

Evidence statements from reviews 1 and 2

This document lists the evidence statements that support the recommendations in NICE's draft guideline on 'Vitamin D – implementation of existing guidance to prevent deficiency'. For details of which evidence statements are linked to each recommendation see section 10 of the guidance. Only evidence statements linked to a recommendation are listed in this document.

The evidence statements are short summaries of evidence in a review. Evidence statements 1.X are from evidence review 1. Evidence statements 2.X are from evidence review 2.

Please note that the wording of some evidence statements has been altered slightly from those in the evidence review(s) to make them more consistent with each other and NICE's standard house style.

Evidence statement 1.1

There is moderate evidence from one [+] before-and-after study¹ and weak evidence [-] from another before-and-after study² that a programme of universal vitamin D supplementation using Healthy Start vitamins, alongside a public awareness campaign about the importance of vitamin D and Healthy Start vitamins, may increase awareness and implementation of existing guidance on vitamin D among health professionals and others working with at-risk populations of pregnant/breast-feeding women and mothers of young children. One study found that the number of symptomatic cases of vitamin D deficiency in children under five years decreased by 59% in a four-year period.¹ Another study showed that 20% of children aged under four years, received at least one bottle of Healthy Start vitamins compared to less than 1% before the programme started.² Both studies indicated that public awareness and health professionals' awareness of the importance of vitamin D and Healthy Start vitamins increased each year that the programme was in operation.^{1,2}

¹ Moy *et al.*, 2012

² Nicholls and Stocker, 2012

Evidence statement 1.2

There is weak evidence from one [-] evaluation study¹ that providing training that includes staff development of bespoke action plans for vitamin D promotion, to frontline staff at nurseries and children's centres, may increase awareness of the importance of vitamin D among staff. Almost all staff reported an increase in knowledge after training, and 3 months post training many were able to list action plan components that they had achieved, including advising parents, providing literature about vitamin D and cascading training to other staff. However, the study provided no baseline data and relied on self-report.

¹. Foodtalk Community Interest Company 2013

Evidence statement 1.3

There is moderate evidence from one [+] before-and-after study¹ and weak evidence from another [-] before-and-after study² that a programme of universal vitamin D supplementation using Healthy Start vitamins increases awareness and implementation of existing guidance on vitamin D among health professionals and others working with at-risk populations of pregnant/breast-feeding women and mothers of young children. A key element of both these programmes has been an emphasis on staff training, where the provision of the free vitamin D supplements has been supported by continuing professional development of health staff including GPs, health visitors, community and hospital midwives, pharmacists, paediatricians and obstetricians about the importance of vitamin D.

¹ Moy *et al.*, 2012

² Nicholls and Stocker, 2012

Evidence statement 1.4

There is weak evidence from one [-] audit of case notes from NHS Trusts in North West England that health visitors and midwives are more likely to discuss vitamin D with, or offer literature to women in Trusts where training programmes had taken place^{1,2}. In 2011, in five out of ten Trusts that had training programmes in place 67% of the reviewed case notes reported discussing vitamin D or offering literature to women compared to 46% of reviewed case notes in five Trusts that did not have training in place. In 2013, in seven out of ten Trusts that had training in place, 61% of reviewed case notes reported discussing vitamin D or offering literature to women compared to 74% in three Trusts that did not have training in place. Two out of the three Trusts that did not have training in place in 2013 had had training in place in 2011 which might explain the unexpectedly high numbers for Trusts that did not have training in place in 2013.

