2009

Madar AA; Klepp K; Meyer HE. Effect of free vitamin D(2) drops on serum 25-hydroxyvitamin D in infants with immigrant origin: a cluster randomized controlled trial. *Eur J Clin Nutr* 63(4): 478-84, 2009

Economic**Aguiar 2020**

Aguiar M, Andronis L, Pallan M, Höglér W, Frew E (2020). Micronutrient deficiencies and health-related quality of life: the case of children with vitamin D deficiency. *Public Health Nutr*, 23(7), 1165-1172.

Filby 2014

Filby A, Lewis L, Taylor M. National Institute for Health and Care Excellence. An Economic Evaluation of Interventions to Improve the Uptake of Vitamin D Supplements in England and Wales. Report. York Health Economics Consortium, 2014.

Filby 2015

Filby A, Taylor M, Jenks M, Burley V. National Institute for Health and Care Excellence. Examining the cost-effectiveness of moving the Healthy Start Vitamin Programme from a targeted to a universal offering. Final report. York Health Economics Consortium, 2015.

Floreskul 2020

Floreskul V, Juma FZ, Daniel AB, Zamir I, Rawdin A, Stevenson M, Mughal Z, Padidela R (2020). Cost-Effectiveness of Vitamin D Supplementation in Pregnant Woman and Young Children in Preventing Rickets: A Modeling Study. *Front Public Health*, 8:439.

Other**SACN 2016**

Scientific Advisory Committee on Nutrition (SACN). Vitamin D and health. 2016. Available from: <https://www.gov.uk/government/publications/sacn-vitamin-d-and-health-report> [accessed 13 March 2024]

Appendices

Appendix A Review protocols

Review protocol for review question: What interventions are effective to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice for pregnant women, breastfeeding women, babies and children up to 5 years?

Table 5: Review protocol

Field	Content
PROSPERO registration number	CRD42022355233
Review title	Interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice for pregnant women, breastfeeding women, babies and children up to 5 years
Review question	What interventions are effective to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice for pregnant women, breastfeeding women, babies and children up to 5 years?
Objective	<p>To assess what interventions are effective to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice for pregnant women, breastfeeding women, babies and children up to 5 years.</p> <p>To assess what interventions are effective to limit the use of vitamin A supplementation in line with government advice in pregnant women.</p>
Searches	<p>The following databases will be searched:</p> <ul style="list-style-type: none"> • Cochrane Central Register of Controlled Trials (CENTRAL) • Cochrane Database of Systematic Reviews (CDSR) • Embase • MEDLINE • Epistemonikos

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Interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice

Field	Content
	<ul style="list-style-type: none"> • CINAHL • PsycInfo • International HTA database • Health Technology Assessment (HTA) <p>Searches will be restricted by:</p> <ul style="list-style-type: none"> • english language only • human studies only <p>The full search strategies for MEDLINE database will be published in the final review. For each search, the principal database search strategy is quality assured by a second information scientist using an adaptation of the PRESS 2015 Guideline Evidence-Based Checklist.</p>
Condition or domain being studied	<p>Vitamin supplementation in pregnant and breastfeeding women in line with government advice</p> <ul style="list-style-type: none"> • healthy start vitamins for pregnant and breastfeeding women (https://www.healthystart.nhs.uk/healthcare-professionals/ https://www.healthystart.nhs.uk/): <ul style="list-style-type: none"> ◦ the daily dose is 1 tablet, which contains: <ul style="list-style-type: none"> - 70 milligrams of vitamin C - 10 micrograms of vitamin D - 400 micrograms of folic acid • vitamin A (https://www.nhs.uk/pregnancy/keeping-well/vitamins-supplements-and-nutrition/) <ul style="list-style-type: none"> ◦ vitamin A (or retinol): Do not take cod liver oil or any supplements containing vitamin A (retinol) when you're pregnant. Too much vitamin A could harm your baby. Always check the label. • vitamin C (https://www.nhs.uk/pregnancy/keeping-well/vitamins-supplements-and-nutrition/) <ul style="list-style-type: none"> ◦ found in fruit and vegetables, a balanced diet can provide all the vitamin C pregnant women need • vitamin D (https://www.nhs.uk/pregnancy/keeping-well/vitamins-supplements-and-nutrition/ https://www.nhs.uk/start4life/pregnancy/vitamins-and-supplements-pregnancy/)

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Interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice

Field	Content
	<ul style="list-style-type: none"> ○ 10 mcg vitamin D daily during the winter months (October until the end of March). ○ those at higher risk of not getting enough vitamin D (not outdoors often, live in an institution like a care home, usually wear clothes that cover most of their skin when outdoors) should take daily 10 mcg vitamin D daily throughout the year. ○ people with black or brown skin may also not make enough vitamin D from sunlight, so should consider taking 10 mcg of vitamin D daily throughout the year. <p>Vitamin supplementation for babies and children up to 5 years in line with government advice</p> <ul style="list-style-type: none"> • Healthy Start children's vitamins drops (from birth to 4 years) (https://www.healthystart.nhs.uk/) <ul style="list-style-type: none"> ○ the daily dose is 5 drops, which contain: <ul style="list-style-type: none"> - vitamin A (233µg) - vitamin C (20mg) - vitamin D (10µg) • vitamins for children (A, C, D) Vitamin D - NHS (www.nhs.uk) https://www.nhs.uk/start4life/baby/baby-vitamins/ https://www.nhs.uk/conditions/baby/weaning-and-feeding/vitamins-for-children/ <ul style="list-style-type: none"> ○ babies from birth to 1 year should have a daily supplement containing 8.5 to 10mcg of vitamin D throughout the year if they are: <ul style="list-style-type: none"> - breastfed - formula-fed and having <500 mls of formula a day, as infant formula is already fortified with vitamin D ○ all children aged 6 months to 5 years should be given vitamin supplements containing vitamins A, C and D every day (unless they are being formula fed with >500mls).
Population	<p>Inclusion:</p> <ul style="list-style-type: none"> • women in a single or multiple pregnancy • breastfeeding women • babies ≤1 year • children between 1 year and 5 years <p>Note: interventions aimed at parents/carers of babies under 1 and parents/carers of children between 1 and 5 years will be included only if they are representing their child or charge</p>

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Interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice

Field	Content
Intervention	<p>Interventions will be included if the main aim is to increase uptake of vitamin supplementation in the population of interest. Interventions will be organised according to the following groups:</p> <p>Intervention group 1: Interventions using information provision and/or education</p> <p>Intervention group 2: Interventions using alternative forms of vitamin supplementation (drops or tablets)</p> <p>Intervention group 3: Interventions aimed at improving access to vitamin supplementation (that is, provision of vitamin supplementation in different settings or incorporation of vitamin supplementation in welfare schemes)</p> <p>Intervention group 4: Interventions using psychological or behavioural techniques</p> <p>Intervention group 5: Multicomponent interventions (interventions that combine more than 1 intervention listed above)</p> <p>The committee anticipated that, along with the intervention, studies would report at least 1 component of each of the groups noted below. Sensitivity analyses will be done according to these if enough data is available.</p> <ul style="list-style-type: none"> • component 1: mode of delivery <ul style="list-style-type: none"> ○ face-to-face (in person, videoconference) ○ printed ○ digital/Electronic ○ audio ○ visual ○ textual (involving written text). • component 2: intervention aimed at individuals or groups <ul style="list-style-type: none"> ○ individual based

Field	Content
	<ul style="list-style-type: none"> ○ group based. • component 3: individualised or tailored interventions <ul style="list-style-type: none"> ○ on demand, tailored interventions based on needs ○ general, aimed to all the population of interest. • component 4: who delivers the intervention <ul style="list-style-type: none"> ○ healthcare practitioner, health or social care worker (report what type) ○ peer (person with professional education on providing information and education on vitamin supplementation) ○ vitamin supplementation 'champion'. • component 5: where is the intervention delivered <ul style="list-style-type: none"> ○ during home visits ○ during consultation with healthcare professionals or health and social care workers (including opportunistic interventions) ○ at support group meetings for parents/carers and other people who use services ○ community pharmacies ○ antenatal clinics ○ specialist clinics ○ community venues ○ religious settings ○ other (report what type). • component 6: behaviour change models, techniques and theories <ul style="list-style-type: none"> ○ trans-theoretical model (stages change) ○ theory of planned behaviour ○ theory of reasoned action ○ health protection theory ○ protection motivation theory

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Interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice

Field	Content
	<ul style="list-style-type: none"> o social cognitive theory o perceptions of risk o other (report what type) o no theory mentioned.
Comparator	<ul style="list-style-type: none"> • one of the above interventions (within the same group or different group interventions will be considered) • status quo/treatment as usual (as defined by study authors, includes no treatment) • time (before and after)
Types of study to be included	<p>Include published full-text papers:</p> <ul style="list-style-type: none"> • systematic reviews of RCTs • parallel RCTs • if insufficient parallel RCTs*: <ul style="list-style-type: none"> o quasi-randomised controlled trials o non-randomised controlled trials/Prospective cohort studies o retrospective cohort studies o historically controlled studies o ecological studies (geographical) o controlled before-and-after studies (including before and after surveys). <p>*Non-randomised studies will be considered for inclusion if insufficient RCT evidence is available for guideline decision making. Sufficiency will be judged taking into account factors including number/quality/sample size of RCTs, outcomes reported and availability of data from subgroups of interest.</p> <p>Conference abstracts will not be included because these do not typically have sufficient information to allow full critical appraisal.</p>
Other exclusion criteria	<p><u>Setting:</u></p> <ul style="list-style-type: none"> • countries other than high income countries (as defined by the OECD)

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Interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice

Field	Content
	<p><i>If any study or systematic review includes <1/3 of women who received care in the above setting, it will be considered for inclusion but, if included, the evidence will be downgraded for indirectness.</i></p> <p><u>Intervention:</u></p> <ul style="list-style-type: none"> • interventions to increase the uptake of folic acid supplementation only. If the study assesses the uptake of folic acid and other supplementation (for example Healthy Start) it would still be considered for inclusion • population-level interventions (for example, TV and online advertising).
Context	The population of this guideline may overlap with the population of women included in other NICE guidelines (such as postnatal care, antenatal care, intrapartum care, pregnancy and complex social factors or obesity prevention).
Primary outcomes (critical outcomes)	<ul style="list-style-type: none"> • changes in vitamin supplementation uptake rate (self-reported or objective measured) <p>Note: if the study reports both self-reported and objective measures, only objective measures will be reported</p>
Secondary outcomes (important outcomes)	<ul style="list-style-type: none"> • changes in attitude, confidence and knowledge as part of people's intention to change behaviour • unintended consequences: <ul style="list-style-type: none"> ◦ increase in inequalities ◦ supplementation wastage
Data extraction (selection and coding)	<p>All references identified by the searches and from other sources will be uploaded into EPPI and de-duplicated. Titles and abstracts of the retrieved citations will be screened to identify studies that potentially meet the inclusion criteria outlined in the review protocol.</p> <p>Dual sifting will be performed on at least 10% of records; 90% agreement is required. Disagreements will be resolved via discussion between the two reviewers, and consultation with senior staff if necessary.</p> <p>Full versions of the selected studies will be obtained for assessment. Studies that fail to meet the inclusion criteria once the full version has been checked will be excluded at this stage. Each study excluded after checking the full version will be listed, along with the reason for its exclusion.</p>

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Interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice

Field	Content
	A standardised form will be used to extract data from studies. The following data will be extracted: study details (reference, country where study was carried out, type and dates), participant characteristics, inclusion and exclusion criteria, details of the interventions if relevant, setting and follow-up, relevant outcome data and source of funding. One reviewer will extract relevant data into a standardised form, and this will be quality assessed by a senior reviewer.
Risk of bias (quality) assessment	<p>Quality assessment of individual studies will be performed using the following checklists:</p> <ul style="list-style-type: none"> • ROBIS tool for systematic reviews • Cochrane RoB tool v.2 for RCTs and quasi-RCTs • Cochrane ROBINS-I tool for non-randomised (clinical) controlled trials and cohort studies • JBI checklist for prevalence studies • Effective Practice and Organisation of Care (EPOC) RoB Tool for before-and-after studies <p>The quality assessment will be performed by one reviewer and this will be quality assessed by a senior reviewer.</p>
Strategy for data synthesis	<p>Quantitative findings will be formally summarised in the review. Where multiple studies report on the same outcome for the same comparison, meta-analyses will be conducted using Cochrane Review Manager software.</p> <p>A fixed effect meta-analysis will be conducted and data will be presented as risk ratios if possible or odds ratios when required (for example, if only available in this form in included studies) for dichotomous outcomes, and mean differences or standardised mean differences for continuous outcomes. Heterogeneity in the effect estimates of the individual studies will be assessed using the I² statistic. Alongside visual inspection of the point estimates and confidence intervals, I² values of greater than 50% and 80% will be considered as significant and very significant heterogeneity, respectively. Heterogeneity will be explored as appropriate using sensitivity analyses and pre-specified subgroup analyses. If heterogeneity cannot be explained through subgroup analysis then a random effects model will be used for meta-analysis, or the data will not be pooled.</p> <p>The confidence in the findings across all available evidence will be evaluated for each outcome using an adaptation of the 'Grading of Recommendations Assessment, Development and Evaluation (GRADE) toolbox' developed by the international GRADE working group: http://www.gradeworkinggroup.org/</p> <p>Minimally important differences:</p> <ul style="list-style-type: none"> • validated scales/continuous outcomes: published MIDs where available

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Interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice

Field	Content
	<ul style="list-style-type: none"> all other outcomes & where published MIDds are not available: 0.8 and 1.25 for all relative dichotomous outcomes; +/- 0.5x control group SD for continuous outcomes.
Analysis of subgroups	<p>Evidence will be stratified by:</p> <ul style="list-style-type: none"> who is the intervention targeted at: <ul style="list-style-type: none"> babies <1 year children: ≥1 year to 5 years women during pregnancy women during breastfeeding. breastfeeding versus formula feeding babies and children vitamin type: <ul style="list-style-type: none"> vitamin D healthy Start vitamins for pregnant and breastfeeding women healthy Start children's vitamins drops (from birth to 4 years). women, babies or children following a vegan/vegetarian diet versus not women, babies or children at higher risk of not getting enough vitamin D naturally (for example, usually wear clothes that cover most of their body, not outdoors often) ethnicity <ul style="list-style-type: none"> White/White British Asian/Asian British Black/African/Caribbean/Black British mixed/Multiple ethnic groups other ethnic group. deprived socioeconomic group comorbidities. <p>Evidence will be subgrouped by the following only in the event that there is significant heterogeneity in outcomes:</p> <ul style="list-style-type: none"> women and parents with disabilities, including learning disabilities and other physical and mental health conditions women going through assisted conception

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Interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice

Field	Content		
	<ul style="list-style-type: none"> • LGBTQ+ women and parents • children with developmental problems • geographical variation, for example, places without adequate provision of primary care (outside cities). <p>Where evidence is stratified or subgrouped the committee will consider on a case by case basis if separate recommendations should be made for distinct groups. Separate recommendations may be made where there is evidence of a differential effect of interventions in distinct groups. If there is a lack of evidence in one group, the committee will consider, based on their experience, whether it is reasonable to extrapolate and assume the interventions will have similar effects in that group compared with others.</p>		
Type and method of review	<input checked="" type="checkbox"/> Intervention <input type="checkbox"/> Diagnostic <input type="checkbox"/> Prognostic <input type="checkbox"/> Qualitative <input type="checkbox"/> Epidemiologic <input type="checkbox"/> Service Delivery <input type="checkbox"/> Other (please specify)		
Language	English		
Country	England		
Anticipated or actual start date	20/10/2022		
Anticipated completion date	22/11/2023		
Stage of review at time of this submission	Review stage	Started	Completed
	Preliminary searches	<input type="checkbox"/>	<input checked="" type="checkbox"/> x
	Piloting of the study selection process	<input type="checkbox"/>	<input checked="" type="checkbox"/> x

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Interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice

Field	Content
	<div>Formal screening of search results against eligibility criteria <input type="checkbox"/> x</div> <div>Data extraction <input type="checkbox"/> x</div> <div>Risk of bias (quality) assessment <input type="checkbox"/> x</div> <div>Data analysis <input type="checkbox"/> x</div>
Named contact	<p>5a. Named contact National Institute for Health and Care Excellence (NICE)</p> <p>5b. Named contact e-mail mandcnutrition@nice.org.uk</p> <p>5c. Organisational affiliation of the review National Institute for Health and Care Excellence (NICE)</p>
Review team members	<p>From the National Guideline Alliance:</p> <ul style="list-style-type: none"> • Senior Systematic Reviewer • Systematic Reviewer
Funding sources/sponsor	This systematic review is being completed by the National Guideline Alliance which receives funding from NICE.
Conflicts of interest	<p>All guideline committee members and anyone who has direct input into NICE guidelines (including the evidence review team and expert witnesses) must declare any potential conflicts of interest in line with NICE's code of practice for declaring and dealing with conflicts of interest. Any relevant interests, or changes to interests, will also be declared publicly at the start of each guideline committee meeting. Before each meeting, any potential conflicts of interest will be considered by the guideline committee Chair and a senior member of the development team. Any decisions to exclude a person from all or part of a meeting will be documented. Any changes to a member's declaration of interests will be recorded in the minutes of the meeting. Declarations of interests will be published with the final guideline.</p>
Collaborators	Development of this systematic review will be overseen by an advisory committee who will use the review to inform the development of evidence-based recommendations in line with section 3 of Developing NICE guidelines :

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Interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice

Field	Content
	the manual . Members of the guideline committee are available on the NICE website: https://www.nice.org.uk/guidance/indevelopment/gid-ng10191
Other registration details	None
URL for published protocol	https://www.crd.york.ac.uk/PROSPERO/display_record.php?RecordID=355233
Dissemination plans	NICE may use a range of different methods to raise awareness of the guideline. These include standard approaches such as: <ul style="list-style-type: none"> • notifying registered stakeholders of publication • publicising the guideline through NICE's newsletter and alerts • issuing a press release or briefing as appropriate, posting news articles on the NICE website, using social media channels, and publicising the guideline within NICE.
Keywords	Vitamin uptake, prenatal, supplementation, babies, infant, children, pregnant, postpartum, breastfeeding
Details of existing review of same topic by same authors	Not applicable
Current review status	<input type="checkbox"/> Ongoing <input type="checkbox"/> Completed but not published <input checked="" type="checkbox"/> Completed and published <input type="checkbox"/> Completed, published and being updated <input type="checkbox"/> Discontinued
Additional information	None
Details of final publication	www.nice.org.uk

CDSR: Cochrane Database of Systematic Reviews; CENTRAL: Cochrane Central Register of Controlled Trials; EPPI: Evidence for policy and practice information; GRADE: Grading of Recommendations Assessment, Development and Evaluation; HTA: Health Technology Assessment; JBI: Joanna Briggs Institute; MID: minimally important difference; NICE: National Institute for Health and Care Excellence; OECD: Organisation for Economic Co-Operation and Development; RCT: randomised controlled trial; RoB: risk of bias; SD: standard deviation, TV: television

Appendix B Literature search strategies

Literature search strategies for review question: What interventions are effective to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice for pregnant women, breastfeeding women, babies and children up to 5 years?

One literature search was performed for the review questions in evidence reviews C and E.

Effectiveness searches

Databases: MEDLINE

Date of last search: 05/12/2023

#	Searches
1	exp Pregnancy/ or Pregnant Women/ or Prenatal Care/
2	(antenatal* or ante natal* or gestation* or maternal* or mother* or pregnan* or prenatal* or pre natal*).ti,ab,kf.
3	1 or 2
4	Preconception Care/
5	(periconcept* or peri concept* or preconcept* or pre concept* or prepregnan* or pre pregnan*).ti,ab,kf.
6	((before or plan* or intend* or intention* or wish* or desir* or want* or prior or prepar* or try* or becom* or get* or start*) adj3 (baby or babies or conceiving or pregnan* or conception* or conceive*)).ti,ab,kf.
7	(start* adj2 family).ti,ab,kf.
8	or/4-7
9	3 or 8
10	breast feeding/ or lactation/
11	(breastfeed* or breastfed* or breastmilk or (breast adj2 (feed* or fed* or milk*)) or expressed milk* or lactat* or (nursing adj (baby or infant* or mother* or neonate* or newborn*))).ti,ab,kf.
12	10 or 11
13	exp Child/ or exp Infant/ or Minors/ or exp Pediatrics/
14	(child* or baby or babies or boy? or girl? or infan* or juvenile? or kid? or kindergar* or minors or neonat* or newborn? or p?ediatric* or preschool* or schoolchild* or school age? or toddler* or young).ti,ab,kf.
15	(child* or baby or babies or infan* or juvenile? or kindergar* or neonat* or newborn? or p?ediatric* or schoolchild* or school age?).jw,nw.
16	or/13-15
17	3 or 12 or 16
18	exp Folic Acid/
19	(folic acid* or folate* or folacin or vitamin b9 or vitamin b 9 or vitamin m or pteroylglutamic acid* or folvite).ti,ab,kf.
20	18 or 19
21	9 and 20
22	exp Vitamins/ or Dietary Supplements/
23	(vitamin* or previtamin* or provitamin* or multivitamin* or micronutrient* or multimicronutrient* or multi* micronutrient*).ti,ab,kf.
24	(precursor* adj3 vitamin*).ti,ab,kf.
25	((diet* or nutrition*) adj2 supplement*).ti,ab,kf.
26	(calciferol* or calcifediol* or calciol* or cholecalciferol* or hydroxycholecalciferol* or dihydroxycholecalciferol* or dihydrotachysterol* or calcitriol* or 24,25-dihydroxyvitamin D* or ergocalciferol* or ergosterol* or viosterol or vitamin d* or vitamind* or 25 hydroxy* or 25-?OH* or vitamina* or (vitamin adj a) or retinol* or retinoid* or retinyl* or retinaldehyde* or carotenoid* or beta carotene* or betacarotene* or tocopherol* or ascorb* or Dehydroascorbic Acid* or vitaminc or (vitamin adj c)).ti,ab,kf.

