

## Question from the Clinic:

### “Please clarify which Vitamin D test is best to identify persons low in Vitamin D”

Although many studies show an association between low serum concentrations of Vitamin D and a variety of disorders, the benefit of supplementation, ideal intake, and necessary serum concentrations for disease prevention and outcome specific benefits are not clear. There has been some debate regarding the optimal serum levels, the safe upper limit of 25-hydroxyvitamin D, and when to treat. Current Endocrine Society Recommendations suggest against routine screening in generally healthy adults (< 75 years) without any known risk factors.

#### Who should be considered for screening?

- Persons with:
  - Osteo-metabolic conditions: parathyroid and kidney disorders, osteomalacia, low bone density, osteopenia/osteoporosis, bone pain, dental abnormalities
  - Muscle weakness, fatigue
- Persons with multiple increased risk factors:
  - Reduced Synthesis
    - Age > 50
    - Low sunlight exposure (housebound, disabled, institutionalized, night shift workers, long hours indoors)
    - Dark Skin
  - Reduced Intake:
    - Restricted Diet/Malnutrition, lack of fortified foods
    - Bariatric surgery
    - GI absorption conditions: inflammatory bowel disease, celiac disease
  - Clinical Conditions:
    - Overweight/obesity
    - Chronic/debilitating disease
    - On medications that can decrease levels: statins, steroids, weight loss agents, spironolactone, ritanovir
    - Liver dysfunction

#### Which test should be used?

Although routine screening in the general population is not recommended due to lack of benefit to cost ratio, to check for deficiency in persons at risk and/or *with established indications*, make sure to use the correct test:

- **Total Serum 25-hydroxyvitamin D concentration (25-OH) test**
  - Recommended in persons at risk for deficiency
  - Measures vitamin D stores and deficiencies
  - Standardization and desirable levels can vary according to underlying condition, and optimal levels are debated
  - Levels can vary by season
- **1,25-dihydroxy test (the active form of Vit D)**
  - Serum levels of the 1,25-dihydroxy Vitamin D are regulated by parathyroid hormone levels, which are regulated by calcium and/or Vitamin D.
  - Use if a person has *hypercalcemia, chronic kidney failure, hyperparathyroidism, or granulomatous diseases*
  - In deficiency, these levels go UP, not down
  - More expensive

#### Supplemental Intake:

- The Endocrine Society recommends targeted supplementation for specific indications
  - The U.S. recommended daily allowance (RDA) of vitamin D:
    - 600 IU for people aged 51–70 years
    - 800 IU for people aged >70 years
  - This can be obtained by daily intake of foods rich in Vitamin D (fatty fish, meat, fortified milk, egg yolk, butter), fortified foods, or supplements
  - When using supplements:
    - Daily lower-dose is preferred over the non-daily higher doses
    - Oral cholecalciferol (vitamin D3) is the preferred form in most persons
- The Endocrine Society does **NOT** support empiric supplementation beyond the RDA in the following groups:
  - Non-pregnant adults < 50 years
  - General population ages 50 -74 years
- Groups to consider empiric supplementation:
  - Children and adolescents (rickets prevention and lower URI infection)
  - Pregnant women (lower preeclampsia risk, preterm birth, neonatal mortality)
  - Adults over 75 years (to lower the risk of mortality)
  - Adults with high-risk prediabetes (to prevent the risk of progression to diabetes)
- Caution: Vitamin D can cause toxicity:
  - The safe upper limit is established at 4000 UI per day
  - Symptoms of toxicity include nausea and vomiting, poor appetite, constipation, muscle weakness, weight loss, hypercalcemia, kidney stones

#### References:

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