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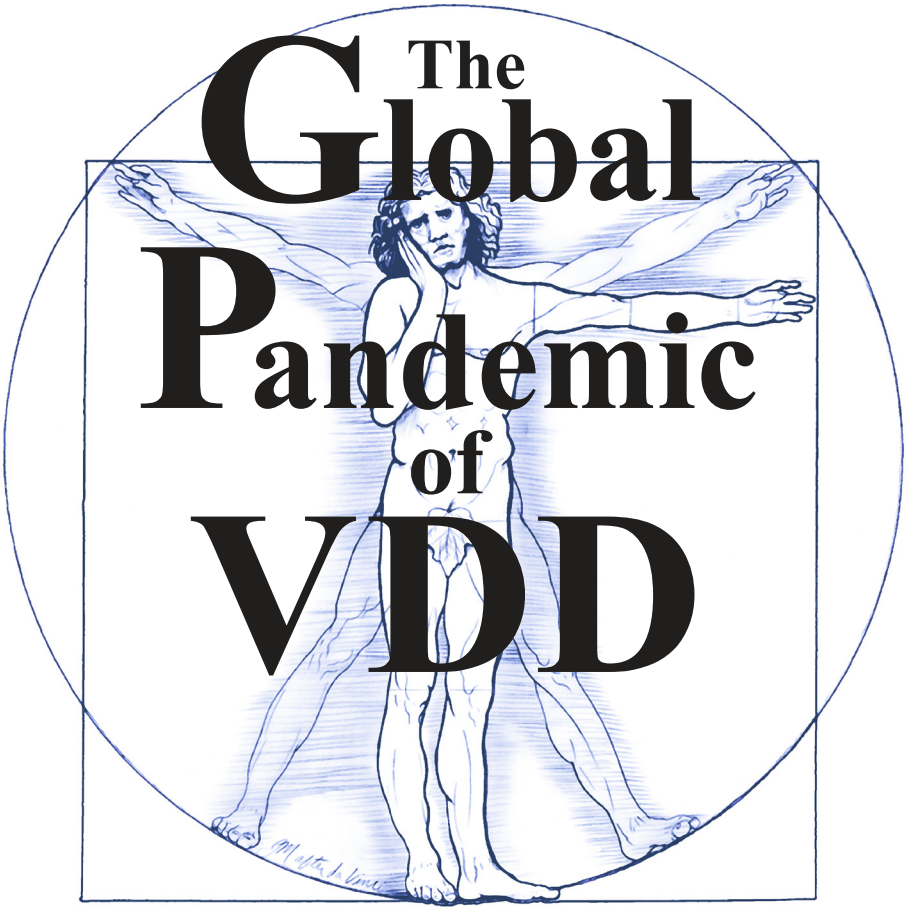
The Global Pandemic of VDD



KING OF ALL SILENT KILLERS

Immediate actions are urgently needed to protect the global population from Vitamin D Deficiency.

Journal of Preventive Medicine & Public Health — 2017[1]

David C. Page, D.D.S.

Prologue: *King of All Silent Killers*

There is a Global Pandemic of **V**itamin **D** **D**eficiency or **VDD**. VDD silently causes premature sickness & premature death. It will become known as ***The King of All Silent Killers***. If you doubt it exists, see page #2. VDD is not like Ebola hemorrhagic fever with easy to see vomiting & coughing up of blood. It is like vitamin **C** deficiency scurvy where lack of one nutrient can be silent, dark & deadly. To see lots of people with VDD, just go to a local hospital.

As early as 1550 BC, Egyptians recorded symptoms of vitamin C deficiency scurvy. From 1500 to 1800 AD, 1 to 2 million sailors died from scurvy while exploring the new world. It was very visible and a very painful death. One month at sea without refrigeration or food containing vitamin **C** and sailors with scurvy would become weak; have red, soft & spongy gums; start to lose teeth & bone; and show signs of skin hemorrhage. When signs of scurvy were seen on the arms or legs of sailors, they were put into the lower dark hold of the ship to die because they did not know if scurvy was contagious. Stories were told of ships freely floating with crews of all dead men. When citrus fruit was observed to prevent scurvy, the British Navy ordered lemon or lime juice to be added to the daily ration of rum, called grog. British sailors then became known as limeys.

Both vitamin C & D deficiency can lead to death, but vitamin D deficiency is subtle & not easily seen in most people. It is easy to see VDD related diseases like psoriasis, acne, vitiligo, rickets-bowed legs, bone loss, baldness, hair loss and poor wound healing. To see about 1 million sick & prematurely dying people with VDD, go to one of the over 5,500 hospitals and look at the in-patients. Studies show that about 83% of patients in many hospitals have VDD. Many hospitals do not routinely check for VDD before or after admission and many people have never even had a vitamin D test. That is unfortunate because research shows vitamin D levels at hospital admission can determine hospital length of stay and whether someone survives. **It is time to get vitamin D blood levels WAY above 30 ng/ml with safe over-the-counter vitamin D3 & this book will teach you why.** Simple, safe and cost-effective vitamin D3 is very important, and so is testing. **Do you have VDD?**

The Global Pandemic of VDD

Vitamin D Deficiency[1]

King of All Silent Killers

"VDD is now recognized as a pandemic."
American Journal of Clinical Nutrition—2008[2]

"A global pandemic of VDD exists."
Journal of the American College of Nutrition—2011[3]

"VDD is a global pandemic associated with increased health care costs..."
Military Medicine—2011[4]

"VDD is a worldwide health problem."
Current Opinion in Clinical Nutrition & Metabolic Care—2012[5]

"VDD is now recognized as a global pandemic."
Nutrients—2013[6]

"The world pandemic of VDD…"
American Journal of Physiology—Cell Physiology—2013[7]

"Iron deficiency anemia and VDD are considered global pandemics."
Journal of the American College of Nutrition—2013[8]

"Vitamin D deficiency and insufficiency is a global health issue that afflicts more than one billion children and adults worldwide."
Reviews in Endocrine and Metabolic Disorders—2017[9]

"Actions are urgently needed to protect the global population from VDD."
Journal of Preventive Medicine & Public Health—2017[10]

"VDD in childhood is a re-emerging public health problem in developed countries."
Journal of Pediatric Endocrinology Metabolism—2018[11]

The Great VDD Debate

In 2011, The Institute of Medicine (IOM), which later changed to the National Academy of Medicine (NAM), published the globally followed vitamin D RDA (Recommended Dietary Allowance per day) guideline.[12] **The Great VDD Debate** has ensued ever since.[13]

In 2014, a group of researchers reported finding a ***statistical error*** made by the IOM in calculating the vitamin D RDA guideline.[14] The task given for setting the RDA is to establish a level that will help to keep most healthy people of all ages & all races healthy.[15] This is crucial since vitamin D boosts the immune system, helps a body stay healthy, and the RDA is used globally. ***If the vitamin D RDA is set too low, it can impact the health of people worldwide.***

In 2015, a second group of researchers published calculations they made confirming the 2013 findings that the RDA was set too low.[16] The IOM set the RDA guideline at **400-800** IU/day for most people. The "statistically correct" adult RDA is really **8,000-10,000** IU/day. The debate is not just about numbers. It is a great debate as to which numbers may help keep most healthy people healthy.

In 2016, a group of IOM members published in a professional peer reviewed medical journal that misinterpretations, misapplication and misunderstanding of the IOM reference values can cause harm. The authors admitted vitamin D has a role in bone health and then stated ***non-skeletal (non-bone) effects were still being studied.*** The authors cautioned that those who advocate "overprescribing" (over **4,000 IU**—the IOM daily set limit) or "over testing" for VDD may cause harm.[17] In fact, it is the people with VDD who suffer harm.

The bottom-line in The Great VDD Debate is whether to believe researchers who say vitamin D can be dangerous or researchers who say it is extremely safe, simple, and cost-effective for human health. Studies show somewhere between **251,000**[18] and **440,000**[19] people die each year from medical errors[20] **compared to maybe 1** from vitamin D overdose.[21] VDD increases risks of sickness and all-cause death, and vitamin D3 decreases them.[22] **As you read *The Global Pandemic of VDD*, you can choose who to believe.**

The Global Pandemic of VDD
Vitamin D Deficiency
King of All Silent Killers

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Vitamin D Deficiency (VDD) the silent enemy of the sick & dying is too often missed, dismissed, denied & ignored. Learn what VDD means to you, your family & friends. Simple & safe vitamin D3 can save time, money and pain.

Contents

Dedication

This book is dedicated to the Creator of Light; to the many researchers who studied and reported on the many benefits of light and vitamin D; to my family and my dental staff who tolerated my long hours of researching-the-research to write this book; and to **those who suffer** both physical & emotional pain & anguish, financial destruction & daily helpless loss of hope mainly because they have VDD (**V**itamin **D D**eficiency).

Purpose

The main purpose of this book is to inspire urgent action to correct The Global Pandemic of VDD and get the blood levels of most people way above 30 ng/ml. A huge number of people suffer VDD related pain, sickness & death daily. *The world needs more vitamin D and more bright sunshine to help with high rates of anxiety, depression, despair, suicide and a long list of acute, chronic and deadly illnesses*. **At least 1 medical doctor, 20 veterans, & 120 others choose suicide daily just in the U.S.** Healthcare costs and insurance rates are exploding, hospitals are closing, and despair is blamed for the 2-year straight decline in the average U.S. life expectancy.[23]

Proceeds

A portion of the proceeds from this book will be used by the SmilePage® Health Institute 501(c)(3) to educate the public & health care providers about The Global Pandemic of VDD & the lifelong health benefits of good vitamin D blood levels. People globally deserve simple, safe & cost-effective health care. Authorities must take urgent action against VDD & other nutritional deficiencies using simple vitamin D3 & multiple vitamins & minerals—costing $20-$40 per person, per year.

Warning - Disclaimer

This book provides a unique view of some complicated human health subjects. Many of the topics covered have entire medical texts and specialties devoted to their study. Therefore, only limited amounts of information can be presented. Many human diseases are multi-factorial, meaning many factors are involved in causing or prolonging disease. There is no single way to prevent, diagnose or treat every human disease. However, you should find priceless useful treasures for you, your friends and your loved ones in ***The Global Pandemic of VDD.***

Medical treatment discussed in this book is based on research findings current at the time the book was written. This text provides information regarding the subject matter covered. It is sold with the understanding that the publisher and author are not engaged in rendering medical or other professional services. If medical or other expert assistance is required, the advice and services of a competent professional should be sought. Further, this text also contains statements, conclusions, advices and recommendations which are the personal opinions of the publisher and author grounded upon the extensive research referenced herein. Individual results presented are often specific to patients in a publication and do not guarantee the same for others. You are urged to learn as much as possible about medical conditions and treatments of interest to you, using the many references and resources now available. **This book hopes to motivate readers to consider alternative medicine options that exist without drugs or surgery. This includes using simple & safe vitamin D3 to treat or prevent VDD.**

You should consult with your own personal health care providers before starting or relying on any medical advice, recommendations or therapy described in this book. The publisher & author do not expressly or impliedly represent or warrant that any alternative medical advice, treatment or therapy recommended in this book including, but not limited to, the RDA (Recommended Diet/Daily Allowance) are, as to any particular individual necessarily medically effective or recommended, and are not responsible for any adverse effects or consequences resulting from the reliance on or implementation of any suggestion, recommendations or medical advice contained in this book.

The publisher and author shall have neither liability nor responsibility to any person or entity with respect to any loss or damage caused, or alleged to be caused, directly or indirectly by the information contained in the book: ***The Global Pandemic of VDD.***

Definitions

D: The "Sunshine Vitamin" (D) is produced in the skin or absorbed in the diet, then converted by the liver & kidneys into **calcitriol**, the active D form that acts like a **hormone**.[24]
D2: Less potent form of D (ergocalciferol).[25]
D3: More potent, natural & OTC form of D (cholecalciferol).
Deficiency: A vitamin D blood level **below 30 ng/ml.**
25(OH)D Test: A critical diagnostic tool for finding silent VDD, although some people claim testing just wastes money. One generally accepted **"normal" range is 30-100 ng/ml.**
Idiopathic: A disease of unknown origin and/or cause.
Inverse Relationship: An opposite relationship where as one variable moves up or down the other goes the opposite way.
IUs: International Units are a measured amount of vitamin D.
Linear Relationship: A proportional relationship where as one variable moves the other follows, often in a straight line.
Mega-Analysis or Study: Analysis or study of many studies.
ng/ml: nanogram per milliliter amount of vitamin D in blood.
OTC: A medication, vitamin or mineral available and sold directly over-the-counter without needing a prescription.
Pandemic: "A worldwide epidemic, or over a very wide area, usually affecting a large number of people."[26]
PMID Number: A unique identifier for a research article stored in the National Institutes of Health PubMed database at www.PubMed.gov; used in most of this book's End Notes.
RDA: Recommended Diet/Daily Allowance is the estimated nutrient or calorie intake needed every day for good health, the goal being to help keep most healthy people healthy.
VDD (Vitamin D Deficiency): In this book, VDD includes D deficiency & D insufficiency as having **25(OH)D <30 ng/ml**. *If a vitamin D level is not sufficient, then it is deficient.*
VDD Related Conditions: noted in *italics* & **bold,** due to space limits, this book contains only some related conditions.
VDS: Vitamin D Supplements used to raise vitamin D blood levels using liquid, gel tab, injection, patch or IV forms.

Introduction

Vitamin D Deficiency (VDD) is well published as a global pandemic, although it is rather ignored. In 1928, VDD was known to cause *tooth decay* and *rickets bone disorder* in children. By 2008, VDD was also known to cause and worsen *osteopenia*, *osteoporosis*, *bone fractures, tooth problems, increase the risk of some common cancers*, *heart diseases*, *autoimmune diseases*, *hypertension* and *infectious diseases*.[27]

The Global Pandemic of Vitamin D Deficiency (VDD) is silently hurting many people. VDD is estimated to afflict over one billion children & adults worldwide. VDD has health consequences that can be mild, severe or deadly. VDS has now been shown to treat endless acute and chronic illnesses such as *autoimmune disorders, Alzheimer's, deadly cancers, cardiovascular diseases, hypertension, infectious diseases, tuberculosis, type 2 diabetes, neurological disorders, pre-eclampsia, periodontitis*, & *childhood dental caries*.[28]

This book will present what may be the biggest dereliction of healthcare duty in history—VDD neglect. VDD is subtle and not easily seen like Ebola that can cause severe bleeding, organ failure and even death.[29] VDD "shines" right before our eyes in over 5,500 registered buildings in the U.S. that can house nearly one million sick and dying people with high rates of VDD. Those buildings, called hospitals, include 209 federal government hospitals, 397 non-federal *psychiatric* hospitals and a total of about 894,574 hospital beds.[30]

There are trusted people in high places that ignore, deny or are ignorant of the abundant evidence that VDD exists and exists everywhere. **If you want better health & lower health care costs, you must ask private & government officials to take urgent action and make immediate efforts to treat VDD in the estimated over one billion people worldwide.**

The Huge Costs of Sickness[31]

The United States spends more per year on healthcare per person, about $10,348 in 2016, than any of the other top 12 economy countries which spend about half as much, on average.[32] Even worse, life expectancy in the U.S. ranks last,[33] while U.S. lifespan declined over the past 2 years.[34]
In 1970, U.S. healthcare costs were **$75 Billion**.[35]
In 2000, U.S. healthcare costs were **$1.2 Trillion**.[36]
In 2018, U.S. healthcare cost estimate is **$3.5 Trillion**.[37]
In 2025, U.S. healthcare cost projection is **$5.5 Trillion**.[38]

"By fashion we have been taught that the causes of medical and surgical diseases are known; yet in reality very little was understood about disease until recently, and we still operate in a scientific twilight.

We have worked with myths inventing scientific explanation to cover our lack of knowledge about the causative factors in illness, and we have traditionally examined physiologic organ systems from a fragmented perspective."*[39]*

In 2008, researchers published finding overall health care **costs were 39% higher in veterans with VDD.**[40]
In 2010, researchers found VDD in veterans **increased costs of infections by 500% & length of hospital stay by 400%.**[41]

In 2008, researchers reported finding VDD solely related to **cardiovascular mortality** & **all-cause mortality.**[42]
In 2011, researchers found ill patients with VDD pre-hospital admission had increased rates of **sepsis blood infection**, and VDD was a significant predictor of **all-cause mortality.**[43]

A Simple & Safe Solution:

Simple, Safe & Effective OTC Vitamin D3!