#	Searches
27	(vit adj2 (A or C or D)).ti,ab,kf.
28	(healthy start* or healthystart*).ti,ab,kf.
29	or/22-28
30	20 or 29
31	17 and 30
32	Health Knowledge, Attitudes, Practice/ or preconception care/ or prenatal care/ or Health Behavior/
33	Information centers/ or information services/ or information dissemination/
34	Education/ or health education/ or exp consumer health information/ or Health Promotion/
35	(advi?e* or promot* or educat* or knowledge or intervention* or coach* or mentor* or inform* or aware* or disseminat*).ti,ab,kf.
36	patient education as topic/ or Correspondence as Topic/ or Posters as Topic/
37	(letter* or correspond* or mail or poster*).ti,ab,kf.
38	exp Communication/
39	(communic* or messag* or listen* or negotiat* or persua* or dialogu* or conversation* or question* or discuss* or written or write).ti,ab,kf.
40	exp Mass Media/
41	(media or radio* or television* or tv* or broadcast* or podcast* or newspaper* or magazine* or display* or presentation*).ti,ab,kf.
42	Informed Consent/
43	(informed adj4 (consent or choice* or decision*)).ti,ab,kf.
44	Reminder Systems/
45	(recall or remind* or prompt* or nudge).ti,ab,kf.
46	(electronic* adj4 invit*).ti,ab,kf.
47	exp internet/ or exp computers, handheld/ or exp Cell Phone/ or mobile applications/ or electronic mail/ or hotlines/
48	((medical or health or electronic or virtual) adj4 (communicat* or educat* or informat* or learn* or coach*)).ti.
49	patient education handout/
50	exp teaching materials/
51	pamphlets/
52	(app or apps or blog* or banner or booklet* or brochure* or bulletin* or cellphone* or diary or diaries or digital* or dvd* or elearn* or e learn* or email* or e mail* or electronic mail* or facebook or face book or facetime or face time or factsheet* or forum* or flyer or guidebook* or handout* or hand out* or helpline* or hotline* or internet* or ipad* or iphone* or leaflet* or myspace or online or magazine* or mobile phone* or multimedia messag* or newsletter* or pamphlet* or palm pilot* or personal digital assistant* or phone* or pocket pc* or podcast* or postcard* or poster? or skype* or smartphone* or smart phone* or smartwatch* or smart watch* or social media or social network* or sms or telephone* or text messag* or twitter or tweet* or video* or web* or wiki* or youtube*).ti.
53	((online or web or internet or digital* or video*) adj3 (based or application* or intervention* or program* or therap*)).ab.
54	((phone* or telephone* or smartphone* or cellphone* or smartwatch* or mobile* or portable*) adj3 (based or application* or intervention* or device* or technolog* or program* or therap*)).ti,ab.
55	(computer* adj4 (handheld or palm top or palmtop or pda or tablet*)).ti.
56	(mobile health or mhealth or m health or ehealth or e health).ti.
57	((mobile health or mhealth or m health or ehealth or e health) adj3 (based or application* or intervention* or program* or therap*)).ab.
58	(cap* or pearl* or softgel* or gel* or pill* or tab* or lozenge* or pastille* or pellet* or liquid* or drink* or solution* or juice* or fluid* or drop* or powder* or sherbet* or biscuit* or bar?).ti,ab,kf.
59	exp Socioeconomic Factors/
60	health status/ or exp health inequities/
61	((government* or welfare or aid* or social security or relief) adj2 (support* or sponsor* or grant* or scheme* or program* or provide* or provision* or assist* or gift* or handout* or donat* or voucher* or subsid* or intervent*)).ti,ab,kf.
62	Health Services Accessibility/

FINAL

Interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice

#	Searches
63	((sexual or health) adj2 (clinic* or center* or centre*)).ti,ab,kf.
64	((preconcept* or pre concept* or prepregnan* or pre pregnan*) adj2 (clinic* or center* or centre* or service? or assessment*)).ti,ab,kf.
65	Community Networks/ or Community-Institutional Relations/
66	((communit* or social) adj4 (network* or relation* or support*)).ti,ab,kf.
67	social support/ or self-help groups/ or Peer Influence/
68	(group* adj2 (support* or self-help*)).ti,ab,kf.
69	((peer* or family or families or friend* or professional* or physician* or nurse*1 or health visitor* or midwife or midwives or social worker* or leader* or community or communities or teacher* or faith or pharmacy* or pharmacist* or chemist or pharmacies* or GP*1 or practition* or doctor* or health professional* or clinician* or consultant* or primary-care* or dietician* or nutritionist* or HCP*1) adj4 (influence* or pressure* or recommend* or advice or advise* or led or support* or educ* or advocat* or knowledge or inform*)).ti,ab,kf.
70	Mentors/
71	(mentor* or role model*).ti,ab,kf.
72	House Calls/
73	((house or home) adj4 (call* or visit*)).ti,ab,kf.
74	Choice Behavior/ or Decision Making/ or Decision Support Techniques/
75	(decision* adj4 (making or support* or aid*)).ti,ab,kf.
76	risk reduction behavior/ or Motivation/ or "Patient Acceptance of Health Care"/
77	((behavio?* or lifestyle* or life style*) adj2 (change* or changing or modification* or modify or modifying or therapy or therapies or program* or intervention* or technique* or establish* or individual* or improv* or enhanc* or encourag* or promot* or optimiz* or optimis* or incentiv*)).ti,ab,kf.
78	motivat*.ti,ab,kf.
79	exp psychotherapy/ or exp counseling/ or self care/
80	self care.ti,ab,kf.
81	counsel*.ti,ab,kf.
82	((diet* or nutrient* or nutrition* or lifestyle*) adj2 (therap* or treat* or intervention* or strateg* or session* or modif* or training or support* or aid* or help* or program*)).ti,ab,kf.
83	((behavio?* or cogniti* or psycho*) adj2 (therap* or treat* or intervention* or strateg* or session* or modif* or training or support* or aid* or help* or program*)).ti,ab,kf.
84	or/32-83
85	"treatment adherence and compliance"/ or patient compliance/ or medication adherence/ or Guideline Adherence/
86	(uptake* or up-tak* or takeup* or tak*-up* or aware* or adher* or nonadher* or non adher* or comply* or complies or complian* or adopt* or implement).ti,ab,kf.
87	(supplement* adj3 behav*).ti,ab,kf.
88	or/85-87
89	84 and 88
90	21 and 89
91	31 and 89
92	letter/
93	editorial/
94	news/
95	exp historical article/
96	Anecdotes as Topic/
97	comment/
98	case report/
99	(letter or comment*).ti.
100	or/92-99
101	randomized controlled trial/ or random*.ti,ab.
102	100 not 101

FINAL

Interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice

#	Searches
103	animals/ not humans/
104	exp Animals, Laboratory/
105	exp Animal Experimentation/
106	exp Models, Animal/
107	exp Rodentia/
108	(rat or rats or mouse or mice or rodent*).ti.
109	or/102-108
110	90 not 109
111	limit 110 to English language
112	91 not 109
113	limit 112 to English language
114	randomized controlled trial.pt.
115	controlled clinical trial.pt.
116	pragmatic clinical trial.pt.
117	randomi#ed.ab.
118	placebo.ab.
119	drug therapy.fs.
120	randomly.ab.
121	trial.ab.
122	groups.ab.
123	or/114-122
124	Clinical Trials as topic.sh.
125	trial.ti.
126	or/114-118,120,124-125
127	Meta-Analysis/
128	Meta-Analysis as Topic/
129	(meta analy* or metanaly* or metaanaly*).ti,ab.
130	((systematic* or evidence*) adj2 (review* or overview*)).ti,ab.
131	(reference list* or bibliograph* or hand search* or manual search* or relevant journals).ab.
132	(search strategy or search criteria or systematic search or study selection or data extraction).ab.
133	(search* adj4 literature).ab.
134	(medline or pubmed or cochrane or embase or psychlit or psyclit or psychinfo or psycinfo or cinahl or science citation index or bids or cancerlit).ab.
135	cochrane.jw.
136	or/127-135
137	111 and (126 or 136)
138	113 and (126 or 136)
139	Observational Studies as Topic/
140	Observational Study/
141	Epidemiologic Studies/
142	exp Case-Control Studies/
143	exp Cohort Studies/
144	Cross-Sectional Studies/
145	Controlled Before-After Studies/
146	Historically Controlled Study/
147	Interrupted Time Series Analysis/
148	Comparative Study.pt.

#	Searches
149	case control\$.tw.
150	case series.tw.
151	(cohort adj (study or studies)).tw.
152	cohort analy\$.tw.
153	(follow up adj (study or studies)).tw.
154	(observational adj (study or studies)).tw.
155	longitudinal.tw.
156	prospective.tw.
157	retrospective.tw.
158	cross sectional.tw.
159	or/139-158
160	111 and 159
161	160 not 137
162	113 and 159
163	162 not 138
164	afghanistan/ or africa/ or africa, northern/ or africa, central/ or africa, eastern/ or "africa south of the sahara"/ or africa, southern/ or africa, western/ or albania/ or algeria/ or andorra/ or angola/ or "antigua and barbuda"/ or argentina/ or armenia/ or azerbaijan/ or bahamas/ or bahrain/ or bangladesh/ or barbados/ or belize/ or benin/ or bhutan/ or bolivia/ or borneo/ or "bosnia and herzegovina"/ or botswana/ or brazil/ or brunei/ or bulgaria/ or burkina faso/ or burundi/ or cabo verde/ or cambodia/ or cameroon/ or central african republic/ or chad/ or exp china/ or comoros/ or congo/ or cote d'ivoire/ or croatia/ or cuba/ or "democratic republic of the congo"/ or cyprus/ or djibouti/ or dominica/ or dominican republic/ or ecuador/ or egypt/ or el salvador/ or equatorial guinea/ or eritrea/ or eswatini/ or ethiopia/ or fiji/ or gabon/ or gambia/ or "georgia (republic)"/ or ghana/ or grenada/ or guatemala/ or guinea/ or guinea-bissau/ or guyana/ or haiti/ or honduras/ or independent state of samoa/ or exp india/ or indian ocean islands/ or indochina/ or indonesia/ or iran/ or iraq/ or jamaica/ or jordan/ or kazakhstan/ or kenya/ or kosovo/ or kuwait/ or kyrgyzstan/ or laos/ or lebanon/ or liechtenstein/ or lesotho/ or liberia/ or libya/ or madagascar/ or malaysia/ or malawi/ or mali/ or malta/ or mauritania/ or mauritius/ or mekong valley/ or melanesia/ or micronesia/ or monaco/ or mongolia/ or montenegro/ or morocco/ or mozambique/ or myanmar/ or namibia/ or nepal/ or nicaragua/ or niger/ or nigeria/ or oman/ or pakistan/ or palau/ or exp panama/ or papua new guinea/ or paraguay/ or peru/ or philippines/ or qatar/ or "republic of belarus"/ or "republic of north macedonia"/ or romania/ or exp russia/ or russia/ or rwanda/ or "saint kitts and nevis"/ or saint lucia/ or "saint vincent and the grenadines"/ or "sao tome and principe"/ or saudi arabia/ or serbia/ or sierra leone/ or senegal/ or seychelles/ or singapore/ or somalia/ or south africa/ or south sudan/ or sri lanka/ or sudan/ or suriname/ or syria/ or taiwan/ or tajikistan/ or tanzania/ or thailand/ or timor-leste/ or togo/ or tonga/ or "trinidad and tobago"/ or tunisia/ or turkmenistan/ or uganda/ or ukraine/ or united arab emirates/ or uruguay/ or uzbekistan/ or vanuatu/ or venezuela/ or vietnam/ or west indies/ or yemen/ or zambia/ or zimbabwe/
165	"organisation for economic co-operation and development"/
166	australasia/ or exp australia/ or austria/ or baltic states/ or belgium/ or exp canada/ or chile/ or colombia/ or costa rica/ or czech republic/ or exp denmark/ or estonia/ or europe/ or finland/ or exp france/ or exp germany/ or greece/ or hungary/ or iceland/ or ireland/ or israel/ or exp italy/ or exp japan/ or korea/ or latvia/ or lithuania/ or luxembourg/ or mexico/ or netherlands/ or new zealand/ or north america/ or exp norway/ or poland/ or portugal/ or exp "republic of korea"/ or "scandinavian and nordic countries"/ or slovakia/ or slovenia/ or spain/ or sweden/ or switzerland/ or turkey/ or exp united kingdom/ or exp united states/
167	european union/
168	developed countries/
169	or/165-168
170	164 not 169
171	137 not 170
172	138 not 170
173	161 not 170
174	163 not 170

Databases: Embase**Date of last search:05/12/2023**

#	Searches
1	exp pregnancy/ or pregnant woman/ or prenatal care/ or prenatal period/
2	(antenatal* or ante natal* or gestation* or maternal* or mother* or pregnan* or prenatal* or pre natal*).ti,ab,kf.
3	1 or 2
4	prepregnancy care/
5	(periconcept* or peri concept* or preconcept* or pre concept* or prepregnan* or pre pregnan*).ti,ab,kf.
6	((before or plan* or intend* or intention* or wish* or desir* or want* or prior or prepar* or try* or becom* or get* or start*) adj3 (baby or babies or conceiving or pregnan* or conception* or conceive*).ti,ab,kf.
7	(start* adj2 family).ti,ab,kf.
8	or/4-7
9	3 or 8
10	exp breast feeding/ or lactation/
11	(breastfeed* or breastfed* or breastmilk or (breast adj2 (feed* or fed* or milk*)) or expressed milk* or lactat* or (nursing adj (baby or infant* or mother* or neonate* or newborn*)))ti,ab,kf.
12	10 or 11
13	exp child/ or "minor (person)"/ or exp pediatrics/
14	(child* or baby or babies or boy? or girl? or infan* or juvenile? or kid? or kindergar* or minors or neonat* or newborn? or p?ediatric* or preschool* or schoolchild* or school age? or toddler* or young).ti,ab,kf.
15	(child* or baby or babies or infan* or juvenile? or kindergar* or neonat* or newborn? or p?ediatric* or schoolchild* or school age?).jx.
16	or/13-15
17	3 or 12 or 16
18	folic acid/
19	(folic acid* or folate* or folacin or vitamin b9 or vitamin b 9 or vitamin m or pteroylglutamic acid* or folvite).ti,ab,kf.
20	18 or 19
21	9 and 20
22	exp vitamin/ or dietary supplement/
23	(vitamin* or previtamin* or provitamin* or multivitamin* or micronutrient* or multimicronutrient* or multi* micronutrient*).ti,ab,kf.
24	(precursor* adj3 vitamin*).ti,ab,kf.
25	((diet* or nutrition*) adj2 supplement*).ti,ab,kf.
26	(calciferol* or calcifediol* or calciol* or cholecalciferol* or hydroxycholecalciferol* or dihydroxycholecalciferol* or dihydrotachysterol* or calcitriol* or 24,25-dihydroxyvitamin D* or ergocalciferol* or ergosterol* or viosterol or vitamin d* or vitamind* or 25 hydroxy* or 25-?OH* or vitamina* or (vitamin adj a) or retinol* or retinoid* or retinyl* or retinaldehyde* or carotenoid* or beta carotene* or betacarotene* or tocopherol* or ascorb* or Dehydroascorbic Acid* or vitaminc or (vitamin adj c)).ti,ab,kf.
27	(vit adj2 (A or C or D)).ti,ab,kf.
28	(healthy start* or healthystart*).ti,ab,kf.
29	or/22-28
30	20 or 29
31	17 and 30
32	attitude to health/ or prepregnancy care/ or prenatal care/ or health behavior/
33	information center/ or information service/ or information dissemination/
34	(advi?e* or promot* or educat* or knowledge or intervention* or coach* or mentor* or inform* or aware* or disseminat*).ti,ab,kf.
35	patient education/ or writing/ or publication/
36	(letter* or correspond* or mail or poster*).ti,ab,kf.
37	exp interpersonal communication/

#	Searches
38	(communic* or messag* or listen* or negotiat* or persua* or dialogu* or conversation* or question* or discuss* or written or write).ti,ab,kf.
39	mass medium/
40	(media or radio* or television* or tv* or broadcast* or podcast* or newspaper* or magazine* or display* or presentation*).ti,ab,kf.
41	informed consent/
42	((informed adj4 (consent or choice* or decision*))).ti,ab,kf.
43	reminder system/
44	((recall or remind* or prompt* or nudge).ti,ab,kf.
45	((electronic* adj4 invit*).ti,ab,kf.
46	exp internet/ or personal digital assistant/ or exp mobile phone/ or exp mobile application/ or e-mail/ or hotline/
47	((medical or health or electronic or virtual) adj4 (communicat* or educat* or informat* or learn* or coach*))).ti.
48	exp teaching/
49	((app or apps or blog* or banner or booklet* or brochure* or bulletin* or cellphone* or diary or diaries or digital* or dvd* or elearn* or e learn* or email* or e mail* or electronic mail* or facebook or face book or facetime or face time or factsheet* or forum* or flyer or guidebook* or handout* or hand out* or helpline* or hotline* or internet* or ipad* or iphone* or leaflet* or myspace or online or magazine* or mobile phone* or multimedia messag* or newsletter* or pamphlet* or palm pilot* or personal digital assistant* or phone* or pocket pc* or podcast* or postcard* or poster? or skype* or smartphone* or smart phone* or smartwatch* or smart watch* or social media or social network* or sms or telephone* or text messag* or twitter or tweet* or video* or web* or wiki* or youtube*).ti.
50	((online or web or internet or digital* or video*) adj3 (based or application* or intervention* or program* or therap*))).ab.
51	((phone* or telephone* or smartphone* or cellphone* or smartwatch* or mobile* or portable*) adj3 (based or application* or intervention* or device* or technolog* or program* or therap*))).ti,ab.
52	((computer* adj4 (handheld or palm top or palmtop or pda or tablet*))).ti.
53	((mobile health or mhealth or m health or ehealth or e health).ti.
54	((mobile health or mhealth or m health or ehealth or e health) adj3 (based or application* or intervention* or program* or therap*))).ab.
55	((cap* or pearl* or softgel* or gel* or pill* or tab* or lozenge* or pastille* or pellet* or liquid* or drink* or solution* or juice* or fluid* or drop* or powder* or sherbet* or biscuit* or bar*).ti,ab,kf.
56	exp socioeconomic/
57	health status/ or health disparity/
58	((government* or welfare or aid* or social security or relief) adj2 (support* or sponsor* or grant* or scheme* or program* or provide* or provision* or assist* or gift* or handout* or donat* or voucher* or subsid* or intervent*))).ti,ab,kf.
59	health care access/
60	((sexual or health) adj2 (clinic* or center* or centre*))).ti,ab,kf.
61	((preconcept* or pre concept* or prepregnan* or pre pregnan*) adj2 (clinic* or center* or centre* or service? or assessment*))).ti,ab,kf.
62	community care/ or public relations/
63	((communit* or social) adj4 (network* or relation* or support*))).ti,ab,kf.
64	social support/ or self help/ or peer pressure/
65	((group* adj2 (support* or self-help*))).ti,ab,kf.
66	((peer* or family or families or friend* or professional* or physician* or nurse*1 or health visitor* or midwife or midwives or social worker* or leader* or community or communities or teacher* or faith or pharmacy* or pharmacist* or chemist or pharmacies* or GP*1 or practition* or doctor* or health professional* or clinician* or consultant* or primary-care* or dietician* or nutritionist* or HCP*1) adj4 (influence* or pressure* or recommend* or advice or advise* or led or support* or educ* or advocat* or knowledge or inform*))).ti,ab,kf.
67	mentor/
68	((mentor* or role model*).ti,ab,kf.
69	home visit/
70	((house or home) adj4 (call* or visit*))).ti,ab,kf.
71	decision making/ or decision support system/
72	((decision* adj4 (making or support* or aid*))).ti,ab,kf.