¹ Jagatia *et al.* 2011

² Jagatia *et al.*, 2013

Evidence statement 1.5

There is moderate evidence from one [+] before-and-after study¹ and weak evidence from another [-] before-and-after study² that a programme of universal vitamin D supplementation using Healthy Start vitamins, alongside a public awareness campaign about the importance of vitamin D and Healthy Start vitamins, increases awareness and uptake of existing guidance on vitamin D among pregnant/breast-feeding women and mothers of young children. One study showed a year on year increase in the proportion of pregnant and lactating women and young children receiving vitamin D supplements over a period of 4 years. Uptake rates of Healthy Start vitamins in 2010/11 were 22% and 14%, and in 2012/13 were 23% and 20% for women and children, respectively.³ In another study 20% of children aged under 4 years received at least one bottle of Healthy Start vitamins at the end of the second year of the programme compared to 1% before the programme began.² Both

studies demonstrated yearly increases in public awareness of the importance of vitamin D and Healthy Start vitamins since the programmes began.^{1, 2}

¹ Moy *et al.*, 2012

² Nicholls and Stocker, 2012

³ McGee and Shaw, 2013 (Update of vitamin uptake numbers from earlier study by Moy *et al.*, 2012)

Evidence statement 1.6

There is weak evidence from one [-] evaluation report, that a community education programme may raise awareness and knowledge about the importance of vitamin D among Asian and Black adults, niqab wearing women and white elderly people.¹ In Bradford thirty-two individuals from these target groups became “vitamin D champions” after receiving training to raise awareness of the importance of vitamin D. They then supported a vitamin D health promotion campaign in the community with 283 people from the target groups attending community events. Of the 32 “community champions” 26 (81%) said they would now take a vitamin D supplement. 56/84 (64%) people who attended the health promotion events and completed a questionnaire said they would now take a vitamin D supplement.

¹ Lockyer S, 2013

Evidence statement 1.7

There is weak evidence from two [-] cost studies^{1, 2} that the costs of providing free universal vitamin D supplementation are less than the costs of treating vitamin D deficiency. Free universal vitamin D supplementation was provided for pregnant women, women whose child is less than 12 months old, and children under four years old in Birmingham (Heart of Birmingham (HoB), Birmingham East and North (BEN), and Birmingham South PCTs). The costs of providing Healthy Start vitamins to 100% of the target group in the three PCT areas were estimated to be £659,952 per year. Assuming 10% uptake for both women and children in BEN and South

PCTs plus 25% uptake in HoB PCT (HoB has been providing free universal Healthy Start vitamins for four years), the costs for the year 2011-12 were estimated to be £102,984. Assuming 25% take up for both women and children in all three PCTs in subsequent years the total costs were estimated to be £164,988. The costs of treating 33 cases of vitamin D deficiency in 2009-2010 were estimated to be £165,000 (£5,000 x 33 cases). The study was not a formal economic evaluation and included only the costs of vitamin supplements plus delivery charges when estimating the costs of the intervention.

¹ McGee 2010

Evidence statement 1.8

There is weak evidence from one [-] mixed methods study¹ that a programme of universal vitamin D supplementation using Healthy Start vitamins increases uptake among mothers and children. National data showed that uptake of the vitamins was higher in areas with universal schemes (3.97% for children and 7.72% for women) than in areas with targeted schemes (1.46% for children and 2.56% for women). Data were supported by in-depth interviews with service users and providers.

¹ Moonan *et al.*, 2012

Evidence statement 1.9

There is weak evidence [-] from one¹ cost study that the average cost of primary prevention compares favourably with the cost of treating vitamin D deficiency in children of Asian origin. The estimated cost was £2,507 to treat one case of vitamin D deficiency. The cost of providing vitamin D supplementation to the total Asian population was estimated to be £10,300 per year or £25,750 per year according to the COMA and DH guidelines, respectively. Providing supplementation to the entire population of 500 children of Asian origin was estimated to avoid 4.27 cases of vitamin D deficiency, therefore saving £10,706 per year. The study was not a formal economic evaluation and included only the costs of vitamin supplements when

estimating the costs of supplementation.