The VDD Quandary

In 2018, researchers reported that the global pandemic of VDD is becoming better known and vitamin D *intoxication* is more frequent—yet rarely deadly. Decades of VDD neglect have forced patients to act alone against VDD. Professional criticism of patient "inappropriate" self-dosing is starting.[44] Ironically, about 100,000 people die every year from prescription drugs.[45] OTC vitamin **D3 4,000 IU/day** is very safe & stays within the current RDA guidelines. Research shows adults can safely take **8,000-10,000 IU/day of D3.** It is what the adult RDA guideline likely should be [see page 19]. **ASK YOUR MEDICAL DOCTOR if you can take 8,000 to 10,000 IUs OTC D3 daily. If not, → Why not?** Otherwise you may need to wait for the RDA to be changed or make a personal choice for better health. Higher levels of vitamin D intake & higher blood levels are starting to show extraordinary health benefits. As previously mentioned, 25(OH)D ***60 ng/ml was recently published as reducing breast cancer risk in women by 80%.*** BUT most people cannot get to 60 ng/ml at the current RDA guideline of 400 to 800 IU per day or maximum 4,000 IU/day. That is just one quandary that prevents maximizing the effects of vitamin D which can safely increase overall health, delay sickness & death, prevent the need for medical care until necessary & increase in-hospital survival. Another big quandary to remember, as OTC D3 self-dosing is criticized, relates to the possible decades of VDD neglect. In just the past decade one person may have died from vitamin D overdose, because vitamin D toxicity is rare, likely over 500,000 IUs & almost never deadly. During the same 10 years, an estimated 2 to 4 million people died from medical errors & 20 to 40 million people (10-20 times more) were said to be harmed by medical error. **Vitamin D3 is very safe, simple, & effective. A year's supply of OTC vitamin D3 & a good multiple vitamin plus minerals costs $20-40 per person. Taken together they promote better health.**

Vitamin D Therapy Works

Vitamin D is effective & powerful for preventing & treating disease. Nothing works better! 86 health problems prove it.

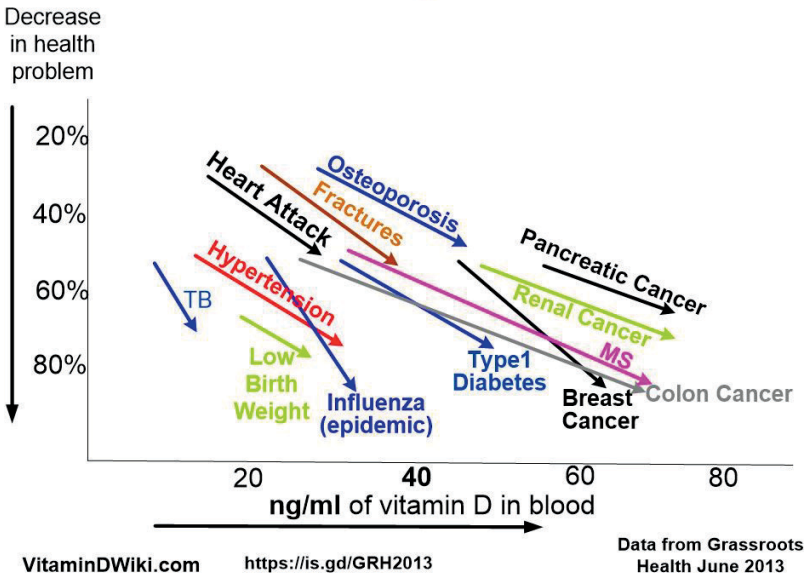
Proof that vitamin D works for any one health problem comes when studies or trials show it. The following health conditions each have published research and/or studies that support the claim that simple, safe and cost-effective vitamin D works.

Some of the 86: *After Heart Attack or Stroke or Aneurysm, Asthma, Attention Deficit Hyperactivity Disorder (ADHD), Autism, Back Pain, Bed-Wetting, Blood Cell Cancer (Multiple Myeloma), Breast Cancer, Cholesterol, Chronic Kidney, Cluster Headaches, Congestive Heart Failure, Chronic Obstructive Pulmonary Disease (COPD), Crohn's Disease, C-Section, Cystic Fibrosis, Death in the Critically Ill, Depression, Diabetes Type 1, Diabetes Type 2, Eczema, Falls, Fatigue, Fatty Liver in Child, Fibromyalgia, Gestational Diabetes, Gingivitis, Growing Pains, Hay Fever, Hemodialysis, Hepatitis-C, Hip Fractures, Hives, Hypertension, Infants Born Taller, Infertile Males, Influenza, Irritable Bowel Syndrome (IBS), Knee Osteoarthritis, Leg Ulcer Healing, Lou Gehrig's Disease (ALS) Low Birth Weight Baby, Low Vitamin D with Breastfeeding, Lupus, Menstrual Pain, Metabolic Syndrome, Middle Ear Effusion, Mite Allergy, Multiple Sclerosis, Muscles in Seniors, Non-Alcoholic Fatty Liver Disease, Osteoarthritis Pain, Parkinson's Disease, Perinatal Depression, Periodontitis, Pneumonia, Pre-eclampsia, Pre-Diabetes, Pregnancy Risks, Preterm Birth, Prostate Cancer, Quality of Life (QoL) Raynaud's Syndrome, Restless Leg Syndrome, Respiratory Tract Infection, Rheumatoid Arthritis Pain, Rickets, Sarcopenia, Senior Antibiotic Use, Sepsis, Sickle Cell, Sleep Disorders, Trauma Deaths, Traumatic Brain Injury, Tuberculosis (TB), Urinary Tract Infection (UTI), Vaginosis, Vertigo, Waist Size, Warts, Weight Loss.*[46]
See more at VDDKills.com & VitaminDWiki.com

Modern Medicine Must Change

Medical advice, procedures & treatments must change. Modern medicine can rescue people from trauma & disease, but too much time is spent managing disease & errors vs. preventing & curing disease.[47] **In 2016, medical error death was estimated to be 251,000 to 440,000 people per year**, or about 1 in 10 deaths in the U.S.[48] Medical errors account for about 1/3 of the $3.5 Trillion estimated 2018 annual U.S. health care costs & $5.5 Trillion is the estimated total cost for 2025. This must change too. **In 500 B.C, Heraclitus rightly stated, "There is nothing permanent except change."**[49] In the 1800s, Henry George said, "There is danger in reckless change; but greater danger in blind conservatism."[50]

It is time to treat & prevent VDD! **Research shows that many diseases go down as vitamin D blood levels go up. It is time for modern medicine *to know the research* and to help people get their vitamin D blood levels WAY above 30 ng/ml with D3.**



Learn more at VDDKills.com & VitaminDWiki.com

Some Vitamin D History

Vitamin D is a hormone with thousands of actions. It affects all cells, tissues, organs, many genes in the body & it regulates the *protective immune system*. Vitamin D Deficiency (VDD) is like a turtle trying to live without a protective hard shell.

From 1919 to 1924, researchers discovered UV light produced vitamin D in skin and foods. Within ten years, the vitamin D chemical was identified, and large quantities of vitamin D were produced and used to treat a variety of *bone diseases*. In the 1920s, it was discovered that vitamin D *prevents tooth decay*.

In 1976, researchers published vitamin D was considered a *hormone* and known to be released by the kidney.[51] In 1979, researchers published how VDS could serve as a prototype for managing VDD related *metabolic bone disease* like *rickets*.[52]

By 1988, more functions of vitamin D became better known which led to more treatments of numerous *bone diseases* including *rickets*, *hypoparathyroidism*, *renal osteopathy* and *osteoporosis*. In 1988, VDS was even suspected as being a possible treatment for certain *leukemias* and *psoriasis*.[53]

In 2003, researchers reported about an ongoing debate and poor consensus in defining the normal blood levels of 25(OH)D. *Osteomalacia* was known to occur at D levels of 5-7 ng/ml. *Osteoporosis* and *hyperparathyroidism* occurred at D levels below 10-12 ng/ml. Blood D levels of 18-20 ng/ml were usually considered adequate or normal. Researchers noted that *secondary hyperparathyroidism* was only avoided if D levels were higher than 30 ng/ml (75 nmol/L). They pointed out that VDD and even "subtle deficiency" of 25(OH)D were found to be neglected in the management of *chronic renal failure* patients when in fact it may play an important role in hormone and mineral balance. In 2003, the researchers emphasized the

importance of maintaining higher levels of 25(OH)D than the accepted "norm" and called for levels *over 40 ng/ml* (or 100 nmol/l) to be considered "desirable." [54]

In 2013, public health officials did not distinguish between the effectiveness of the two forms of vitamin D supplements—prescription D2 and OTC D3. In 2013, researchers published finding over-the-counter (OTC) vitamin D3 effective for keeping blood D levels stable in winter time when vitamin D producing UV exposure decreased. Both vitamin D2 & placebo during winter time resulted in blood D levels decreasing. *Researchers concluded daily VDS with D3 was more effective than D2*.[55] Current literature seems to favor OTC D3 as being more effective than the often-prescribed version vitamin D2.[56]

In 2014, researchers published results of a giant "umbrella review" of studies and vitamin D trials. They found associations between VDD and a broad range of health conditions from *infant birth weight* to *kidney disease* and even *dental caries*. Rather than call for routine screening for VDD and routine VDS for VDD related conditions, the researchers called for more research and more evidence.[57] In 2014, other researchers reported results of a meta-analysis of 32 study articles published from 1966 to 2013. ***VDD below 30 ng/ml was found related to higher all-cause mortality.*** VDD below 30 ng/ml greatly increased the number of people at risk compared to the much lower 20 ng/ml *all-cause-mortality* cutoff point set by the National Academy of Sciences.[58]

For decades, researchers have found VDD to be extremely common worldwide. Food has changed, and most people are out of the sun all day. They found VDD has primary and secondary relationships and associations with a *myriad of human illnesses and even all-cause mortality (death)*. Even so, most researchers continue to call for "further studies" and ignore a call to diagnose and treat VDD. **People & governments could benefit if researcher conclusions were better made public.**

Some Vitamin D Actions

Anti-Aging: In 2008, it was published that vitamin D is one of the most essential *anti-aging* medicines.[59]
Anti-Cancer: In 2002, it was published that vitamin D can *kill cancer cells and malignant cancer cells by apoptosis*.[60]
Anti-Cancer Metastasis: In 2011, it was published that many actions of vitamin D include *preventing cancer metastasis*.[61]
Anti-Death: In 2012, researchers reported study results of 70,528 adults in their 60s and 70s. Older people taking vitamin D with Calcium were 9% less likely to die within 3 years.[62]
Anti-Depression: In 2014, published research results of a meta-analysis concluded VDS (≥800 I.U. daily) is as effective for *depression relief* as *anti-depression* medication.[63]
Anti-Infection: In 2014, it was published that vitamin D *boosts the immune system against infection* by triggering production of **Anti-Microbial** peptides (**LL-37**)[64] that *can directly kill pathogens including bacteria, fungus and viruses*. Therefore, vitamin D is **Anti-Bacterial**, **Anti-Fungal** and **Anti-Viral**.[65]
Anti-Inflammation: In 2010, researchers reported vitamin D showed *therapeutic anti-inflammatory treatment effects*.[66]
Anti-Pain: In 2017, researchers reported VDS (4,000 IU/day) in cancer pain patients reduced the need for *fentanyl opioid*.[67]
Autophagy Action: In 2011, researchers published vitamin D, via *cathelicidin*, can kill bad cells on the inside (intracellular) even hard to kill *Mycobacterium tuberculosis*. The vitamin D *immune response* can recycle bad cell parts by *autophagy*.[68]
Epigenetic: In 2014, researchers reported vitamin D helps regulate normal gene expression & *prevent disease formation*.[69]
Hormone Action: In 1978, published researcher stated vitamin D is more than a vitamin & acts like a hormone & VDD begins *osteomalacia* that can result in elderly *femur bone fractures*.[70]
Immune System Booster: In 2010, researchers published that vitamin D *regulates and boosts the immune system*.[71]
Profoundly Effective: In 2001, researchers published that vitamin D is profoundly effective with *few side effects*.[72]

The BIG Void in Healthcare

Professional health schools have long taught vitamin D is mainly needed for teeth and bone health. For over a decade, vitamin D has been known as a hormone that *boosts immunity* and has *thousands of actions affecting most body cells*.[73]

A vital void in health diagnosis & treatment exists. Many healthcare workers do not check patient vitamin D levels nor understand how vitamin D has *strong whole-body actions*. Most seem unaware of ***The Silent Global Pandemic of VDD.***

Most people have never been tested for VDD. Most people have never had regular re-testing. Curiously, most hospitals do not test people for VDD pre-admission although **hospital length of stay and survival has been shown to be related to vitamin D levels at admission.** Still, trusted organizations[74] and publications recommend against general VDD screening[75] alleging unproven value, and/or a waste of time or money.

VDS supplement therapy for VDD may be inadequate based on the U.S 2010 RDA vitamin D guidelines.[76] So even when VDD is diagnosed, low RDA doses can be ineffective.

A big void in VDD diagnosis & treatment may be why so many chronic illnesses are not prevented or cured. It may also be why so many chronically sick & dying people feel hopeless and forced to seek alternative health treatments at higher rates than ever before.[77] **Ignoring nutrition can be deadly.**

Modern medicine rescues people from trauma & disease, but it appears to spend more time managing disease than preventing or curing it.[78] Immediate actions are needed to treat VDD and bring change. Well educated healthcare workers can bring much needed change by recommending more simple, safe, & cost-effective OTC vitamin D3! [79]

"The BIG Vitamin D Mistake"

"In 2014, a fatal error for global health was uncovered.[80] A few months later independent researchers confirmed the Institute of Medicine's terrible 2011 mistake.[81] The largest meta-analysis ever conducted of all studies published between January 1, 1966 and January 15, 2013 dealing with *all-cause mortality* related to blood 25(OH)D, showed that **25(OH)D levels under 30 ng/ml may be too low for safety associated with higher all-cause mortality.** This demolished the "famous" U-shape curve associating vitamin D levels and mortality,[82] in line with the Endocrine Society's expert committee 2011 recommendations. Even after publication of "The Big Vitamin D Mistake,"[83] there has been no official reaction from the Institute of Medicine or any other official authorities. [The IOM/NAM reportedly has since admitted making a mistake but still refuses to change their conclusions] Since *all-disease (autoimmune diseases, metabolic syndrome, type 2 diabetes, cancer) mortality risk* is reduced with blood vitamin D levels greater than or equal to 40 ng/ml, we urge all responsible public health authorities to consider designating the recommended dietary allowance (i.e., the average daily level of intake sufficient to meet the nutrient requirements of nearly all healthy people, presuming minimal sun exposure) intake levels corresponding to those proposed by the Endocrine Society Expert Committee (2011) as safe upper tolerable daily intake doses for patients at risk for VDD (under 20 ng/ml): **2000 IU** for those under 1 year of age, **4000 IU** for those 1-18 years old, and **10,000 IU** for those over age 18 years. **Actions are urgently needed to protect global health from vitamin D deficiency."**[84]

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It is Time to Treat & Prevent VDD!

The BIG "D" Story Has 2 Sides

There are many researchers with lots of education degrees who believe <u>there is not</u> a Global Pandemic of VDD. Many of these researchers have published about it in peer reviewed journals for over a decade. They often write articles in support of or based on the Recommended Daily Allowance (RDA) of vitamin D set in 2010 & published in 2011. The RDA task is to determine the average daily dietary nutrient intake needed to help keep most healthy people healthy.[85] As of 7/1/2018, the National Institutes of Health (NIH) web-site posted the vitamin D RDA as **400 to 800 IUs/day.**[86] Some of these researchers claim in well-respected journals and papers that those who say the RDA is incorrect are just trying to cause fear and increase costly vitamin D testing and VDS.[87]

There are many researchers with lots of education degrees who believe <u>there is</u> a Global Pandemic of VDD. They too have published about it for over a decade, claiming the vitamin D RDA is grossly inadequate. <u>In 2014</u>, researchers called the vitamin D recommended daily allowance (RDA) grossly inadequate to correct VDD in many adult patients. Instead of the 4-800 IU/day guideline, they found at least **5000 IU/day of D3** is usually needed to correct VDD and at least 2,000 IU per day to maintain levels above VDD.[88] Others believe even higher levels, **8,000 to 10,000 IUs/day**, are needed. <u>In 2016</u>, a very large group of researchers from over 12 countries reviewed data from 14 population groups and discovered more evidence the RDA is set too low. They found VDD is more prevalent than believed and needs public health action.[89] Since **up to 99%**[90] of people in varied global population groups have VDD, **it makes perfect sense the vitamin D RDA is way too low to keep most healthy people healthy.**

Which side will you believe?