#	Searches
73	risk reduction/ or motivation/ or patient attitude/
74	((behavio?r* or lifestyle* or life style*) adj2 (change* or changing or modification* or modify or modifying or therapy or therapies or program* or intervention* or technique* or establish* or individual* or improv* or enhanc* or encourag* or promot* or optimiz* or optimis* or incentiv*)) .ti,ab,kf.
75	motivat*.ti,ab,kf.
76	exp psychotherapy/ or exp counseling/ or self care/
77	self care.ti,ab,kf.
78	counsel*.ti,ab,kf.
79	((diet* or nutrient* or nutrition* or lifestyle*) adj2 (therap* or treat* or intervention* or strateg* or session* or modif* or training or support* or aid* or help* or program*)) .ti,ab,kf.
80	((behavio?r* or cogniti* or psycho*) adj2 (therap* or treat* or intervention* or strateg* or session* or modif* or training or support* or aid* or help* or program*)) .ti,ab,kf.
81	or/32-80
82	exp patient compliance/ or protocol compliance/
83	(uptake* or up-tak* or take up* or tak*-up* or aware* or adher* or nonadher* or non adher* or comply* or complies or complian* or adopt* or implement).ti,ab,kf.
84	(supplement* adj3 behav*).ti,ab,kf.
85	or/82-84
86	81 and 85
87	21 and 86
88	31 and 86
89	letter.pt. or letter/
90	note.pt.
91	editorial.pt.
92	case report/ or case study/
93	(letter or comment*).ti.
94	or/89-93
95	randomized controlled trial/ or random*.ti,ab.
96	94 not 95
97	animal/ not human/
98	nonhuman/
99	exp Animal Experiment/
100	exp Experimental Animal/
101	animal model/
102	exp Rodent/
103	(rat or rats or mouse or mice or rodent*).ti.
104	or/96-103
105	87 not 104
106	limit 105 to English language
107	88 not 104
108	limit 107 to English language
109	(conference abstract* or conference review or conference paper or conference proceeding).db,pt,su.
110	106 not 109
111	108 not 109
112	random*.ti,ab.
113	factorial*.ti,ab.
114	(crossover* or cross over*).ti,ab.
115	((doubl* or singl*) adj blind*).ti,ab.

FINAL

Interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice

#	Searches
116	(assign* or allocat* or volunteer* or placebo*).ti,ab.
117	crossover procedure/
118	single blind procedure/
119	randomized controlled trial/
120	double blind procedure/
121	or/112-120
122	systematic review/
123	meta-analysis/
124	(meta analy* or metanaly* or metaanaly*).ti,ab.
125	((systematic or evidence) adj2 (review* or overview*)).ti,ab.
126	(reference list* or bibliograph* or hand search* or manual search* or relevant journals).ab.
127	(search strategy or search criteria or systematic search or study selection or data extraction).ab.
128	(search* adj4 literature).ab.
129	(medline or pubmed or cochrane or embase or psychlit or psyclit or psychinfo or psycinfo or cinahl or science citation index or bids or cancerlit).ab.
130	((pool* or combined) adj2 (data or trials or studies or results)).ab.
131	cochrane.jw.
132	or/122-131
133	110 and (121 or 132)
134	111 and (121 or 132)
135	Clinical study/
136	Case control study/
137	Family study/
138	Longitudinal study/
139	Retrospective study/
140	comparative study/
141	Prospective study/
142	Randomized controlled trials/
143	141 not 142
144	Cohort analysis/
145	cohort analy\$.tw.
146	(Cohort adj (study or studies)).tw.
147	(Case control\$ adj (study or studies)).tw.
148	(follow up adj (study or studies)).tw.
149	(observational adj (study or studies)).tw.
150	(epidemiologic\$ adj (study or studies)).tw.
151	(cross sectional adj (study or studies)).tw.
152	case series.tw.
153	prospective.tw.
154	retrospective.tw.
155	or/135-140,143-154
156	110 and 155
157	156 not 133
158	111 and 155
159	158 not 134
160	afghanistan/ or africa/ or "africa south of the sahara"/ or albania/ or algeria/ or andorra/ or angola/ or argentina/ or "antigua and barbuda"/ or armenia/ or exp azerbaijan/ or bahamas/ or bahrain/ or bangladesh/ or barbados/ or belarus/ or belize/ or benin/ or bhutan/ or bolivia/ or borneo/ or exp "bosnia and herzegovina"/ or botswana/ or exp brazil/ or

#	Searches
	brunei darussalam/ or bulgaria/ or burkina faso/ or burundi/ or cambodia/ or cameroon/ or cape verde/ or central africa/ or central african republic/ or chad/ or exp china/ or comoros/ or congo/ or cook islands/ or cote d'ivoire/ or croatia/ or cuba/ or cyprus/ or democratic republic congo/ or djibouti/ or dominica/ or dominican republic/ or ecuador/ or el salvador/ or egypt/ or equatorial guinea/ or eritrea/ or eswatini/ or ethiopia/ or exp "federated states of micronesia"/ or fiji/ or gabon/ or gambia/ or exp "georgia (republic)"/ or ghana/ or grenada/ or guatemala/ or guinea/ or guinea-bissau/ or guyana/ or haiti/ or honduras/ or exp india/ or exp indonesia/ or iran/ or exp iraq/ or jamaica/ or jordan/ or kazakhstan/ or kenya/ or kiribati/ or kosovo/ or kuwait/ or kyrgyzstan/ or laos/ or lebanon/ or liechtenstein/ or lesotho/ or liberia/ or libyan arab jamahiriya/ or madagascar/ or malawi/ or exp malaysia/ or maldives/ or mali/ or malta/ or mauritania/ or mauritius/ or melanesia/ or moldova/ or monaco/ or mongolia/ or "montenegro (republic)"/ or morocco/ or mozambique/ or myanmar/ or namibia/ or nauru/ or nepal/ or nicaragua/ or niger/ or nigeria/ or niue/ or north africa/ or oman/ or exp pakistan/ or palau/ or palestine/ or panama/ or papua new guinea/ or paraguay/ or peru/ or philippines/ or polynesia/ or qatar/ or "republic of north macedonia"/ or romania/ or exp russian federation/ or rwanda/ or sahel/ or "saint kitts and nevis"/ or "saint lucia"/ or "saint vincent and the grenadines"/ or saudi arabia/ or senegal/ or exp serbia/ or seychelles/ or sierra leone/ or singapore/ or "sao tome and principe"/ or solomon islands/ or exp somalia/ or south africa/ or south asia/ or south sudan/ or exp southeast asia/ or sri lanka/ or sudan/ or suriname/ or syrian arab republic/ or taiwan/ or tajikistan/ or tanzania/ or thailand/ or timor-leste/ or togo/ or tonga/ or "trinidad and tobago"/ or tunisia/ or turkmenistan/ or tuvalu/ or uganda/ or exp ukraine/ or exp united arab emirates/ or uruguay/ or exp uzbekistan/ or vanuatu/ or venezuela/ or viet nam/ or western sahara/ or yemen/ or zambia/ or zimbabwe/
161	exp "organisation for economic co-operation and development"/
162	exp australia/ or "australia and new zealand"/ or austria/ or baltic states/ or exp belgium/ or exp canada/ or chile/ or colombia/ or costa rica/ or czech republic/ or denmark/ or estonia/ or europe/ or exp finland/ or exp france/ or exp germany/ or greece/ or hungary/ or iceland/ or ireland/ or israel/ or exp italy/ or japan/ or korea/ or latvia/ or lithuania/ or luxembourg/ or exp mexico/ or netherlands/ or new zealand/ or north america/ or exp norway/ or poland/ or exp portugal/ or scandinavia/ or sweden/ or slovakia/ or slovenia/ or south korea/ or exp spain/ or switzerland/ or "Turkey (republic)"/ or exp united kingdom/ or exp united states/ or western europe/
163	european union/
164	developed country/
165	or/161-164
166	160 not 165
167	133 not 166
168	134 not 166
169	157 not 166
170	159 not 166

Database: Cochrane Database of Systematic Reviews Issue 12 of 12, December 2023 and Cochrane Central Register of Controlled Trials Issue 12 of 12, December 2023

Date of last search: 07/12/2023

#	Searches
#1	MeSH descriptor: [Pregnancy] explode all trees
#2	MeSH descriptor: [Pregnant Women] this term only
#3	MeSH descriptor: [Prenatal Care] this term only
#4	(antenatal* or ante NEXT natal* or gestation* or maternal* or mother* or pregnan* or prenatal* or pre NEXT natal*):ti,ab,kw
#5	{OR #1-#4}
#6	MeSH descriptor: [Preconception Care] this term only
#7	(periconcept* or peri NEXT concept* or preconcept* or pre NEXT concept* or prepregnan* or pre NEXT pregnan*):ti,ab,kw
#8	((before or plan* or intend* or intention* or wish* or desir* or want* or prior or prepar* or try* or becom* or get* or start*) near/3 (baby or babies or conceiving or pregnan* or conception* or conceive*)):ti,ab,kw
#9	(start* NEAR/2 family):ti,ab
#10	{OR #6-#9}
#11	#5 OR #10
#12	MeSH descriptor: [Breast Feeding] this term only

FINAL

Interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice

#	Searches
#13	MeSH descriptor: [Lactation] this term only
#14	(breastfeed* or breastfed* or breastmilk or (breast NEAR/2 (feed* or fed* or milk*)) or expressed NEXT milk* or lactat* or (nursing NEAR (baby or infant* or mother* or neonate* or newborn*))) :ti,ab,kw
#15	{OR #12-#14}
#16	MeSH descriptor: [Child] explode all trees
#17	MeSH descriptor: [Infant] explode all trees
#18	MeSH descriptor: [Minors] this term only
#19	MeSH descriptor: [Pediatrics] explode all trees
#20	(child* or baby or babies or boy or boys or girl or girls or infan* or juvenile or juveniles or kid or kids or kindergar* or minors or neonat* or newborn or newborns or pediatric* or paediatric* or preschool* or schoolchild* or "school age" or "school aged" or toddler* or young):ti,ab,kw
#21	(child* or baby or babies or infan* or juvenile or juveniles or kindergar* or neonat* or newborn or newborns or pediatric* or paediatric* or schoolchild* or "school age" or "school aged"):so
#22	{OR #16-#21}
#23	#5 OR #15 OR #22
#24	MeSH descriptor: [Folic Acid] explode all trees
#25	(folic NEXT acid* or folate* or folacin or "vitamin b9" or "vitamin b 9" or "vitamin m" or pteroylglutamic NEXT acid* or folvite):ti,ab,kw
#26	#24 OR #25
#27	#11 AND #26
#28	MeSH descriptor: [Vitamins] explode all trees
#29	MeSH descriptor: [Dietary Supplements] this term only
#30	(vitamin* or previtamin* or provitamin* or multivitamin* or micronutrient* or multimicronutrient* or multi* NEXT micronutrient*):ti,ab,kw
#31	(precursor* NEAR/3 vitamin*):ti,ab,kw
#32	((diet* or nutrition*) NEAR/2 supplement*):ti,ab,kw
#33	(calciferol* or calcifediol* or calciol* or cholecalciferol* or hydroxycholecalciferol* or dihydroxycholecalciferol* or dihydrotachysterol* or calcitriol* or "24,25 dihydroxyvitamin D" or ergocalciferol* or ergosterol* or viosterol* or "vitamin d" or vitamind or 25 NEXT hydroxy* or 25 NEXT OH* or vitamina* or (vitamin NEAR a) or retinol* or retinoid* or retinyl* or retinaldehyde* or carotenoid* or beta NEXT carotene* or betacarotene* or tocopherol* or ascorb* or Dehydroascorbic NEXT Acid* or vitaminc or (vitamin NEAR c)):ti,ab,kw
#34	(vit NEAR/2 (A or C or D)):ti,ab,kw
#35	(healthy NEXT start* or healthystart*):ti,ab,kw
#36	{OR #28-#35}
#37	#26 OR #36
#38	#23 AND #37
#39	MeSH descriptor: [Health Knowledge, Attitudes, Practice] this term only
#40	MeSH descriptor: [Preconception Care] this term only
#41	MeSH descriptor: [Prenatal Care] this term only
#42	MeSH descriptor: [Health Behavior] this term only
#43	MeSH descriptor: [Information Centers] this term only
#44	MeSH descriptor: [Information Services] this term only
#45	MeSH descriptor: [Information Dissemination] this term only
#46	MeSH descriptor: [Education] this term only
#47	MeSH descriptor: [Health Education] this term only
#48	MeSH descriptor: [Consumer Health Information] explode all trees
#49	MeSH descriptor: [Health Promotion] this term only
#50	(advice* or advise* or promot* or educat* or knowledge or intervention* or coach* or mentor* or inform* or aware* or disseminat*):ti,ab,kw
#51	MeSH descriptor: [Patient Education as Topic] this term only

FINAL

Interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice

#	Searches
#52	MeSH descriptor: [Correspondence as Topic] this term only
#53	MeSH descriptor: [Posters as Topic] this term only
#54	(letter* or correspond* or mail or poster*):ti,ab,kw
#55	MeSH descriptor: [Communication] explode all trees
#56	(communic* or messag* or listen* or negotiat* or persua* or dialogu* or conversation* or question* or discuss* or written or write):ti,ab,kw
#57	MeSH descriptor: [Mass Media] this term only
#58	(media or radio* or television* or tv* or broadcast* or podcast* or newspaper* or magazine* or display* or presentation*):ti,ab,kw
#59	MeSH descriptor: [Informed Consent] this term only
#60	(informed NEAR/4 (consent or choice* or decision*)):ti,ab,kw
#61	MeSH descriptor: [Reminder Systems] this term only
#62	(recall or remind* or prompt* or nudge):ti,ab,kw
#63	(electronic* NEAR/4 invit*):ti,ab,kw
#64	MeSH descriptor: [Internet] explode all trees
#65	MeSH descriptor: [Computers, Handheld] explode all trees
#66	MeSH descriptor: [Cell Phone] this term only
#67	MeSH descriptor: [Mobile Applications] this term only
#68	MeSH descriptor: [Electronic Mail] this term only
#69	MeSH descriptor: [Hotlines] this term only
#70	((medical or health or electronic or virtual) NEAR/4 (communicat* or educat* or informat* or learn* or coach*)):ti
#71	MeSH descriptor: [Patient Education Handout] this term only
#72	MeSH descriptor: [Teaching Materials] this term only
#73	MeSH descriptor: [Pamphlets] this term only
#74	(app or apps or blog* or banner or booklet* or brochure* or bulletin* or cellphone* or diary or diaries or digital* or dvd* or elearn* or e NEXT learn* or email* or e NEXT mail* or electronic NEXT mail* or facebook or "face book" or facetime or "face time" or factsheet* or forum* or flyer or guidebook* or handout* or hand NEXT out* or helpline* or hotline* or internet* or ipad* or iphone* or leaflet* or mspace or online or magazine* or mobile NEXT phone* or multimedia NEXT messag* or newsletter* or pamphlet* or palm NEXT pilot* or personal NEXT digital NEXT assistant* or phone* or pocket NEXT pc* or podcast* or postcard* or poster or posters or skype* or smartphone* or smart NEXT phone* or smartwatch* or smart NEXT watch* or "social media" or social NEXT network* or sms or telephone* or text NEXT messag* or twitter or tweet* or video* or web* or wiki* or youtube*):ti
#75	((online or web or internet or digital* or video*) NEAR/3 (based or application* or intervention* or program* or therap*)):ab
#76	((phone* or telephone* or smartphone* or cellphone* or smartwatch* or mobile* or portable*) NEAR/3 (based or application* or intervention* or device* or technolog* or program* or therap*)):ti,ab
#77	(computer* NEAR/4 (handheld or "palm top" or palmtop or pda or tablet*)):ti
#78	("mobile health" or mhealth or "m health" or ehealth or "e health"):ti
#79	((("mobile health" or mhealth or "m health" or ehealth or "e health") NEAR/3 (based or application* or intervention* or program* or therap*)):ab
#80	(cap* or pearl* or softgel* or gel* or pill* or tab* or lozenge* or pastille* or pellet* or liquid* or drink* or solution* or juice* or fluid* or drop* or powder* or sherbet* or biscuit* or bar or bars):ti,ab,kw
#81	MeSH descriptor: [Socioeconomic Factors] explode all trees
#82	MeSH descriptor: [Health Status] this term only
#83	MeSH descriptor: [Health Inequities] explode all trees
#84	((government* or welfare or aid* or "social security" or relief) NEAR/2 (support* or sponsor* or grant* or scheme* or program* or provide* or provision* or assist* or gift* or handout* or donat* or voucher* or subsid* or intervent*)):ti,ab,kw
#85	MeSH descriptor: [Health Services Accessibility] this term only
#86	((sexual or health) NEAR/2 (clinic* or center* or centre*)):ti,ab,kw
#87	((preconcept* or pre NEXT concept* or prepregnan* or pre NEXT pregnan*) NEAR/2 (clinic* or center* or centre* or service or services or assessment*)):ti,ab,kw

FINAL

Interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice

#	Searches
#88	MeSH descriptor: [Community Networks] this term only
#89	MeSH descriptor: [Community-Institutional Relations] this term only
#90	((communit* or social) NEAR/4 (network* or relation* or support*)):ti,ab,kw
#91	MeSH descriptor: [Social Support] this term only
#92	MeSH descriptor: [Self-Help Groups] this term only
#93	MeSH descriptor: [Peer Influence] this term only
#94	(group* NEAR/2 (support* or self NEXT help*)):ti,ab,kw
#95	((peer* or family or families or friend* or professional* or physician* or nurse*1 or health NEXT visitor* or midwife or midwives or social NEXT worker* or leader* or community or communities or teacher* or faith or pharmacy* or pharmacist* or chemist or pharmacies* or GP*1 or practition* or doctor* or health NEXT professional* or clinician* or consultant* or primary NEXT care* or dietician* or nutritionist* or HCP*1) NEAR/4 (influence* or pressure* or recommend* or advice or advise* or led or support* or educ* or advocat* or knowledge or inform*)):ti,ab,kw
#96	MeSH descriptor: [Mentors] this term only
#97	(mentor* or role NEXT model*):ti,ab,kw
#98	MeSH descriptor: [House Calls] this term only
#99	((house or home) NEAR/4 (call* or visit*)):ti,ab,kw
#100	MeSH descriptor: [Choice Behavior] this term only
#101	MeSH descriptor: [Decision Making] this term only
#102	MeSH descriptor: [Decision Support Techniques] this term only
#103	(decision* NEAR/4 (making or support* or aid*)):ti,ab,kw
#104	MeSH descriptor: [Risk Reduction Behavior] this term only
#105	MeSH descriptor: [Motivation] this term only
#106	MeSH descriptor: [Patient Acceptance of Health Care] this term only
#107	((behavior* or behaviour* or lifestyle* or life NEXT style*) NEAR/2 (change* or changing or modification* or modify or modifying or therapy or therapies or program* or intervention* or technique* or establish* or individual* or improv* or enhanc* or encourag* or promot* or optimiz* or optimis* or incentiv*)):ti,ab,kw
#108	motivat*:ti,ab,kw
#109	MeSH descriptor: [Psychotherapy] explode all trees
#110	MeSH descriptor: [Counseling] explode all trees
#111	MeSH descriptor: [Self Care] this term only
#112	self care:ti,ab,kw
#113	counsel*:ti,ab,kw
#114	((diet* or nutrient* or nutrition* or lifestyle*) NEAR/2 (therap* or treat* or intervention* or strateg* or session* or modif* or training or support* or aid* or help* or program*)):ti,ab,kw
#115	((behavior* or behaviour* or cogniti* or psycho*) NEAR/2 (therap* or treat* or intervention* or strateg* or session* or modif* or training or support* or aid* or help* or program*)):ti,ab,kw
#116	{OR #39-#115}
#117	MeSH descriptor: [Treatment Adherence and Compliance] this term only
#118	MeSH descriptor: [Patient Compliance] this term only
#119	MeSH descriptor: [Medication Adherence] this term only
#120	MeSH descriptor: [Guideline Adherence] this term only
#121	(uptake* or up NEXT tak* or takeover* or tak* NEXT up* or aware* or adher* or nonadher* or non NEXT adher* or comply* or complies or complian* or adopt* or implement):ti,ab,kw
#122	(supplement* NEAR/3 behav*):ti,ab,kw
#123	{OR #117-#122}
#124	#116 AND #123
#125	#27 AND #124
#126	#38 AND #124
#127	conference:pt or (clinicaltrials or trialsearch):so

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Interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice

#	Searches
#128	#125 NOT #127
#129	#126 NOT #127

Database: PsycINFO

Date of last search: 05/12/2023

#	Searches
1	exp Pregnancy/ or Prenatal Care/ or Perinatal Period/
2	(antenatal* or ante natal* or gestation* or maternal* or mother* or pregnan* or prenatal* or pre natal*).ti,ab,id.
3	1 or 2
4	(periconcept* or peri concept* or preconcept* or pre concept* or prepregnan* or pre pregnan*).ti,ab,id.
5	((before or plan* or intend* or intention* or wish* or desir* or want* or prior or prepar* or try* or becom* or get* or start*) adj3 (baby or babies or conceiving or pregnan* or conception* or conceive*)).ti,ab,id.
6	(start* adj2 family).ti,ab,id.
7	or/4-6
8	3 or 7
9	breast feeding/ or lactation/
10	(breastfeed* or breastfed* or breastmilk or (breast adj2 (feed* or fed* or milk*)) or expressed milk* or lactat* or (nursing adj (baby or infant* or mother* or neonate* or newborn*))).ti,ab,id.
11	9 or 10
12	(child* or baby or babies or boy? or girl? or infan* or juvenile? or kid? or kindergar* or minors or neonat* or newborn? or p?ediatric* or preschool* or schoolchild* or school age? or toddler* or young).ti,ab,id.
13	(child* or baby or babies or infan* or juvenile? or kindergar* or neonat* or newborn? or p?ediatric* or schoolchild* or school age?).jn,jx.
14	12 or 13
15	3 or 11 or 14
16	exp Folic Acid/
17	(folic acid* or folate* or folacin or vitamin b9 or vitamin b 9 or vitamin m or pteroylglutamic acid* or folvite).ti,ab,id.
18	16 or 17
19	8 and 18
20	exp Vitamins/ or Dietary Supplements/
21	(vitamin* or previtamin* or provitamin* or multivitamin* or micronutrient* or multimicronutrient* or multi* micronutrient*).ti,ab,id.
22	(precursor* adj3 vitamin*).ti,ab,id.
23	((diet* or nutrition*) adj2 supplement*).ti,ab,id.
24	(calciferol* or calcifediol* or calciol* or cholecalciferol* or hydroxycholecalciferol* or dihydroxycholecalciferol* or dihydrotachysterol* or calcitriol* or 24,25-dihydroxyvitamin D* or ergocalciferol* or ergosterol* or viosterol or vitamin d* or vitamind* or 25 hydroxy* or 25-?OH* or vitamina* or (vitamin adj a) or retinol* or retinoid* or retinyl* or retinaldehyde* or carotenoid* or beta carotene* or betacarotene* or tocopherol* or ascorb* or Dehydroascorbic Acid* or vitaminc or (vitamin adj c)).ti,ab,id.
25	(vit adj2 (A or C or D)).ti,ab,id.
26	(healthy start* or healthystart*).ti,ab,id.
27	or/20-26
28	19 or 27
29	15 and 28
30	Health Attitudes/ or Health Knowledge/ or health behavior/ or Prenatal Care/
31	information/ or information dissemination/ or information services/
32	Education/ or Health Education/ or exp health information/ or Health Promotion/

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Interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice

#	Searches
33	(advi?e* or promot* or educat* or knowledge or intervention* or coach* or mentor* or inform* or aware* or disseminat*).ti,ab,id.
34	Client Education/ or knowledge transfer/
35	(letter* or correspond* or mail or poster*).ti,ab,id.
36	exp Communication/
37	(communic* or messag* or listen* or negotiat* or persua* or dialogu* or conversation* or question* or discuss* or written or write).ti,ab,id.
38	exp Mass Media/
39	(media or radio* or television* or tv* or broadcast* or podcast* or newspaper* or magazine* or display* or presentation*).ti,ab,id.
40	Informed Consent/
41	(informed adj4 (consent or choice* or decision*)).ti,ab,id.
42	(recall or remind* or prompt* or nudge).ti,ab,id.
43	(electronic* adj4 invit*).ti,ab,id.
44	exp Internet/ or exp mobile devices/ or mobile applications/ or computer mediated communication/ or Hot Line Services/
45	((medical or health or electronic or virtual) adj4 (communicat* or educat* or informat* or learn* or coach*)).ti.
46	teaching/
47	(app or apps or blog* or banner or booklet* or brochure* or bulletin* or cellphone* or diary or diaries or digital* or dvd* or elearn* or e learn* or email* or e mail* or electronic mail* or facebook or face book or facetime or face time or factsheet* or forum* or flyer or guidebook* or handout* or hand out* or helpline* or hotline* or internet* or ipad* or iphone* or leaflet* or myspace or online or magazine* or mobile phone* or multimedia messag* or newsletter* or pamphlet* or palm pilot* or personal digital assistant* or phone* or pocket pc* or podcast* or postcard* or poster? or skype* or smartphone* or smart phone* or smartwatch* or smart watch* or social media or social network* or sms or telephone* or text messag* or twitter or tweet* or video* or web* or wiki* or youtube*).ti.
48	((online or web or internet or digital* or video*) adj3 (based or application* or intervention* or program* or therap*)).ab.
49	((phone* or telephone* or smartphone* or cellphone* or smartwatch* or mobile* or portable*) adj3 (based or application* or intervention* or device* or technolog* or program* or therap*)).ti,ab.
50	(computer* adj4 (handheld or palm top or palmtop or pda or tablet*)).ti.
51	(mobile health or mhealth or m health or ehealth or e health).ti.
52	((mobile health or mhealth or m health or ehealth or e health) adj3 (based or application* or intervention* or program* or therap*)).ab.
53	(cap* or pearl* or softgel* or gel* or pill* or tab* or lozenge* or pastille* or pellet* or liquid* or drink* or solution* or juice* or fluid* or drop* or powder* or sherbet* or biscuit* or bar?).ti,ab,id.
54	exp Socioeconomic Factors/
55	Health Status/ or health disparities/
56	((government* or welfare or aid* or social security or relief) adj2 (support* or sponsor* or grant* or scheme* or program* or provide* or provision* or assist* or gift* or handout* or donat* or voucher* or subsid* or intervent*)).ti,ab,id.
57	health care access/
58	((sexual or health) adj2 (clinic* or center* or centre*)).ti,ab,id.
59	((preconcept* or pre concept* or prepregnan* or pre pregnan*) adj2 (clinic* or center* or centre* or service? or assessment*)).ti,ab,id.
60	Social Networks/
61	((communit* or social) adj4 (network* or relation* or support*)).ti,ab,id.
62	Social Support/ or support groups/ or exp interpersonal influences/
63	(group* adj2 (support* or self-help*)).ti,ab,id.
64	((peer* or family or families or friend* or professional* or physician* or nurse*1 or health visitor* or midwife or midwives or social worker* or leader* or community or communities or teacher* or faith or pharmacy* or pharmacist* or chemist or pharmacies* or GP*1 or practition* or doctor* or health professional* or clinician* or consultant* or primary-care* or dietician* or nutritionist* or HCP*1) adj4 (influence* or pressure* or recommend* or advice or advise* or led or support* or educ* or advocat* or knowledge or inform*)).ti,ab,id.
65	Mentor/
66	(mentor* or role model*).ti,ab,id.

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Interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice

#	Searches
67	Home Visiting Programs/
68	((house or home) adj4 (call* or visit*)).ti,ab,id.
69	Choice Behavior/ or Decision Making/ or Decision Support Systems/
70	(decision* adj4 (making or support* or aid*)).ti,ab,id.
71	preventive health behavior/ or Motivation/
72	((behavio?* or lifestyle* or life style*) adj2 (change* or changing or modification* or modify or modifying or therapy or therapies or program* or intervention* or technique* or establish* or individual* or improv* or enhanc* or encourag* or promot* or optimiz* or optimis* or incentiv*)).ti,ab,id.
73	motivat*.ti,ab,id.
74	exp Psychotherapy/ or exp Counseling/ or Self-Care/
75	self care.ti,ab,id.
76	counsel*.ti,ab,id.
77	((diet* or nutrient* or nutrition* or lifestyle*) adj2 (therap* or treat* or intervention* or strateg* or session* or modif* or training or support* or aid* or help* or program*)).ti,ab,id.
78	((behavio?* or cogniti* or psycho*) adj2 (therap* or treat* or intervention* or strateg* or session* or modif* or training or support* or aid* or help* or program*)).ti,ab,id.
79	or/30-78
80	treatment compliance/
81	(uptake* or up-tak* or takeup* or tak*-up* or aware* or adher* or nonadher* or non adher* or comply* or complies or complian* or adopt* or implement).ti,ab,id.
82	(supplement* adj3 behav*).ti,ab,id.
83	or/80-82
84	79 and 83
85	19 and 84
86	29 and 84
87	(letter or editorial or comment reply).dt. or case report/
88	(letter or comment*).ti.
89	or/87-88
90	exp randomized controlled trial/
91	random*.ti,ab.
92	or/90-91
93	89 not 92
94	animal.po.
95	(rat or rats or mouse or mice or rodent*).ti.
96	or/93-95
97	85 not 96
98	86 not 96
99	limit 97 to English language
100	limit 98 to English language
101	clinical trial.md.
102	Clinical trials/
103	Randomized controlled trials/
104	Randomized clinical trials/
105	assign*.ti,ab.
106	allocat*.ti,ab.
107	crossover*.ti,ab.
108	cross over*.ti,ab.
109	((doubl* or singl*) adj blind*).ti,ab.

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Interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice

#	Searches
110	factorial*.ti,ab.
111	placebo*.ti,ab.
112	random*.ti,ab.
113	volunteer*.ti,ab.
114	trial?.ti,ab.
115	or/101-114
116	(meta analysis or "systematic review").md.
117	META ANALYSIS/
118	SYSTEMATIC REVIEW/
119	(meta analy* or metanaly* or metaanaly*).ti,ab.
120	((systematic* or evidence*) adj2 (review* or overview*).ti,ab.
121	(reference list* or bibliograph* or hand search* or manual search* or relevant journals).ab.
122	(search strategy or search criteria or systematic search or study selection or data extraction).ab.
123	(search* adj4 literature).ab.
124	cochrane.jw.
125	((pool* or combined) adj2 (data or trials or studies or results)).ab.
126	(medline or pubmed or cochrane or embase or psychlit or psyqlit or cinahl or science citation index or bids or cancerlit).ab.
127	or/116-126
128	99 and (115 or 127)
129	100 and (115 or 127)
130	FOLLOWUP STUDY/
131	(follow up adj (study or studies)).tw.
132	(observational adj (study or studies)).tw.
133	(epidemiologic\$ adj (study or studies)).tw.
134	(cross sectional adj (study or studies)).tw.
135	(Case control\$ adj (study or studies)).tw.
136	TREATMENT OUTCOMES/
137	treatment outcome.md.
138	CLINICAL TRIALS/
139	clinical trial.md.
140	chang\$.tw.
141	evaluat\$.tw.
142	reviewed.tw.
143	prospective\$.tw.
144	retrospective\$.tw.
145	baseline.tw.
146	cohort.tw.
147	case series.tw.
148	(compare\$ or compara\$).tw.
149	or/130-148
150	99 and 149
151	150 not 128
152	100 and 149
153	152 not 129

Database: CINAHL**Date of last search: 05/12/2023**

#	Searches
S123	S40 AND S121 (English language, Human)
S122	S29 AND S121 (English language, Human)
S121	S114 AND S120
S120	S115 OR S116 OR S117 OR S118 OR S119
S119	TI (supplement* N3 behav*) OR AB (supplement* N3 behav*)
S118	TI ((uptake* or up-tak* or takeup* or tak*-up* or aware* or adher* or nonadher* or non adher* or comply* or complies or complian* or adopt* or implement)) OR AB ((uptake* or up-tak* or takeup* or tak*-up* or aware* or adher* or nonadher* or non adher* or comply* or complies or complian* or adopt* or implement))
S117	(MH "Guideline Adherence")
S116	(MH "Patient Compliance")
S115	(MH "Medication Compliance")
S114	S41 OR S42 OR S43 OR S44 OR S45 OR S46 OR S47 OR S48 OR S49 OR S50 OR S51 OR S52 OR S53 OR S54 OR S55 OR S56 OR S57 OR S58 OR S59 OR S60 OR S61 OR S62 OR S63 OR S64 OR S65 OR S66 OR S67 OR S68 OR S69 OR S70 OR S71 OR S72 OR S73 OR S74 OR S75 OR S76 OR S77 OR S78 OR S79 OR S80 OR S81 OR S82 OR S83 OR S84 OR S85 OR S86 OR S87 OR S88 OR S89 OR S90 OR S91 OR S92 OR S93 OR S94 OR S95 OR S96 OR S97 OR S98 OR S99 OR S100 OR S101 OR S102 OR S103 OR S104 OR S105 OR S106 OR S107 OR S108 OR S109 OR S110 OR S111 OR S112 OR S113
S113	TI (((behavio?r* or cogniti* or psycho*) N2 (therap* or treat* or intervention* or strateg* or session* or modif* or training or support* or aid* or help* or program*))) OR AB (((behavio?r* or cogniti* or psycho*) N2 (therap* or treat* or intervention* or strateg* or session* or modif* or training or support* or aid* or help* or program*)))
S112	TI (((diet* or nutrient* or nutrition* or lifestyle*) N2 (therap* or treat* or intervention* or strateg* or session* or modif* or training or support* or aid* or help* or program*))) OR AB (((diet* or nutrient* or nutrition* or lifestyle*) N2 (therap* or treat* or intervention* or strateg* or session* or modif* or training or support* or aid* or help* or program*)))
S111	TI counsel* OR AB counsel*
S110	TI self care OR AB self care
S109	(MH "Self Care")
S108	(MH "Counseling+")
S107	(MH "Psychotherapy+")
S106	TI motivat* OR AB motivat*
S105	TI (((behavio?r* or lifestyle* or life style*) N2 (change* or changing or modification* or modify or modifying or therapy or therapies or program* or intervention* or technique* or establish* or individual* or improv* or enhanc* or encourag* or promot* or optimiz* or optimis* or incentiv*))) OR AB (((behavio?r* or lifestyle* or life style*) N2 (change* or changing or modification* or modify or modifying or therapy or therapies or program* or intervention* or technique* or establish* or individual* or improv* or enhanc* or encourag* or promot* or optimiz* or optimis* or incentiv*)))
S104	(MH "Motivation")
S103	TI ((decision* N4 (making or support* or aid*))) OR AB ((decision* N4 (making or support* or aid*)))
S102	(MH "Decision Making") OR (MH "Decision Making, Patient") OR (MH "Decision Support Techniques")
S101	TI (((house or home) N4 (call* or visit*))) OR AB (((house or home) N4 (call* or visit*)))
S100	(MH "Home Visits")
S99	TI ((mentor* or role model*)) OR AB ((mentor* or role model*))
S98	(MH "Mentorship")
S97	TI (((peer* or family or families or friend* or professional* or physician* or nurse*1 or health visitor* or midwife or midwives or social worker* or leader* or community or communities or teacher* or faith or pharmacy* or pharmacist* or chemist or pharmacies* or GP*1 or practition* or doctor* or health professional* or clinician* or consultant* or primary-care* or dietician* or nutritionist* or HCP*1) N4 (influence* or pressure* or recommend* or advice or advise* or led or support* or educ* or advocat* or knowledge or inform*))) OR AB (((peer* or family or families or friend* or professional* or physician* or nurse*1 or health visitor* or midwife or midwives or social worker* or leader* or community or communities or teacher* or faith or pharmacy* or pharmacist* or chemist or pharmacies* or GP*1 or practition* or doctor* or health professional* or clinician* or consultant* or primary-care* or dietician* or nutritionist* or HCP*1) N4 (influence* or pressure* or recommend* or advice or advise* or led or support* or educ* or advocat* or knowledge or inform*)))

#	Searches
S96	TI ((group* N2 (support* or self-help*))) OR AB ((group* N2 (support* or self-help*)))
S95	(MH "Peer Pressure")
S94	(MH "Support Groups")
S93	(MH "Support, Social+")
S92	TI (((communit* or social) N4 (network* or relation* or support*))) OR AB (((communit* or social) N4 (network* or relation* or support*)))
S91	(MH "Community-Institutional Relations")
S90	(MH "Community Networks")
S89	TI (((preconcept* or pre concept* or prepregnan* or pre pregnan*) N2 (clinic* or center* or centre* or service? or assessment*)))) OR AB (((preconcept* or pre concept* or prepregnan* or pre pregnan*) N2 (clinic* or center* or centre* or service? or assessment*))))
S88	TI (((sexual or health) N2 (clinic* or center* or centre*))) OR AB (((sexual or health) N2 (clinic* or center* or centre*)))
S87	(MH "Health Services Accessibility")
S86	TI (((government* or welfare or aid* or social security or relief) N2 (support* or sponsor* or grant* or scheme* or program* or provide* or provision* or assist* or gift* or handout* or donat* or voucher* or subsid* or intervent*))) OR AB (((government* or welfare or aid* or social security or relief) N2 (support* or sponsor* or grant* or scheme* or program* or provide* or provision* or assist* or gift* or handout* or donat* or voucher* or subsid* or intervent*)))
S85	(MH "Health Inequities")
S84	(MH "Health Status")
S83	(MH "Socioeconomic Factors+")
S82	TI ((cap* or pearl* or softgel* or gel* or pill* or tab* or lozenge* or pastille* or pellet* or liquid* or drink* or solution* or juice* or fluid* or drop* or powder* or sherbet* or biscuit* or bar?)) OR AB ((cap* or pearl* or softgel* or gel* or pill* or tab* or lozenge* or pastille* or pellet* or liquid* or drink* or solution* or juice* or fluid* or drop* or powder* or sherbet* or biscuit* or bar?))
S81	AB ((mobile health or mhealth or m health or ehealth or e health) N3 (based or application* or intervention* or program* or therap*))
S80	TI (mobile health or mhealth or m health or ehealth or e health)
S79	TI (computer* N4 (handheld or palm top or palmtop or pda or tablet*))
S78	TI (((phone* or telephone* or smartphone* or cellphone* or smartwatch* or mobile* or portable*) N3 (based or application* or intervention* or device* or technolog* or program* or therap*))) OR AB (((phone* or telephone* or smartphone* or cellphone* or smartwatch* or mobile* or portable*) N3 (based or application* or intervention* or device* or technolog* or program* or therap*)))
S77	AB ((online or web or internet or digital* or video*) N3 (based or application* or intervention* or program* or therap*))
S76	TI (app or apps or blog* or banner or booklet* or brochure* or bulletin* or cellphone* or diary or diaries or digital* or dvd* or elearn* or e learn* or email* or e mail* or electronic mail* or facebook or face book or facetime or face time or factsheet* or forum* or flyer or guidebook* or handout* or hand out* or helpline* or hotline* or internet* or ipad* or iphone* or leaflet* or mspace or online or magazine* or mobile phone* or multimedia messag* or newsletter* or pamphlet* or palm pilot* or personal digital assistant* or phone* or pocket pc* or podcast* or postcard* or poster? or skype* or smartphone* or smart phone* or smartwatch* or smart watch* or social media or social network* or sms or telephone* or text messag* or twitter or tweet* or video* or web* or wiki* or youtube*)
S75	(MH "Pamphlets")
S74	(MH "Teaching Materials+")
S73	TI (((medical or health or electronic or virtual) N4 (communicat* or educat* or informat* or learn* or coach*)))
S72	(MH "Telephone Information Services")
S71	(MH "Email")
S70	(MH "Mobile Applications")
S69	(MH "Cellular Phone+")
S68	(MH "Computers, Hand-Held+")
S67	(MH "Internet+")
S66	TI (electronic* N4 invit*) OR AB (electronic* N4 invit*)
S65	TI ((recall or remind* or prompt* or nudge)) OR AB ((recall or remind* or prompt* or nudge))
S64	(MH "Reminder Systems")

#	Searches
S63	TI ((informed N4 (consent or choice* or decision*))) OR AB ((informed N4 (consent or choice* or decision*)))
S62	(MH "Consent")
S61	TI ((media or radio* or television* or tv* or broadcast* or podcast* or newspaper* or magazine* or display* or presentation*)) OR AB ((media or radio* or television* or tv* or broadcast* or podcast* or newspaper* or magazine* or display* or presentation*))
S60	(MH "Communications Media+")
S59	TI ((communic* or messag* or listen* or negotiat* or persua* or dialogu* or conversation* or question* or discuss* or written or write)) OR AB ((communic* or messag* or listen* or negotiat* or persua* or dialogu* or conversation* or question* or discuss* or written or write))
S58	(MH "Communication+")
S57	TI ((letter* or correspond* or mail or poster*)) OR AB ((letter* or correspond* or mail or poster*))
S56	(MH "Posters")
S55	(MH "Writing+")
S54	(MH "Patient Education")
S53	TI ((advi?e* or promot* or educat* or knowledge or intervention* or coach* or mentor* or inform* or aware* or disseminat*)) OR AB ((advi?e* or promot* or educat* or knowledge or intervention* or coach* or mentor* or inform* or aware* or disseminat*))
S52	(MH "Health Promotion")
S51	(MH "Consumer Health Information+")
S50	(MH "Health Education")
S49	(MH "Education")
S48	(MH "Selective Dissemination of Information")
S47	(MH "Information Services")
S46	(MH "Information Centers")
S45	(MH "Health Behavior")
S44	(MH "Prenatal Care")
S43	(MH "Pregnancy Care")
S42	(MH "Attitude to Health")
S41	(MH "Health Knowledge")
S40	S25 AND S39
S39	S28 OR S38
S38	S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37
S37	TI ((healthy start* or healthystart*)) OR AB ((healthy start* or healthystart*))
S36	TI ((vit N2 (A or C or D))) OR AB ((vit N2 (A or C or D)))
S35	TI ((calciferol* or calcifediol* or calciol* or cholecalciferol* or hydroxycholecalciferol* or dihydroxycholecalciferol* or dihydrotachysterol* or calcitriol* or 24,25-dihydroxyvitamin D* or ergocalciferol* or ergosterol* or viosterol or vitamin d* or vitamind* or 25 hydroxy* or 25-?OH* or vitamina* or (vitamin N1 a) or retinol* or retinoid* or retinyl* or retinaldehyde* or carotenoid* or beta carotene* or betacarotene* or tocopherol* or ascorb* or Dehydroascorbic Acid* or vitaminc or (vitamin N1 c))) OR AB ((calciferol* or calcifediol* or calciol* or cholecalciferol* or hydroxycholecalciferol* or dihydroxycholecalciferol* or dihydrotachysterol* or calcitriol* or 24,25-dihydroxyvitamin D* or ergocalciferol* or ergosterol* or viosterol or vitamin d* or vitamind* or 25 hydroxy* or 25-?OH* or vitamina* or (vitamin N1 a) or retinol* or retinoid* or retinyl* or retinaldehyde* or carotenoid* or beta carotene* or betacarotene* or tocopherol* or ascorb* or Dehydroascorbic Acid* or vitaminc or (vitamin N1 c)))
S34	TI (((diet* or nutrition*) N2 supplement*)) OR AB (((diet* or nutrition*) N2 supplement*))
S33	TI (precursor* N3 vitamin*) OR AB (precursor* N3 vitamin*)
S32	TI ((vitamin* or previtamin* or provitamin* or multivitamin* or micronutrient* or multimicronutrient* or multi* micronutrient*)) OR AB ((vitamin* or previtamin* or provitamin* or multivitamin* or micronutrient* or multimicronutrient* or multi* micronutrient*))
S31	(MH "Dietary Supplements")
S30	(MH "Vitamins+")
S29	S11 AND S28