¹Zipitis *et al.*, 2006

Evidence statement 1.10

There is weak evidence from 17 studies (seven [-] surveys of at-risk groups ^{1, 2, 3, 4, 5, 6,7}, seven [-] surveys of health care professionals or providers ^{7, 8, 9, 10, 11, 12, 13}, and three [-] surveys of both at-risk groups and health care professionals ^{14, 15, 16}) that generally there is a lack of knowledge about the importance of vitamin D in bone health and the consequences of vitamin D deficiency, a lack of awareness of Healthy Start schemes, and lack of awareness of NICE guidelines and Department of Health guidelines about vitamin D supplements for at-risk groups. Most studies report that less than 50% of health care professionals advise pregnant and breast feeding women about taking vitamin D supplements or giving them to their children.

Sixteen studies explicitly focused on two at-risk groups a) pregnant and breastfeeding women and b) infants and children under five years, and certain of these studies focused on women and children from at-risk ethnic minority groups. No studies were identified that explicitly focused on c) people aged 65 years and over. One study explicitly focused on d) people who have low or no exposure to the sun, and e) people who have dark skin.¹

¹ Alemu and Varnam, 2012

² Austin *et al.*, 2012

³ Chandaria *et al.*, 2011

⁴ Leven *et al.*, 2012

⁵ Lucas-Herald *et al.*, 2012

⁶ Sharma *et al.*, 2011

⁷ Robinson, 2013

⁸ Cleghorn, 2006

⁹ Garton, 2008

¹⁰ Jagatia *et al.*, 2011

¹¹ Jain *et al.*, 2011

¹² Ling *et al.*, 2011

¹³ Lockyer *et al.*, 2011

¹⁴ Sharma *et al.*, 2009

¹⁵ Feeding for Life Foundation, 2012

¹⁶ Roberts, 2012

¹⁷ Zipitis *et al.*, 2011

Evidence statement 1.11

There is strong evidence (++) from one¹ qualitative study, strong evidence [++] from a mixed methods study², weak evidence [-] from one² qualitative study and weak evidence [-] from one³ survey that there are key reasons for poor uptake of Healthy Start vitamin supplements. Parents find it difficult to access Healthy Start vitamins, health professionals do not promote the scheme, families that are eligible for Healthy Start are unaware of the scheme, the distribution system is complex, confused and weak, and mothers are not motivated to take the vitamins or to give them to their children. Things that may help to increase the uptake of Healthy Start vitamins are free universal supplementation, central ordering of vitamins and increasing the number of distribution centres.

¹ Jessiman *et al.*, 2013

² McFadden *et al.*, 2013

³ Stocker and Nicholls, 2012

⁴ NHS England, 2013

Evidence statement 1.12

There is moderate evidence [+] from one¹ qualitative study of members of the Somali community in Bristol and health care professionals working with them, that an identified important health need is access to evidence-based information about vitamin D deficiency, especially for women.

¹ Ingram and Potter, 2009.

Evidence statement 1.13

There is weak evidence [-] from implementation of an online data capture system¹ that issuing an electronic card to women eligible for vitamin supplements (pregnant women, and women one year after delivery, and children aged one month to four years) has advantages over other methods of encouraging uptake of vitamins. The system makes it easier to ensure the supply chain is efficient. Lewisham Public Health and Clinical Commissioning Group reported an increase in uptake of women's tablets (from 10% to 30% of those eligible) and children's vitamin D drops (from 6% to 30% of those eligible).

¹ Public Health Lewisham, 2014

Evidence statement 1.14

There is moderate evidence [+] from one¹ before and after study that vitamin D supplements can be distributed locally in such a way as to ensure their availability for the following at-risk groups: a) pregnant and breastfeeding women, and b) infants and young children aged under 5 years. In Birmingham, the vitamin D public health campaign and scheme are overseen by a steering group that has worked to identify obstacles and practical issues to ensure vitamin D supplements are available. The scheme has established one ordering and distribution point for vitamins and increased the number of issuing sites throughout the city. Pharmacies and children's centres contribute significantly to issuing vitamin D supplements (issuing 20% and 29.7% of total vitamins respectively).²

