



CHANGE

Do not routinely test for vitamin D

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What you need to know

- Routinely testing vitamin D levels in asymptomatic individuals is not recommended, based on a lack of evidence for benefit
- Shared decision making and conversations with patients can help explore the risks and benefits of unnecessary testing
- Physician education, audit, feedback of physicians' ordering practices, and system-wide changes in ordering and remuneration are effective strategies to reduce unnecessary vitamin D testing

Routine vitamin D testing has been increasing owing to patient demand, attention in mass media, correlational studies connecting vitamin D to various health concerns, and physicians promoting its use.¹⁻¹⁰ Recently, possible associations between vitamin D deficiency and severe covid-19 received scientific attention, fuelling renewed media attention and a rapid guideline from the National Institute for Health and Care Excellence (NICE) on appropriate indications for supplementation.¹¹⁻¹⁶

Box 1 presents a list of clinical conditions where testing vitamin D may be appropriate, but vitamin D tests are frequently requested without any of these clinical indications. Studies from the UK, US, Canada, and Australia suggest that 25% to 75% of vitamin D testing may be unnecessary.^{9,22-26} This can be potentially harmful to patients by leading to additional testing, and wastes valuable healthcare resources.²⁷ In this article we offer an overview of evidence and guideline recommendations on routine vitamin D testing, (also known as vitamin D screening) and offer practical suggestions for reducing unnecessary testing.

Box 1: Commonly cited indications where vitamin D testing is appropriate¹⁷⁻²¹

- Rickets
- Osteomalacia
- Osteoporosis
- Hyperparathyroidism
- Malabsorption syndromes
- Medications affecting absorption or metabolism of vitamin D (antifungals, HIV antiretroviral therapy, anticonvulsants, etc)
- Chronic kidney disease
- Hypophosphatemia and hypo/hypercalcemia
- Deeply pigmented skin
- Isolated elevation of alkaline phosphatase

Evidence for change

Several international guidelines recommend against routinely testing or screening for vitamin D in people with no clinical symptoms or risk of deficiency (**box 2**). These recommendations are based on evidence that in healthy adults, vitamin D levels are not associated with disease.^{16-21,28} Vitamin D supplementation is recommended population wide in northern climates such as in the UK^{16,17} during the winter and all year round in people with dark or pigmented skin^{16,18} whose vitamin D levels are lower. Those who are advised to supplement with vitamin D can do so without testing.

Box 2: International guidelines and recommendations on vitamin D testing**British Society for Rheumatology**

- Vitamin D testing should be reserved for people at high risk of deficiency and avoided as part of routine investigation of widespread pain alone. Repeat testing is not normally indicated in people taking supplements

United States Preventive Services Task Force

- Current evidence is insufficient to assess the balance of benefits and harms of screening for vitamin D deficiency in asymptomatic adults

Choosing Wisely Canada Family Medicine

- Don't routinely measure vitamin D in adults at low risk of deficiency

Osteoporosis Canada

- Monitoring of routine supplement use and routine testing of otherwise healthy individuals as a screening procedure are not indicated

National Institute for Health and Care Excellence (UK)

- Only test vitamin D status if someone has symptoms of deficiency or is at very high risk

Royal Australian College of General Practitioners

- Routine screening for vitamin D deficiency is not recommended in populations at low risk of deficiency

Royal College of Pathologists of Australasia

- Routine screening of adults (including pregnant women), healthy infants, and children for vitamin D deficiency is not currently recommended

A systematic review published by the United States Preventive Services Task Force in 2021 did not identify any studies that showed vitamin D screening improved health outcomes or caused any direct harms.²⁸ The costs of vitamin D testing is high—estimated to be £17m in the UK,²⁹ \$104.7m (£58m) in Australia,³⁰ \$30m (£19.2m) in Canada, and \$293m (\$241m) in the US per year.²⁴

"Change" articles aim to alert clinicians to the immediate need for a change in practice to make it consistent with current evidence. We welcome suggestions for future articles (email us at practice@bmj.com)

Barriers to change

Ingrained practice patterns of routine screening in primary care can be hard to change, even with well designed multi-component interventions.^{31,32} Confusion may arise about when vitamin D testing is indicated, including for end stage chronic kidney disease and malabsorption syndromes.¹⁷⁻²¹ Patients may request testing, which drives physicians to order the test to address patient expectations and avoid a potentially challenging conversation around why the test is not necessary. However, evidence from shared decision making literature in primary care shows that patients are satisfied

if they feel that the physician has listened to their concerns, even if they did not receive a requested test.³³⁻³⁵

How should we change our practice?