VDD in Most Hospital Patients

In 1998, VDD was frequently found in hospital inpatients, including inpatients with no obvious VDD risk factors. *VDD was even found in those with vitamin D intakes exceeding the recommended daily allowance (RDA).*[91]

From 2005 to 2018, **VDD was found in an average of 83%** of hospital inpatients in 19 hospital studies worldwide.[92]

In 2005, **VDD was found in 94%** of hospital inpatients with *osteoporotic hip fracture inpatients*.[93]

In 2007, **VDD was found in 94%** of patients admitted to a hospital *rehabilitation unit*. Patients with VDD had *longer length of stay* and *poorer outcome*.[94]

In 2012, **VDD was found in 84%** of hospital inpatients with *hip fractures*.[95]

In 2012, **VDD was found in 73%** of *acute heart attack (myocardial infarction)* inpatients. VDD was also found to be associated with Myocardial Infarction *mortality*.[96]

In 2013, **VDD was found in 86%** of *nephrology (kidney)* hospital inpatients and outpatients.[97]

In 2013, **VDD was found in 75%** of *psychiatric* hospital inpatients.[98]

In 2013, **VDD was found in 96%** of *pediatric* inpatients with *respiratory illnesses*.[99]

In 2013, **VDD was found in 64%** of *alcohol-use disorder* and *major depression* inpatients.[100]

In 2014, **VDD was found in 72%** of *psychogeriatric* patients referred to a psychiatric hospital.[101]

In 2015, **VDD was found in 95%** of *hospitalized patients* studied. Researchers urged better diagnosis and recognition of common VDD to better manage VDD.[102]

In 2015, **VDD was found in 95%** of *psychiatric* inpatients.[103]

In 2015, **VDD was found in 83%** of *adolescent* inpatients diagnosed with *eating disorders*.[104]

In 2016, **VDD was found in 97.5%** of patients admitted to a general hospital with *breast, lung, or colorectal cancer*.[105]

In 2016, **VDD was found in 93%** of *adolescent* inpatients *in a secure psychiatric hospital*.[106]

In 2016, **VDD was found in 80%** of inpatients with *schizophrenia* disorder and **VDD was also found n 78%** of inpatients with *autism spectrum* disorder.[107]

In 2016, **VDD was found in 54%** of 4,257 hospital inpatients. **VDD was discovered** to be related to higher risk of *falls, longer stay* in the hospital, *impaired quality of life* and an *increased risk of 30-day mortality*.[108]

In 2017, **VDD was found in 87%** of hospital inpatients in a *forensic intellectual disability* service area. They reported screening for VDD, and VDS for VDD improved patient physical health. But even after 6 months of VDS, 47% still had VDD, indicating more D was needed.[109]

In 2018, **VDD was found in 83%** of established and new admission patients within a *developmental disability secure inpatient facility*.[110]

VDD in Mental Illness Patients

In 2011, **VDD was found to be so common and severe in children and adolescents** with severe mental illness that they *recommended VDS regardless of disease or treatment*.[111]

In 2016, **VDD was found to be 4.7 times more common** in outpatients with *bipolar disorder, schizophrenia, and/or schizoaffective disorder*.[112]

In 2018, **VDD screening** was found to occur in only **12.33%** of psychiatric inpatients & researchers called it inadequate. Those 12.33% tested had a **mean VDD level of 20.7 ng/ml.**[113]

Research shows VDD is often more common & worse in those with mental Illness. VDD is present in most patients in psychiatric hospitals. [see pages 21 & 22] There are over 450 definitions of Mental Disorders.[114] VDD is much more common or more severe in many of them including: *Alcohol Use Disorders, Alzheimer's, Anhedonia, Anti-Social Behaviors, Anxiety Disorder, Anxiety Post-Stroke, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorder (ASD), Bipolar Disorder, Cognitive Disorders, Depression, Eating Disorders, Drug Use Disorders, Epilepsy, Erectile Dysfunction, Major Depressive Episode (MDE), Mood Disorders, Obsessive-Compulsive Disorder (OCD), Parkinson's, Postpartum Depression (PPD), Post Traumatic Stress Disorder (PTSD), Psychosis, Psychotic Child Experiences, Psychotic Geriatric Inpatients, Seasonal Affective Disorder (SAD), Schizoaffective Disorder, Schizophrenia & Suicide. It is possible prescription medications worsen VDD.*

It is time to treat & prevent VDD! Research shows that many diseases go down as vitamin D blood levels go up. It is time for modern medicine *to know the research* and to help people get their vitamin D blood levels way above 30 ng/ml with D3.

VDD in Top Health Conditions

Research shows VDD is much more common and worse in people with the following conditions:

Top 13 KILLERS in the U.S.

Heart Disease (633,842) • *Cancer* (595,930)
Medical Errors (251,000 to 440,000+)
Chronic Lower Respiratory Disease (155,041)
Accidents (146,571) • *Stroke and CVD* (140,323)
Alzheimer's Disease (110,561) • *Diabetes* (79,535)
Influenza & Pneumonia (57,062) • *Kidney Disease* (49,959)
Suicide (44,193) • *Septicemia* • *Liver Disease* [115]

* The Top 13 killers represent over 75% of all deaths. *
* All Top killers are listed in the A to Z book section. *

Top 10 Silent KILLERS in the U.S.

Hypertension • Diabetes • Coronary Artery Disease
Alzheimer's • Fatty Liver Disease • Osteoporosis • Hepatitis
Colon Cancer • Non-melanoma Skin Cancer • Cervical Cancer

Top 12 KILLERS Worldwide

Ischemic Heart Disease • Stroke • Chagas
Lower Respiratory Infection
Chronic Obstructive Pulmonary Disease (COPD)
Lung Cancer • Diabetes • Alzheimer's & Dementia
Diarrhea • Tuberculosis • Road Injury [116]

Top 25 Rx Drug CONDITIONS

Autoimmune Diseases • Arthritis • Psoriatic Arthritis
Psoriasis • Plaque Psoriasis • Rheumatoid Arthritis • DVT
Cancer • Crohn's • Ulcerative Colitis • GERD • COPD
ADD • Depression • Bipolar • Schizophrenia • Myeloma
Asthma • Diabetes • Cholesterol • Hepatitis C • Thyroid
Macular Degeneration • Atrial Fibrillation • Anticoagulant

VDD Conditions, etc.: A to Z

VDD Conditions, etc. A to Z: are emphasized in **bold** & *italics*. Due to space limitations, this book contains definitions & references for only some of the many VDD conditions.

Accidental Death (unintentional injuries): In 2007, VDD was reported to be a risk factor for *falls* which today remain a leading cause of *accidental death* in older persons. VDD is more common in many factors that increase the risk of *falls*. The VDD related list includes *aging, orthostatic hypotension, Parkinson's disease, delirium, many medications, anemia, diabetes mellitus, depression, syncope, seizures,* and *cognitive impairment*.[117] VDD increases the risk of both *falling* & *bone fractures,* which separately or combined can lead to *accidental death*—a *"top ten" reason for death each year.*[118] VDD is present in most seniors & studies show taking four or more drugs may increase *falls, recurrent falls* and *injury*.[119]

Accidents Reduced by VDS: In 2007, VDS (vitamin D3 supplements) were reported in a meta-analysis to reduce the risk of *falls* and *fractures*. VDS with D3 was found to reduce the risk of both *accidents* and *accidental death*.[120]

Acne: In 2016, VDD was reported to be more common in acne patients and *acne severity* was inverse to vitamin D levels.[121]

Acute Ischemic Stroke: In 2015, VDD was already reported to predict *cardiovascular disease* and *all-cause death*. In a study of *acute ischemic stroke* patients with a mean age of 66.2 years old, vitamin D levels were found to independently predict *stroke functional outcome*. Vitamin D blood levels were significantly higher in patients with good outcomes compared to those with VDD and *poor stroke outcomes*.[122]

Acute Myocardial Infarction: In 2015, VDD was found in

98.3 % of patients having a *first heart attack* in a country where even 95.8% of controls had VDD.[123]

Acute Respiratory Distress Syndrome (ARDS): In 2015, VDD was found to be common in people who develop *ARDS*. VDD seemed to contribute to development of *ARDS*. Action was advised to correct VDD in patients at risk for *ARDS*.[124]

Aging: In 1993, VDD was found related to *aging* and resultant *bone disorders* of *osteoporosis*.[125] In 1995, *researchers reported vitamin D intake & synthesis decreased with age and they noted the vitamin D RDA may be too low*.[126] In 2017, VDD was reported to speed up *aging* and *age-related diseases*. Researchers noted vitamin D may help control the *rate of aging* because vitamin D *regulates many of the aging processes* like *inflammation, oxidative stress, autophagy, DNA disorders, mitochondrial dysfunction, reactive oxygen signaling* and *epigenetic changes*. Researchers found people with normal vitamin D levels were protected from a*ge-related diseases* and *aged slower,* while those with VDD *aged faster*.[127]

Age Related Diseases: In 2009, VDD was found associated with an increased risk of several *chronic diseases* including *osteoporosis, cancer, autoimmune disorders, diabetes, hypertension, atherosclerosis* and *muscle weakness,* all of which can be considered age related diseases. Researchers also found VDD related to an increased risk of *nervous system diseases* such as *multiple sclerosis, Alzheimer's, Parkinson's disease, seasonal affective disorder,* and *schizophrenia*.[128]

AIDS: In 2014, VDD in HIV-positive adults was reported to be common, to weaken the *immune system & to* increase *AIDS* complications such as *infections, wasting, poor perinatal outcomes, HIV disease progression, AIDS events & death*.[129]

Alcoholic Liver Disease (ALD): In 2013, VDD was reported to increase *liver damage & mortality* in *ALD* patients.[130]

All-Cause Mortality (leading to death): In 2009, VDD was found related to *all-cause mortality* and even more highly related to *cardiovascular mortality*.[131] In 2009, VDD was found in a prospective study to be inversely & independently associated with both *cardiovascular disease* and *all-cause mortality*. Researchers called for more studies instead of VDS to treat VDD in the elderly.[132] In 2013, researchers published results of a very large study that again found VDD inversely & very strongly related to all-cause mortality & *cause-specific mortality* from *cardiovascular diseases*. VDD was also found to be common in *respiratory (lung) diseases* & *cancer*. Needed VDS to treat common VDD was still not prescribed.[133]

Allergic Rhinitis: In 2012, severe VDD was reported to be much higher in patients with *allergic rhinitis*.[134]

Allergies: In 2011, VDD was found related to the prevalence of *allergies*.[135] In 2016, VDD was found strongly associated with *asthma*, *allergic diseases*, *allergic rhinitis* and *wheezing* in children, all of which have been increasing for decades.[136]

Alzheimer's Disease (AD): In 2011, VDD was reported to be common in older AD patients and involved with *low mood* & *impaired cognitive function*. Researchers then found that VDS improves *cognitive function* in some *AD* patients and VDS undeniably provides *AD* benefits.[137] In 2013, VDD was found to be worse in patients with *AD*.[138]

Alzheimer's & Dementia: Before 2015, associations between vitamin D status and *Alzheimer's disease* (AD) and *Dementia* were already known. In 2015, VDD < 20 ng/ml was found in a meta-analysis of past studies to *increase risks of developing both AD and Dementia*.[139]

Amyotrophic Lateral Sclerosis (ALS) or Lou Gehrig's disease: In 1997, severe VDD & *osteopenia* were found in *ALS* patients.[140] In 2013, VDD was found in 81% of *ALS* pa-

tients & 2000 IU of daily VDS for 9 months was deemed safe with beneficial effects.[141] In 2014, researchers found that high dose vitamin D3 improved function while restricting D3 made function worse in a mouse model of *ALS*.[142] In 2017, VDD was named a possible risk factor for *ALS*--identified for over 150 years as a neurological condition of unknown origin.[143]

Anemia: In 1976, VDD was reported as related to *anemia*.[144] In 2017, researchers published agreement exists that VDD is directly associated with *anemia* in children and adults with *chronic disease* or *inflammation*.[145]

Anemia in Critically Ill Adults: In 2018, researchers reported finding *500,000 IU D3 VDS* in critically ill adults increased *hemoglobin* and decreased *hepcidin* and *anemia* after one week, where 250,000 IU VDS and placebo did not.[146]

Aneurysm – Abdominal Aortic (AAA): In 2013, VDD was reported to be found with larger *Abdominal Aortic Aneurysm (AAA)* and inversely related to *AAA* diameter.[147] In 2017, researchers found low circulating levels of vitamins B6/C/D/E (not B12) associated with *AAA*. They found much lower VDD in patients with *AAA* than in patients without *AAA*.[148]

Aneurysm -- Cerebral: In 2016, VDD was found at a much higher rate in patients with *cerebral aneurysms* requiring treatment than in a control group. Aneurysm "management" is often restricted because what promotes their formation, growth and rupture is usually considered unknown.[149]

Aneurysm – Thoracic: In 2012, VDD was reported to be an independent risk factor associated with *thoracic aneurysm* also known as *aortic dilatation*.[150]

Anger: In 2015, VDD was reported to significantly increase the risk of *anger*, *anxiety, psychiatric distress*, *poor sleep quality*, *depression* and *worry* in adolescents.[151]

Angioedema: In 2008, VDS was noted as one possible therapy for *angioedema*, *atopic dermatitis*, and *urticaria*.[152]

Anhedonia: In 2015, researchers reported finding *anhedonia* very common in *psychiatric patients* hospitalized for *depression*. They discovered VDD <20 ng/ml to be related to symptoms of *cognitive & affective depression*. VDD was distinctly noted with *anhedonia* symptoms.[153] *Anhedonia* is the inability to get pleasure from normally pleasurable activities. It is often present with *mental disorders*, especially *mood disorder*. There are numerous forms of *anhedonia* including *sexual*, *social*, *musical* and *more*. *Depression* and *anhedonia* exist and coexist in many conditions of *mental illness*.[154]

Ankle & Foot Fractures: In 2014, VDD was reported to be common in patients with *foot or ankle injury*. Researchers published that vitamin D with or without calcium reduced *fractures and improved fracture healing*. The study concluded that monitoring vitamin D blood levels and proper VDS should be considered in patients with *fractures*.[155]

Ankle Fracture Healing: In 2015, researchers published finding preoperative vitamin D levels in *orthopedic trauma* patients correlated with *clinical outcomes* after *ankle fracture fixation*. VDD can result in *worse outcomes* even one year after patients are treated for ankle fractures.[156]

Anorexia Nervosa: In 2015, VDD was found to be widespread in untreated *anorexia nervosa* patients along with *impaired bone health* and *low bone mineral density*.[157]

Anti-Bacterial D3: In 2012, researchers reported D3 & LL-37 help kill dangerous *group A streptococcus bacteria*.[158] In 2017, researchers published VDS (with LL-37) *kills the S. pneumonia bacteria & reduces inflammation & cell harm*.[159]

Anti-Cancer D & Ultraviolet-B (UVB) Sun Light: In 2006, a

researcher reported finding strong evidence natural vitamin D *increased cancer survival*. In different locations around the world, the higher the UVB index (needed to naturally produce vitamin D) the lower the rates of cancer & mortality, and the higher the survival from *cancers* such as *breast, colon, lung, stomach, ovaries, pancreas, kidney and non-Hodgkin's lymphoma*.[160] In 2018, research supports *embracing sensible sunshine for vitamin D-cancer prevention*.[161]

Anti-Body Levels in Pediatric-Onset Multiple Sclerosis: In 2011, researchers published finding *lower antibody levels* to common childhood viruses including *Epstein-Barr*, *cytomegalovirus* (CMV) and *herpes simplex* in pediatric-onset *multiple sclerosis* patients with *lower vitamin D levels*.[162]

Anti-Depressants: In 2016, ***many drugs, including antidepressants, were listed as causing "drug induced nutrient depletion" including the depletion of vitamin D.***[163] In 2008, researchers reported finding "bias" when 94% of antidepressant trial publications had positive results. An FDA analysis of 74 studies, 12 drugs and over 12,000 people revealed 37 of 38 trials with positive results were published, but only 14 of 36 trials with negative results were published. Researchers concluded that selective publishing of clinical trials, called bias, might harm researchers, people in studies, health care professionals and patients.[164] In 2010, a medical doctor wrote that antidepressants don't work and have side effects. Related hidden unpublished studies were only found using the Freedom of Information Act. Reportedly, 86 percent of people taking an antidepressant have one of more side effects such as weight gain, fatigue, insomnia, loss of mental abilities, nausea and sexual dysfunction. The same medical doctor recommended taking 2,000 to 5,000 IU of vitamin D3 daily because VDD can lead to depression.[165] In 2017, results of a meta-analysis of over 375,000 people in 16 studies were published. It found a 33 percent increased risk of dying prematurely and a 14 percent higher risk of adverse cardiovascular events like

stroke and heart attack in people taking antidepressants.[166] About 10% of people in the U.S. now take antidepressants.[167] In 2017, results of a meta-analysis of 22 studies with 99,367 people found that antidepressants increased risk of cerebrovascular disease & acute heart disease.[168]

Anxiety: In 2015, VDD was reported to be an independent risk factor for *anxiety*.[169] In 2015, another study published that significantly *lower levels of calcitriol* (the active form of vitamin D) were found in men and women with *depression*, as well as those with *anxiety* disorders.[170]

Anxiety Post-Stroke: In 2016, VDD was published to be independently related to *post-stroke anxiety* and the VDD related *anxiety* could continue for one month after a stroke. Researchers already knew VDD was common in patients with *mood disorders*, *stroke*, and *post stroke depression*.[171]

Arterial Disease: In 2012, VDD was found to be very common in patients with *peripheral artery disease*, *aortic aneurysm*, *congestive heart failure and cerebrovascular disease, and* an independent risk factor for *arterial disease*.[172]

Arthritis: In 2010, VDD was found to be quite common in patients with *rheumatoid arthritis*.[173] In 2011, VDD was found in a "surprisingly high" number of patients with inflammatory joint diseases in a sunny country, including patients with *rheumatoid arthritis, psoriatic arthritis and ankylosing spondylitis*.[174] In 2013, VDD was found in 83% of 4,075 patients with *rhematoid arthritis* and an average age of 59.7 years.[175] In 2012, VDD was found in over ½ of patients with *juvenile idiopathic arthritis* at an average age of 10 ½.[176]

Arthroplasty (joint surgery): In 2013, VDD and *sarcopenia* were found to increase the risk of *disability* in the one million annual *hip and knee replacements*.[177] In 2017, VDD was found to be an *infection risk at hip and knee joint implants*,

and VDD *increased the risk of 90-day implant complications* and *infections needing corrective surgery*.[178]