¹ Moy *et al.*, 2012

² McGee and Shaw 2013 (an update of the public health campaign reported by Moy *et al* 2012)

Evidence statement 1.15

There is weak evidence [-] from one¹ survey of eleven Healthy Start schemes (chosen as examples of good practice for the Healthy Start website) that a large range of vitamin issuing sites are used to ensure availability for the following at-risk groups: a) pregnant and breastfeeding women, and b) infants and young children aged under 5 years. These include: children's centres; child health clinics; antenatal clinics; health centres/GP surgeries; and community pharmacies. The supply of vitamins was ensured mainly by using one central point to order vitamins and to monitor vitamin use at the issuing points.

¹ NHS England, 2013

Evidence statement 1.16

There is good evidence [++] from one¹ report about Healthy Start vouchers and vitamins that the distribution system for Healthy Start vitamins is confused, weak and complex, resulting in vitamin supplements only being available in a few locations and in some areas there were no distribution sites (as maternity care was organised by the acute trust while Healthy Start vitamin supplements were ordered by the PCT). In addition, there were problems with maintaining supply and short shelf-life. Practitioners and beneficiaries suggested a variety of schemes to improve distribution, by doing away with the application process and/or physically handing out vitamin supplements and making them widely available at places where women go anyway: supermarkets, pharmacies, children's centres, and GP practices. Examples of good practice in improving distribution included engaging with community pharmacies, using children's centres for distribution, placing orders for vitamin supplements to the children's centre via their local school, and selling supplements to non-beneficiaries to raise their profile.

¹ McFadden *et al* 2013

2.1 Evidence statement: Mailed dissemination for guideline implementation

There is mixed evidence from four reviews on the effectiveness of mailed dissemination for improving guideline uptake.^{1,2,3,4} There is some evidence from two reviews that mailed dissemination is effective^{2,3} and evidence from one review that mailed dissemination is ineffective.¹ One review reported inconclusive results.⁴

¹ Brusamento *et al.*, 2012

² Grimshaw *et al.*, 2004

³ Medves *et al.*, 2010

⁴ Prior *et al.*, 2008

2.2 Evidence statement: Computerised decision systems for guideline implementation

There is strong evidence from one overview of systematic reviews¹ and two systematic reviews^{2,3} that computerised decision systems are effective in increasing guideline uptake. However, there is evidence from one review that computerised decision systems are ineffective compared with usual care or paper based systems.⁴

¹ Prior *et al.*, 2008

² Okelo *et al.*, 2013

³ Brusamento *et al.*, 2012

⁴ Heselmans *et al.*, 2009

2.3 Evidence statement: Educational meetings for guideline implementation

There is mixed evidence from four systematic reviews^{1,2,3,4} on the effectiveness of educational meetings for increasing guideline uptake. Two reviews reported improvements in guideline uptake following educational meetings; one review found that the inclusion of nurse case management to educational workshops to promote

guideline uptake resulted in improvements in patient outcomes¹, while the other review reported the majority of included studies (74%) reported positive findings⁴. Two reviews did not find evidence of effectiveness on professional practice outcomes.^{2,3}

¹ Lineker and Husted, 2010

² van der Wees *et al.*, 2008

³ Grimshaw *et al.*, 2004

⁴ Medves *et al.*, 2010

2.4 Evidence statement: Continuing education for guideline implementation

There is mixed evidence from one overview of systematic reviews¹ and two systematic reviews^{2,3} on the effectiveness of continuing education for increasing guideline uptake. All included overviews and systematic reviews reported mixed findings with both effective and ineffective results. All reviews were of poor quality and the components of continuing education were poorly described.