Reducing vitamin D testing can be tackled at several levels, including the individual physician-patient interaction, the practice setting, and the broader health system. Multi-component interventions tend to be more effective than single interventions, and can include clinician and patient education, audit and feedback, order set changes, and clinical decision support (fig 1).³⁶ Practice groups or hospitals can reduce vitamin D testing by using specific interventions tailored to local context.

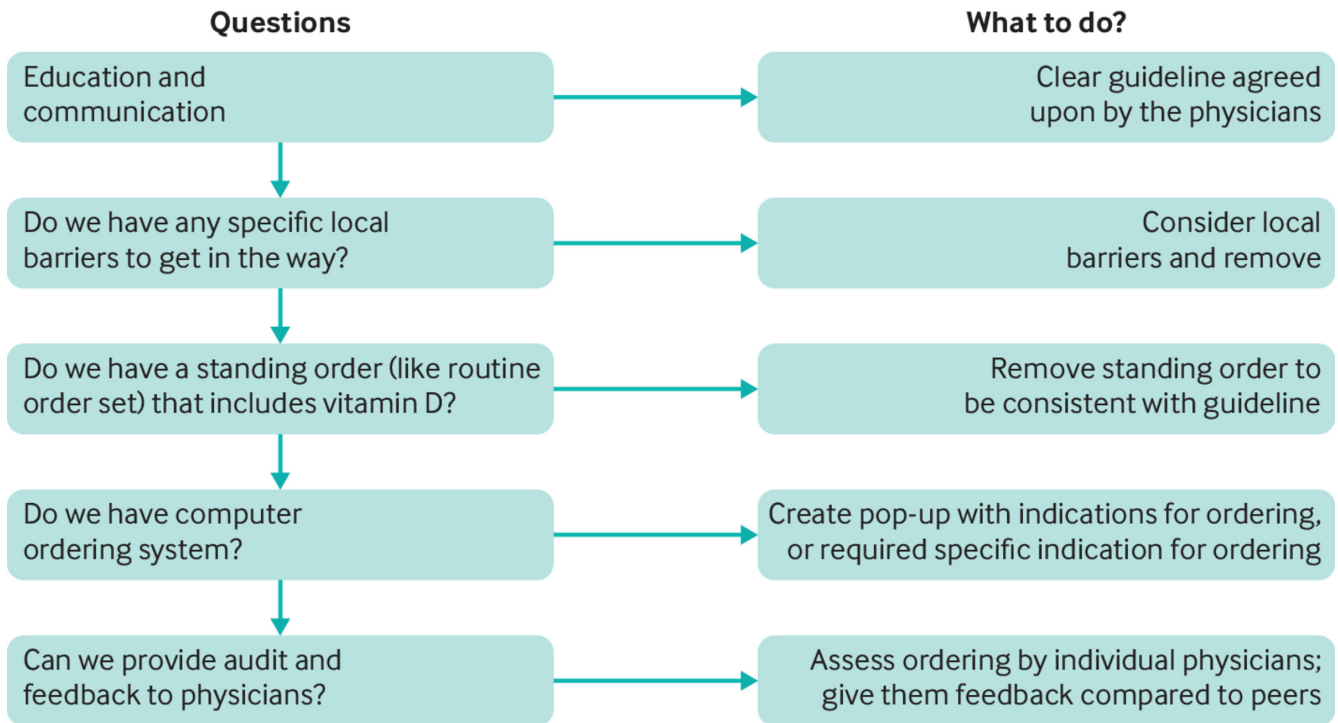


Fig 1 | Guidance for reducing vitamin D testing in a practice setting

Individual consultation

Use the principles of shared decision making when discussing vitamin D testing with patients.^{37,38} Patients may have read claims in the lay press about benefits of vitamin D. Requests for vitamin D testing can create opportunities for patient engagement in their care.³⁹ Specific language useful for shared decision making conversations are given in box 3. For example, it is often helpful to explore what patients have heard that led to the request and to understand their main worries or concerns. This allows physicians to validate patient concerns before explaining that the test is probably unnecessary. Sharing materials to explain vitamin D testing and supplementation can be helpful (box 4).

Box 3: Examples of questions and responses for a conversation with patients requesting vitamin D testing

Patient: "I would like a vitamin D level to test my status."
 Physician (*options to respond*): "There is a lot of attention to vitamin D. What have you read or heard that leads you to? wonder about this?"
 "I would like to understand what you are most concerned about that leads to your request."

Patient: "I've heard that deficiency in vitamin D can cause (... the disease or concern)."