FINAL

Interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice

#	Searches
S28	S26 OR S27
S27	TI ((folic acid* or folate* or folacin or vitamin b9 or vitamin b 9 or vitamin m or pteroylglutamic acid* or folvite)) OR AB ((folic acid* or folate* or folacin or vitamin b9 or vitamin b 9 or vitamin m or pteroylglutamic acid* or folvite))
S26	(MH "Folic Acid+")
S25	S5 OR S17 OR S24
S24	S18 OR S19 OR S20 OR S21 OR S22 OR S23
S23	TI ((child* or baby or babies or infan* or juvenile? or kindergar* or neonat* or newborn? or p?ediatric* or schoolchild* or school age?)) OR AB ((child* or baby or babies or infan* or juvenile? or kindergar* or neonat* or newborn? or p?ediatric* or schoolchild* or school age?))
S22	TI ((child* or baby or babies or boy? or girl? or infan* or juvenile? or kid? or kindergar* or minors or neonat* or newborn? or p?ediatric* or preschool* or schoolchild* or school age? or toddler* or young)) OR AB ((child* or baby or babies or boy? or girl? or infan* or juvenile? or kid? or kindergar* or minors or neonat* or newborn? or p?ediatric* or preschool* or schoolchild* or school age? or toddler* or young))
S21	(MH "Pediatrics+")
S20	(MH "Minors (Legal)")
S19	(MH "Infant+")
S18	(MH "Child+")
S17	S12 OR S13 OR S14 OR S15 OR S16
S16	TI ((nursing N1 (baby or infant* or mother* or neonate* or newborn*))) OR AB ((nursing N1 (baby or infant* or mother* or neonate* or newborn*)))
S15	TI ((breastfeed* or breastfed* or breastmilk or expressed milk* or lactat*)) OR AB ((breastfeed* or breastfed* or breastmilk or expressed milk* or lactat*))
S14	TI ((breast N2 (feed* or fed* or milk*))) OR AB ((breast N2 (feed* or fed* or milk*)))
S13	(MH "Lactation")
S12	(MH "Breast Feeding+")
S11	S5 OR S10
S10	S6 OR S7 OR S8 OR S9
S9	TI (start* N2 family) OR AB (start* N2 family)
S8	TI (((before or plan* or intend* or intention* or wish* or desir* or want* or prior or prepar* or try* or becom* or get* or start*) N3 (baby or babies or conceiving or pregnan* or conception* or conceive*))) OR AB (((before or plan* or intend* or intention* or wish* or desir* or want* or prior or prepar* or try* or becom* or get* or start*) N3 (baby or babies or conceiving or pregnan* or conception* or conceive*)))
S7	TI ((periconcept* or peri concept* or preconcept* or pre concept* or prepregnan* or pre pregnan*)) OR AB ((periconcept* or peri concept* or preconcept* or pre concept* or prepregnan* or pre pregnan*))
S6	(MH "Pregnancy Care")
S5	S1 OR S2 OR S3 OR S4
S4	TI ((antenatal* or ante natal* or gestation* or maternal* or mother* or pregnan* or prenatal* or pre natal*)) OR AB ((antenatal* or ante natal* or gestation* or maternal* or mother* or pregnan* or prenatal* or pre natal*))
S3	(MH "Prenatal Care")
S2	(MH "Expectant Mothers")
S1	(MH "Pregnancy+")

Database: EPISTEMONIKOS

Date of last search: 05/12/2023

#	Searches
1	((advanced_title_en:((pregnan* OR antenatal OR prenatal OR periconcept* OR preconcept* OR prepregnan*)) OR advanced_abstract_en:((pregnan* OR antenatal OR prenatal OR periconcept* OR preconcept* OR prepregnan*))
2	(advanced_title_en:((folic acid* OR folate* OR folacin OR vitamin b9 OR pteroylglutamic acid* OR folvite)) OR advanced_abstract_en:((folic acid* OR folate* OR folacin OR vitamin b9 OR pteroylglutamic acid* OR folvite))
3	1 AND 2

#	Searches
4	((advanced_title_en:((uptake* OR up-tak* OR take up* OR tak*-up* OR aware* OR adher* OR nonadher* OR non-adher* OR comply* OR complies OR complian* OR adopt* OR implement)) OR advanced_abstract_en:((uptake* OR up-tak* OR take up* OR tak*-up* OR aware* OR adher* OR nonadher* OR non-adher* OR comply* OR complies OR complian* OR adopt* OR implement)))
5	3 AND 4
6	((advanced_title_en:((pregnan* OR breastfeeding OR breastfed OR lactat* OR child* OR infant* OR baby OR babies OR newborn)) OR advanced_abstract_en:((pregnan* OR breastfeeding OR breastfed OR lactat* OR child* OR infant* OR baby OR babies OR newborn)))
7	((advanced_title_en:((folic acid* OR folate* OR folacin OR vitamin b9 OR pteroylglutamic acid* OR folvite)) OR advanced_abstract_en:((folic acid* OR folate* OR folacin OR vitamin b9 OR pteroylglutamic acid* OR folvite)))
8	(advanced_title_en:((vitamin* OR previtamin* OR provitamin* OR multivitamin* OR "healthy start" OR healthystart)) OR advanced_abstract_en:((vitamin* OR previtamin* OR provitamin* OR multivitamin* OR "healthy start" OR healthystart))))
9	7 OR 8
10	6 AND 9
11	((advanced_title_en:((uptake* OR up-tak* OR take up* OR tak*-up* OR aware* OR adher* OR nonadher* OR non-adher* OR comply* OR complies OR complian* OR adopt* OR implement)) OR advanced_abstract_en:((uptake* OR up-tak* OR take up* OR tak*-up* OR aware* OR adher* OR nonadher* OR non-adher* OR comply* OR complies OR complian* OR adopt* OR implement)))
12	10 AND 11
13	5 OR 12
	[Filters: protocol=no, classification=systematic-review, cochrane=missing]

Economic searches

The health economic searches for this review question were broader to capture relevant health economic papers.

Databases: Medline

Date of last search: 05/12/2023

#	Searches
1	exp Pregnancy/ or Pregnant Women/ or Prenatal Care/
2	(antenatal* or ante natal* or gestation* or maternal* or mother* or pregnan* or prenatal* or pre natal*).ti,ab,kf.
3	1 or 2
4	breast feeding/ or lactation/
5	(breastfeed* or breastfed* or breastmilk or (breast adj2 (feed* or fed* or milk*)) or expressed milk* or lactat* or (nursing adj (baby or infant* or mother* or neonate* or newborn*))).ti,ab,kf.
6	4 or 5
7	exp Child/ or exp Infant/ or Minors/ or exp Pediatrics/
8	(child* or baby or babies or boy? or girl? or infan* or juvenile? or kid? or kindergar* or minors or neonat* or newborn? or p?ediatric* or preschool* or schoolchild* or school age? or toddler* or young).ti,ab,kf.
9	(child* or baby or babies or infan* or juvenile? or kindergar* or neonat* or newborn? or p?ediatric* or schoolchild* or school age?).jw,nw.
10	or/7-9
11	3 or 6 or 10
12	exp Folic Acid/
13	(folic acid* or folate* or folacin or vitamin b9 or vitamin b 9 or vitamin m or pteroylglutamic acid* or folvite).ti,ab,kf.
14	12 or 13
15	exp Vitamins/ or Dietary Supplements/

#	Searches
16	(vitamin* or previtamin* or provitamin* or multivitamin* or micronutrient* or multimicronutrient* or multi* micronutrient*).ti,ab,kf.
17	(precursor* adj3 vitamin*).ti,ab,kf.
18	((diet* or nutrition*) adj2 supplement*).ti,ab,kf.
19	(calciferol* or calcifediol* or calciol* or cholecalciferol* or hydroxycholecalciferol* or dihydroxycholecalciferol* or dihydrotachysterol* or calcitriol* or 24,25-dihydroxyvitamin D* or ergocalciferol* or ergosterol* or viosterol or vitamin d* or vitamind* or 25 hydroxy* or 25-?OH* or vitamina* or (vitamin adj a) or retinol* or retinoid* or retinyl* or retinaldehyde* or carotenoid* or beta carotene* or betacarotene* or tocopherol* or ascorb* or Dehydroascorbic Acid* or vitaminc or (vitamin adj c)).ti,ab,kf.
20	(vit adj2 (A or C or D)).ti,ab,kf.
21	(healthy start* or healthystart*).ti,ab,kf.
22	or/15-21
23	14 or 22
24	11 and 23
25	Health Knowledge, Attitudes, Practice/ or preconception care/ or prenatal care/ or Health Behavior/
26	Information centers/ or information services/ or information dissemination/
27	Education/ or health education/ or exp consumer health information/ or Health Promotion/
28	(advi?e* or promot* or educat* or knowledge or intervention* or coach* or mentor* or inform* or aware* or disseminat*).ti,ab,kf.
29	patient education as topic/ or Correspondence as Topic/ or Posters as Topic/
30	(letter* or correspond* or mail or poster*).ti,ab,kf.
31	exp Communication/
32	(communic* or messag* or listen* or negotiat* or persua* or dialogu* or conversation* or question* or discuss* or written or write).ti,ab,kf.
33	exp Mass Media/
34	(media or radio* or television* or tv* or broadcast* or podcast* or newspaper* or magazine* or display* or presentation*).ti,ab,kf.
35	Informed Consent/
36	(informed adj4 (consent or choice* or decision*)).ti,ab,kf.
37	Reminder Systems/
38	(recall or remind* or prompt* or nudge).ti,ab,kf.
39	(electronic* adj4 invit*).ti,ab,kf.
40	exp internet/ or exp computers, handheld/ or exp Cell Phone/ or mobile applications/ or electronic mail/ or hotlines/
41	((medical or health or electronic or virtual) adj4 (communicat* or educat* or informat* or learn* or coach*)).ti.
42	patient education handout/
43	exp teaching materials/
44	pamphlets/
45	(app or apps or blog* or banner or booklet* or brochure* or bulletin* or cellphone* or diary or diaries or digital* or dvd* or elearn* or e learn* or email* or e mail* or electronic mail* or facebook or face book or facetime or face time or factsheet* or forum* or flyer or guidebook* or handout* or hand out* or helpline* or hotline* or internet* or ipad* or iphone* or leaflet* or mspace or online or magazine* or mobile phone* or multimedia messag* or newsletter* or pamphlet* or palm pilot* or personal digital assistant* or phone* or pocket pc* or podcast* or postcard* or poster* or skype* or smartphone* or smart phone* or smartwatch* or smart watch* or social media or social network* or sms or telephone* or text messag* or twitter or tweet* or video* or web* or wiki* or youtube*).ti.
46	((online or web or internet or digital* or video*) adj3 (based or application* or intervention* or program* or therap*)).ab.
47	((phone* or telephone* or smartphone* or cellphone* or smartwatch* or mobile* or portable*) adj3 (based or application* or intervention* or device* or technolog* or program* or therap*)).ti,ab.
48	(computer* adj4 (handheld or palm top or palmtop or pda or tablet*)).ti.
49	(mobile health or mhealth or m health or ehealth or e health).ti.
50	((mobile health or mhealth or m health or ehealth or e health) adj3 (based or application* or intervention* or program* or therap*)).ab.

#	Searches
51	(cap* or pearl* or softgel* or gel* or pill* or tab* or lozenge* or pastille* or pellet* or liquid* or drink* or solution* or juice* or fluid* or drop* or powder* or sherbet* or biscuit* or bar?).ti,ab,kf.
52	exp Socioeconomic Factors/
53	health status/ or exp health inequities/
54	((government* or welfare or aid* or social security or relief) adj2 (support* or sponsor* or grant* or scheme* or program* or provide* or provision* or assist* or gift* or handout* or donat* or voucher* or subsid* or intervent*)).ti,ab,kf.
55	Health Services Accessibility/
56	((sexual or health) adj2 (clinic* or center* or centre*)).ti,ab,kf.
57	((preconcept* or pre concept* or prepregnan* or pre pregnan*) adj2 (clinic* or center* or centre* or service? or assessment*)).ti,ab,kf.
58	Community Networks/ or Community-Institutional Relations/
59	((communit* or social) adj4 (network* or relation* or support*)).ti,ab,kf.
60	social support/ or self-help groups/ or Peer Influence/
61	(group* adj2 (support* or self-help*)).ti,ab,kf.
62	((peer* or family or families or friend* or professional* or physician* or nurse*1 or health visitor* or midwife or midwives or social worker* or leader* or community or communities or teacher* or faith or pharmacy* or pharmacist* or chemist or pharmacies* or GP*1 or practition* or doctor* or health professional* or clinician* or consultant* or primary-care* or dietician* or nutritionist* or HCP*1) adj4 (influence* or pressure* or recommend* or advice or advise* or led or support* or educ* or advocat* or knowledge or inform*)).ti,ab,kf.
63	Mentors/
64	(mentor* or role model*).ti,ab,kf.
65	House Calls/
66	((house or home) adj4 (call* or visit*)).ti,ab,kf.
67	Choice Behavior/ or Decision Making/ or Decision Support Techniques/
68	(decision* adj4 (making or support* or aid*)).ti,ab,kf.
69	risk reduction behavior/ or Motivation/ or "Patient Acceptance of Health Care"/
70	((behavio?* or lifestyle* or life style*) adj2 (change* or changing or modification* or modify or modifying or therapy or therapies or program* or intervention* or technique* or establish* or individual* or improv* or enhanc* or encourag* or promot* or optimiz* or optimis* or incentiv*)).ti,ab,kf.
71	motivat*.ti,ab,kf.
72	exp psychotherapy/ or exp counseling/ or self care/
73	self care.ti,ab,kf.
74	counsel*.ti,ab,kf.
75	((diet* or nutrient* or nutrition* or lifestyle*) adj2 (therap* or treat* or intervention* or strateg* or session* or modif* or training or support* or aid* or help* or program*)).ti,ab,kf.
76	((behavio?* or cogniti* or psycho*) adj2 (therap* or treat* or intervention* or strateg* or session* or modif* or training or support* or aid* or help* or program*)).ti,ab,kf.
77	or/25-76
78	24 and 77
79	letter/
80	editorial/
81	news/
82	exp historical article/
83	Anecdotes as Topic/
84	comment/
85	case reports/
86	(letter or comment*).ti.
87	or/79-86
88	randomized controlled trial/ or random*.ti,ab.

FINAL

Interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice

#	Searches
89	87 not 88
90	animals/ not humans/
91	exp Animals, Laboratory/
92	exp Animal Experimentation/
93	exp Models, Animal/
94	exp Rodentia/
95	(rat or rats or mouse or mice or rodent*).ti.
96	or/89-95
97	78 not 96
98	limit 97 to English language
99	Economics/
100	Value of life/
101	exp "Costs and Cost Analysis"/
102	exp Economics, Hospital/
103	exp Economics, Medical/
104	exp Resource Allocation/
105	Economics, Nursing/
106	Economics, Pharmaceutical/
107	exp "Fees and Charges"/
108	exp Budgets/
109	budget*.ti,ab.
110	cost*.ti,ab.
111	(economic* or pharmaco?economic*).ti,ab.
112	(price* or pricing*).ti,ab.
113	(financ* or fee or fees or expenditure* or saving*).ti,ab.
114	(value adj2 (money or monetary)).ti,ab.
115	resourc* allocat*.ti,ab.
116	(fund or funds or funding* or funded).ti,ab.
117	(ration or rations or rationing* or rationed).ti,ab.
118	ec.fs.
119	or/99-118
120	exp models, economic/
121	*Models, Theoretical/
122	*Models, Organizational/
123	markov chains/
124	monte carlo method/
125	exp Decision Theory/
126	(markov* or monte carlo).ti,ab.
127	econom* model*.ti,ab.
128	(decision* adj2 (tree* or analy* or model*)).ti,ab.
129	or/120-128
130	quality-adjusted life years/
131	sickness impact profile/
132	(quality adj2 (wellbeing or well being)).ti,ab.
133	sickness impact profile.ti,ab.
134	disability adjusted life.ti,ab.
135	(qal* or qtime* or qwb* or daly*).ti,ab.

#	Searches
136	(euroqol* or eq5d* or eq 5*).ti,ab.
137	(qol* or hql* or hqol* or h qol* or hrqol* or hr qol*).ti,ab.
138	(health utility* or utility score* or disutilit* or utility value*).ti,ab.
139	(hui or hui1 or hui2 or hui3).ti,ab.
140	(health* year* equivalent* or hye or hyes).ti,ab.
141	discrete choice*.ti,ab.
142	rosseter.ti,ab.
143	(willingness to pay or time tradeoff or time trade off or tto or standard gamble*).ti,ab.
144	(sf36* or sf 36* or short form 36* or shortform 36* or shortform36*).ti,ab.
145	(sf20 or sf 20 or short form 20 or shortform 20 or shortform20).ti,ab.
146	(sf12* or sf 12* or short form 12* or shortform 12* or shortform12*).ti,ab.
147	(sf8* or sf 8* or short form 8* or shortform 8* or shortform8*).ti,ab.
148	(sf6* or sf 6* or short form 6* or shortform 6* or shortform6*).ti,ab.
149	or/130-148
150	98 and (119 or 129 or 149)

Databases: Ovid Embase

Date of last search: 05/12/2023

#	Searches
1	exp pregnancy/ or pregnant woman/ or prenatal care/ or prenatal period/
2	(antenatal* or ante natal* or gestation* or maternal* or mother* or pregnan* or prenatal* or pre natal*).ti,ab,kf.
3	1 or 2
4	exp breast feeding/ or lactation/
5	(breastfeed* or breastfed* or breastmilk or (breast adj2 (feed* or fed* or milk*)) or expressed milk* or lactat* or (nursing adj (baby or infant* or mother* or neonate* or newborn*))).ti,ab,kf.
6	4 or 5
7	exp child/ or "minor (person)"/ or exp pediatrics/
8	(child* or baby or babies or boy? or girl? or infan* or juvenile? or kid? or kindergar* or minors or neonat* or newborn? or p?ediatric* or preschool* or schoolchild* or school age? or toddler* or young).ti,ab,kf.
9	(child* or baby or babies or infan* or juvenile? or kindergar* or neonat* or newborn? or p?ediatric* or schoolchild* or school age?).jx.
10	or/7-9
11	3 or 6 or 10
12	folic acid/
13	(folic acid* or folate* or folacin or vitamin b9 or vitamin b 9 or vitamin m or pteroylglutamic acid* or folvite).ti,ab,kf.
14	12 or 13
15	exp vitamin/ or dietary supplement/
16	(vitamin* or previtamin* or provitamin* or multivitamin* or micronutrient* or multimicronutrient* or multi* micronutrient*).ti,ab,kf.
17	(precursor* adj3 vitamin*).ti,ab,kf.
18	((diet* or nutrition*) adj2 supplement*).ti,ab,kf.
19	(calciferol* or calcifiediol* or calciol* or cholecalciferol* or hydroxycholecalciferol* or dihydroxycholecalciferol* or dihydrotachysterol* or calcitriol* or 24,25-dihydroxyvitamin D* or ergocalciferol* or ergosterol* or viosterol or vitamin d* or vitamind* or 25 hydroxy* or 25-?OH* or vitamina* or (vitamin adj a) or retinol* or retinoid* or retinyl* or retinaldehyde* or carotenoid* or beta carotene* or betacarotene* or tocopherol* or ascorb* or Dehydroascorbic Acid* or vitaminc or (vitamin adj c)).ti,ab,kf.
20	(vit adj2 (A or C or D)).ti,ab,kf.
21	(healthy start* or healthystart*).ti,ab,kf.