¹ Prior *et al.*, 2008

² Chaillet *et al.*, 2006

³ Brusamento *et al.*, 2012

2.5 Evidence statement: Educational outreach visits for guideline implementation

There is strong evidence from one overview of systematic reviews¹ and two systematic reviews^{2,3} about the effectiveness of educational outreach visits for increasing guideline uptake. An overview of systematic reviews reported positive findings for practice visits by educators, the provision of promotional material, and subsequent reminders or educational follow-up.¹ One review shows that educational outreach visits delivered by pharmacists reduced inappropriate prescribing² and the other review reported that healthcare visits from outside an organisation were beneficial in providing education to healthcare professionals.³

¹ Prior *et al.*, 2008

² Lineker and Husted, 2010

³ Medves *et al.*, 2010

2.6 Evidence statement: Audit and feedback for guideline implementation

There is moderate evidence from one overview of systematic reviews¹ and moderate evidence from six systematic reviews^{2,3,4,5,6,7} about the effectiveness of audit and feedback for increasing guideline uptake. An overview of systematic reviews reported moderate evidence of effectiveness of audit and feedback; eight of 18 included systematic reviews reported positive findings, while ten reported unclear findings. Four reviews reported moderate evidence that audit and feedback were effective^{2,4,6,7} with the majority of included studies reporting positive findings. Two reviews (identifying one RCT each) reported no evidence that audit and feedback were effective.^{3,5.}

¹ Prior *et al.*, 2008

² Chaillet *et al.*, 2006

³ Lineker and Husted, 2010

⁴ Okelo *et al.*, 2013

⁵ Brusamento *et al.*, 2012

⁶ Grimshaw *et al.*, 2004

⁷ Medves *et al.*, 2010

2.7 Evidence statement: Opinion leaders for guideline implementation

There is mixed evidence from one overview of systematic reviews¹ and two systematic reviews^{2,3} on the effectiveness of opinion leaders for increasing guideline uptake. All included overviews and systematic reviews reported mixed findings with both effective and ineffective results. All reviews were of poor quality.

¹ Prior *et al.*, 2008

² Chaillet *et al.*, 2006

³ Medves *et al.*, 2010

2.8 Evidence statement: Patient mediated strategies for guideline implementation

There is mixed evidence from one overview of systematic reviews¹ and two systematic reviews^{2,3} on the effectiveness of patient mediated strategies for increasing guideline uptake where patient-mediated strategies were defined as new clinical information (not previously available) which was collected directly from patients and given to the provider. An overview of systematic reviews reported mixed findings with five included reviews reporting positive findings and four reviews reporting inconclusive findings.¹ In this overview of reviews, patient-mediated strategies were defined as interventions designed to influence practitioner behaviour via information provided to patients. Two reviews reported that the majority of their included studies showed benefits in employing patient mediated strategies for guideline uptake; however all included reviews were of poor quality and in most cases the components of the patient mediated strategies were not reported.^{2,3}

¹ Prior *et al.*, 2008

² Grimshaw *et al.*, 2004

³ Medves *et al.*, 2010

2.9 Evidence statement: Reminders for guideline implementation

There is moderate evidence from one overview of systematic reviews¹ and three systematic reviews^{2,3,4} on the effectiveness of reminders for increasing guideline uptake. An overview of systematic reviews reported that 75% of included reviews showed positive findings.¹ Three further systematic reviews support this finding.^{2,3,4} Reminders were provided verbally, on paper or on a computer screen.

¹ Prior *et al.*, 2008

² Chaillet *et al.*, 2006

³ Grimshaw *et al.*, 2004

⁴ Medves *et al.*, 2010

2.10 Evidence statement: Multifaceted interventions for guideline implementation

There is moderate evidence from two overviews of systematic reviews^{1,2} and six systematic reviews^{3,4,5,6,7,8} on the effectiveness of multifaceted interventions for increasing guideline uptake. The overviews reported that a combined total of 18 of the 22 included studies showed that multifaceted and intensive strategies were more effective than single interventions^{1,2}.