Asthma: In 2017, VDD was found in a review of 10 studies to to be common in children with *asthma* and much worse in children with *asthma* compared to non-asthmatics.[179]

Asthma & VDS: In 2017, after a large study meta-analysis, researchers found *VDS reduced the rate of asthma attacks needing steroid treatment*.[180]

Athletes: In 2015, VDD was found in most of 2,313 athletes in a mega-study.[181]

Athletes in Wheel Chairs: In 2016, VDD was found in all 20 Elite Indoor Wheel Chair Athletes studied and *12 weeks of 6000 IU daily VDS normalized D levels*.[182]

Athletic Performance in NBA: In 2018, VDD was found in 73.5% of 279 National Basketball Association players studied pre-draft. Those with VDD had a much lower rate of being drafted & draft rate increased as vitamin D levels increased.[183]

Athletic Performance in NFL: In 2015, VDD was found to be more common in blacks and in those released pre-season due to *injury* or *poor performance* in an 80 National Football League (NFL) player study. *Higher vitamin D levels increased chances of getting an NFL contract*.[184]

Atherosclerosis: In 2017, VDD was reported to raise the risk of *subclinical* and *carotid atherosclerosis*.[185] In 2017, a meta-analysis of 21 studies with 3,777 VDD patients and 4,792 controls found VDD was associated with *subclinical* atherosclerosis which may increase the risk of *morbidity* and *mortality* from *cardiovascular disease*.[186] In 2017, researchers reported finding VDD directly related to *carotid plaque*. Vitamin D blood levels were negatively associated with *carotid*

atherosclerosis. As blood vitamin D levels increased, the amount of high-risk carotid plaque decreased.[187]

Atopic Dermatitis: In 2014, VDD was found to increase the risk of *significantly worse atopic dermatitis*.[188]

Atrial Electromechanical Delay (AEMD): In 2015, VDD was reported to increase *AEMD* in patients and vitamin D blood level was found to be an independent predictor for *AEMD*. Researchers suggested VDS may effectively decrease *AEMD* and reduce clinical *atrial arrhythmias*.[189]

Atrial Fibrillation (AF): In 2014, VDD was reported to be related to non-valvular *AF*. Researchers found *left atrium diameter* and *systolic blood pressure* in the pulmonary artery were higher in those with VDD. VDD was already known to be involved with *cardiovascular diseases* including *coronary artery disease*, *heart failure* and *hypertension*.[190] In 2016, VDD was found in a meta-analysis to modestly increase the risk of *AF*.[191] In 2016, VDD was found to be strongly associated with *AF* in patients with *chronic heart failure*.[192]

Atrial Fibrillation (AF) After Coronary Bypass: In 2016, VDD was found related to new onset *AF* after coronary artery bypass grafting, commonly known as heart bypass surgery.[193]

Attention Deficit Hyperactivity Disorder (ADHD): In 2013, VDD was found to be much worse in children with *ADHD* compared to healthy controls. *ADHD* is the most common *child behavior disorder,* so researchers suggested infant VDS may be a safe and effective way to reduce the risk of *ADHD*.[194] In 2014, researchers called *ADHD* one of the most common *childhood psychiatric disorders* affecting some 2-18% of children globally, usually in early life, and with "unknown origins." Researchers did report finding VDD was worse in *ADHD* children than in healthy controls.[195] In 2014, researchers stated *ADHD, a neuro-developmental disorder,*

was becoming increasingly more common and those with ADHD were known to have reduced levels of nutrients needed for neurologic function like vitamin D, zinc, ferritin and magnesium. They noted low levels of nutrients could not yet be blamed for causing *ADHD* but stated it would be safe and justified to supplement known nutritional deficiencies.[196] In 2014, more researchers found VDD worse in *ADHD* children compared to healthy non-ADHD children.[197] In 2015, vitamin D blood levels were found to be lower in *ADHD* children than in healthy children. Researchers concluded *the presence of ADHD might be related to vitamin D levels*.[198] In 2015, a study review of 36 years of publications reported finding VDD and *bed-wetting* to be risk factors for *ADHD*.[199]

Autism Spectrum Disorder (ASD): In 2014, VDD was found to be worse in children with *autism* compared to healthy children. Researchers suggested *VDS might be a safe & more effective strategy to reduce the risk of autism*.[200] In 2016, researchers published study results that found an ASD group had the *highest ferritin and the lowest vitamin B12 and D levels*. They also found vitamin D levels in an *ADHD* group to be significantly lower compared to healthy controls. Study results highlighted the importance of vitamins B12 and D3 in *ASD* and *ADHD* patients.[201] In 2017, researchers published finding VDD and *iron deficiency* along with *anemia* more common in *autistic children* compared to controls.[202]

Autism Spectrum Disorder (ASD) Improved with VDS: VDD has been reported to be very common in children with *ASD* and VDD may contribute to the cause of *ASD*. In 2016, researchers published that *3 months of VDS with D3 significantly improved ASD behavior and symptom ratings*. Study data indicated treatment in younger children gave greatest results. Safe cost-effective VDS with D3 may significantly improve *ASD* in some children, especially younger ones.[203]

Autophagy: In 2009, researchers reported how vitamin D

induces *autophagy* (the destruction of dysfunctional cells) and can even lead to *killing of Mycobacterium tuberculosis*.[204]

Baldness: In 2014, VDD was found to be common in *alopecia areata hair loss* and worse VDD matched *worse hair loss*.[205] In 2017, VDD was found to be common in patients with *spot baldness*, or *alopecia areata*, compared to healthy controls.[206] In 2017, topical .005% calcipotriol was reported to cause hair regrowth beginning at 4 weeks and in 59% of study patients after 12 weeks.[207] In 2018, a meta-analysis review of past studies found VDD more common and worse in patients with *alopecia areata baldness* than controls.[208]

Barrett's Esophagus Cancer (BE): In 2017, VDD was found in all studied *BE cancer* patients, so researchers noted that VDD may increase the risk of *BE cancer*.[209]

Bed-wetting (Nocturnal Enuresis-NE): In 2014, VDD was reported to increase the risk of *NE* in children ages 5 to 7.[210] In 2018, researchers found VDS 1000 IU/day and omega-3 each resulted in reduced *NE* wet nights, but when combined they cured 45% of *NE* in children ages 7 to 15 years old.[211]

Behcet's Disease (BD): In 2011, VDD was found to be much lower in *BD* patients than in controls.[212] In 2014, researchers published that VDD may *trigger BD*.[213] In 2016, researchers published VDS may help *BD* patients.[214] In 2017, researchers reported VDD to be common in *BD*, a multiple system *inflammatory disorder* with unpredictable episodes of *orogenital (oral and genital) ulcers*, *skin lesions* and *uveitis*.[215]

Bladder Cancer: In 2015, VDD was reported to *increase the risk of bladder carcinoma (cancer)*.[216]

Bone Cancer: In 2017, VDD was found in 83% of patients with *bone tumors* and *tumor-like lesions* and VDD was worse in patients with *malignant bone tumors*.[217]

Bone Cancer Metastasis: In 2015, VDD was found at a "*widespread & alarming rate"* in patients with *multiple myeloma & metastatic bone disease*. Researchers specifically noted that patients with *bone metastasis* from *breast cancer*, *prostate cancer & multiple myeloma* most often had VDD.[218]

Bone Fractures in Elderly: In 2006, VDD was found in 89% of adults with *fragility bone fractures*.[219] In 2006, VDD was also found in 89% of elderly *fragility bone fracture* patients at a different bone clinic.[220]

Bone Fractures in People with Intellectual Disability (ID): In 2006, VDD was found to be common in people with ID and *bone fractures*. Researchers noted oral VDS is effective in restoring normal vitamin D levels and should be routinely considered for those at the highest risk.[221]

Bone Fracture Prevention in Elderly Women: In 2010, researchers published results of a meta-analysis review of 12,658 women in eight controlled trials. They found VDS D3 800 IU daily reduced *osteoporotic non-vertebral*, *hip and non-vertebral-non-hip fractures* in elderly women.[222]

Bone Stress Fractures: In 2016, VDD under 40 ng/ml was found in 83% of non-military patients with *bone stress fractures* and researchers called for research to learn the links.[223]

Bone Stress Fracture Prevention: In 2012, a published study recommended the vitamin D RDA guidelines be raised for adequate bone health. It suggested the 600 to 800 IU per day RDA be raised to 800 to 1,000 IU for most adults, and some *adults should take as much as 2,000 IU of vitamin D3 daily because vitamin D is safe, effective and even preventive*.[224]

Bowlegs & Knock-Knees: In 1984, *rickets* was blamed for causing *bowlegs or knock-knees*, *but VDD causes rickets*.[225]

Brain Development Disorders: In 2003, researchers reported finding rats born to mothers with VDD had profound *brain developmental alterations* at birth. They suggested maternal human VDD would have similar consequences.[226] In 2004, researchers published results of a review of studies and noted evidence was growing and showing critical components of *orderly brain development* can be influenced by prenatal low vitamin D3 levels.[227] By 2009, there was clear evidence VDD may cause *abnormal brain development* and be a risk factor for *neuropsychiatric disorders* like *schizophrenia*.[228] In 2018, evidence was increasing that vitamin D can directly affect *brain growth and development from birth to death*. Vitamin D levels can directly impact *fertilization, implantation, early development, differentiation and ultimately the growth and development of organs like the heart and brain*. VDD was reported to *alter proper development* and result in increased *infertility* and increased *neurodevelopmental diseases* such as *attention deficit hyperactivity disorder* (ADHD), *autism spectrum disorders* (ASD) and *schizophrenia*.[229]

Brain Hemorrhage: In 2015, researchers reported that adding vitamin D to a *dementia* drug gave a much stronger protective combined effect in intracranial hemorrhage (brain bleed) after *traumatic brain injury* or ruptured *cerebral aneurysm*.[230]

Brain Injury: In 2016, VDD was found to be common in patients after traumatic brain injury and VDD increased the risk of *post trauma impaired cognitive function a severe depression*.[231] In 2016, researchers reported finding very low vitamin D in severe traumatic brain injury patients which directly affected *quality of life* after injury. They recommended active screening and treatment for VDD in head-injured patients to reduce the risk of further *morbidity*, such as *osteomalacia* and *cardiovascular disease*.[232]

Brain Protection: In 2015, researchers reported evidence that vitamin D plays critical roles in *brain development*, *metabo-*

lism and *protection*, and D may be *neuroprotective* against homocysteine that can result in nerve damage.[233] In 2017, researchers reported since VDD is reaching *epidemic* status globally, concerns exist about *brain development & disease* needing ideal blood D levels to *protect* the adult brain.[234]

Breast Cancer (BC): Before 2009, VDD was found to be strongly related to BC, inversely associated with *BC* before diagnosis, and significantly & inversely related to *BC* after diagnosis.[235] In 2011, VDD was reported to be more common in women with *breast cancer*. Patients treated for *BC* had other negative health issues such as *bone loss*, *falls*, and *joint pain*. Researchers called for careful VDS for *BC* patients.[236] In 2012, *VDD was found in* ***95.6%*** *of BC patients* vs. 77% of controls. Researchers concluded ***VDD was present in almost all BC patients.***[237] In 2014, *VDD was found in* ***99%*** *of BC females* and even found in 40% of females taking VDS.[238] In 2017, researchers published finding VDD significantly increased the risk of *BC* and *VDD blood levels below* ***20 ng/ml increased the risk of BC by 7.8 times.***[239] In 2018, researchers reported finding VDD in most *BC* patients and VDD under 20 ng/ml was significantly associated with *BC* in women ages 34-54. They noted a diet including mushrooms (which contain a vitamin D pre-cursor) decreased the risk of *BC*.[240] [241]

Breast Cancer (BC) Metastasis: In 2010, VDD was reported to *promote the growth of BC cells in bones*.[242]

Breast Cancer (BC) Prevention: In 2011, VDD was reported to increase the risk of having breast cancer and vitamin D blood level of ***47 ng/ml reduced the risk of BC by 50%.***[243] In 2014, a comprehensive database search and review found breast cancer risk decreased and protection from *BC* significantly increased as vitamin D blood level increased.[244] In 2016, researchers published finding higher blood vitamin D to be protective against breast cancer. Vitamin D level was found to be inversely and very strongly related to a lower risk

of BC.[245] In 2018, researchers found a vitramin D blood level *greater than or equal to* ***60 ng/ml resulted in an 80% lower BC risk*** *than ≤ 20 ng/ml in women.*[246]

Breast Cancer (BC) Recurrence & Death: In 2013, VDD in patients diagnosed with early stage *BC* was found to increase the risk of *BC recurrence & death*.[247]

Breast Cancer (BC) Recurrence Prevention: In 2013, researchers reviewed 14 years of published literature and reported finding that the risk of *BC* and the risk of *BC recurrence* decreased as vitamin D blood levels increased.[248]

Breast Cancer (BC) Survival: A 2017 study reported finding a highly significant linear dose-response relationship between vitamin D blood levels and *overall survival in BC patients*.[249]

Breast Cancer (BC) Survival & Tumor Size: In 2012, VDD at early *BC* diagnosis was found to be correlated with *larger BC tumor size* at diagnosis. Researchers found VDD <30 ng/ml at diagnosis strongly associated with *worse overall survival* and *decreased disease-free interval*, while ***vitamin D blood levels above 30 ng/ml related to increased overall survival and increased disease-free interval.***[250]

Breast Cancer (BC) Triple Negative: In 2012, VDD was discovered to be worse in patients with more *aggressive and worse prognosis breast cancer, like triple negative BC*.[251] In 2016, researchers reported finding patients were ***2.54 times*** *more likely to have triple negative BC when VDD levels were ≤ 10 ng/ml*.[252] In 2017, researchers published finding *VDD in* ***100%*** *of triple negative BC women* and VDD related to *poorer prognosis* in women with *BC*.[253]

Breast Implant Rejection: In 2017, VDD was reported to significantly increase the development of *autoimmune disease* and silicone implant rejection.[254]

Bullous Pemphigoid (BP): In 2016, VDD was found to be significantly associated with *BP* in older in-patients with a high level of one or more other disorders.[255]

Cancer: In 2013, VDD was reported to increase the risk of multiple cancers including: *cancers of the esophagus, stomach, colon, rectum, gallbladder, pancreas, lung, breast, uterus, ovary, prostate, urinary bladder, kidney, skin, thyroid, and hematopoietic system-- Hodgkin's lymphoma, non-Hodgkin's lymphoma, and multiple myeloma*.[256] VDD is more common in most of the other most frequent cancer's in the U.S. including: *Barrett's Esophagus, Bladder, Breast, Colorectal, Endometrial, Kidney, Leukemia, Liver, Lung, Lymphoma, Melanoma, Non-Hodgkin Lymphoma, Oral Squamous Cell, Pancreatic, Pet, Prostate, & Thyroid*. Many common cancers present with over 40,000 cases per year.[257]

Cancer Prevention & D3: In 2002, researchers published that it was "well-known" *vitamin D3 has potent actions to prevent cancer growth, reduce tumor invasion and promote cancer cell death*. They concluded it should be mandatory to ensure proper vitamin D3 levels, especially in relation to cancer of the *breast, prostate, colon* and *malignant melanoma*.[258] In 2015, researchers noted VDD is common in *cancer patients* and related to *poor cancer prognosis and disease progression*. Therefore, vitamin D status should be monitored in all *cancer* patients and adequate VDS D3 given when needed.[259]

Cardiovascular Disease (CVD): In 2008, VDD was reported to be independently related to *cardiovascular mortality* and *all-cause mortality*.[260] In 2016, VDD was found to be very common in patients with CVD in a literature review. Researchers called for VDD to be diagnosed & treated.[261] In 2017, VDD was found to be associated with *chronic inflammatory diseases* including *obesity* and *diabetes* with both being strong risk factors for *cardiovascular diseases* (CVD). Researchers noted VDD related CVDs such as *hypertension,*

atherosclerosis, coronary artery disease, cardiac fibrosis, hypertrophy, cardiomyopathy, myocardial infarction, heart failure, aneurysm, & peripheral arterial disease are all major causes of morbidity and mortality.[262]

Cardiovascular Disease (CVD) Risk Factors: In 2010, VDD *≤ 30 ng/ml was found* to be very related to an increased prevalence of *diabetes, hypertension, hyperlipidemia*, and *peripheral vascular disease*. Researchers found VDD highly associated with *coronary artery disease, myocardial infarction, heart failure, stroke, incident death, heart failure, coronary artery disease,* and *myocardial infarction*. They found VDD common in the general population and concluded vitamin D appears to play a primary role in *cardiovascular* risk factors and *disease*.[263] In 2012, researchers published results of a meta-analysis that found *a strong inverse association between the VDD and the risk of CVD*. VDD was found to be related to increased *stroke, coronary heart disease, total CVD* and *CVD mortality*.[264] In 2017, researchers published that a meta-analysis of observational studies found vitamin D to be inversely associated with *CVD risk* and *CVD disease*.[265]

