Vitamin D-Drug Interactions Explained

All vitamin D-drug interactions I know of are briefly described in the following handout. To begin with, most known vitamin D-drug interactions are **only** classified as either *moderate* or *minor* (and, with only rare exceptions, as *severe*). They also fall into three primary interaction categories:

☑ **Interactions that increase your need for vitamin D supplementation**.

🚫 **Interactions that require physician monitoring of your vitamin D intake (when not monitored, some of these interactions could prove lethal).**

ⓘ **Other Interactions:** *Here the current medical recommendation is to check with your physician and/ or pharmacist about possible vitamin D-drug interactions before taking a vitamin D supplement.*

If you are someone who heeded my advice to start taking a vitamin D supplement, please take comfort (as I do) in knowing how many ☑ vitamin D-drug interactions exist (those where **increasing** your vitamin D intake is recommended), compared to the paucity of 🚫 vitamin D-drug interactions (those where **decreasing** your vitamin D intake is recommended). The significance of the ⓘ vitamin D-drug interactions are very complex and not well-studied. My recommendation here is to treat them as possible 🚫 vitamin D-drug interactions. [**NOTE**: For most ⓘ vitamin D-drug interactions, additional information is provided in this handout.]

Finally, my personal assessment is this: If I had to choose between taking a vitamin D supplement and taking a 🚫 or ⓘ prescription or OTC drug, I'd choose to take vitamin D, and look for a lifestyle change to make, or a ☑ drug to take. To loosely paraphrase a recent statement about prescription and OTC drugs: *Many drug interactions, side effects, and efficacies can not be detected when drugs are first approved. These real world drug outcomes may be found only after the drugs have been used by millions of people and for a long time.* Vitamin D has been promoting human survival for at least 250,000 years.

Some vitamin D-drug interactions may increase your need for vitamin D. In these vitamin D-drug interaction cases, taking more vitamin D is recommended: (a) *Depletion or interference*: These medications may deplete or interfere with the absorption or function of vitamin D. (b) *Side effect reduction/prevention*— Increasing your vitamin D supplementation may help reduce the likelihood and/or severity of a potential side effect caused by these medications. (c) *Supportive interactions*: Vitamin D supplements may support or otherwise help the medication work better.

☑ **Anticonvulsants**: Most anticonvulsant medications accelerate the body's use of vitamin D.

Brand Names: Carbamazepine®, Carbatrol®, Celontin®, Dilantin®, Epitol®, Ethosuximide®, Ethotoin®, Felbamate®, Felbatol®, Fosphentyoin®, Keppra®, Lamictal®, Lamotrigine®, Levetiracetam®, Mesantoin®, Methsuximide®, Milontin®, Mysoline®, Oxcarbazepine®, Peganone®, Phenobarbital®, Phensuximide®, Phenytoin®, Primidone®, Tegretol®, Topamax®, Topiramate®, Tridione®, Trileptal®, Trimethadione®, Zarontin®, Zonegran®, Zonisamide®

☑ **Calcium Channel Blockers:** These medications, used to treat high blood pressure and heart conditions, may decrease the production of vitamin D by the body.

Brand Names: Bosoptin®, Calan®, Covera-HS®, Isoptin®, Verapamil®**,** and Verelan®

☑ **Cimetidine**: These medications are used to treat stomach and duodenal ulcers, acid reflux and Zollinger-Ellison syndrome. They may also decrease the production of vitamin D by the body.

Brand Names: Tagamet® and TagametHB®.

☑ **Cholesterol-Lowering Drugs:** These medications are used to lower cholesterol levels in people with high blood cholesterol. They interfere with the absorption of vitamin D (as well as other fat-soluble vitamins). Most cholesterol-lowering drugs also appear to decrease the production of vitamin D by the body. Their most common side effects are muscle and joint aches (now believed to result from a vitamin D deficiency)

The cholesterol-lowering drugs include: (**1**) ***Statins*** *(also known as HMG CoA reductase inhibitors)*: **Brand Names**: Lipitor®, Lescol®, Mevacor®, Altoprev™, Pravachol®, Crestor®, and Zocor®. (**2**) ***Selective cholesterol absorption inhibitors***: **Brand Name**: Zetia®; and (**3**) ***Resins*** *(also known as bile acid sequestrant or bile acid-binding drugs)*: **Brand Names**: Questran®, Questran Light®, Prevalite®, Locholest®, Locholest Light®, Colestid®, and WelChol®.

☑ **Flurbiprofen**: These medications are non-steroidal anti-inflammatory drugs (NSAIDs) prescribed to treat chronic inflammation and pain (eg. arthritis). Optimal circulating vitamin D levels improve their efficacy. [**NOTE**: Optimal vitamin D blood levels promote the anti-inflammatory and analgesic potencies of all NSAIDs, including all OTC NSAIDs).