#	Searches
22	or/15-21
23	14 or 22
24	11 and 23
25	attitude to health/ or prepregnancy care/ or prenatal care/ or health behavior/
26	information center/ or information service/ or information dissemination/
27	(advi?e* or promot* or educat* or knowledge or intervention* or coach* or mentor* or inform* or aware* or disseminat*).ti,ab,kf.
28	patient education/ or writing/ or publication/
29	(letter* or correspond* or mail or poster*).ti,ab,kf.
30	exp interpersonal communication/
31	(communic* or messag* or listen* or negotiat* or persua* or dialogu* or conversation* or question* or discuss* or written or write).ti,ab,kf.
32	mass medium/
33	(media or radio* or television* or tv* or broadcast* or podcast* or newspaper* or magazine* or display* or presentation*).ti,ab,kf.
34	informed consent/
35	(informed adj4 (consent or choice* or decision*)).ti,ab,kf.
36	reminder system/
37	(recall or remind* or prompt* or nudge).ti,ab,kf.
38	(electronic* adj4 invit*).ti,ab,kf.
39	exp internet/ or personal digital assistant/ or exp mobile phone/ or exp mobile application/ or e-mail/ or hotline/
40	((medical or health or electronic or virtual) adj4 (communicat* or educat* or informat* or learn* or coach*)).ti.
41	exp teaching/
42	(app or apps or blog* or banner or booklet* or brochure* or bulletin* or cellphone* or diary or diaries or digital* or dvd* or elearn* or e learn* or email* or e mail* or electronic mail* or facebook or face book or facetime or face time or factsheet* or forum* or flyer or guidebook* or handout* or hand out* or helpline* or hotline* or internet* or ipad* or iphone* or leaflet* or myspace or online or magazine* or mobile phone* or multimedia messag* or newsletter* or pamphlet* or palm pilot* or personal digital assistant* or phone* or pocket pc* or podcast* or postcard* or poster? or skype* or smartphone* or smart phone* or smartwatch* or smart watch* or social media or social network* or sms or telephone* or text messag* or twitter or tweet* or video* or web* or wiki* or youtube*).ti.
43	((online or web or internet or digital* or video*) adj3 (based or application* or intervention* or program* or therap*)).ab.
44	((phone* or telephone* or smartphone* or cellphone* or smartwatch* or mobile* or portable*) adj3 (based or application* or intervention* or device* or technolog* or program* or therap*)).ti,ab.
45	(computer* adj4 (handheld or palm top or palmtop or pda or tablet*)).ti.
46	(mobile health or mhealth or m health or ehealth or e health).ti.
47	((mobile health or mhealth or m health or ehealth or e health) adj3 (based or application* or intervention* or program* or therap*)).ab.
48	(cap* or pearl* or softgel* or gel* or pill* or tab* or lozenge* or pastille* or pellet* or liquid* or drink* or solution* or juice* or fluid* or drop* or powder* or sherbet* or biscuit* or bar?).ti,ab,kf.
49	exp socioeconomics/
50	health status/ or health disparity/
51	((government* or welfare or aid* or social security or relief) adj2 (support* or sponsor* or grant* or scheme* or program* or provide* or provision* or assist* or gift* or handout* or donat* or voucher* or subsid* or intervent*)).ti,ab,kf.
52	health care access/
53	((sexual or health) adj2 (clinic* or center* or centre*)).ti,ab,kf.
54	((preconcept* or pre concept* or prepregnan* or pre pregnan*) adj2 (clinic* or center* or centre* or service? or assessment*)).ti,ab,kf.
55	community care/ or public relations/
56	((communit* or social) adj4 (network* or relation* or support*)).ti,ab,kf.

#	Searches
57	social support/ or self help/ or peer pressure/
58	(group* adj2 (support* or self-help*)).ti,ab,kf.
59	((peer* or family or families or friend* or professional* or physician* or nurse*1 or health visitor* or midwife or midwives or social worker* or leader* or community or communities or teacher* or faith or pharmacy* or pharmacist* or chemist or pharmacies* or GP*1 or practition* or doctor* or health professional* or clinician* or consultant* or primary-care* or dietician* or nutritionist* or HCP*1) adj4 (influence* or pressure* or recommend* or advice or advise* or led or support* or educ* or advocat* or knowledge or inform*)).ti,ab,kf.
60	mentor/
61	(mentor* or role model*).ti,ab,kf.
62	home visit/
63	((house or home) adj4 (call* or visit*)).ti,ab,kf.
64	decision making/ or decision support system/
65	(decision* adj4 (making or support* or aid*)).ti,ab,kf.
66	risk reduction/ or motivation/ or patient attitude/
67	((behavio?r* or lifestyle* or life style*) adj2 (change* or changing or modification* or modify or modifying or therapy or therapies or program* or intervention* or technique* or establish* or individual* or improv* or enhanc* or encourag* or promot* or optimiz* or optimis* or incentiv*)).ti,ab,kf.
68	motivat*.ti,ab,kf.
69	exp psychotherapy/ or exp counseling/ or self care/
70	self care.ti,ab,kf.
71	counsel*.ti,ab,kf.
72	((diet* or nutrient* or nutrition* or lifestyle*) adj2 (therap* or treat* or intervention* or strateg* or session* or modif* or training or support* or aid* or help* or program*)).ti,ab,kf.
73	((behavio?r* or cogniti* or psycho*) adj2 (therap* or treat* or intervention* or strateg* or session* or modif* or training or support* or aid* or help* or program*)).ti,ab,kf.
74	or/25-73
75	24 and 74
76	letter.pt. or letter/
77	note.pt.
78	editorial.pt.
79	case report/ or case study/
80	(letter or comment*).ti.
81	or/76-80
82	randomized controlled trial/ or random*.ti,ab.
83	81 not 82
84	animal/ not human/
85	nonhuman/
86	exp Animal Experiment/
87	exp Experimental Animal/
88	animal model/
89	exp Rodent/
90	(rat or rats or mouse or mice or rodent*).ti.
91	or/83-90
92	75 not 91
93	limit 92 to English language
94	(conference abstract* or conference review or conference paper or conference proceeding).db,pt,su.
95	93 not 94
96	health economics/
97	exp economic evaluation/

#	Searches
98	exp health care cost/
99	exp fee/
100	budget/
101	funding/
102	resource allocation/
103	budget*.ti,ab.
104	cost*.ti,ab.
105	(economic* or pharmaco?economic*).ti,ab.
106	(price* or pricing*).ti,ab.
107	(financ* or fee or fees or expenditure* or saving*).ti,ab.
108	(value adj2 (money or monetary)).ti,ab.
109	resourc* allocat*.ti,ab.
110	(fund or funds or funding* or funded).ti,ab.
111	(ration or rations or rationing* or rationed).ti,ab.
112	or/96-111
113	statistical model/
114	exp economic aspect/
115	113 and 114
116	*theoretical model/
117	*nonbiological model/
118	stochastic model/
119	decision theory/
120	decision tree/
121	monte carlo method/
122	(markov* or monte carlo).ti,ab.
123	econom* model*.ti,ab.
124	(decision* adj2 (tree* or analy* or model*)).ti,ab.
125	or/115-124
126	quality adjusted life year/
127	"quality of life index"/
128	short form 12/ or short form 20/ or short form 36/ or short form 8/
129	sickness impact profile/
130	(quality adj2 (wellbeing or well being)).ti,ab.
131	sickness impact profile.ti,ab.
132	disability adjusted life.ti,ab.
133	(qal* or qtime* or qwb* or daly*).ti,ab.
134	(qal* or qtime* or qwb* or daly*).ti,ab.
135	(qol* or hql* or hqol* or h qol* or hrqol* or hr qol*).ti,ab.
136	(health utility* or utility score* or disutilit* or utility value*).ti,ab.
137	(hui or hui1 or hui2 or hui3).ti,ab.
138	(health* year* equivalent* or hye or hyes).ti,ab.
139	discrete choice*.ti,ab.
140	rosser.ti,ab.
141	(willingness to pay or time tradeoff or time trade off or tto or standard gamble*).ti,ab.
142	(sf36* or sf 36* or short form 36* or shortform 36* or shortform36*).ti,ab.
143	(sf20 or sf 20 or short form 20 or shortform 20 or shortform20).ti,ab.
144	(sf12* or sf 12* or short form 12* or shortform 12* or shortform12*).ti,ab.

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Interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice

#	Searches
145	(sf8* or sf 8* or short form 8* or shortform 8* or shortform8*).ti,ab.
146	(sf6* or sf 6* or short form 6* or shortform 6* or shortform6*).ti,ab.
147	or/126-146
148	95 and (112 or 125 or 147)

Database: CRD HTA (last updated 31st March 2018)

Date of last search: 12/09/2022

#	Searches
1	MeSH DESCRIPTOR pregnancy EXPLODE ALL TREES IN HTA
2	MeSH DESCRIPTOR pregnant women IN HTA
3	MeSH DESCRIPTOR prenatal care IN HTA
4	((antenatal* or ante natal* or gestation* or maternal* or mother* or pregnan* or prenatal* or pre natal*)) and (Project record:ZDT OR Full publication record:ZDT) IN HTA
5	#1 OR #2 OR #3 OR #4
6	MeSH DESCRIPTOR breast feeding IN HTA
7	MeSH DESCRIPTOR lactation IN HTA
8	((breast adj2 (feed* or fed* or milk*))) and (Project record:ZDT OR Full publication record:ZDT) IN HTA
9	((breastfeed* or breastfed* or breastmilk or expressed milk* or lactat*)) and (Project record:ZDT OR Full publication record:ZDT) IN HTA
10	((nursing adj (baby or infant* or mother* or neonate* or newborn*))) and (Project record:ZDT OR Full publication record:ZDT) IN HTA
11	#6 OR #7 OR #8 OR #9 OR #10
12	MeSH DESCRIPTOR child EXPLODE ALL TREES IN HTA
13	MeSH DESCRIPTOR infant EXPLODE ALL TREES IN HTA
14	MeSH DESCRIPTOR minors IN HTA
15	MeSH DESCRIPTOR pediatrics EXPLODE ALL TREES IN HTA
16	((child* or baby or babies or boy* or girl* or infan* or juvenile* or kid* or kindergar* or minors or neonat* or newborn* or p*ediatric* or preschool* or schoolchild* or school age* or toddler* or young*)) and (Project record:ZDT OR Full publication record:ZDT) IN HTA
17	#12 OR #13 OR #14 OR #15 OR #16
18	#5 OR #11 OR #17
19	MeSH DESCRIPTOR folic acid EXPLODE ALL TREES IN HTA
20	((folic acid* or folate* or folacin or vitamin b9 or vitamin b 9 or vitamin m or pteroylglutamic acid* or folvite*)) and (Project record:ZDT OR Full publication record:ZDT) IN HTA
21	#19 OR #20
22	MeSH DESCRIPTOR vitamins EXPLODE ALL TREES IN HTA
23	MeSH DESCRIPTOR dietary supplements IN HTA
24	((vitamin* or previtamin* or provitamin* or multivitamin* or micronutrient* or multimicronutrient* or multi* micronutrient*)) and (Project record:ZDT OR Full publication record:ZDT) IN HTA
25	((precursor* adj3 vitamin*)) and (Project record:ZDT OR Full publication record:ZDT) IN HTA
26	((diet* or nutrition*) adj2 supplement*)) and (Project record:ZDT OR Full publication record:ZDT) IN HTA
27	((calciferol* or calcifediol* or calciol* or cholecalciferol* or hydroxycholecalciferol* or dihydroxycholecalciferol* or dihydrotachysterol* or calcitriol* or ergocalciferol* or ergosterol* or viosterol or vitamin d* or vitamind* or vitamina* or retinol* or retinoid* or retinyl* or retinaldehyde* or carotenoid* or beta carotene* or betacarotene* or tocopherol* or ascorb* or Dehydroascorbic Acid* or vitaminc*)) and (Project record:ZDT OR Full publication record:ZDT) IN HTA
28	((vit adj2 (A or C or D))) and (Project record:ZDT OR Full publication record:ZDT) IN HTA
29	((healthy start* or healthystart*)) and (Project record:ZDT OR Full publication record:ZDT) IN HTA
30	#22 OR #23 OR #24 OR #25 OR #26 OR #27 OR #28 OR #29

#	Searches
31	#21 OR #30
32	#18 AND #31

Database: INAHTA**Date of last search: 05/12/2023**

#	Searches
1	"Pregnancy"[mhe]
2	"Pregnant Women"[mh]
3	"Prenatal Care"[mh]
4	((antenatal* or ante natal* or gestation* or maternal* or mother* or pregnan* or prenatal* or pre natal*)) [Title] OR ((antenatal* or ante natal* or gestation* or maternal* or mother* or pregnan* or prenatal* or pre natal*)) [abs]
5	#4 OR #3 OR #2 OR #1
6	"Breast Feeding"[mh]
7	"Lactation"[mh]
8	((breastfeed* or breastfed* or breastmilk or expressed milk* or lactat*)) [Title] OR ((breastfeed* or breastfed* or breastmilk or expressed milk* or lactat*)) [abs]
9	((breast AND (feed* or fed* or milk*)) [Title] OR ((breast AND (feed* or fed* or milk*)) [abs]
10	((nursing AND (baby or infant* or mother* or neonate* or newborn*)) [Title] OR ((nursing AND (baby or infant* or mother* or neonate* or newborn*)) [abs]
11	#10 OR #9 OR #8 OR #7 OR #6
12	"Child"[mhe]
13	"Infant"[mhe]
14	"Minors"[mh]
15	"Pediatrics"[mhe]
16	((child* or baby or babies or boy* or girl* or infan* or juvenile* or kid* or kindergar* or minors or neonat* or newborn* or p*ediatric* or preschool* or schoolchild* or school age* or toddler* or young)) [Title] OR ((child* or baby or babies or boy* or girl* or infan* or juvenile* or kid* or kindergar* or minors or neonat* or newborn* or p*ediatric* or preschool* or schoolchild* or school age* or toddler* or young)) [abs]
17	#16 OR #15 OR #14 OR #13 OR #12
18	#17 OR #11 OR #5
19	"Folic Acid"[mhe]
20	((folic acid* or folate* or folacin or vitamin b9 or vitamin b 9 or vitamin m or pteroylglutamic acid* or folvite)) [Title] OR ((folic acid* or folate* or folacin or vitamin b9 or vitamin b 9 or vitamin m or pteroylglutamic acid* or folvite)) [abs]
21	#20 OR #19
22	"Vitamins"[mhe]
23	"Dietary Supplements"[mh]
24	((vitamin* or previtamin* or provitamin* or multivitamin* or micronutrient* or multimicronutrient* or multi* micronutrient*) [Title] OR ((vitamin* or previtamin* or provitamin* or multivitamin* or micronutrient* or multimicronutrient* or multi* micronutrient*)) [abs]
25	((precursor* AND vitamin*)) [Title] OR ((precursor* AND vitamin*)) [abs]
26	((((diet* or nutrition*) AND supplement*)) [Title] OR (((diet* or nutrition*) AND supplement*)) [abs]
27	((calciferol* or calcifediol* or calciol* or cholecalciferol* or hydroxycholecalciferol* or dihydroxycholecalciferol* or dihydrotachysterol* or calcitriol* or ergocalciferol* or ergosterol* or viosterol or vitamind* or 25 hydroxy* or vitamina* or retinol* or retinoid* or retinyl* or retinaldehyde* or carotenoid* or beta carotene* or betacarotene* or tocopherol* or ascorb* or Dehydroascorbic Acid* or vitaminc)) [Title] OR ((calciferol* or calcifediol* or calciol* or cholecalciferol* or hydroxycholecalciferol* or dihydroxycholecalciferol* or dihydrotachysterol* or calcitriol* or ergocalciferol* or ergosterol* or viosterol or vitamind* or 25 hydroxy* or vitamina* or retinol* or retinoid* or retinyl* or retinaldehyde* or carotenoid* or beta carotene* or betacarotene* or tocopherol* or ascorb* or Dehydroascorbic Acid* or vitaminc)) [abs]
28	((vit AND (A or C or D))) [Title] OR ((vit AND (A or C or D))) [abs]
29	((healthy start* or healthystart*)) [Title] OR ((healthy start* or healthystart*)) [abs]

FINAL

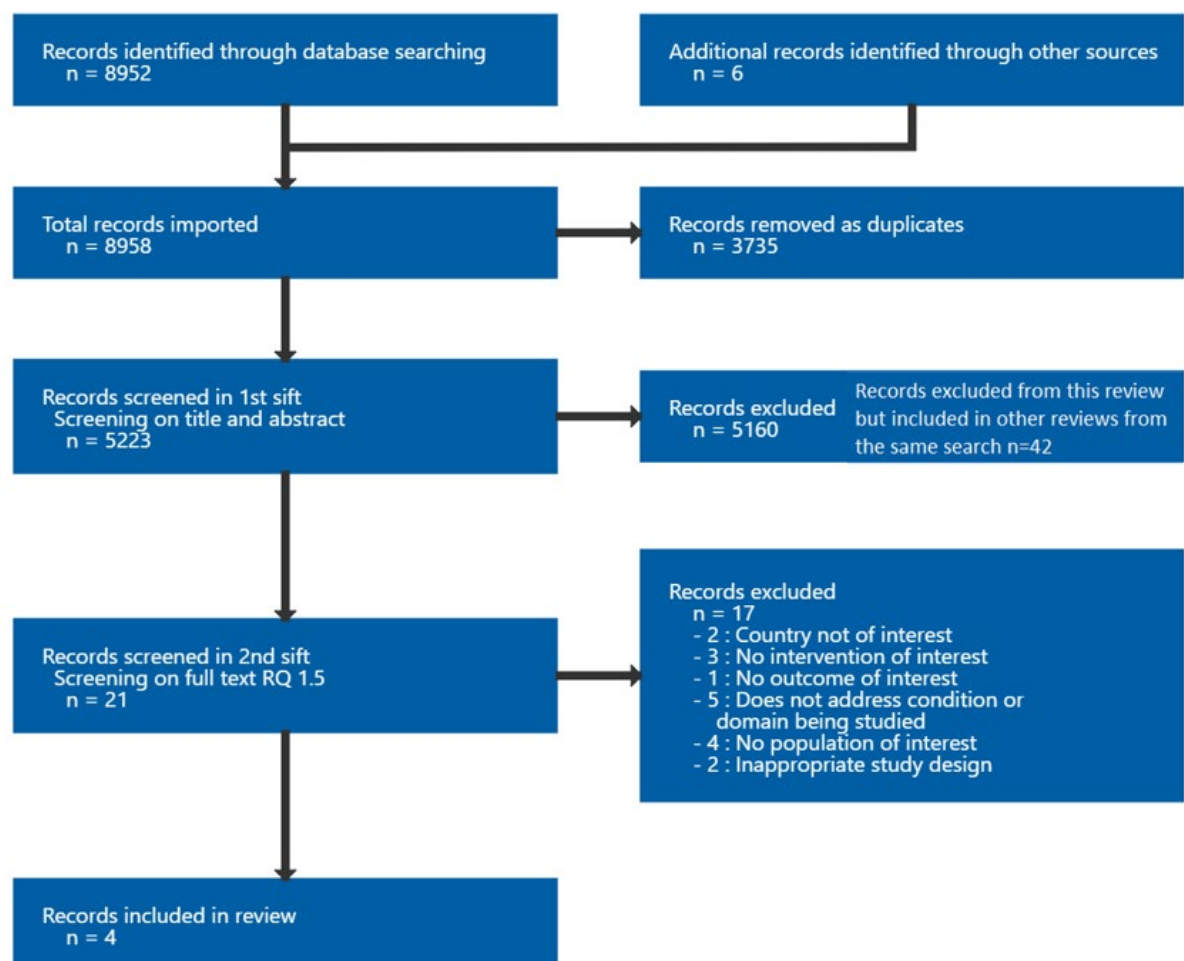
Interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice

#	Searches
30	#29 OR #28 OR #27 OR #26 OR #25 OR #24 OR #23 or #22
31	#30 OR #21
32	#31 AND #18
33	"Treatment Adherence and Compliance"[mh]
34	"Patient Compliance"[mh]
35	"Medication Adherence"[mh]
36	"Guideline Adherence"[mh]
37	((uptake* or up-tak* or takeup* or tak*-up* or aware* or adher* or nonadher* or non adher* or comply* or complies or complian* or adopt* or implement))[Title] OR ((uptake* or up-tak* or takeup* or tak*-up* or aware* or adher* or nonadher* or non adher* or comply* or complies or complian* or adopt* or implement))[abs]
38	#37 OR #36 OR #35 or #34 or #33
39	#38 AND #32

Appendix C Effectiveness evidence study selection

Study selection for: What interventions are effective to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice for pregnant women, breastfeeding women, babies and children up to 5 years?

Figure 1: Effectiveness evidence study selection flow chart



Appendix D Evidence tables

Evidence tables for review question: What interventions are effective to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice for pregnant women, breastfeeding women, babies and children up to 5 years?