Cardiovascular Disease (CVD) & VDS: In 2008, researchers reported VDD was known to be associated with *CVD* risk factors such as *hypertension, obesity, diabetes mellitus* and *metabolic syndrome* and to be involved with *CVD diseases* such as *stroke & congestive heart failure*. They concluded that easy VDD screening & simple VDS may have benefits to reduce *CVD & CVD* mortality.[266] In 2012, researchers found VDD associated with several *CVD* related diseases including *hypertension, coronary artery disease, cardiomyopathy,* and *diabetes*. They found VDD a strong independent predictor of *all-cause death*. They concluded VDD increases the risk of *CVD* and lowers *CVD* survival, while VDS significantly increases *CVD* survival, especially in patients with VDD. [267]

Carpal Tunnel Syndrome (CTS): In 2016, VDD was reported

to be a trigger for CTS and *CTS* severity correlated with VDD severity. Researchers recommended vitamin D testing for *CTS* patients.[268] In 2017, researchers noted that *CTS* and VDD clinically looked unique, but each could cause *chronic pain*. They found VDD *increased CTS pain intensity* and VDS *may decrease CTS pain*.[269]

Celiac Disease (CD): In 2017, VDD was reported in most children with *CD* at the time of *CD* diagnosis. Researchers found 70% of *CD* children had VDD, the most commonly deficient vitamin in their nutrient study. After 6 months of a gluten-free diet, most measured micronutrients returned to normal, *but vitamin D levels remained below normal*.[270]

Cell Signaling: In 2015, researchers reported finding a *decline in vitamin D levels leads to a decline in cell stability* of the regulatory signaling network which may account for why so many major diseases have been linked to VDD. Some of those many diseases linked to VDD include *Alzheimer's disease* (AD), *Parkinson's disease* (PD), M*ultiple Sclerosis* (MS), *hypertension* and *cardiovascular disease*.[271]

Cervical Cancer & HPV: In 1992, VDD was suspected as being related to *cervical and other gynecological cancers*.[272] In 2003, researchers reported vitamin D may be preventive for *cervical cancer, breast cancer, and ovarian cancer*.[273] In 2010, reseachers found a strong inverse relationship between dietary calcium & vitamin D intake, and *cervical cancer*.[274] In 2016, VDD was reported to be a possible reason *HPV related cervical cancer* was persistent.[275] In 2016, VDD was found to increase the risk *cervicovaginal HPV infection*.[276]

Chagas: In 1993, VDS was reported to provide some protection from *Trypanosoma cruzi* (Chagas) infection in mice. Chagas is a top "kissing bug" killer in parts of the world.[277]

Child Abuse: In 2009, cases were published to show how

parents of infants with *accidental fractures* can be wrongfully accused of child abuse when VDD is present.[278] In 2018, researchers published how radiologists miss biopsy-proven *rickets* 80% of the time in infants that present with *multiple unexplained fractures* in different stages of healing. Unless a bone biopsy is performed (the gold standard to diagnose *rickets* when abuse is suspected) innocent parents can be wrongfully arrested, sent to prison & their infant removed.[279]

Cholesterol: Cholesterol is needed by every cell in the body. Testosterone, estrogen, & progesterone sex hormones are all made from cholesterol. **Vitamin D is made from cholesterol. Lowering cholesterol may cause VDD & increase risks** of *heart disease, diabetes, several cancers, dementia and memory loss, depression and anxiety, ability to fight stress, muscle soreness, fatigue, heart failure, inflammation, low libido, dizziness, hearing difficulties, edema & infertility*.[280] Remember being told to lower your cholesterol, limit bacon, eggs, butter, then margarine, whole milk, saturated fatty foods, red meat, salt, etc.?[281] Today we are still being told to lower total blood cholesterol, lower salt, limit saturated and trans fats, butter, whole milk, butter, fatty cuts of meat, lard, coconut oils, etc.[282] In 2004, the National Cholesterol Education Panel (NCEP) advised reducing cholesterol levels even lower to a point which might need multiple cholesterol lowering drugs. In 2006, a review published in the Annals of Internal Medicine found scant evidence to support the NCEP's new guidelines to lower cholesterol to less than 70. This is extremely important because cholesterol is critical to health and we keep being told to reduce cholesterol with prescription medications that can have serious side effects. **In 2015, it was known that only 25% of heart attack victims have high cholesterol & 75% have lower cholesterol.**[283] Isn't that the opposite of what we have been told for decades?

Chronic Kidney Disease Puritis (itch): (CKD-P): In 2015, researchers published finding topical vitamin D (calcipotriol)

to be a safe and effective therapy for *CKD-P* which can be very troublesome in patients with *end-stage renal disease*.[284]

Chronic Muscle Pain (Myalgia): In 2005, VDD was reported to be one possible *chronic muscle pain* factor that must be corrected to resolve *myalgia pain* which is common world-wide and includes *myofascial pain* and *fibromyalgia*.[285]

Chronic Musculo-Skeletal Pain: In 2013, researchers published results of a study designed to evaluate the effects of correcting VDD on *pain*, *fatigue* and *quality of life*. Forty-nine patients age 18 to 50 with severe VDD were studied and v*ery high dose VDS was needed to correct severe VDD. High dose VDS resulted in improved quality of life,* significantly decreased pain, decreased need for analgesics, and decreased discomfort in simple daily activities like walking, shopping and cleaning. *VDD correction resulted in a positive impact on physical, mental and social activities*. Non-specific musculo-skeletal pain or unexplained physical weakness and lack of energy are common. Correcting VDD was deemed proper and needed before prescribing complex and expensive examinations in such patients.[286] In 2016, VDD was found to be very common in pediatric populations. *VDS reduced pain intensity in children with chronic recurrent pain* and VDS improved mobility and daily function in those with VDD and muscle-skeletal orthopedic disorders.[287]

Chronic Obstructive Pulmonary Disease (COPD): In 2015, VDD was found to *accelerate and aggravate development of COPD disease*. Researchers concluded since VDD is highly prevalent, research needs to explore possible positive effects of VDS on *COPD* onset and decline of lung function.[288] In 2016, researchers published meta-analysis results after reviewing 21 studies and thousands of *COPD* patients and controls. They found *vitamin D blood levels inversely related to risk, severity and exacerbation of COPD. They found VDD increased risk of COPD & severe COPD*. [289]

Chronic Pain: In 2014, VDD was found in *92% of chronic pain patients studied, and pain intensity and pain severity increased as VDD worsened*.[290]

Chronic Widespread Pain (CWP): In 2015, VDD was found to be more common in people with *CWP* than in controls. *CWP* is a world-wide musculo-skeletal disorder that reduces quality of life and can lead to disability.[291] In 2016, researchers recommended that patients with *CWP* be investigated for VDD since VDD increases *CWP* and depression. When indicated, *VDS in patients with nonspecific CWP provided improvements in musculo-skeletal symptoms, level of depression and quality of life of patients*.[292]

Clostridium Difficile Colitis (C. Diff.): In 2012, VDD was was reported to have reached "pandemic status" and was a risk factor for *C. Diff*. Researches noted VDS was an effective and inexpensive way to improve patient recovery from devastating *C. Diff. infection*.[293] In 2014, *VDD under 15 ng/ml was reported to increase the risk of community-acquired C. Diff*. Researchers concluded vitamin D may play a role in the risk of getting *C. Diff*.[294] In 2015, researchers noted *C. Diff. affects up to 10% of hospitalized patients* and is the most common cause of *hospital origin diarrhea*. They discovered a strong inverse relationship between VDD D3 blood levels and *C. Diff* severity.[295] In 2015, VDD prior to hospital admission was found to increase the risks of developing hospital-acquired *C. Diff*.[296] In 2016, VDD in *C. Diff*. patients was found related to length of *diarrhea* and *increased rates of sepsis*.[297]

Cod Liver Oil: In 2011, researchers recommended cod liver oil for the "pandemic of VDD" as it contains *vitamin A*, *vitamin D* and *omega 3 fatty acids* that work well together to reduce VDD and related diseases. They knew VDD *increased the risk of infective, autoimmune, neurodegenerative, cardiovascular diseases* as well as *diabetes, osteoporosis* and *cancer*. *Researchers estimated a 10% sickness cost savings by treat-*

ing VDD for just these diseases.[298]

Cognitive Function: In 2016, VDD was reported to be associated with *cognitive impairment*. Researchers found vitamin D blood levels over *40 ng/ml were very related to better verbal fluency*—a form of cognitive executive functioning. They concluded that blood levels *over 40 ng/ml may be optimal for some forms of cognitive executive functioning*.[299]

Colds & Flu & D Preventive: In 2017, researchers published findings that *taking extra vitamin D can protect against colds, flu and other respiratory infections*. The study reviewed the records of over 11,000 people from "0 to 95 years" old from 25 randomized controlled trials in 14 countries. They concluded *VDS is safe, is flu preventive and is protective against acute respiratory infection, especially in those with VDD*.[300]

Colorectal Cancer (CRC): In 1987, *vitamin D3 was reported to notably inhibit the growth of colon cancer cells*.[301] In 2017, VDD was found to be highly prevalent in a study of 2,910 *CRC* patients and *VDD was a strong & independent predictor of a poor prognosis. Patients with vitamin D3 blood levels less than 4.74 ng/ml had much higher mortality*. The study suggested that VDS and outdoor exercise may improve CRC patient prognosis and deserved more research.[302]

Coronary Artery Disease (CAD): In 2012, VDD was noted to be linked to *CAD* & *cardiovascular death*. Researchers then found *double or triple CAD* and diffuse *CAD* were more common in worse VDD.[303]

Coronary Artery Ectasia (CAE): In 2014, VDD was found to be *common in CAE patients*.[304]

Crohn's Disease (CD): In 2006, VDD was found in a high proportion of *CD* patients, so researchers suggested patients with *CD* increase their vitamin D levels.[305] In 2013, *CD dis-*

ease activity was found to be inversely related to vitamin D blood levels, and active *CD* associated with VDD. They also found *smokers* had worse VDD than non-smokers.[306] In 2017, researchers found *CD disease activity confirmed by endoscope inversely related to VDD in hospitalized CD patients*.[307]

Critically Ill: In 2012, *VDD in critically ill patients was found to get worse over time while in Intensive Care Units (ICU).* Researchers discovered worse VDD related to a *longer time in the ICU* and *increased the risk of ICU-acquired infection*. They found *critically ill patients with higher vitamin D levels had a shorter time in the ICU until discharge alive*.[308] In 2014, a meta-analysis found *VDD increased the risk of severe infections, sepsis & mortality in the critically ill*.[309]

Critically Ill Children: In 2017, *VDD was found to increase severity of child illness, multiple organ dysfunction, mortality & the need for Pediatric Intentive Care Unit intervention*. In a large review of publications & studies of critically ill children, researchers noted *VDD may be a modifiable risk factor*.[310]

Critically Ill Surgical Patients: In 2012, VDD under 20 ng/ml was found to have a significant impact on critically ill surgical patients. VDD was related to a *longer length of stay*, *increased organ dysfunction* and *higher rates of infection and sepsis*. Researchers called for more studies on VDS to determine how to improve outcomes.[311]

Cystic Fibrosis (CF): In 2007, VDD was found in 90% of the *CF* study subjects. CF children, adolescents and young adults taking 800 IU/day of VDS continued to test low in vitamin D which indicates higher VDS doses are needed to normalize VDD. Researchers noted that *CF* patients with pancreatic insufficiency had poor absorption of fat and fat-soluble vitamins including vitamin D.[312] In 2014, VDD was found in almost all *cystic fibrosis* patients studied. In addition, VDD related to symptoms of *depression* in the studied youth.[313] In

2015, VDD was found to be common in *cystic fibrosis*.[314]

Death (Mortality): In 2009, VDD was reported to be linked to *higher mortality*.[315] In 2013, researchers published results of a meta-analysis of 32,142 mainly elderly study participants and all-cause mortality (death). The study found 25(OH)D *levels significantly & inversely associated with all-cause mortality &* increased vitamin D levels related to 8% lower mortality.[316] In 2014, VDD was found to increase the risk of *mortality* and *many health conditions*. Researchers reported higher plasma 25(OH)D levels predicted lower 13-year total *mortality* & *cardiovascular disease*, *respiratory disease* and *fractures*.[317] In 2015, VDD was found to be *inversely related to mortality* and related to *death* caused by *respiratory disease*, *digestive diseases*, *endocrine*, *nutritional* and *metabolic disease*.[318] In 2015, *VDD less than 12 ng/ml in critically ill patients was found specifically related to mortality*.[319] In 2017, VDD was found to *increase the risk of all-cause mortality* in a meta-analysis of studies.[320] In 2017, other researchers found a *strong inverse association between VDD and mortality*.[321]

Death Prevention & D3 (not D2) VDS: In 2014, researchers reviewed data from 56 studies & 95,286 study participants ages 18 to 107. They published that vitamin D3 supplements (not D2) seemed to decrease *mortality* in mostly elderly women (77%) living independently or in institutions.[322]

Delirium: In 2013, VDD was frequently found in *delirium* in-patients yet vitamin D was rarely checked in *delirium* patient workups and management.[323]

Delusions: In 2016, VDD was found to be common in patients with *hallucinations* and *delusions* that are often seen with chronic debilitating *schizophrenia*.[324]

Dementia: In 2011, VDD was found to be associated with *advanced-stage dementia* in older inpatients.[325]

Dementia Prevention with VDS: In 2016, VDD was found to be involved in the mechanisms of *neurodegenerative and cognitive decline* associated with *dementia* and *Alzheimer's disease* that increased with age. Researchers reported proper higher vitamin D levels, needing greater VDS, were crucial to slow & prevent *cognitive decline*, or improve to decline.[326]

Dental Cavities (Caries Tooth Decay): In 1928, ***vitamin D was discovered by observation to prevent cavities. Vitamin D stopped the spread of caries and halted (arrested) caries*** in children by hardening it with a diet rich in vitamin D.[327] In 2013, a review of 24 clinical trials and 2,827 children found evidence vitamin D was a promising *anti-caries agent*. Researchers concluded vitamin D *may reduce caries and be caries-preventive*.[328] In 2016, children with lower 25(OH)D blood levels were found to have more *decayed*, *missing*, *filled* or *treated teeth*. VDD findings were independent of brushing twice daily, lower household education & yearly dental visits. Researchers concluded VDS to improve vitamin D levels in children could help prevent decay.[329] In 2017, researchers reported examining 406 ten-year old children who had vitamin D and/or fluoride supplements during the first year of infant life. Both supplements prevented caries in the primary dentition but not in the permanent dentition. ***Vitamin D was 4% more effective than fluoride in preventing decay.***[330]

Dental Caries Prevention & Maternal VDS: In 2015, higher maternal vitamin D intake during pregnancy was found likely to lower the risk of *dental caries (cavities)* in their children at 3 to 4 years of age.[331]

Dental Disease In-General: In 2017, VDD was reported to involve many overall and health conditions including *early childhood dental cavities* and *periodontitis*.[332]

Dental Early Child Health: In 2016, Vitamin D and calcium supplements in children ages 0 to 5-year old were found to

improve *dental health*.[333]

Dental Gingivitis: In 2005, VDD was found to *increase gum inflammation (gingivitis)*. Researchers found *a linear relation* between vitamin D and gingivitis in non-smokers aged 13 to over 90, in all races, ethnic groups, and both genders. They concluded *vitamin D may reduce gingivitis* through its little-known *anti-inflammatory effects*.[334]

Dental Implant Failure: In 2014, VDD was suspected in *dental implant failure*. Researchers advised *vitamin D status in patients be checked before placing dental implants*.[335] In 2016, VDD was diagnosed in two patients after implants failed and had to be removed within 15 days of placement. After VDS, both had successful implant replacement.[336]

Dental Malocclusion: In 1997, researchers published evidence that VDD could result in *malocclusion during growth and development*. They recorded the history of a one-year old girl with VDD rickets who by age nine had very *severely crowded upper teeth and a short undergrown lower jaw. Her Class II division 2 dental malocclusion required orthodontics*.[337]

Dental Periodontitis (Gum Disease): In 2016, researchers noted *periodontitis and osteoporosis diseases* both involve bone resorption & bone loss, and share risk factors like age, genetics, hormone changes, smoking, calcium and VDD.[338]

Dental Periodontitis Post-Surgery Healing: In 2011, VDD and *periodontitis* were known to be associated. Researchers found that if VDD was present at the time of gum surgery, *healing was worse for up to 1 year after the surgery*. They concluded, after data analysis, that good vitamin D status may be critical to good healing after periodontal surgery.[339]

Dental Severe Early Childhood Caries (S-ECC): In 2012, researchers published results of a pilot study where children

with *severe early childhood caries* were found to have lower Vitamin D levels than age-matched controls. They noted that *S-ECC children routinely require dental surgery*.[340] In 2013, VDD and poor nutrition were found at much higher rates in children with severe early childhood caries than in controls.[341] In 2018, VDD & anemia were found to be common in studied preschool children with *severe early childhood caries*.[342]