Brand Names: Ansaid® and Froben®

☑ **Gabapentin**: This drug is used to treat or prevent seizures, and as an analgesic for chronic pain. It interferes with the production, absorption and function of vitamin D. At the same time, adequate circulating vitamin D levels may help reduce the likelihood and/or severity of the potential side effects of gabapentin. **Brand Name:** Neurontin®

☑ **Heparin** and **Low molecular weight heparins (LMWH)**: Taking these medications slows blood clotting acutely, at high doses (heparin), or gradually over several months (LMWHs), and can result in osteopenia or osteoporosis: Two-low bone density conditions/ diseases associated with vitamin D deficiency. While the mechanisms for these drug-induced effects are not known, increased vitamin D supplementation is recommended for anyone taking these medications.

Brand Names for LMWHs: Lovenox®, Fragmin®, and Innohep®.

☑ **Hydroxychloroquine**: This medication is used to treat sarcoidosis, malaria, lupus erythematosus, rheumatoid arthritis, post-Lyme arthritis and Sjögren's Syndrome (all autoimmune diseases, and diseases associated with vitamin D deficiency). Because this drug blocks the formation of active vitamin D, anyone taking it needs to take vitamin D supplements and have their vitamin D status monitored by a health practitioner.

Brand Name: Plaquenil®

☑ **Indapamide**: This medication is a thiazide-like diuretic used, either alone or in combination with other drugs, to treat high blood pressure and to prevent salt and fluid retention. It is known

to deplete/ interfere with the absorption/ function of vitamin D. Anyone taking it needs to increase their vitamin D intake, and have their vitamin D status monitored by a health practitioner.

Brand Name: Lozol®

☑ **Isoniazid**: This medication, used to treat tuberculosis, has been shown to decrease blood levels of vitamin D by 47% after a single treatment. Everyone taking this medication requires vitamin D supplementation, typically at fairly high levels. Anyone taking it needs to have their vitamin D status monitored by a health practitioner.

Brand Names: INH®, Laniazid®, Nydrazid®; **Combination drugs:** Rifamate®, Rimactane®

☑ **Mineral Oil**: Mineral oil interferes with vitamin D absorption. Anyone taking these mineral oil-containing drugs should increase their vitamin D intake.

Brand Names: Agoral®, Kondremul Plain®, Milkinol®, Neo-Cultol®, Petrogalar Plain®

☑ **Neomycin**: Alone, these antibacterial medications are poorly absorbed when taken by mouth. So they are typically combined with enteric coated erythromycin to suppress gastrointestinal bacteria before surgery to avoid infection. They are also used to treat hepatic coma in cases of liver failure, and may be included in some antibiotic products used to treat infections of the eyes, ears, or skin. Because these medications may deplete or interfere with the absorption and/ or normal function of vitamin D, anyone taking them should increase their vitamin D intake.

Brand Names: Mycifradin®, Myciguent®, NeoTab®

☑ **Oral Corticosteroids**: Oral corticosteroids are used to treat autoimmune and inflammatory diseases, including asthma, bursitis, Crohn's disease, tendinitis, ulcerative colitis, rheumatoid arthritis, and lupus, as well as skin conditions, such as eczema and psoriasis. They are also used to reduce inflammation associated with severe allergic reactions and to prevent organ rejection following transplant surgery. Strong scientific evidence suggests these medications deplete or interfere with the absorption and/ or function of vitamin D. Anyone taking one or more of these medications needs to take vitamin D supplements and to have their vitamin D status monitored by a health practitioner.

Brand Names: Aristocort®, Cortef®l, Decadron®, Delta-Cortef®l, Deltasone®, Dexamethasone Oral®, Hydrocortisone Oral®, Medrol®, Methylprednisolone®, Orasone®, Pediapred®, Prednisolone Oral®, Prelone®, Triamcinolone®

☑ **Phenobarbital**: These drugs appear to interfere with the normal absorption or metabolism of vitamin D. Increased vitamin D supplementation and regular vitamin D status monitoring, by a health practitioner, are strongly recommended for anyone taking these medications. **Brand Names:** Phenobarbitone®, Bellatal®; Solfoton®.