There is mixed evidence from six systematic reviews about the effectiveness of multifaceted interventions; each primary study within the reviews used a different number and type of intervention components so it is not possible to report which components are most effective in combination. Four systematic reviews reported improvements in guideline uptake using multifaceted interventions^{3,4,5,6}; one review reported mixed findings⁷ and one review reported ineffective findings.⁸

¹ Prior *et al.*, 2008

² Francke *et al.*, 2008

³ Chaillet *et al.*, 2006

⁴ Okelo *et al.*, 2013

⁵ Simpson *et al.*, 2005

⁶ van der Wees *et al.*, 2008

⁷ Brusamento *et al.*, 2012

⁸ Grimshaw *et al.*, 2004

2.11 Evidence statement: Organisational change for guideline implementation

There is limited evidence from one overview of systematic reviews¹ and two systematic reviews^{2,3} regarding the effectiveness of organisational change. No review suggested that organisational change was an effective intervention to increase guideline uptake.

¹ Prior *et al.*, 2008

² Okelo *et al.*, 2013

³ Medves *et al.*, 2010

2.12 Evidence statement: Characteristics of guidelines thought to influence implementation

There is limited evidence from one overview of systematic reviews¹ and three systematic reviews^{2,3,4} regarding characteristics of guidelines thought to influence implementation. Complexity, user unfriendliness, limited accessibility, trialability*, discordance between guidelines, and lack of local ownership were suggested as barriers to implementation.^{5,3,2} An overview of systematic reviews also reported that guidelines that do not require specific resources have a greater chance of implementation.¹

¹ Francke *et al.*, 2008

² Gurses *et al.*, 2010

³ Simpson *et al.*, 2005

⁴ Cochrane *et al.*, 2007

⁵ Okelo *et al.*, 2013

**Trialability was defined in terms of a question: Can the clinician test or try this guideline with relative ease? (Gurses 2010)

2.13 Evidence statement: Characteristics of professionals thought to influence implementation

There is limited evidence from one overview of systematic reviews¹ and three systematic reviews^{2,3,4} regarding characteristics of professionals thought to influence implementation. Lack of physician awareness of, or agreement with guidelines,

conservative attitude, and greater experience of treating community acquired pneumonia and legal concerns were thought to be barriers to implementation.^{2,3,4,1.}

¹ Francke *et al.*, 2008

² Simpson *et al.*, 2005

³ Gurses *et al.*, 2010

⁴ Cochrane *et al.*, 2007

2.14 Evidence statement: Characteristics of patients thought to influence implementation

There is limited evidence from one overview of systematic reviews¹ and two systematic reviews^{2,3} regarding characteristics of patients thought to influence implementation. Overall, patient attitudes, knowledge, or behaviours (such as adherence) were all thought to influence implementation. These reviews also suggested that co-morbidities reduced the chance that guidelines are followed.^{2,3,1.}

¹ Francke *et al.*, 2008

² Simpson *et al.*, 2005

³ Cochrane *et al.*, 2007

2.15 Evidence statement: Characteristics of the environment thought to influence implementation

There is limited evidence from one overview of systematic reviews¹ and one systematic review² regarding characteristics of the environment thought to influence implementation. The overview of systematic reviews suggested that lack of support from peers or superiors as well as insufficient staff and time were the main barriers to implementation¹, while the additional systematic review suggested that limited time, personnel and resources devoted to support guideline adherence and high workload were barriers.²

¹ Francke *et al.*, 2008

² Simpson *et al.*, 2005

2.16 Evidence statement: Barriers to implementation

There is limited evidence from two systematic reviews^{1,2} regarding barriers to implementation. One review suggested that system characteristics such as the physical environment and organizational characteristics were barriers to implementation.¹ The other review reported that lack of knowledge, awareness or skill, personal efficacy and lack of resources were barriers to implementation.²

¹ Gurses *et al.*, 2010

² Cochrane *et al.*, 2007