Dental Staff can Screen for VDD & Oral & Overall Disease by looking for Psoriasis: In 2014, researchers recommended dental offices screen for VDD and oral and overall diseases by looking for *psoriasis* or when taking health histories. A *simple visible psoriasis exam should be routine*.[343] Patients with ***psoriasis, the visible killer***, have much higher risks of *cardiovascular disease* including *obesity, hypertension, dyslipidemia, diabetes, hypertension, myocardial infarction, inflammation, & stroke*. *Psoriasis* can flag many other *body disorders* such as *arthritis* (including *temporomandiblular joint disorder), renal, liver, endocrine, neurologic, gastrointestinal, pulmonary, eye, hearing loss, nails, skin, infections, cancer, psychological--including suicide, substance abuse, higher mortality, and diseases of the oral tissues*.[344] In 2016, researchers found VDD in most *psoriasis patients*.[345]

Dental Third Molar Oral Surgery Healing & VDS: In 2016, researchers published that in patients 18 to 40 years old with VDD, a pre-surgery single oral high dose of vitamin D3 (*300,000 IU of cholecalciferol 4 days before the procedure*) was found to have a positive impact on third molar surgery outcomes. Patients with increased vitamin D levels showed reduced *inflammation* and a more favorable clinical course.[346]

Dental Tooth Eruption: In 2005, children given high dose vitamin D (100,000 IU) prenatally and at 6 weeks old were found to have earlier first tooth eruption at 5.0 months vs. 7.2 months in children not given the high dose of vitamin D.[347]

Dental Tooth Loss: In 2014, 25(OH)D blood levels were found to be very related and inversely related to the frequency of *tooth loss*. Researchers found a direct relationship between raising vitamin D levels and decreased *tooth loss*. They concluded *VDS might protect against tooth loss*.[348]

Dental Tooth Malformation: In 2014, researchers noted VDD *rickets* was reported for decades to be present with defects in *tooth enamel, dentin* and *cementum*.[349]

Depression: In 2012, researchers reported finding *depression* was worse in those with VDD than those without VDD.[350] In 2012, VDD was found related to *depression* in young adult males.[351] In 2013, results of a metanalysis were published where risk of *depression* in 12,648 mostly elderly people was found inversely associated to blood 25(OH)D levels.[352] In 2014, researchers reported VDS may help patients with *depression*.[353] In 2018, researchers reported VDD may increase the risk of *depression & depression severity*.[354]

Dermatomyositis (DM): In 2010, researchers noted that much higher levels of VDS were needed to prevent VDD than RDA guidelines allowed. They reported VDD was already related to *autoimmune rheumatologic disorders* like *systemic lupus erythematosus*, *rheumatoid arthritis*, *Behcet's*, *polymyositis, dermatomyositis* and *systemic scleroderma*.[355] In 2017, VDD was reported as a factor in developing *DM*.[356]

Desquamative Inflammatory Vaginitis (DIV): In 2008, researchers published finding VDS reversed VDD *DIV, DIV* vaginitis with *yellow vaginal discharge, vulvovaginal itching, burning and dyspareunia,* and *normalized vagina tissues*.[357]

Diabetes – Type 1 (T1D): In 2009, VDD was found to be higher in *T1D* children as compared to non-diabetics. They also discovered early life VDD was linked to later onset of *type 1 diabetes*. Since vitamin D intake in children was found

to be very poor, researchers suggested that VDS might be a safe and effective strategy for reducing the risk of *T1D*.[358] In 2011, VDD was found to be common in *T1D* children.[359]

Diabetes – Type 2: In 2013, higher blood 25(OH)D was found to indicate vitamin D supplements may reduce the onset of *Type 2 diabetes*.[360] In 2017, researchers reported VDS at least 4000 IU/day significantly reduced *fasting plasma glucose*, lowered *HbA1C* and improved *insulin resistance*.[361]

Diabetes Infections, Neuropathies & Pain: In 2013, VDD was found to be more common and severe in *diabetics with foot infections* than in diabetics without foot infections. Researchers advised VDS for VDD to improve clinical outcomes.[362] In 2013, VDD was found to be very common in type 2 diabetic patients and independently related to *diabetic neuropathy (DN)*.[363] In 2014, severe VDD was found more common in diabetics with *foot infection*.[364] In 2015, VDD was found more common in patients with *diabetes* than in controls and VDD was worse in *diabetics with diabetic peripheral neuropathy* than those without.[365] In 2015, VDD was found inversely related to *DN presence and pain severity*.[366] In 2015, VDD was found related to lower urinary tract symptoms & *benign prostate hyperplasia* in type 2 diabetic men.[367] In 2016, VDD was found to be common in *DN* patients and *DN* stage *kidney disease* got worse as VDD worsened. [368]

Disease Reduction: In 2008, researchers noted that 18 randomized controlled trials had proven VDD related to *most diseases of modernization as well as all cause mortality*. They recommended VDS at higher doses for better health.[369]

Disease Survival & VDS: In 2009, VDD was reported to affect people of all ages. Researchers noted VDD disease symptoms include *low back pain*, *muscle aches*, *muscle weakness* and *throbbing bone pain* after applied pressure to the sternum or tibia. They found VDS could help *normalize D*

levels and reduce disease, including *fractures* and *falls* in adults.[370] In 2015, VDD was was found in a review of studies to be a risk factor for *major chronic diseases* and *premature death*. Researchers recommended raising vitamin D blood levels to boost *immune systems* to respond to *severe disease challenges* and help *prevent disease related death*. They noted VDD is global and VDS intervention easy to implement.[371]

Drug Addiction: In 2013, a medical article suggested vitamin D may be a unique and effective way to *treat drug abuse and addiction*. The article was based on fact that drug abuse raises dopamine levels in the brain while vitamin D protects the same dopamine pathways.[372] In 2016, lower vitamin D3 in a high fat diet was found to *promote obesity & increase food intake & drug consumption* by adjusting dopamine circuits.[373]

Drugs Can Worsen VDD: In 1980, a research article noted that a single drug can produce multiple vitamin deficiencies of A, B, C, D, K, etc.[374] In 1985, it was known that some anti-anxiety, anti-convulsive and insomnia drugs could cause VDD.[375] In 2010, it was known that other drugs could deplete vitamin D or block vitamin D absorption and cause VDD.[376]

E. coli Infection: In 2014, VDD was found to weaken the brain's defense against Escherichia coli bacterial infections like *meningitis & meningoencephalitis*, which can lead to high rates of *nervous system damage & death*.[377]

Eczema: In 2013, VDD was found to be significantly higher in children and adolescents with *eczema*.[378]

Ehlers-Danlos Syndrome (EDS): In 2016, VDD was found in 50% of *EDS* patients and many also had *platelet aggregation disorders*.[379] In 2017, researchers found parents of infants with *EDS* and/or VDD and multiple fractures could be wrongfully accused of child abuse & neglect.[380]

Elder Abuse: In 1995, researchers cautioned against diagnosing abuse in seniors with bruising, hip discomfort and even fractures until the possibility of *osteomalacia* is ruled out. *Poor diet, lack of sun and VDD can appear to be a crime*.[381]

Electrocardiogram Abnormalities (ECGA): In 2014, VDD was found related to increased frequency of major *ECGAs*. In the study of 5,108 people 13% of people with VDD less than or equal to 20 ng/ml had *ECGAs*. Only .9% (9/10ths of 1%) of people with vitamin D levels above 40 ng/ml had *ECGAs*, which helps explain their lower rates of mortality.[382]

Emergency Rooms: In 2014, VDD was discovered to cause *such severe muscle pain (myalgia)* that it could dramatically impact a patient's life. VDD can be missed in *chronic pain* diagnostic work-ups in all types of *pain* patients, including those keeping emergency rooms busy. Simple & safe VDS can greatly improve *myalgia pain & quality of life*.[383]

Endometriosis: In 2017, VDD was found in a high percent of women with *ovarian endometriosis*. Researchers also found a direct correlation between size of *ovarian endometrioma* (uterine inner layer tissue cysts) & vitamin D3 blood levels.[384]

Epilepsy: In 2010, VDD was found to be common in *epileptics* and made worse with *antiepileptic drugs* even when used in non-therapeutic doses. Researchers also found that *chronic antiepileptic drug use* can result in *bone loss*, so VDS and added calcium were advised.[385] In 2014, VDD was linked to *nervous system disorders* like *multiple sclerosis*, *Alzheimer's*, *Parkinson's & epilepsy*—the second leading neurological disorder.[386] In 2015, researchers found VDD present in a large percentage of children on *antiepileptic drugs*. Longer use and multiple prescription drug therapy can make VDD worse over time.[387] *Epilepsy* is a common condition where abnormal brain activity can lead to unpredictable seizures. It is the fourth most common neurological disorder and can affect

people of all ages.[388] In 2006, epilepsy was called a 7 to 14 times increased risk of a *child drowning* and a 2 times increased risk of *fractures* related to drug induced thin bone.[389] In 2011, researchers reported *hypoparathyroidism* can be misdiagnosed as epilepsy but safely resolved with calcium & VDS.[390] In 2018, a 24-year-old man went to an emergency room suffering from *recurrent seizures*. His 10-year history of epilepsy was 1st diagnosed at age 14. After a proper diagnosis of VDD he was given calcium and VDS. He recovered well, stopped the *antiepileptic drugs* and became seizure free.[391]

Epilepsy: Sudden Unexpected Death in Epilepsy (SUDEP): In 2010, researchers published how *SUDEP* was considered the most important direct *epilepsy-related* reason for *death*. They noted causes & disease processes of *SUDEP* were not well known, but studies found links between VDD, *epilepsy*, *heart failure*, *sudden cardiac death* & some SUDEP cases.[392]

Epstein-Barr Virus (EBV): In 2012, VDD and *EBV* were found related to development of *multiple sclerosis*.[393]

Erectile Dysfunction in Type 2 Diabetes Mellitus (T2DM): In 2016, researchers reported a significant relation between VDD and *erectile dysfunction* in T2DM men.[394]

Exclusively Breast-fed Infants: In 2006, VDD was found in about 26% of exclusively breastfed infants suffering from *hypo-calcemic seizures*. Their mothers also had VDD. Researchers emphasized the need for VDS & added sunlight exposure in exclusively breastfed infants and their mothers.[395]

Ewing Sarcoma: In 2012, VDD was found in 88% of *Ewing Sarcoma & Osteosarcoma bone cancer* patients due to effects of chemotherapy, malnutrition & lactose intolerance.[396]

Eye: Contact Lenses: In 2016, VDD was found related to e*ye tear* and *lens dysfunction* in those wearing contact lenses,

likely due to VDD related *dry eye*.[397]

Eye: Dry Eye Syndrome (DES): In 2016, researchers advised VDD patients to be screened for DES.[398] In 2017, researchers found VDD increased risk of *dry eye syndrome*.[399] In 2016, researchers reported results of a study of VDD patients with continued DES after conventional treatment failed. They found VDS effective & useful in treating DES after conventional treatment failed. VDS helped beginning at 2 weeks.[400]

Eye: Pain: In 2016, researchers reported on a 40-year old patient with 2 years of *chronic eye pain & discomfort* that conventional treatment for *dry eye* failed to improve. After many more diagnostic tests, VDD 5.86 ng/ml was discovered and VDS "dramatically" & finally improved symptoms.[401]

Eye: Protection & VDS: In 2017, researchers reported VDS in patients with VDD helps protect eyes. VDS improves eye lens *tear hyperosmolarity* (tear saltiness) and reduces *inflammation* that can cause *dry eye ocular surface damage*.[402]

Eye: Sjogren's Syndrome (SS): In 2017, researchers found VDD common in *SS* patients just like in other autoimmune disorders including *lymphoma* and *neuropathy*.[403]

Falling: In 2015, VDD under 20 ng/ml was found to be worse in elderly *fallers* than in non-fallers. Researchers noted that VDS could help older persons prevent *falling* and resulting *bone fractures*.[404] In 2017, VDD was found to be related to older *inpatient falling*, an increased recurrence of falling and a greater frequency of *orthostatic hypotension*.[405]

Falling & Fractures & VDS: In 2009, VDS was recommended to benefit most adults and prevent *falling* and *fractures*. VDS was found to reduce fracture risk by decreasing falls and increasing bone density. Conclusions of two large controlled trials stated VDS reduces the risk of *falls* by 19%, reduces

risk of *hip fracture* by 18% and reduces risk of *non-vertebral fracture* by 20%. A variety of other conclusions were made from the two-trial review. 1) VDS may benefit patients with other health problems like *cancer*, *diabetes* and *heart disease*. 2) To prevent VDD, *VDS higher than the recommended RDA was needed to reach a target level of at least 30 ng/ml*.[406] In 2014, researchers published results of a systematic review of studies from 1946 to 2014. They concluded the benefits of VDS (vitamin D supplement treatment) with or without calcium, may be related to decreased risk of *first time falls*, *repeat falls* and *mortality* in either older or institutionalized adults.[407]

Familial Mediterranean Fever (FMF): In 2013, VDD was found to be worse in *FMF* patients.[408] In 2016, VDD was found to be significantly worse in children with both *FMF* and *idiopathic juvenile arthritis*.[409]

Fatigue: In 2015, VDD was found to cause a patient's vague complaint of *fatigue* which responded to VDS.[410]

Fertility: In 2013, a review of 30 years of publications found vitamin D is involved in many *functions of the reproductive system* in both men and women. In men, vitamin D status was found to be associated with *semen quality*, *sperm count*, *motility* and *morphology*. In men, vitamin D supplementation showed evidence of favorable effects on *semen quality*, *testosterone concentrations* and *fertility outcomes*. In women, vitamin D status was found to be associated with *endometriosis, polycystic ovarian syndrome (PCOS)* and *in-vitro fertilization (IVF) outcomes*. This publication provided new insights into infertility and treatment.[411] In 2017, published research suggested that activated vitamin D in a woman may promote *selection of high quality sperm*.[412]

Fibromyalgia (FM): In 2001, VDD levels under 20 ng/ml were found in 50% of study patients with either *fibromyalgia* or *systemic lupus erythematosus*.[413] In 2016, VDD was found

to be very common in FM patients. FM chronic syndrome often combined *fatigue*, *widespread muscle pain* and a variety of *cognitive symptoms,* yet VDS research was lacking.[414]

Food Allergy: In 2011, VDD was reported to be linked to the development of *asthma* and *allergy* diseases. Researchers published study findings that VDD was worse in children with *allergies, asthma, acute urticaria, allergic rhinitis, atopic dermatitis,* and *food allergy*.[415]

Frailty: In 2016, VDD was found to greatly increase the risk of *frailty* or *being weak & delicate*. The relationship was most significant when comparing worst VDD level patients with highest D level patients.[416] In 2017, after adjusting for factors such as smoking and season, severe VDD under 10 ng/ml was found to increase the risk of *frailty* in women nearly 300%.[417]

Frailty & Mortality: In 2013, VDD was found related to the prevalence of *frailty* in a study of 4,203 men ages 70-88 years. VDD was investigated since it was known to be common in older men & women. Researchers found VDD predicts *all-cause mortality* separate from VDD related frailty.[418]

Gastrointestinal Cancer: In 2018, VDD was reported to increase the risk of developing *numerous diseases & cancers*. VDD increases the risk of *gastrointestinal tract cancers of the esophagus, gastric (stomach), liver, pancreas & colon*. So, VDS may be a safe and economical way to reduce the risk of cancers and improve cancer prognosis and outcome.[419]

Gastric Bypass Surgery (GPS) May Need A Modified RDA: In 2009, severe VDD was found to increase after *GPS*. When five *GPS* patients aged 39 to 60 were studied, all five were found to have *osteomalacia bone disorder* as confirmed by biopsy. All five had 2 to 5 years of *stooping posture, muscle weakness, difficulty walking, bone pain, bone tenderness* and *waddling gait due to severe muscle weakness*. When very

high doses of vitamin D (*100,000 IU/day*) were needed to correct severe VDD in *GPS* patients, researchers concluded the current VDS RDA guidelines were grossly inadequate.[420]

Geriatric Disease Severity: In 2012, VDD was found to be a marker of severity for one or more *chronic diseases in older in-patients* (average age about 84).[421]

Geriatric Hospital Longer Stay (LS): In 2013, VDD was found to be inversely related to *geriatric longer stay*.[422] In 2013, VDD was found to be a risk for *geriatric longer stay*.[423]

Gestational Anemia: In 2017, VDD was found to be a risk factor for *gestational anemia*. Researchers advised monitoring high-risk pregnant women for VDD.[424]

Gestational Diabetes Mellitus (GDM): In 2008, VDD was found in 70.6% of pregnant women and VDD increased the risk of *GDM*.[425] In 2015, VDD in early pregnancy was found to be inversely associated with the risk of *GDM*.[426] In 2016, researchers found pregnant women with VDD had significantly higher risks of *gestational diabetes* and *negative pregnancy outcomes* such as *anemia*, *macrosomia*, *abnormal amniotic fluid*, & *miscarriage* or *still birth*.[427] In 2018, a meta-analysis found VDD increased the risk of *gestational diabetes*.[428]

Gonorrhea: In 2013, researchers reported vitamin D induced *LL-37* plus curcumin may be effective against drug-resistant *gonorrhea* that increases the risk of *bladder cancer*.[429]

Graves' Disease: In 2015, VDD was found to increase the risk for *Graves' disease* and *Graves' disease* patients were more likely to have VDD.[430]

Hand, Foot & Mouth Disease (HFMD): In 2017, VDD was found to be worse in patients with *HFMD*.[431]

Health & Well-Being: In 2003, vitamin D was known to be *crucial for proper growth, development and maintenance of a healthy skeleton from birth to death*. VDD was known to have *serious negative consequences* including increased risk of *cancers of the colon, prostate, breast* and *ovary*, *hypertension, multiple sclerosis* and *type 1 diabetes*. It became known that a better understanding of vitamin D was needed for *overall health* and *well-being*.[432]

Heart Attack: In 2008, VDD was found to increase the risk of *heart attack (myocardial infarction)* in men aged 40 to 75 years old in a ten-year study. VDD remained a risk even after adjusting for known coronary artery disease factors such as family history, ethnicity, region, cholesterol levels, triglyceride levels, diabetes, hypertension, body mass index and alcohol consumption.[433] In 2015, VDD was found to be very common in *acute heart attack* patients. Researchers found that *severe* ***VDD less than 10 ng/ml related to a 4.5 times increased risk of heart attack.***[434]

Heart Disease: In 2009, VDD was reported to be associated with an increased risk of *CVD, including hypertension, heart failure, ischemic heart disease, incident hypertension, and sudden cardiac death*.[435] *Heart Disease*, also called *cardiovascular disease (CVD)*, is the *#1 reason for death in the U.S. and the world*. *Heart disease* is a major cause of disability and has been the leading cause of death in the U.S. for over 80 years.[436] In the U.S. about 25% of people that die each year, die of *heart disease*.[437] In 2015, the Center for Disease Control (CDC) listed death from *heart disease* as being #1, numbering 633,842.[438] Heart disease includes *coronary heart disease, heart attack, congestive heart failure, and congenital heart disease*. More and more studies show VDD as a risk factor for *heart attacks congestive heart failure, peripheral arterial disease (PAD), strokes* and other conditions like *diabetes* and *high blood pressure* that are associated with *heart disease*.[439] Many studies now show direct "associations" be-

tween VDD and *heart disease and heart related disorders*. Sadly, vitamin D testing and vitamin D supplement treatment is not usually recommended to prevent *heart disease*.