☑ **Sodium Fluorides**: These medications are used to prevent dental cavities, and have long (since the 1970's) been postulated to also be effective in the treatment of osteoporosis. Research demonstrates a synergistic interaction between these medications and vitamin D supplements, both in the prevention of dental cavities and osteoporosis. **Brand Names:** Fluorigard®, Fluorinse®, Fluoritab®, Fluorodex®, Flura-Drops®, Flura-Tab®, Karidium®, Luride®, Pediaflor®, PreviDent®

☑ **Valproic Acid**: These medications slow down the liver's conversion of vitamin D into its biologically-active form. Increased vitamin D supplementation and regular vitamin D status monitoring, by a health practitioner, are strongly recommended for anyone taking these medications. **Brand Names:** Depakene Syrup®, Depakene®, Depakote®, Divalproex Sodium®, Sodium Valproate®

☑ **Weight loss products:** These medications are used for weight loss. Like olestra, a substance added to certain food products, they are intended to bind to fat and prevent the absorption of fat. Because of their effects on fat, they may also prevent the absorption of fat-soluble vitamins such as vitamin D. Increased vitamin D supplementation and regular vitamin D status monitoring, by a health practitioner, are strongly recommended for anyone taking these medications.. **Brand Names:** Xenical®, Alli®, and Olean® (olestra).

[Added Comment: Like their "*take this pill and lose weight*" predecessors, I predict these medications will also soon be shown to be unsafe. Why? They all adversely affect the absorption and actions of all four fat-soluble vitamins. Perhaps decreasing the saturated fat in your diet is a better weight-loss strategy than taking a pill? In this vein, I should mention recent scientific research indicates people achieve greater weight loss by adopting a Mediterranean Diet (see: http://www.oldwayspt.org/med_pyramid.html), than by adopting a Very Low Fat Diet]

Some vitamin D – drug interactions may be negative and indicate vitamin D supplements should not be taken without first speaking with your physician or pharmacist. For these medications, you should never take a vitamin supplement because it may lead to: (a) *Reduced drug absorption/bioavailability*: In this case, you need to avoid taking vitamin D supplements when taking this medication since doing so may decrease the absorption and/or activity of the medication in your body. (b) *Adverse interactions*: n this case, you need to avoid taking vitamin D supplements when taking this medication because taking them together may cause undesirable or dangerous results.

It is very important to mention any medical condition or disease that results in alterations in vitamin D metabolism makes it unsafe to take vitamin D supplements, or to consume vitamin D-rich foods without the supervision of a knowledgeable and caring physician. These include: Primary hyperparathyroidism, sarcoidosis, tuberculosis, lymphoma, kidney failure and liver failure. If you suffer from one of these conditions, never increase the vitamin D content of your diet or take a vitamin D supplement before consulting a physician.

☑⃠ **Estrogens (Combined):** Hormone replacement therapy with estrogen appears to increase vitamin D levels in the blood; this may have a beneficial effect on calcium and bone metabolism. In addition, use of vitamin D supplements in conjunction with estrogen replacement therapy (ERT) increases bone mass more than ERT alone. However, this benefit may be lost with the addition of progesterone. **Brand Names:** Cenestin®, Conjugated Estrogens®, Esterified Estrogens®, Estratab®, Menest®, Premarin®; **Combination drugs:** Estratest®/Estratest HS®, Prempro®

⃠ **Verapamil**: These medications belong to a class of calcium channel blocker drugs used to treat angina pectoris, heart arrhythmias, and high blood pressure (hypertension). Anyone taking these medications should avoid taking vitamin D supplements because taking them together may cause undesirable or dangerous results. **Brand Names:** Calan®, Covera-HS®, Isoptin®, Verelan®; **Combination drug:** Tarka®

Warfarin: This anticoagulant medication is widely used to prevent and/ or treat venous thromboses, pulmonary embolism and dangerous blood clotting in people with atrial fibrillation. In 1975, a single letter to the *Journal of the American Medical Association* suggested that vitamin D increases the activity of anticoagulants and that this interaction could prove dangerous. However, there have been no other reports of such an interaction, even though tens of millions of people are taking multivitamins that contain vitamin D. Most doctors typically do not tell patients taking anticoagulant medications to avoid vitamin D. **Brand Name:** Coumadin®

Some vitamin D – drug interactions may require further explanation.

Allopurinol: These medications are used to treat gout (caused by high levels of uric acid in the body), certain cancer medications, and kidney stones. Rarely, these medications may be used to treat seizures, pain caused by pancreas disease, certain infections, to improve survival after bypass surgery, to reduce ulcer relapses, and to prevent rejection of kidney transplants. Individuals with gout have low blood concentration of the active form of vitamin D (1,25 dihydroxycholecalciferol), and allopurinol corrects this problem. **Brand Names:** Lopurim®, Zyloprim® Aloprim®

Aluminum-Containing Antacids and Acid Reducers: Aluminum is found in most antacids. These medications are used to treat heartburn, GERD, and acid reflux. Walk into any drug store and you will quickly realize that there are more OTC antacid and acid reducers available than there are choices for headache remedies or bandaids. Because all antacids, but especially aluminum-containing antacids, may interfere with **both** the absorption and the actions of **most** essential nutrients (including vitamin D) and many prescription medicines, this fact is alarming. Aluminum can be toxic if high levels are absorbed and/ or retained in the body.