Physician (*validation*): "Oh, I can understand your concern about (name it specifically). Perhaps I can tell you more about that issue and we can then decide together whether you need a vitamin D level or not."

Physician (*information exchange—brief and avoid medical jargon*): Present key information about the patient's specific concern; how we get vitamin D from sunlight or supplements; the groups at high risk of deficiency (indicating whether the patient falls in any of these), the best evidence about not testing but using supplementation (the patient resources in box 4 are useful to support this conversation).

Physician (*checking and responding to questions*): "What do you think of the information I presented? How does this fit for you?"

Address patient questions and come to shared decision.

Box 4: Patient information resources

- Choosing Wisely Canada. Vitamin D tests. [Vitamin D Tests - Choosing Wisely Canada](#)
- Alberta Health Services. Vitamin D and your health. [Alberta Vitamin D Fact Sheet](#)
- Royal Osteoporosis Society. [Vitamin D Supplements and Tests](#).

Practice settings

Education alone is not sufficient for practice change, but it is important to provide information about the lack of utility of vitamin D testing. Engaging physicians in discussions about the evidence and getting agreement on the criteria for ordering vitamin D in their practice setting is an important first step.⁴⁰⁻⁴³ Agreement reached should be communicated broadly within the clinical setting.

Change strategies, such as audit and feedback, have been shown to reduce vitamin D testing in several settings.⁴⁰⁻⁴⁴ Demonstrating a gap in a physician's own practice is highly motivating for change and typically leads to approximately 5% change in practice.⁴⁵ Reminders at the time physicians are ordering a vitamin D test, particularly with electronic physician ordering, are effective.⁴⁶ Pop-up reminders can present appropriate indications for vitamin D testing, and such decision support tools have been shown to improve appropriate care broadly by 4-8%.⁴⁷

An example of a successful programme in a large academic hospital in Ontario, Canada, engaged physicians and dietitians in developing guidelines and a policy for vitamin D testing.⁴⁰ Using this guideline, the computerised ordering system was modified so physicians were required to enter one of five specific indications for testing. These changes led to a 27% decrease in orders for vitamin D. Change strategies, such as audit and feedback or modification of order sets, need to be tailored to local contexts, with an understanding of specific barriers and facilitators of change.

System-wide changes

System-wide changes enacted across a jurisdiction by modifying order sets or changing remuneration practices are perhaps the most efficient strategies to reduce vitamin D testing. For example, in 2015 Alberta Health Services, a province-wide health system, introduced a new requisition for vitamin D testing.⁴² This required specific indications for ordering vitamin D testing based on the Choosing Wisely Canada recommendation, which had been broadly circulated among the physicians. In the 12 month period after the revised requisition was introduced, testing declined by 91.4%. Other system-wide approaches have included decreases in funding or restricting ordering based on specialty type or setting, to reduce vitamin D testing.²³⁻⁴⁸ In Australia, new criteria were introduced into the Medicare payment system in 2014 such that vitamin D tests were not reimbursed unless patients were in specific high risk categories.²³ The change resulted in a 47% reduction in testing. This was much lower than the change in Alberta, and suggests that funding restrictions without coexisting educational materials or rationale may be less effective.

Another example of a system change was in the US Kaiser Permanente health system, which required physicians to affirm their order for vitamin D a second time in the computerised ordering system.⁴³ Additionally, vitamin D testing was removed from the laboratory ordering preference list except for specialists who manage specific disorders requiring testing, including endocrinologists, nephrologists, and orthopaedic surgeons.

System level interventions such as these are relatively straightforward and inexpensive to implement in settings where laboratory services or billing systems are centralised, but more difficult in decentralised settings.

Sources and selection criteria

We conducted searches in Medline, Medline Ahead of Print, Medline In-Process and other Non-Indexed Citations. MeSH (Medical Subject Headings) were used when available; keywords included: "Vitamin D or

25-hydroxyvitamin D" and "laboratories or test or testing or lab or measure or measurement" and "reduce or reduction or inappropriate or overuse". Searches were also conducted in Pubmed and Google Scholar with the above search terms. A snowballing technique was used to identify additional articles of interest based on cited literature or specific themes of the article. Relevant guidelines were directly compiled from the literature search above or by going direct to the organisations' web pages and searching for the relevant guidelines. Guideline references were reviewed for any additional relevant articles.

Education into practice

- How would you discuss vitamin D testing with a patient who requests it?
- How would you audit vitamin D testing at your practice and implement any changes?

How patients were involved in the creation of this article

D'Arcy Duquette, who serves as a patient adviser to Choosing Wisely Canada, offered suggestions for the section about physician-patient communication and reviewed the manuscript.

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