Heart Failure (HF): In 2008, VDD was found to be related to more *frequent myocardial dysfunction, heart failure deaths and sudden cardiac death*.[440] In 2011, worse VDD was found to indicate a *poor prognosis* in *HF* patients.[441] In 2012, VDD was found to be highly prevalent in *HF* patients and *VDD significantly predicted reduced survival*. Researchers found VDS *improved HF outcomes*.[442]

Hemodialysis -- Sudden Cardiac Death: In 2010, VDD was found very related to *sudden cardiac death, cardiovascular events*, and *mortality* in dialysis patients who are at high risk for sudden death. Researchers found VDD related to *stroke* and *fatal infection*. ***Patients with severe VDD (≤ 10.1 ng/ml) had a 3 times greater risk of sudden cardiac death compared to those with vitamin D levels over 30 ng/ml.***[443]

Hepatitis Viruses: In 2018, VDD was found to be related to several *cancers* and numerous *infectious diseases*. Researchers noted VDD is very prevalent worldwide in *hepatitis B (HBV)* and *hepatitis C* (HCV), especially with blood levels below 20 ng/ml. They stated VDD is involved in the process of *chronic liver diseases* like other *communicable diseases*.[444]

Herpes Zoster (HZ) or Shingles: In 2012, vitamin D was reported to potentially prevent *Herpes Zoster* reactivation in kidney dialysis patients.[445]

High Dose D3 VDS in Critically Ill Patients: In 2016, VDD was found very common in critically ill patients. Researchers found high dose VDS (250,000 or 500,000 IU D3) delivered over 5 days, safely and significantly increased 25(OH) D levels and *decreased hospital length of stay*.[446]

Hip Fractures: In 2008, VDD was found associated with a higher risk for *hip fracture*.[447] In 2013, VDD was found in most *hip fracture* patients age 18 and older even in a sunny climate. Those ages 71 and older had much worse VDD than a control group.[448] In 2016, very low VDD was found in about 82% of elderly patients with *proximal hip fracture* and even the control group of women had significant VDD.[449]

HIV Virus: In 2011, VDD was found to be highly prevalent in *HIV-infected* adults.[450] In 2012, researchers reported finding VDD or severe VDD *in over 84% of HIV positive patients*.[451] In 2013, VDD in HIV infected individuals was found to be underestimated, undertreated and highly prevalent. Researchers noted that VDD could negatively impact *bone health, neurocognitive, metabolic, cardiovascular and immune functions,* as well as put *HIV-infected* subjects at a *greater risk of developing osteopenia/osteoporosis and fragility fractures*.[452]

Homocysteine (Hcy): In 2017, VDD & Hcy were both found to contribute to cardiovascular disease. Hcy induces oxidative stress, increases lipid peroxidation, generates reactive oxygen species & causes protein damage. Calcitriol, a vitamin D analog, (50 nmol/L) reverses Hcy's negative effects. So, calcitriol may be preventive & therapeutic against Hcy actions.[453]

Hospital Acquired Bloodstream Infections (HABSI): In 2013, a study of VDD in 2135 adult patients found that 25(OH)D concentrations below ***10 ng/ml before hospitalization predicted a higher risk of developing HABSI.***[454]

Hospital Acquired Clostridium Difficile Infections: In 2015, a study of 568 adult patients revealed that vitamin D status before hospital admission was inversely associated with risk of developing *hospital-acquired C. difficile infections*.[455]

Hospital Inpatients in Sunny Country: In 2004, VDD was found to be common in internal medicine ward hospitalized

patients, including patients with no known VDD risk factors. *Researchers recommended VDS during hospitalization and at discharge as primary or secondary preventive measure*.[456]

Hospital Pre-Admission Vit. D Levels & Death: In 2011, VDD pre-hospital admission was found to be a significant predictor of *all-cause mortality* in both the short-term and the long-term in critically ill patients. Researchers also found critically ill patients with VDD before hospital admission had *increased rates of blood infection*, as confirmed by blood culture.[457] In 2013, researchers published results of an analysis of 23,603 hospitalized patients. They found that patients with 25(OH)D under ***30 ng/ml before hospital admission had an increased risk of all-cause mortality*** at 30 days after hospitalization. They also found pre-hospital blood 25(OH)D *≤15 ng/ml level was significantly related to higher odds of sepsis or community-acquired bloodstream infection*.[458] In 2014, researchers published results after reviewing records of 3,386 critically ill patients aged 18 or older. They found *VDD in critically ill patients before hospital admission highly predicted after admission sepsis*. They discovered *VDD increased the risk of mortality (death) after the start of critical care*.[459]

Hospital Readmission & Dialysis Patients & VDS: In 2009, researchers published study results of 126,000 hemodialysis patients who usually have more frequent hospitalization than patients without renal failure. They found *VDS given within 7 days of discharge significantly reduced repeat hospitalization* compared to patients not given vitamin D.[460]

Hospital Readmission & Untreated Asymptomatic VDD: In 2016, researchers published study results after analyzing the histories of inpatients aged 18-99 years who all had VDD. They found *even moderate VDD can be asymptomatic* and concluded it is *important to correct VDD to reduce mortality and rates of readmission long term*.[461]

Hospital Readmission & Acute Hip Fractures & VDS: In 2010, VDD was found in 98% of acute hip fracture patients aged 65 years of older. Researchers found physical therapy (PT) reduced falls but not hospital readmission and *2000 IU D3 VDS reduced readmission by 39% but not falls*.[462]

Hypertension: In 2013, VDD was found to lead to *high blood pressure* and increased *atherosclerosis* in mice, suggesting VDS could reduce both.[463] In 2013, researchers found *systolic blood pressure* inversely associated with vitamin D levels in whites.[464] In 2013, researchers found 3 months of *oral vitamin D3 VDS lowered systolic blood pressure in blacks*.[465] In 2017, VDD was found to have inverse relationships with *higher systolic* and *diastolic blood pressure*, *higher pulse rate* and *higher triglycerides*.[466]

Hypogonadism: In 2012, VDD was found to be associated with *hypogonadism*, both compensated and secondary, in men aged 40-79 years old.[467] In 2015, lower vitamin D level was found related to an increased prevalence of *hypogonadism*.[468]

Idiopathic Child Disease: In 1975, *small doses of vitamin D3 were found to have high level effects on children with rickets, hereditary hypophosphatemia, chronic idiopathic hypoparathyroidism, and chronic renal failure*.[469]

Idiopathic Inflammatory Myopathies (IIM): In 2013, VDD was reported to be in most patients with adult *myositis* IMM including *polymyositis, dermatomyositis and inclusion body myositis*, and in those with *spontaneous myopathies, and muscle disease of unknown origin*.[470]

Idiopathic Juvenile Arthritis (IJA): In 2013, VDD was found in up to 82% of IJA children in 3 studies.[471] In 2014, VDD was found in 75% of IJA patients aged 7 to 15.[472] *Worse VDD resulted in higher IJA disease activity*.[473]

Idiopathic Juvenile Osteoporosis (IJO): In 1982, VDD was found in a 11-year-old patient with IJO and *bone fractures*. *VDS resolved IJO and reduced fractures*.[474]

Idiopathic Skin Disorders & VDS: In 2011, researchers found VDS was 70% successful in treating idiopathic skin disorders like idiopathic *angioedema, itch, rash, and urticaria*, and called for routine VDD assessment in such patients.[475]

Idiopathic Thrombocytopenic Purpura (ITP): In 2016, *VDD was found in most children with newly diagnosed ITP and chronic ITP*.[476]

Immune System Regulator: In 2004, vitamin D was reported to be an important immune system regulator.[477]

Infants: In 2015, a researcher noted VDS for a fetus & infant should have the same public health priority as vaccines to protect from harm. *VDD can cause hypocalcaemic seizures, dilated cardiomyopathy, skeletal myopathy, congenital and infantile rickets & osteomalacia, & even death*. Therefore, global health care provider action needs to define medical & parental responsibility for VDS.[478]

Infant Hypocalcemic Seizures: In 2007, researchers noted that while maternal VDD was known to result in *child rickets,* VDD was not well known to cause neonatal *hypocalcemic convulsions*.[479] In 2010, researchers published finding infants with *hypocalcemic seizures* always had mothers with severe VDD which might be prevented with VDS.[480]

Infectious Disease: In 2017, VDD was reported to *decrease immunity* and lead to increased rates of *several infectious diseases* as well as their severity. Such diseases include *respiratory infections, tuberculosis, fungal infections, human immunodeficiency virus (HIV),* and *sepsis*.[481]

Infectious Disease Barrier Destruction: In 2011, VDD was reported to negatively impact many *host defense mechanisms* including *epithelial cells* that are critical barriers to disease. Vitamin D was becoming recognized as a regulator of body defenses such as *inflammation, immunity and disease repair*. VDD was becoming known as a factor in *infectious diseases, neoplastic diseases, lung diseases and inflammation*. VDD was highly suspect in *inflammatory lung diseases such as COPD, asthma, infection and cancer*.[482] In 2014, VDD was reported to *alter epithelial tissue defenses against infectious agents*.[483] This is critical to body defenses against *infectious disease and chronic diseases*. *Epithelial tissue* is what helps to protect the outer and inner surfaces of the body, body cavites and organs. In 2015, VDD was reported to cause pronounced *dysfunction of the epithelial lining of intestines*, allow *Esherichia coli bacteria growth and invasion, and promote inflammatory bowel diseases like Crohn's disease*.[484] In 2018, VDD was reported to increase *pneumonia* in children. *Lung infection* is often related to *disease barrier destruction*. VDD was found to increase the risk & incidence of *serious disease symptoms, pneumonia, sepsis, need for mechanical ventilation and multiple organ failure*. Researchers called for VDS to treat and prevent *pneumonia*.[485]

Infectious Disease Prevention & Protection: In 2012, VDS was reported by researchers to be a low-cost way to protect various at-risk groups of people from *infectious diseases* worldwide. They noted VDD was known to increase *immune disorders & faster progression of some infectious diseases*. They reported that evidence shows *vitamin D protects against tuberculosis*, has a potential effect on *human immunodeficiency virus (HIV)* & plays a critical role in *respiratory infection defense*. Researchers called for public education to stress the need for adequate dietary intake of VDS in at-risk groups to protect from *infectious diseases*.[486] In 2015, researchers noted that over "the past decade" VDD was found to increase the risk of acquiring *several infectious diseases* and VDD pre-

dicted *poorer disease outcomes*. Since VDD hurts *immunity*, they noted VDS is needed to protect against *common infectious diseases like sepsis, methicillin-resistant Staphylococcus aureus, pneumonia influenza, human immunodeficiency virus type-1 and hepatitis C virus (HCV)*.[487]

Infectious Mononucleosis: In 2016, VDD was reported to *be worse in acute infectious mononucleosis patients at the time of (Mono or Kissing Disease) Epstein-Barr virus infection*.[488]

Infertility: In 2010, researchers reported vitamin D was important for *sperm formation & maturation*.[489] In 2016, infertile men with VDD were found to have lower total numbers of motile sperm, lower sperm motility, and lower levels of certain sex hormones.[490] In 2017, researchers stated that VDD was one of the most common global health problems and VDD was correlated to *sperm motility*.[491] In 2017, VDD and autoimmune disease were named independent risk factors *for infertile women and VDS may help pregnancy outcome*.[492] In 2018, VDD was reported to negatively impact *male and female reproduction and can even cause infertility*. Researchers published there is evidence vitamin D regulates male and female *reproductive processes*. VDD is involved with *gonadal insufficiency, decreased sperm count and motility, and histological abnormalities of testis, ovary and uterus*. Evidence shows VDD negatively affects *female reproduction* including *polycystic ovary syndrome (PCOS)* and *outcome of in-vitro fertilization (IVF)*. Researchers noted that *VDS might improve infertility, improve metabolic disturbances and improve menstrual frequency in women*.[493] In 2018, vitamin D was confirmed as being involved in *many functions of reproduction* for both men and women. Researchers concluded that *VDD is related to adverse male and female fertility outcomes including hypogonadism and polycystic ovary syndrome*.[494]

Infertility and Vitamin D Supplements: In 2017, a research paper stated that *VDS is important for multiple factors related*

to successful reproduction, including *sex steroid production, estrogen signaling and semen quality*. It reported that recent studies indicated *higher blood D levels related to higher chance of achieving pregnancy, so VDS might benefit couples needing reproductive assistance*.[495]

Inflammation: In 2013, VDD was suspected of being related to *chronic low-grade inflammation, chronic kidney disease*, and *cardiovascular disease*.[496] In 2014, both VDD and *inflammation* were reported to be connected to many chronic diseases, but researchers questioned which comes first.[497]

Inflammatory Bowel Disease (IBD): In 2014, researchers reported VDD common in *IBD* patients & inexpensive VDS can reduce *IBD & IBD* relapse; decrease risk of *IBD*-related surgeries; & improve *IBD* outcomes & quality of life.[498] In 2014, researchers reported patients with *IBD* had an increased risk of ***Clostridium Difficile Infection (CDI***), & higher vitamin D levels reduce the risk of *CDI in IBD* patients.[499] In 2015, researchers published results of a meta-analysis that found VDD to be very related to *IBD* and VDD increased the risk of having *IBD*. They also found *ulcerative colitis patients twice as likely as controls to have VDD*. [500]

Inflammatory Bowel Disease (IBD) & D3: In 2012, researchers published results of a study that found *D3 was better at improving outcomes, limiting health-care costs and reducing expenses in patients with inflammatory bowel disease*.[501]

Inflammatory Bowel Disease (IBD) in Children: In 2011, researchers published finding a *high portion of study children with IBD had VDD*. They stated the importance of checking for VDD, with VDS treatment if VDD was present, to help manage pediatric *IBD*.[502]

Influenza (Flu): In 1949, researchers started looking at vitamin D intake related to the swine *influenza* virus.[503] In 2006, *VDD*

was found to make children more vulnerable to respiratory infections including epidemic influenza. It was known that vitamin D had profound effects on human immunity and could dramatically stimulate *anti-microbial action* against *lung infection*. Researchers also reported on a study showing *vitamin D reduced the incidence of respiratory infections in children*.[504] In 2008, researchers reported that VDD may help explain many of the historically puzzling and unexplained *influenza* inconsistencies. **Confusion existed about numerous influenza conundrums including:** Where does *influenza* hide between seasonal outbreaks? Why are epidemics so explosive? Why do epidemics end so fast? Why did past epidemics spread so fast without modern transportation? And why as vaccination rates increased has influenza mortality not declined in the aged?[505] In 2009, researchers responding to the 2009 outbreak of the H1N1 swine flu *influenza* noted ***VDD can trigger the influenza virus***. *They recommended strongly that all health-care workers & patients be tested & treated for VDD to prevent respiratory infection*.[506]

Intensive Care Unit (ICU) + Children: In 2016, VDD found to be very common *in critically ill children admitted to the ICU* and *children with VDD had a longer stay in the ICU*.[507]

Intensive Care Unit (ICU) + Mortality: In 2009, published research stated that *ICU critically ill patients rarely have VDD considered and rarely have VDS*, if at all in the ICU. Writers noted VDD may be an unrecognized factor in ICU patient adverse outcomes.[508] In 2011, VDD was found in about *95% of patients admitted to an ICU. Hospital mortality (death) in Medical ICU patients was higher with worse VDD*. Researchers called for a study on how Vitamin D supplements affect mortality.[509] A 2014, VDD was found to *increase risk for severe infections, sepsis, & mortality in the critically ill*.[510]

