**Vitamin D 1000 • Vitamin D 4000 • Vitamin D+K • Vitamin D+K Emulsified**

**Vitamin D 1000**

<table>
<thead>
<tr>
<th><strong>Supplement Facts</strong></th>
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</thead>
<tbody>
<tr>
<td><strong>Vitamin D</strong> (as cholecalciferol)</td>
<td>1000 IU</td>
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</table>

**Vitamin D 4000**

<table>
<thead>
<tr>
<th><strong>Supplement Facts</strong></th>
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</thead>
<tbody>
<tr>
<td><strong>Vitamin D</strong> (as cholecalciferol)</td>
<td>4000 IU</td>
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**Vitamin D+K**

<table>
<thead>
<tr>
<th><strong>Supplement Facts</strong></th>
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</thead>
<tbody>
<tr>
<td><strong>Vitamin D</strong> (as cholecalciferol)</td>
<td>2000 IU</td>
</tr>
<tr>
<td><strong>Vitamin K1</strong> (as phytomenadione)</td>
<td>75 mcg</td>
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**Vitamin D+K Emulsified**

<table>
<thead>
<tr>
<th><strong>Supplement Facts</strong></th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Vitamin D</strong> (as cholecalciferol)</td>
<td>2000 IU</td>
</tr>
<tr>
<td><strong>Vitamin K2</strong> (menaquinone-7)</td>
<td>5 mcg</td>
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</tbody>
</table>

Vitamin D supplementation is critical for many individuals, due to widespread deficiency of this essential nutrient. Moss Nutrition offers a variety of Vitamin D3 supplements to help address the individual needs of your patients.

**Understanding Vitamin D**

While most vitamins function primarily as antioxidants or enzyme co-factors, vitamin D functions as a pro-hormone. This means that once it is converted into 25-hydroxy vitamin D (25-OHD), its bioactive form, vitamin D has specific hormone-like effects in the body. The fact that almost every cell in the body has receptor sites for vitamin D may explain the wide range of functions and benefits attributed to this important, fat-soluble nutrient.

Vitamin D promotes bone mineralization and remodeling by enhancing intestinal absorption of calcium and phosphorus, boosting calcium and phosphorus reabsorption in the kidney, and regulating their levels in serum. In addition to supporting bone health, vitamin D also helps modulate inflammation, insulin sensitivity, and immune function (possibly by working in tandem with insulin and cortisol). Additional vitamin D benefits suggested by clinical research include direct anti-viral activity, improved balance and reduction of falls in the elderly, and inhibition of uncontrolled cell proliferation.

**Active/Inactive Forms of Vitamin D**

Whether in the form of vitamin D3 (cholecalciferol, the animal-derived form) or vitamin D2 (ergocalciferol, made by plants), the vitamin D obtained from food, supplements and sunlight exposure is inactive until converted into 25-OHD. This conversion is carried out in liver and kidney cells with the aid of cytochrome p450 detoxification enzymes. People with fat malabsorption and those suffering from impaired liver/kidney function, toxicity syndromes or inflammatory conditions, including obesity, may require higher amounts of supplemental vitamin D and/or additional strategies to maintain 25-OHD levels within the healthy range. Based on new findings underscoring the importance of vitamin D, many experts

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* These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure or prevent any disease.
suggest that previously accepted minimum values of serum 25-OHD be raised from 25 nmol/L to 50 nmol/L. Although vitamin D deficiency is common, a serum blood test is required to determine a patient’s actual need for supplementation, and to establish baseline levels.

**Synergistic Vitamin K Effects**

Research suggests vitamin K plays a strong role in supporting bone and vascular health due to its synergistic relationship with calcium and vitamin D. This relationship can be summarized as follows: Vitamin D helps boost calcium levels in the blood by enhancing its intestinal absorption and kidney reabsorption; vitamin K helps guide circulating calcium into bone tissue. Vitamin K operates in this regard by serving as a cofactor in the carboxylation of specific glutamic acid proteins, namely osteocalcin, which directs circulating serum calcium into bone tissue, and matrix Gla protein (MGP), which inhibits the deposition of calcium into blood vessels. In the absence of adequate vitamin K to activate osteocalcin and MGP, incomplete carboxylation of these two Gla proteins permits free calcium to be deposited into soft tissues (such as blood vessel walls) rather than into bone tissue, thereby increasing the risk of bone loss and vascular calcifications.

Vitamin K is found in numerous forms. Vitamin K1 (phylloquinone) is the form which occurs naturally in plants, with green vegetables such as parsley, kale and broccoli among the richest sources. Vitamin K2 (a series of menaquinones [MKs]) is found in fermented foods including sauerkraut, cheese and natto. Vitamin K2 is also produced bacterially in the human intestine. Some research suggests that vitamin K2 is used preferentially in the gamma-carboxylation of osteocalcin, hence it is often considered the more active form for use in supplements. However, many studies indicate significant benefits for K1 as well. For example, a two-year randomized controlled trial of vitamin K1 (200 mcg) with vitamin D3 (400 IU) plus calcium (1000 mg) on the bone health of older women, noted a substantial increase in carboxylation of osteocalcin, along with a significant increase in bone mineral density in the vitamin K1 group compared to controls.

Moss Nutrition vitamin D supplements are offered alone and with vitamin K to help meet your patients’ individual needs. Our **Vitamin D+K** contains 250 mcg of vitamin K1 per capsule. **Vitamin D+K Emulsified** liquid provides 5 mcg of vitamin K2 per five drop serving, and may be flexibly dosed down to single drop servings for use by children.

**REFERENCES**