Table 6: Evidence tables

Cawley, 2020

Bibliographic Reference	Cawley, Caroline; Buckenmeyer, Hannelore; Jellison, Trina; Rinaldi, Joseph B; Vartanian, Keri B; Effect of a Health System-Sponsored Mobile App on Perinatal Health Behaviors: Retrospective Cohort Study.; JMIR mHealth and uHealth; 2020; vol. 8 (no. 7); e17183
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Study details

Country/ies where study was carried out	USA
Study type	Retrospective cohort
Study dates	March 2018 to January 2019
Inclusion criteria	Women who <ul style="list-style-type: none">• had four or more prenatal visits to any of the selected clinics• were aged over 18 years• gave birth to a live infant at a Providence hospital 4-6 months prior to the start of the study.
Exclusion criteria	<ul style="list-style-type: none">• Employee of Providence
Patient characteristics	Intervention group, N=167

	Control group, N=400
	Age, mean (SD), years
	Not reported
	Age n (%), years
	Intervention group
	<25 = 7 (4.2)
	25 - 29 = 34 (20.4)
	30-34 = 62 (37.1)
	35-39 = 53 (31.7)
	> 40 = 11 (6.6)
	Control group
	<25 = 26 (6.5)
	25 - 29 = 84 (21.0)
	30-34 = 133 (35.3)
	35-39 = 119 (29.8)
	> 40 = 38 (7.5)
	Number of children, n (%)

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Interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice

	<p>Intervention group</p> <p>First child = 109 (65.1)</p> <p>More than 1 child = 58 (34.9)</p> <p>Control group</p> <p>First child = 193 (48.4)</p> <p>More than 1 child = 207 (51.7)</p>
Intervention(s)/control	<p>Intervention: Information/education provision - Users of the Circle app. The Circle app was designed with the following goals:</p> <ul style="list-style-type: none"> • Provide the opportunity to connect and receive personalized health information to promote healthy pregnancies, births, and paediatric care from birth to 18 years of age. • Give users access to relevant, trustworthy, evidence-based pregnancy and infant care information. • Connect users to prenatal and postnatal care and services. • Provide informative content, to-do lists, reminders and tools to monitor health of mother and baby during pregnancy and after birth. • Keep patients accessing the same healthcare providers. • Improve family well-being. • Integrate with online services offered that are aimed at increasing access to care. <p>Control: Status quo - Non-users of the Circle app</p>
Duration of follow-up	Follow-up not reported
Sources of funding	Not industry funded
Sample size	N = 567

N=number of participants; USA: United States of America

Study arms

Intervention arm: Circle app users (N = 167)

Control arm: non-Circle app users (N = 400)

Maternal and child nutrition: evidence reviews for interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice (January 2025)

Outcomes

Health behaviours while pregnant

Outcome	Intervention arm: Circle app users vs Control arm: non-Circle app users, N2 = 379, N1 = 162
Did not take recommended vitamins (Adjusted OR) Adjusted for age (continuous), race, gross household income, number of children, and insurance type	0.91 (0.84)
Odds ratio/p value	

N: number of participants; OR: odds ratio

Did not take recommended vitamins - Polarity - Lower values are better
Includes only study participants with responses to health behaviour questions

Critical appraisal – Risk Of Bias In Non-randomized Studies of Interventions (ROBINS-I)

Section	Question	Answer
1. Bias due to confounding	Risk of bias judgement for confounding	Moderate <i>(Confounding domains were objective and collected from self-reported questionnaires. Responses to questionnaires were not validated against external records, however, were less likely to threaten validity due to objective measures.)</i>
2. Bias in selection of participants into the study	Risk of bias judgement for selection of participants into the study	Low
3. Bias in classification of interventions	Risk of bias judgement for classification of interventions	Moderate <i>(App user and non-user group was defined retrospectively based on survey responses after baseline. Those who stated on the survey that they used the Circle app during the prenatal period were defined as users and those did not use the Circle app during the prenatal period or did not use the app at all were defined as non-users.)</i>

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Interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice

Section	Question	Answer
4. Bias due to deviations from intended interventions	Risk of bias judgement for deviations from intended interventions	No information <i>(No details were provided relating to intervention implementation success, deviations or co-interventions used. Details relating to lack of initiation and adherence of the app are unclear as the study combines those that did not initiate use of the Circle app and those that did not adhere to the app during the prenatal period..)</i>
5. Bias due to missing data	Risk of bias judgement for missing data	Low
6. Bias in measurement of outcomes	Risk of bias judgement for measurement of outcomes	Low
7. Bias in selection of the reported result	Risk of bias judgement for selection of the reported result	No information <i>(The authors state that they selected three main types of outcome study measures from the Providence Birth and Infant Care survey which contains many validated and developed measures of pre- and postnatal health, health care, health behaviours, and health knowledge. It is unclear whether the selection of outcome measures or different analyses in the study were pre-specified as there is no protocol for this study.)</i>
Overall bias	Risk of bias judgement	Moderate
Overall bias	Risk of bias variation across outcomes	The study is judged to be at low or moderate risk of bias for all domains.
Overall bias	Directness	Partially Applicable <i>(Main aim of the intervention is not as focused as described in review protocol - study aimed to examine whether the use of the Circle app during the prenatal period is associated with improved health and health behaviour outcomes)</i>

de Nooijer, 2012

Bibliographic Reference de Nooijer, J.; Jansen, R.; van Assema, P.; The use of implementation intentions to promote vitamin D supplementation in young children; Nutrients; 2012; vol. 4 (no. 10); 1454-1463

Study details

Country/ies where study was carried out	The Netherlands
Study type	Randomised controlled trial (RCT)
Study dates	Not reported
Inclusion criteria	<ul style="list-style-type: none">• parents of children aged 1 to 3½ years old• residing in the Netherlands• registered members of Flycatcher, a Dutch ISO-certified Internet panel.
Exclusion criteria	<p>Participants</p> <ul style="list-style-type: none">• already giving their child 10µg of vitamin D supplementation at least six days a week• with a negative intention towards giving vitamin D supplementation• not living with the child• who were randomised to the intervention group and did not fill in an implementation intention.
Patient characteristics	<p>Participant age, mean (SD), years</p> <p>34.1 (4.4)</p> <p>Participant gender, n (%)</p> <p>Female = 78</p> <p>Male = 22</p>

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	<p>Child age, mean (SD), years</p> <p>2.3 (0.8)</p> <p>Child gender, n (%)</p> <p>Female = 54</p> <p>Male = 46</p> <p>First-born child, %</p> <p>Yes = 40</p> <p>No = 60</p>
Intervention(s)/control	<p>Intervention: Multicomponent intervention involving information/education provision and behavioural intervention - Implementation intention instruction involving:</p> <ul style="list-style-type: none"> • Questionnaire to assess current supplementation behaviour and intention to give vitamin D supplements. • Written information on vitamin D supplementation, why it is important in children and the required amount. • A formulation of an implementation intention. <p>Control: Information provision only - No implementation intention instruction involving:</p> <ul style="list-style-type: none"> • Questionnaire to assess present supplementation behaviour and intention to give vitamin D supplements. • Written information on vitamin D supplementation, why it is important in children and the required amount.
Duration of follow-up	4 weeks
Sources of funding	Not industry funded
Sample size	N = 171 (894 randomised)

ISO: International Organisation for Standardisation; N: number of participants; SD: standard deviation; µg: micrograms

Study arms

Maternal and child nutrition: evidence reviews for interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice (January 2025)

Intervention arm: Implementation intention instruction (N = 80)

Control arm: No implementation intention instruction (N = 91)

Outcomes

Study timepoints

- Baseline
- 4 week

Vitamin D supplementation behaviours

Outcome	Baseline, Intervention armImplementation intention instruction, N = 80	Baseline, Control arm: No implementation intention instruction, N = 91	4 week, Intervention arm: Implementation intention instruction, N = 80	4 week, Control arm: No implementation intention instruction, N = 91
Number of parents performing adequate supplementation behaviour (n (%)) Parents already performing adequate supplementation were excluded from the study	n = 0	n = 0	n = 29 ; % = 36	n = 25 ; % = 27
No of events				

N: number of participants

Number of parents performing adequate supplementation behaviour - Polarity - Higher values are better
Number of days vitamin D was supplemented - Polarity - Higher values are better

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Critical appraisal - Cochrane Risk of Bias tool (RoB 2.0)

Section	Question	Answer
Domain 1: Bias arising from the randomisation process	Risk of bias judgement for the randomisation process	Some concerns <i>(Lack of information on the randomisation process and baseline values for both groups not reported but study states no differences were found between intervention and control groups)</i>
Domain 2a: Risk of bias due to deviations from the intended interventions (effect of assignment to intervention)	Risk of bias for deviations from the intended interventions (effect of assignment to intervention)	Some concerns <i>(Insufficient information on blinding and assignment to intervention)</i>
Domain 2b: Risk of bias due to deviations from the intended interventions (effect of adhering to intervention)	Risk of bias judgement for deviations from the intended interventions (effect of adhering to intervention)	Low
Domain 3. Bias due to missing outcome data	Risk-of-bias judgement for missing outcome data	Low
Domain 4. Bias in measurement of the outcome	Risk-of-bias judgement for measurement of the outcome	Some concerns <i>(Self-reported outcomes)</i>
Domain 5. Bias in selection of the reported result	Risk-of-bias judgement for selection of the reported result	Low
Overall bias and Directness	Risk of bias judgement	Some concerns <i>(The study is judged to raise some concerns in at least one domain for this result, but not to be at high risk of bias for any domain)</i>
Overall bias and Directness	Overall Directness	Directly applicable
Overall bias and Directness	Risk of bias variation across outcomes	n/a

N/A: not applicable

Maternal and child nutrition: evidence reviews for interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice (January 2025)

Evans, 2014**Bibliographic Reference**

Evans, WD; Wallace Bihm, J; Szekely, D; Nielsen, P; Murray, E; Abroms, L; Snider, J; Initial outcomes from a 4-week follow-up study of the Text4baby program in the military women's population: randomized controlled trial; Journal of medical Internet research; 2014; vol. 16 (no. 5); e131

Study details

Country/ies where study was carried out	USA
Study type	Randomised controlled trial (RCT)
Study dates	December 1, 2011 to January 31, 2013
Inclusion criteria	Female military health care beneficiaries (both active duty and family members) <ul style="list-style-type: none"> aged 18-45 years first presenting for prenatal care before 14-weeks gestation with a working mobile phone able to speak and read English.
Exclusion criteria	Not reported
Patient characteristics	Intervention group, n = 230 Control group, n = 229 Age, mean (SD), years NR Age, n (%), years

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	<p><20 = 31 (3.3)</p> <p>20-34 = 837 (88.8)</p> <p>>35 = 75 (7.9)</p> <p>Parity, n (%)</p> <p>Yes = 451 (47.8)</p> <p>No = 492 (52.2)</p> <p>Pre-pregnancy BMI, n (%)</p> <p>Underweight = 7 (0.7)</p> <p>Normal = 154 (16.4)</p> <p>Overweight = 97 (10.3)</p> <p>Obese = 63 (6.7)</p>
Intervention(s)/control	<p>Intervention: Information/education provision - Text4baby (in addition to usual care) which involved:</p> <ul style="list-style-type: none"> • Receipt of welcome and introductory messages. • Receipt of three text messages per week throughout their enrolment, tailored to the date of enrolment and baby's gestational age. • A total of 135 distinct prenatal text messages. <p>Control: Status quo - Usual care</p>
Duration of follow-up	4 weeks
Sources of funding	Not industry funded
Sample size	N = 943

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Interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice

Other information	<p>Owing to the significant loss-to-follow-up, demographic characteristics of the baseline and follow-up samples were compared and the analysis showed statistically significant differences in those reporting being married and in those currently working or attending school.</p> <p>In the adjusted model, which accounts for four socioeconomic variables, imputations for missing values for marital status and race, and inverse probability weighting were used to account for the attrition</p>
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BMI: body mass index; N: number of participants; USA: United States of America

Study arms

Intervention arm: Text4baby (N = 229)
Number reported is for those who completed the program. Baseline number not reported according to allocated group.

Control arm: Usual care (N = 230)
Number reported is for those who completed the program. Baseline number not reported according to allocated group.

Outcomes

Study timepoints

- Baseline
- 4 week

Improvements in attitudes towards prenatal vitamins

Outcome	Intervention arm: Text4baby vs Control arm: Usual care, 4 week vs Baseline, N2 = 230, N1 = 229
<p>Taking a prenatal vitamin is important to the health of my developing baby - strongly agree</p> <p>Effect of intervention and time on strong agreement (N=943 for baseline sample)</p> <p>aOR (95% CI)</p>	<p>1.73 (0.80 to 3.73)</p>

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Outcome	Intervention arm: Text4baby vs Control arm: Usual care, 4 week vs Baseline, N2 = 230, N1 = 229
Taking a prenatal vitamin will improve the health of my developing baby - strongly agree Effect of intervention and time on strong agreement (N=943 for baseline sample) aOR (95% CI)	1.91 (1.08 to 3.34)

aOR: adjusted odds ratio; N: number of participants

Effects of intervention and time on strong agreement (Fully adjusted for age [quintile], parity, imputed marital status and race, and use of inverse probability weighting to account for attrition [indicates change to "strongly disagree" - reverse coded])

Critical appraisal - Cochrane Risk of Bias tool (RoB 2.0)

Section	Question	Answer
Domain 1: Bias arising from the randomisation process	Risk of bias judgement for the randomisation process	Low
Domain 2a: Risk of bias due to deviations from the intended interventions (effect of assignment to intervention)	Risk of bias for deviations from the intended interventions (effect of assignment to intervention)	Low (No deviations from intended intervention)
Domain 2b: Risk of bias due to deviations from the intended interventions (effect of adhering to intervention)	Risk of bias judgement for deviations from the intended interventions (effect of adhering to intervention)	Low
Domain 3. Bias due to missing outcome data	Risk-of-bias judgement for missing outcome data	Some concerns (51.3% of randomised participants had missing outcome data)
Domain 4. Bias in measurement of the outcome	Risk-of-bias judgement for measurement of the outcome	Some concerns (Self-reported outcomes)

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Section	Question	Answer
Domain 5. Bias in selection of the reported result	Risk-of-bias judgement for selection of the reported result	Some concerns (Adjusted estimates included missing outcome data by imputations)
Overall bias and Directness	Risk of bias judgement	High (The study is judged to be at high risk of bias in at least one domain for this result)
Overall bias and Directness	Overall Directness	Partially applicable (Main aim of the intervention is not as focused as described in review protocol - study aimed to describe the intervention including the design, methods and baseline data, and to evaluate the initial outcomes of the program at 4 weeks post baseline.)
Overall bias and Directness	Risk of bias variation across outcomes	N/A

Madar, 2009

Bibliographic Reference

Madar AA; Klepp K; Meyer HE; Effect of free vitamin D(2) drops on serum 25-hydroxyvitamin D in infants with immigrant origin: a cluster randomized controlled trial.; Eur J Clin Nutr; 2009; vol. 63 (no. 4); 478-84

Study details

Country/ies where study was carried out	Norway
Study type	Cluster randomised controlled trial
Study dates	March 2004 to February 2006

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Inclusion criteria	<ul style="list-style-type: none"> Pakistani, Turkish or Somali background who came for a routine 6-week check of their infants
Exclusion criteria	Not reported
Patient characteristics	<p>Intervention group, n= 22; adjusted sample size = 16</p> <p>Control group, n =29; adjusted sample size = 22</p> <p>Infants' age, mean (SD), weeks</p> <p>Intervention = 7 (1.7)</p> <p>Control = 6.9 (1.8)</p>
Intervention(s)/control	<p>Intervention: Multicomponent interventions (information/ education provision and vitamin D drops supply) consisting</p> <ul style="list-style-type: none"> Free vitamin D2 drops. Simple Illustrated brochure describing the importance of vitamin D and how to administer the drops to their infants, translated into Urdu, Turkish and Somali. <p>Mothers were instructed to give their infant five drops containing 10 µg (400 IU) vitamin D2 daily.</p> <p>Control: Status quo - usual care: traditional health care for children provided by public health nurses consisting of</p> <ul style="list-style-type: none"> Oral information about vitamin D. Recommendation of vitamin D supplementation.
Duration of follow-up	Approximately 6 weeks (study reports infants recruited at 6 weeks old and followed up at 3 months of age.)
Sources of funding	Not industry funded
Sample size	<p>N = 51</p> <p>Design effect (using ICC for outcome 'patient made change to food' = 0.000)</p>

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Interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice

	$1 + (8-1) \times 0.05 = 1.35$ Adjusted sample size = $51/1.35 = 37.78$ Adjusted sample size, N = 38
Other information	Study reports that a multilevel analysis was first performed as randomisation was made at health-centre level and the analysis showed there was no clustering effect. Therefore, further analyses were performed by conventional ANCOVA. Additional analyses were performed adjusting for gender, ethnicity and the mother’s educational background.

ANCOVA: analysis of covariance; BMI: body mass index; ICC: intraclass correlation coefficient; IU: international units; N: number of participants; SD: standard deviation; µg: micrograms

Study arms

Intervention arm: Free Vitamin D2 drops (N = 22)

Control arm: usual care (N = 29)

Outcomes

Study timepoints

- Baseline
- 3 months

Change in total S-25OHD levels

Outcome	Intervention arm: Free Vitamin D2 drops, 32 week vs Baseline, N = 22	Control arm: usual care, 32 week vs Baseline, N = 29
Change in total S-25OHD (Mean (SD))	54.7 (29.9)	16.9 (38.8)
Mean (SD)		

N: number of participants; S-25OHD: S-25-hydroxyvitamin D; SD: standard deviation

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Critical appraisal - Cochrane Risk of Bias tool (RoB 2.0) Cluster randomised trials NGA

Section	Question	Answer
1a. Bias arising from the randomisation process	Risk of bias judgement for the randomisation process	Low
1b. Bias arising from the timing of identification and recruitment of individual participants in relation to timing of randomisation	Risk of bias judgement for the timing of identification and recruitment of individual participants in relation to timing of randomisation	Low
2a. Bias due to deviations from intended interventions	Risk of bias judgement for deviations from intended interventions	Low
3. Bias due to missing outcome data	Risk of bias judgement for missing outcome data	Some concerns (Insufficient information to determine if outcome assessors were aware of the intervention.)
4. Bias in measurement of the outcome	Risk of bias judgement for measurement of the outcome	Some concerns (<i>Comparative data between lost to follow-up participants and those that completed were not reported by the study, but study states no differences between both groups.</i>)
5. Bias in selection of the reported result	Risk of bias for selection of the reported result	Low
Overall bias and Directness	Risk of bias judgement	Some concerns (<i>The study is judged to raise some concerns in at least one domain.</i>)
Overall bias and Directness	Overall Directness	Directly applicable

Appendix E Forest plots

Forest plots for review question: What interventions are effective to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice for pregnant women, breastfeeding women, babies and children up to 5 years?

No meta-analysis was conducted for this review question and so there are no forest plots.

Appendix F GRADE tables

GRADE tables for review question: What interventions are effective to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice for pregnant women, breastfeeding women, babies and children up to 5 years?

Table 7: Evidence profile for comparison 1: Interventions using information/education provision versus status quo (including no treatment) in pregnant women – Combined components

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Information/education provision	Status quo (including no treatment)	Relative (95% CI)	Absolute		
Did not take recommended prenatal vitamins – pregnant women. Components of intervention: Digital/Electronic intervention, aimed at individuals, general intervention, delivered by peer (Wildflower Health, a digital health company), delivered on mobile devices. (follow-up unclear)												
1 (Cawley 2020)	observational studies	serious ¹	no serious inconsistency	serious ²	very serious ³	none	167	400	aOR 0.91 (0.36 to 2.27) ⁴	-	VERY LOW	CRITICAL NO IMP. DIFF
Improvement in attitudes towards prenatal vitamins – Strongly agree that taking a prenatal vitamin is important to the health of my developing baby – pregnant women. Components of intervention: Face to face and digital/electronic intervention, aimed at individuals, general intervention, delivered by peer (Voxiva Inc., a company delivering interactive mHealth solutions), delivered on mobile devices, health belief model and social cognitive theory. (follow-up 4 weeks)												
1 (Evans 2014)	randomised trials	very serious ⁵	no serious inconsistency	serious ²	serious ⁶	none	229	230	aOR 1.73 (0.8 to 3.73) ⁷	-	VERY LOW	IMPORTANT NO EV. OF IMP. DIFF
Improvement in attitudes towards prenatal vitamins – Strongly agree that taking a prenatal vitamin will improve the health of my developing baby – pregnant women. Components of intervention: Face to face and digital/electronic intervention, aimed at individuals, general intervention, delivered by peer (Voxiva Inc., a company delivering interactive mHealth solutions), delivered on mobile devices, health belief model and social cognitive theory. (follow-up 4 weeks)												
1 (Evans 2014)	randomised trials	very serious ⁵	no serious inconsistency	serious ²	serious ⁶	none	229	230	aOR 1.91 (1.09 to 3.34) ⁷	-	VERY LOW	IMPORTANT IMP. BENEFIT

aOR: Adjusted Odds Ratio; CI: confidence interval; Inc: Incorporated; mHealth: mobile health; MID: minimally important difference; RoB: risk of bias

¹ Serious risk of bias in the evidence contributing to the outcomes as per JBI checklist for analytical studies.

² The app based intervention is indirect as it was designed with broader intentions than information provision/education as described in the protocol. The app provided information on a variety of topics to promote healthy pregnancy, birth and paediatric care from birth to 18 years and incorporates a variety of other features such as those designed to increase access, provide continuity or connect users to different health services as well as improve family well-being.