Vitamin D can increase how much aluminum the body absorbs. This interaction might be a problem for people with kidney disease. Taking certain antacids for long periods of time may alter the levels, metabolism, and availability of vitamin D. Likewise, taking a vitamin D supplement may also increase how much aluminum the body absorbs and retains.

Because the vitamin D antacid interaction might be a problem for people with kidney disease, it is especially important to take your vitamin D supplement two hours before, or four hours after antacids. Few people taking OTC antacids and acid-reducers are aware they should consult their doctor or pharmacist before taking them if they are also taking a prescription medication or nutritional supplements. Taking certain antacids for long periods of time may alter the levels, metabolism, and availability of vitamin D.

For those taking a vitamin D supplement, the effects are more complex because vitamin D can increase how much aluminum the body absorbs and retains. Aluminum may be toxic if high levels are absorbed and/ or retained in the body. Because this interaction might be a problem for people with kidney disease, it is especially important to take your vitamin D supplement two hours before, or four hours after antacids. **Brand Names:** Alenic Alka®, Amphojel®, Di-Gel®, Gaviscon®, Genaton®, Maalox®, Mylanta®, Rolaids®, and Riopan®.

Calcipotriol/ calcipotriene: These medications are synthetic derivatives of vitamin D used in the treatment of psoriasis. Anyone taking these prescription drug derivatives of vitamin D needs to avoid taking vitamin D supplements. [***Question***: Why not just take larger dose vitamin D supplement?] **Brand Names**: Dovonex® or Daivonex®.

Digoxin: This medication is used to help your heart beat stronger. Taking vitamin D along with digoxin may increase the effects of digoxin and lead to an irregular heartbeat. **Brand Name**: Lanoxin®.

Estradiol: Estradiol is a semisynthetic human estrogenic hormone used to treat menopausal symptoms, to prevent osteoporosis in postmenopausal women, and as replacement therapy in other conditions of inadequate estrogen production. Estradiol, like natural estrogens, stimulates the conversion of the prohormone form of vitamin D to its biological active form. However, in a controlled study of osteoporotic women, only those receiving **both** estradiol replacement and

vitamin D had increases in bone density of the hip. **Brand Names:** Alora®, Climara®, Dalergen®, Delestrogen®, Depo-Estradiol®, Depogen®, DepoGynogen®, E-Cypionate®, Escalim®, Esclim®, Estinyl®, Estrace®, Estraderm®, Estragyn LA 5®, Estring®, Estro-Cyp®, Estro-L.A.®, Ethinyl Estradiol®, FemPatch®, Gynodiol®, Gynogen L.A.®, Menaval®, Noven®, Vagifem®, Vivelle®; **Combination drugs:** Climagest®, Climesse®

Medroxyprogesterone: Medroxyprogesterone is in a class of medications, called progestins, used to treat endometriosis and to prevent pregnancy. A recent study of postmenopausal women suggests medroxyprogesterone suppresses biologically-active vitamin D levels in these women. **Brand Names:** Cycrin®, Depo-Provera®, Provera®; **Combination drug:** Prempro®

Thiazide Diuretics: These medications are used to lower blood pressure to reduce water accumulation caused by other diseases. Diuretics in this class (such as hydrochlorothiazide) increase the activity of vitamin D and can lead to inappropriately high calcium levels in the blood. This could cause serious side effects including kidney problems. **Brand Names:** Bendrofluazide®, Bendroflumethiazide®, Benzthiazide®, Chlorothiazide®, Chlorthalidone®, Cyclopenthiazide®, Diucardin®, Diuril®, Enduron®, Esidrix®, Exna®, HCTZ, Hydrochlorothiazide, HydroDIURIL®, Hydroflumethiazide, Hydromox®, Hygroton®, Indapamide, Lozol®, Methyclothiazide, Metolazone, Mykrox®, Naqua®, Naturetin®, Oretic®, Polythiazide, Quinethazone, Renese®, Trichlormethiazide, Xipamide, Zaroxolyn®; **Combination drugs:** Aldactazide®, Aldoclor®, Aldoril®, Apresazide®, Captozide®, Co-Tendione, Co-Zidocapt, Combipres®, Dyazide®, Hyzaar®, Inderide®, Lopressor® HCT, Maxzide®, Moduretic®, Prinizide®, Tenoretic®, Timolide®, Vaseretic®, Zestoretic®, Ziac®

Final Note: In preparing this paper, hundreds of sources were used. It is not meant to be either an authoritative or definitive resource on this topic, but rather an informed starting point. Please use this information to become a better-informed healthcare consumer.