³ 95% CI crosses 2 MIDs (0.85 and 1.25).

⁴ Adjusted for age (continuous), race, gross household income, number of children, and insurance type.

⁵ Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2.

⁶ 95% CI crosses 1 MID (1.25).

⁷ Adjusted for age [quintile], parity, imputed marital status and race, and use of inverse probability weighting to account for attrition.

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Interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice

Table 8: Evidence profile for comparison 2: Multicomponent interventions (information/education provision and Vitamin D drops supply) versus status quo (including no treatment) in babies aged 3 months – Combined components

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Multicomponent intervention (information/education provision and Vitamin D drops supply)	Status quo	Relative (95% CI)	Absolute		
Vitamin D supplementation uptake rate – measured as change in total serum 25(OH)D in babies aged 3 months. Components of intervention: Face to face and printed interventions, aimed at individuals, general interventions, delivered by healthcare practitioner, health and social care worker (public health nurses), delivered in child health clinics. (follow-up 6 weeks; Better indicated by higher values)												
1 (Madar 2009)	cluster randomised trials	serious ¹	no serious inconsistency	no serious indirectness	very serious ²	none	16	22	-	MD 37.8 higher (15.95 to 59.65 higher)	VERY LOW	CRITICAL IMP. BENEFIT

CI: confidence interval; (OH)D: hydroxyvitamin D; MD: mean difference; MID: minimally important difference; RoB: risk of bias; SD: standard deviation

¹ Serious risk of bias in the evidence contributing to the outcomes as per RoB 2 for cluster randomised trials.

² 95% CI crosses 2 MIDs (0.5x control group SD, for 'vitamin supplementation uptake rate – measured as change in total serum 25OHD' = -17.9, +17.9).

Table 9: Evidence profile for comparison 3: Multicomponent interventions (information/education provision and psychological or behavioural technique) versus control (information/education provision only) in children 1 to 3.5 years – Combined components

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Multicomponent intervention (information/education provision and psychological or behavioural technique)	Information/education provision only	Relative (95% CI)	Absolute		
Vitamin D supplementation uptake rate – measured as number of parents performing adequate supplementation ¹ in children 1 to 3.5 years. Components of intervention: Face to face and printed interventions, aimed at individuals, general interventions, who delivered intervention NR, delivered on internet panel. (follow-up 4 weeks)												
1 (de Nooijer 2012)	randomised trials	serious ²	no serious inconsistency	no serious indirectness	serious ³	none	29/80 (36.3%)	25/91 (27.5%)	RR 1.32 (0.85 to 2.05)	88 more per 1000 (from 41 fewer to 288 more)	LOW	CRITICAL NO EV. OF IMP. DIFF.

CI: confidence interval; MID: minimally important difference; NR: Not reported; RoB: risk of bias RR: Risk Ratio; µg: microgram

¹ Adequate supplementation behaviour refers to giving child 10µg vitamin D at least 6 days a week.

² Serious risk of bias in the evidence contributing to the outcomes as per RoB 2.

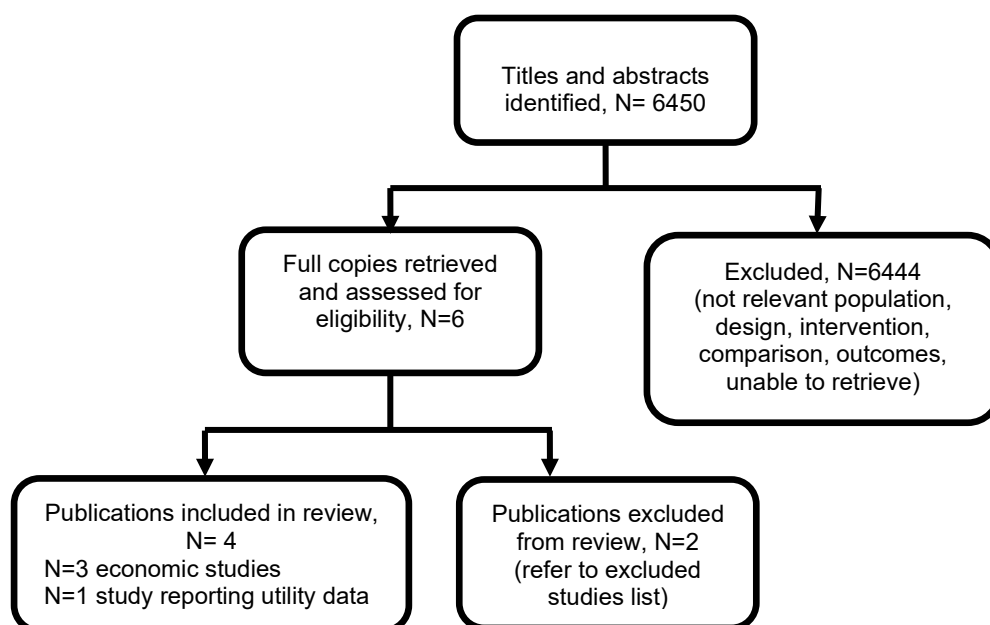
³ 95% CI crosses 1 MID (1.25).

Appendix G Economic evidence study selection

Study selection for: What interventions are effective to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice for pregnant women, breastfeeding women, babies and children up to 5 years?

Figure 2 shows the flow diagram of the selection process for economic evaluations of interventions aiming to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice for pregnant women, breastfeeding women, babies and children up to 5 years and any studies reporting related health state utility data.

Figure 2: Economic evidence study selection flow chart



Appendix H Economic evidence tables

Economic evidence tables for review question: What interventions are effective to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice for pregnant women, breastfeeding women, babies and children up to 5 years?

Table 10: Economic evidence tables for interventions aiming to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice for pregnant women, breastfeeding women, babies and children up to 5 years

Study ID Country Type of study	Interventions and comparators	Study population Study design Data sources	Costs and outcomes: description and values	Results: Cost-effectiveness	Comments
Filby 2014 UK Cost-effectiveness analysis	Universal vitamin D supplementation to all women during pregnancy and 12 months post-partum, & all children <5 years old. Supplements were provided free of charge at Health Centres, Children's Centres, and some GP practices & pharmacies. Information was provided through adverts on buses, Asian media networks, Asian shops, posters and leaflets (in 8 community languages) in health centres and surgeries, and logo-branded materials, for example, shopping bags, supermarket trolley keys, baby sunhats and t-shirts.	Pregnant women up to 12 months post-partum and children aged <5 years Economic modelling Source of effectiveness & intervention cost data: published study on Heart of Birmingham PCT Source of other cost data: published study	Costs included: intervention (staff, mass media, vitamin D acquisition), management of vitamin D deficiency. Total costs for the whole eligible population in England: Intervention: £18,463,596 No intervention: £14,197,855 Outcome: number of people taking vitamin D supplements; number of people with symptomatic vitamin D deficiency Among eligible population: Number taking vitamin D supplements: Intervention: Women - 165,194 Children - 714,641 No intervention: Women - 21,547 Children - 107,196	ICER (for each sub-population only respective costs considered): Women: Cost per extra person taking vitamin D: £10.15 Cost per deficiency averted: £2,859 Children: Cost per extra person taking vitamin D: £4.62 Cost per deficiency averted: £1,229 Intervention not cost-saving even at 0% supplementation without intervention or 50% supplementation following intervention	<ul style="list-style-type: none"> • Perspective: likely NHS + cost of mass media campaign • Currency: GBP (£) • Cost year: 2012-3 • Time horizon: NR, likely until completion of vitamin D deficiency management • Discounting: NR • Applicability: Partial • Quality: potentially serious methodological limitations

Study ID Country Type of study	Interventions and comparators	Study population Study design Data sources	Costs and outcomes: description and values	Results: Cost-effectiveness	Comments
	No intervention	Source of unit costs: national sources	Number with symptomatic vitamin D deficiency: Intervention: Women - 352 Children - 2,003 No intervention: Women - 862 Children - 4,288		
Filby 2015 UK Cost-effectiveness and cost-utility analysis	<p>Universal offering of Health Start Vitamin programme to a. pregnant women from 10 weeks; women with a child aged <12 months; children aged 6 months - 4 years b. all women planning a pregnancy; pregnant women; women with a child aged <12 months; infants aged 0-6 months; children aged 6 months – 5 years</p> <p>Current offering of Health Start Vitamin programme to pregnant women from 10 weeks aged <18 years, low-income (in receipt of qualifying income-related benefits or tax credits) adult pregnant women from 10 weeks & low-income women with a child aged <12 months; children from</p>	<p>Women planning a pregnancy; pregnant women; women with a child aged <12 months; infants aged 0-6 months; children aged 6 months – 5 years</p> <p>Economic modelling</p> <p>Source of effectiveness & clinical input data: published UK study, national surveys, primary online survey</p> <p>Source of intervention and other cost data: national and local</p>	<p>Costs included: intervention (distribution & set up, vitamin acquisition), management of vitamin D deficiency and NTDs.</p> <p>Total incremental costs for the whole eligible population in England: (a): £7,874,978 (b): £4,893,907</p> <p>Offering to subgroups: Women planning a pregnancy + <10 weeks pregnant: -£989,352 Pregnant women <10 weeks: £1,683,725</p> <p>Outcomes: For vitamins A and C: number of people below the LRNI (level of intake likely to be sufficient to meet the needs of 2.5% of the population) For vitamin D: symptomatic vitamin D deficiency For folic acid: NTD-affected pregnancies, QALY estimated using</p>	<p>ICER: (a): £620,898/QALY (b): £6,528/QALY Offering to subgroups: Women planning pregnancy + <10 weeks pregnant: dominant Pregnant women <10 weeks: £7,126/QALY</p> <p>(b): Intervention not cost-effective if</p> <ul style="list-style-type: none"> • probability NTD in pregnant women >10 weeks is <0.15% • probability of vitamin D deficiency in infants and children aged 6 months - 4 years receiving intervention >0.2% • uptake of folic acid in women planning a pregnancy + <10 	<ul style="list-style-type: none"> • Perspective: NHS, public sector (NHS, local authority, central government); societal (public sector & individuals) • Currency: GBP (£) • Cost year: 2014 • Time horizon: lifetime for NTDs • Discounting: 3.5% • Applicability: Direct • Quality: potentially serious methodological limitations

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Study ID Country Type of study	Interventions and comparators	Study population Study design Data sources	Costs and outcomes: description and values	Results: Cost-effectiveness	Comments
	low-income families aged 6 months - 4 years. Healthy Start vitamin supplements contain: Maternal - folic acid; vitamin C; vitamin D. Children - vitamin A; vitamin C; vitamin D.	data, published evidence Source of unit costs: national & local sources	EQ-5D (UK tariff) & other unclear ratings Incremental outcomes among eligible population in England: (a): 13 QALYs, -20,886 people below vitamin A LRNI, -7,263 people below vitamin C LRNI (b): 750 QALYs Offering to subgroups: Women planning pregnancy + <10 weeks pregnant: 737 QALYs Pregnant women <10 weeks: 230 QALYs	weeks pregnant receiving intervention <30% • proportion of NTD-affected terminations >92%	
Floreskul 2020 UK Cost-utility analysis	Free vitamin D supplementation (Healthy Start vitamin D promotion & supplementation) No intervention	Pregnant women and children aged <4 years with varying degrees of skin pigmentation Economic modelling Source of effectiveness data: published study & trust observational dataset Source of resource use data: trust	Costs included: promotion campaign, distribution and supplementation of vitamin D, overheads, treatment of rickets, management of vitamin D deficiency; lifetime complications (in SA). Total costs per person (intervention vs. comparator): Dark skin tone: £20.23 vs. £21.46 Medium skin tone: £12.17 vs. £2.84 Light skin tone: £10.99 vs. £0.12 Outcome: QALY (from preventing rickets) based on EQ-5D and CHU-9D, UK general population preferences	ICER: Dark skin tone: intervention dominant Medium skin tone: £20,222/QALY Light skin tone: £423,340/QALY Probability of intervention being cost-effective at £20,000/QALY: Dark skin tone: 0.99 Medium skin tone: 0.52 Light skin tone: 0.00	<ul style="list-style-type: none"> • Perspective: NHS/PSS • Currency: GBP (£) • Cost year: 2016-7 • Time horizon: 4 years (lifetime in SA) • Discounting: NR • Applicability: Direct • Quality: potentially serious methodological limitations

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Study ID Country Type of study	Interventions and comparators	Study population Study design Data sources	Costs and outcomes: description and values	Results: Cost-effectiveness	Comments
		administrative records, published data Source of unit costs: national	Total QALYs per person (intervention vs. comparator): Dark skin tone: 3.335 vs. 3.334 Medium skin tone: 3.3337 vs 3.3332 Light skin tone: 3.33532 vs. 3.33529	Medium skin tone results sensitive to the risk of having rickets, rickets duration, intervention costs, supplementation rates. Assuming life-long consequences did not affect conclusions.	

CHU: child health utility; ICER: incremental cost-effectiveness ratio; LRNI: lower reference nutrient intake; NHS: national health service; NR: not reported; NTD: neural tube defect; PCT: primary care trust; PSS: personal social services; QALY: quality-adjusted life year; SA: sensitivity analysis

Appendix I Economic model

Economic model for review question: What interventions are effective to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice for pregnant women, breastfeeding women, babies and children up to 5 years?

This area was prioritised for de novo economic modelling. The committee selected to assess the cost-effectiveness of health technologies (such as apps), because these are the only interventions they considered for a recommendation which have promising evidence but are not currently in routine use in England. However, there was no adequate effectiveness evidence on health technologies to allow a meaningful and informative economic analysis to be carried out. Therefore, no economic model was developed for this review question.

Appendix J Excluded studies

Excluded studies for review question: What interventions are effective to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice for pregnant women, breastfeeding women, babies and children up to 5 years?

Excluded effectiveness studies

The excluded studies table only lists the studies that were considered and then excluded at the full-text stage for this review (N=17) and not studies (N=42) that were considered and then excluded from the search at the full-text stage as per the PRISMA diagram in Appendix C for the other review question in the same search (see evidence review C).

Table 11: Excluded studies and reasons for their exclusion

Study	Reason for exclusion
Akkermans, M.D., Eussen, S.R.B.M., Van Der Horst-Graat, J.M. et al. (2017) A micronutrient-fortified young-child formula improves the iron and Vitamin D status of healthy young European children: A randomized, double-blind controlled trial. American Journal of Clinical Nutrition 105(2): 391-399	- No intervention of interest <i>Study focused on fortification of formula milk with micronutrients</i>
Chilukuri, Nymisha, Cheng, Tina L, Psoter, Kevin J et al. (2018) Effectiveness of a Pediatric Primary Care Intervention to Increase Maternal Folate Use: Results from a Cluster Randomized Controlled Trial. The Journal of pediatrics 192: 247-252e1	- Does not address condition or domain being studied <i>Study focused on vitamins containing folate that were not Healthy Start vitamins and only reported on folate outcomes. This study is included in evidence review C.</i>
Corsello, A, Milani, GP, Gianni, ML et al. (2022) Different Vitamin D Supplementation Strategies in the First Years of Life: A Systematic Review. Healthcare (Basel, Switzerland) 10(6)	- No intervention of interest <i>No intervention of interest. Study assessed different doses of vitamin D supplementation and placebo</i>
deRosset, Leslie, Mullenix, Amy, Flores, Alina et al. (2014) Promotora de Salud: Promoting Folic Acid Use Among Hispanic Women. Journal of Women's Health (15409996) 23(6): 525-531	- No population of interest <i>Non-pregnant women</i>

Study	Reason for exclusion
Flores, Alina L., Isenburg, Jennifer, Hillard, Christina L. et al. (2017) Folic Acid Education for Hispanic Women: The Promotora de Salud Model. Journal of Women's Health (15409996) 26(2): 186-194	- No population of interest <i>All women between 18 - 45 years with no indication of being pregnant were included in the study. Results showed that none of the women were pregnant at the start of the study</i>
Golley, R, Pearce, J, Nelson, M et al. (2011) Children's lunchtime food choices following the introduction of food-based standards for school meals: observations from six primary schools in Sheffield. Public Health Nutrition 14(2): 271-278	- No population of interest <i>Children aged 8-10 years</i>
Gomes, F., King, S.E., Dallmann, D. et al. (2021) Interventions to increase adherence to micronutrient supplementation during pregnancy: a systematic review. Ann. New York Acad. Sci. 1493(1): 41-58	- Country not of interest <i>A systematic review with all included studies from low- and middle- income countries and non-OECD countries</i>
Molton, JS, Pang, Y, Wang, Z et al. (2016) Prospective single-arm interventional pilot study to assess a smartphone-based system for measuring and supporting adherence to medication. BMJ open 6(12nopagination)	- Does not address condition or domain being studied <i>Study addresses medication adherence for tuberculosis</i>
Moonan, May, Maudsley, Gillian, Hanratty, Barbara et al. (2022) An exploration of the statutory Healthy Start vitamin supplementation scheme in North West England. BMC Public Health 22(1): 1-12	- Inappropriate study design <i>Not an intervention study. Study had a quantitative element which reported the uptake of healthy start vouchers using quarterly uptake data. The quantitative element informed the qualitative element (the perceptions of women and health professionals about healthy start vitamins) which was the main focus of the study</i>
Morgan, LM, Major J, Meyer R et al. (2009) Multivitamin use among non-pregnant females of childbearing age in the Western North Carolina multivitamin distribution program. N C Med J 5(70): 386-90	- No population of interest <i>Women of childbearing age with no indication of being pregnant</i>
Moy, RJ, McGee, E, DeBelle, GD et al. (2012) Successful public health action to reduce the incidence of symptomatic vitamin D deficiency.	- No intervention of interest <i>Public health intervention: public awareness campaign about vitamin D</i>

Study	Reason for exclusion
Archives of Disease in Childhood 97(11): 952-954	
Murtadha, Z.A.J.; Abdulrahman, M.A.; Saeed, H.D. (2019) Effect of monthly Vitamin D supplementation during pregnancy versus counseling for increased dietary intake on vitamin serological level and development of adverse effects. Research Journal of Pharmaceutical, Biological and Chemical Sciences 10(1): 386-392	- Country not of interest <i>The study was not conducted in a high-income country (Iraq)</i>
Nguyen, P.; Thomas, M.; Koren, G. (2009) Predictors of prenatal multivitamin adherence in pregnant women. Journal of Clinical Pharmacology 49(6): 735-742	- Inappropriate study design <i>Not an intervention study. Study assessed predictors of adherence to prenatal vitamin</i>
Oza-Frank, Reena, Kachoria, Rashmi, Keim, Sarah A et al. (2015) Provision of specific preconception care messages and associated maternal health behaviors before and during pregnancy. American Journal of Obstetrics & Gynecology 212(3): 372e1-8	- Does not address condition or domain being studied <i>Prenatal vitamin use was measured before pregnancy</i>
Phelan, S; Abrams, B; Wing, RR (2019) Prenatal Intervention with Partial Meal Replacement Improves Micronutrient Intake of Pregnant Women with Obesity. Nutrients 11(5)	- Does not address condition or domain being studied <i>Not focused on supplementation. Study focuses on micronutrient intake which includes food, beverages and supplements. Vitamin intake from supplements were not presented separately</i>
Tanna, Nuttan K, Alexander, Emma C, Lee, Charlotte et al. (2021) Interventions to improve vitamin D status in at-risk ethnic groups during pregnancy and early childhood: a systematic review. Public health nutrition 24(11): 3498-3519	- Does not address condition or domain being studied <i>Included studies have been individually assessed and these do not meet inclusion criteria, either because they are assessing the impact of vitamin D supplementation on 25(OH)D levels; because the age range is above 5 years old or because they were conducted in a low- or middle-income country. We identified 1 relevant study (Madar 2009), which has been individually included in the systematic review</i>

FINAL

Interventions to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice

Study	Reason for exclusion
Wadia, U, Soon, W, Chivers, P et al. (2018) Randomised Controlled Trial Comparing Daily Versus Depot Vitamin D3 Therapy in 0-16-Year-Old Newly Settled Refugees in Western Australia Over a Period of 40 Weeks. Nutrients 10(3)	- No outcome of interest <i>Outcomes included 25(OH)D level and nutritional intake of vitamin D. No outcomes relevant to uptake of vitamin supplements</i>

25(OH)D: 25-hydroxy vitamin D

Excluded economic studies

Study	Reason for exclusion
Aguiar, M, Andronis, L, Pallan, M et al. (2020) The economic case for prevention of population vitamin D deficiency: a modelling study using data from England and Wales. European journal of clinical nutrition 74(5): 825-833	Population wider than population in research question
Dundas R, Boroujerdi M, Browne S, Deidda M, Bradshaw P, Craig P, et al. Evaluation of the Healthy Start voucher scheme on maternal vitamin use and child breastfeeding: a natural experiment using data linkage. Public Health Res 2023;11(11)	Economic results not presented

Appendix K Research recommendations – full details

Research recommendations for review question: What interventions are effective to increase uptake of vitamin supplements (including Healthy Start vitamins) in line with government advice for pregnant women, breastfeeding women, babies and children up to 5 years?

No research recommendations were made for this review question.