Intensive Care Unit (ICU) + Survival: A 2012, VDD was found to be the most common nutritional deficiency in the

United States and rarely measured, seldom recognized, and rarely treated, especially in critically ill patients. Researchers looked at surgical ICU patients and concluded VDD was very related to *increased surgical ICU length of stay, ICU unit cost and ICU mortality (subject to death)*.[511] In 2012 researchers reported finding *VDD common in patients admitted to the ICU* and *longer survival times in patients sufficient in Vitamin D*. The article concluded that vitamin D status may be a biomarker or co-factor of survival.[512] In 2014, researchers reported finding blood vitamin D levels in patients within 24 hours of ICU admission may identify patients at high risk for prolonged hospitalization, 90-day readmission, & 90-day mortality.[513] In 2015, *researchers reported VDD may be a modifiable red flag for adverse outcomes in critical illness and critical illness trials*. The further noted *VDS is inexpensive and appears safe in critical illness trials*. They still asked for more research before recommending VDS.[514]

Irritable Bowel Syndrome (IBS) in Children: In 2017, VDD was found in about 93% of pediatric patients with *IBS*. Over 50% had VDD at a higher rate when compared to *IBD* and other mal-absorption syndromes. Researchers noted that *IBS* can cause significant morbidity in children and adolescents and available effective treatments were limited. [515]

Juvenile Dermatomyositis (JDM): In 2012, VDD was found to be related to *disease activity in JDM*.[516]

Kawasaki Disease (KD): In 2016, VDD was found in 98.7% of *KD* children studied. Researchers found *VDD correlated with erythrosedimentation rate, C-reactive protein levels, hemoglobin level, coronary artery aneurysms and non-aneurysmatic cardiovascular lesions in KD children*.[517]

Kidney (Renal) Disease: In 2005, vitamin D was known to be biologically inactive and needed orderly conversion in the kidney and then the liver to form active vitamin D. Patients

with *kidney failure* were known to often be resistant to vitamin D and in need of special attention and supplementation to maintain proper D levels. **Blood 25(OH)D levels of at least 20 ng/ml and preferably 30-50 ng/ml were reported to have important health benefits in healthy children & adults, as well as children & adults suffering from *chronic kidney disease*.**[518] In 2006, VDD was found in in over 92% of *chronic renal failure patients* on peritoneal dialysis.[519] In 2009, VDD was found to independently predict *chronic kidney disease survival* regardless of other factors such as vascular calcification and stiffness.[520] By 2011, VDD was known to be common in *chronic kidney disease (CKD)* and related to *higher morbidity* and *mortality*.[521] In 2012, researchers reported VDD was more common in *CKD* children and adults.[522] In 2013, VDD was found in 83% of *CKD* patients & *remaining kidney function* was related to VDD level.[523] In 2016, VDD was found to be common in *CKD* patients & implicated in *all-cause mortality* & *morbidity*.[524]

Kidney Stones: In 2012, researchers published that *high blood 25(OH)D did NOT increase the risk of kidney stones*.[525] In 2012, researchers reported *kidney stone formers had much lower levels of vitamin D*.[526] In 2014, researchers reported blood 25(OH)D levels at 20-100 ng/ml did NOT increase the formation *of kidney stones*.[527] In 2016, researchers reported finding *VDD (18 ng/ml) worse in kidney stone formers*.[528] In 2017, researchers concluded that neither high dose nor low dose VDS for VDD repletion increased *kidney stones*.[529]

Liver Cancer: In 2014, VDD was found to be related to advanced stages of *liver cancer* & predicted a *poor outcome*.[530]

Liver Disease: In 2012, VDD was found very related to *liver dysfunction*. VDD predicted *liver failure* and *mortality*.[531] In 2013, researchers discovered VDD prevalent & inversely related to severity of c*hronic liver disease*.[532]

LL-37: In 2008, researchers reported that vitamin D3 induces the formation of **LL-37**, *an antimicrobial peptide that can kill bacteria rapidly*.[533] In 2009, researchers noted VDD resulted in increased rates of *infection* like *Tuberculosis*, but *cod liver oil* vitamin D induced *antimicrobial peptides*, like LL-37, that protect against infection. [534] In 2014, researchers discovered D3 induced **LL-37,** *promotes diabetic foot ulcer* (DFU) *wound healing* and even acts against *E. Coli*. This is important since *DFU* can lead *to severe infections* and *poor healing*, & *DFU*s are a most common *diabetes*-related reason for hospitalizations.[535] In 2009, vitamin D3 was found to induce **LL-37** & boost the *immune system* of newborns.[536] In 2018, researchers found ***D3 induces LL-37 to have anti-cancer effects*** for cancers like *colon cancer*, *gastric cancer*, *oral squamous cell carcinoma* & *blood malignancy*.[537]

Low Back Pain (LBP): In 2003, VDD was found in 83% of patients aged 15 to 52 years with *chronic LBP of unknown origin* present for over 6 months. *VDS therapy improved clinical symptoms in 95% of all LBP patients studied*. Researchers called for mandatory VDD screening & VDS treatment for chronic *LBP* patients with VDD.[538] In 2007, researchers reported chronic *LBP* to be extremely common and often of unknown cause or origin (idiopathic). Very low levels of VDD were found in many patients with *LBP*.[539]

Lung Cancer: In 2015, VDD was found to increase the risks of *lung cancer*. Researchers noted that patients with 25(OH)D levels near 21 ng/ml to 36 ng/ml received greater protection against *lung cancer* than those with worse VDD. They found limited data on the effects of higher vitamin D levels.[540]

Lung Cancer & Platinum-Based First Line Chemotherapy: In 2017, VDD was found to independently predict poorer overall survival in patients with *advanced non-small cell lung cancer* treated with platinum-based first-line chemotherapy. ***Patients with 25(OH)D levels above 10 ng/ml lived about***

16% longer than patients testing under 10 ng/ml.[541]

Lung Infection: In 2011, VDD was reported to increase the risk of *lung infection* from *Mycobacterium tuberculosis* and *influenza A*. Childhood *asthma* was linked to maternal vitamin D status. VDD was found to be related to several *chronic lung diseases* such as *cystic fibrosis, chronic obstructive pulmonary disease* and *interstitial lung disease*.[542]

Lyme Disease: In 2007, vitamin D was found to inhibit *Lyme disease* arthritis like other *autoimmune diseases*, including *encephalomyelitis, thyroiditis, type-1 diabetes mellitus, inflammatory bowel disease (IBD), systemic lupus erythematosus,* and *collagen induced arthritis*. Vitamin D was already known to be related to *hypertension, immunity, muscle function, cancer* and *infection prevention*.[543]

Lymphoma Cancer: In 2018, VDD was found to be common in patients with *lymphoid malignancies* and those with **VDD under 7.87 ng/ml had *shorter survival time*.**[544]

Lymphoma Cancer – Non-Hodgkin's (NHL): In 2010, VDD in *NHL* patients with diffuse *large B-cell lymphoma* was found to result in *lower overall survival*.[545]

Macular Degeneration: In 2015, VDD was found to increase the odds of having *macular degeneration* by **6.7 times.**[546] In 2016, VDD was found to be inversely associated with age related *macular degeneration*.[547]

Major Depressive Disorder (MDD) & VDS: In 2016, VDS for 8 weeks was found to greatly improve *MDD depressive* symptoms. MMD is form of *depression* and *mental disorder* categorized by at least two weeks of low mood. It may co-exist with *low energy*, *low self-esteem* and loss of interest in fun activities.[548] Researchers also found evidence VDS improved *glucose homeostasis & reduced oxidative stress*.[549]

Major Depression Episode (MDE) -- Cognitive Impairment: In 2017, VDD was reported as very related to *mental illness*. *Patients with VDD and MDE were found to be more prone to cognitive impairment, MDE onset and depression severity*.[550]

Malnutrition: In 2018, researchers reported finding *VDD common in children with severe acute malnutrition or wasting disease*. They found that mean weight-for-height or length scores for children getting standard treatment for *severe acute malnutrition improved with high dose VDS D3*.[551]

Mantle Cell Lymphoma & VDS D3: In 2014, VDS D3 added to the cancer drug lenalidomide was found to greatly increase *cancer cell apoptosis (death) in mantle cancer cells* which can be an *incurable form of B-cell malignancy*.[552]

Maternal VDD & Attention Deficit Hyperactivity Disorder: In 2015, researchers found *ADHD*-like symptoms decreased as maternal 25(OH)D3 levels increased. *Higher maternal circulating 25(OH)D3 levels during pregnancy related to lower risk of ADHD-like symptoms in childhood*.[553]

Maternal VDD & Birth Outcomes: In 2016, researchers published results of a study of gestational vitamin D levels in 7098 mothers and offspring. They found that *lowest and worst maternal VDD resulted in proportional worst fetal growth restriction, increased risk of preterm birth and small size for gestational age at birth*.[554]

Maternal VDD & Brain Development & Schizophrenia: In 2016, VDD was named a possible condition that may alter *fetal brain development inutero* and increase the risk of *schizophrenia* later in life. *Schizophrenia* affects about 1% of the US population and is a *debilitating neuropsychiatric disorder*. VDD can easily be prevented and should be. [555]

Maternal VDD & Early Childhood Caries (Cavities): In

2014, maternal prenatal vitamin D levels were found to affect *growth and development of primary teeth*. Researchers also discovered VDD negatively and inversely related to *poorly formed enamel (hypoplasia)*, the presence of *decay* and later development of *early childhood caries* in infants.[556]

Maternal VDD & Fetal VDD: In 2009, VDD was found in about *82% of mothers and 97% of newborns*. Researchers concluded that VDD was a problem in women of reproductive age, in mothers and in their newborns.[557] In 2015, VDD was found to be *common in high-risk pregnant women* and it became known that maternal VDD could have *severe consequences for both the mother and child*. Researchers called for mandatory monitoring of blood 25(OH)D3 levels during pregnancy and urged VDS preventive action at the slightest evidence of VDD. They called for action to reduce morbidity during pregnancy and lactation, along with the possible subsequent negative impact of VDD on the fetus, the newborn and the child.[558] In 2017, researchers published a review article that covered the history, risk factors and controversies related to pregnancy and childhood VDD. They noted how many studies linked VDD to adverse health outcomes that extend well beyond bone health for both children and pregnant women. They called VDD and a related recent increase in nutritional rickets a global public health problem deserving systems to detect and prevent devastating pediatric diseases without further debate.[559]

Maternal VDD & Newborns: In 2006, VDD was found to be common in mothers & neonates in Greece. Innocent newborns are the most vulnerable to VDD. *Vitamin D levels in mothers averaged 16.4 ng/ml and neonates averaged 20 ng/ml*. Researchers concluded pregnant women should be prescribed VDS because abundant sunlight exposure in Athens, Greece was not enough to prevent VDD.[560] In 2011, VDD was found to be prevalent in mothers and neonates in all racial groups and in all seasons, in Oakland, California. *Even about 51% of*

women taking daily prenatal vitamin and mineral supplements (400 IU vitamin D) had VDD.[561] In 2012, researchers reported study results that found the average mother and neonate (newborns) in Turkey *had severe VDD at 11.5 ± 5-7 ng/ml*.[562] In 2013, researchers published finding pregnant women and newborns in China were at *high risk for severe VDD*. *Mothers with severe VDD had lower birth weight and lower birth length newborns*. *Newborns with VDD had lower birth weight & smaller heads*. Researchers concluded both maternal & neonatal VDD resulted in smaller newborns.[563]

Maternal VDD & Newborn Lifelong Health: A 2010, VDD was found to be very common and present in 40% to 80% of pregnant women. Researchers explained how VDD may result in *long-term threats to human health*. They also reported how evidence was growing and pointing to VDD as a risk factor for many *chronic diseases such as type 1 diabetes, cancer, heart disease, osteomalacia, rickets, multiple sclerosis, and schizophrenia*.[564]

Maternal VDD & Pre-eclampsia: In 2010, researchers published that maternal VDD was found to be related to an increased risk of *severe pre-eclampsia*. They concluded that VDS may modify the increased risk of *severe pre-eclampsia* associated with VDD.[565] In 2014, VDD was found to be a risk factor for *severe pre-eclampsia*.[566]

Mean Platelet Volume (MPV): In 2017, a published study found that VDD and/or vitamin B12 deficiency was related to MPV in two groups of children and adolescents aged 2-18. The study found that *attention deficit hyperactivity disorder (ADHD*) group and *autism spectrum disorder (ASD)* group showed lower levels of vitamin B12 and vitamin D. It concluded that *both ADHD and ASDs may have increased risk for cardiovascular disease due to vitamin B12 and D deficiency* & deficits should be closely monitored.[567]

Medical Error Harm & Death & VDS: Medical errors are the third leading cause of death in the United States after *heart disease* and *cancer*.[568] In 2001, researchers published that adverse events resulted in an average of 7.0 extra days in a Denmark hospital, just like in the United States, United Kingdom and Australia.[569] In 2006, researchers published that *errors and adverse events in critical care units are often not disclosed*.[570] In 2013, researchers published results of an investigation of prior estimates that 98,000 Americans die each year from medical errors. The estimate of 98,000 was based on nearly 30 years old data. Using more recent 2008 to 2011 data and an average of four studies, they initially estimated deaths from preventable harm in hospitals to be **210,000 per year**. After considering related factors, the researchers then estimated the true number of premature deaths associated with preventable harm to patients to be over **400,000 per year**. *They also published that serious harm to patients appeared to be 10 to 20 times more common than lethal harm*.[571] In 2016, research found an estimated **251,000 to 440,000** die from medical errors every year.[572] An urgent appropriate increase in simple & safe VDS is needed to reduce the need for medical care, decrease medical errors, & decrease harm and death.

Medical Error Costs: In 1998, the Institute of Medicine's (IOM) annual report estimated 98,000 deaths occur annually due to preventable medical errors. In 1999, the IOM released a publication called To Err Is Human.[573] It estimated that one medical error death costs about $75,000 TO $100,000 per year for **10 years of each lost life.** The IOM's "conservative" estimate claimed **$73.5 to $98 billion** in annual loss related to medical errors.[574] In 2012, an article published on the economics of health care quality and medical errors estimated the annual loss to be ten times greater than the IOM estimate--the cost being **$735 to $980 billion.**[575] That is a lot of pain, suffering and money. How much? Modern medicine's medical errors cost about 25-33% of the $3 Trillion ($3,000,000,000,000.00) U.S. healthcare spending in 2012.[576]

More recent annual medical error death estimates at 251,000 to 440,000 may make the 2012 estimates even much higher.

Medical Errors in Pediatrics: In 2003, researchers published finding over 50% of pediatric patients admitted for hospital general surgery suffered medical errors. The researchers noted that The Institute of Medicine named medical error a leading cause of death and injury. *Medical error deaths were reported to be higher than those caused by motor vehicle collisions, breast cancer and AIDs*.[577] In 2006, researchers reviewed patient records from 15 Neonatal Intensive Care Units and found adverse events rates to be higher than previously noted. *Many adverse events caused permanent harm*, most were labeled preventable, and *only 8% were voluntarily reported*.[578] In 2006, researchers published that medication-related harm occurs in about 11% of pediatric hospital inpatients. They reported *74% of high risk neonatal ICU patients suffer hospital-related harm*.[579] Simple, safe and cost-effective VDS is needed urgently to reduce illness and related medical care; and to reduce potential medical error injury or death.

Melanoma Skin Cancer: In 2009, VDD found *at time of diagnosis was related to both thicker tumors & lower survival from melanoma*. VDD was also found to independently increase the *risk of melanoma relapse & death*. Researchers urged patients with melanoma or at high risk of melanoma to seek testing for VDD.[580] In 2015, VDD was again found to be more common in people with *thicker and higher stage melanom tumors*. Researchers again concluded melanoma had a poorer prognosis when VDD was present at time of diagnosis. They recommended a vitamin D level of 20 ng/ml may result in a better prognosis for some thinner *melanomas*.[581] In 2015, researchers published evidence that *VDD under 8 ng/ml and smoking were related to poorer melanoma survival*.[582] In 2017, *VDD ≤20 ng/ml was found to be related to worse prognosis & increased risk of melanoma, & various other cancers*. Researchers concluded early VDD & insufficient VDS in

metastatic melanoma patients related to worse prognosis.[583]

Memory: In 2013, researchers published results of a mega-study investigation into adult cognitive impairment that was already known to be related to VDD. *VDD was found related to episodic memory disorders & highly related to executive dysfunctions, including mental processing speed & shifting*.[584]

Mental Illness: There are over 450 definitions of mental illness or mental disorder.[585] Too many mental disorders have had little or no VDD or VDS research. In 2016, researchers published that ***VDD was found to be 4.7 times more common in outpatients with mental illnesses like bipolar disorder, schizophrenia, or schizoaffective disorder*.** These are some of the most severe patient mental disorders. Researcher conclusions called for annual VDD testing to prevent *osteoporosis* and maintain *muscle strength* and *bone health*, but they did not call for VDS for those diagnosed with VDD.[586]

Mental Illness – Antidepressant Vitamin D: In 2018, VDD was reported to be *a global problem* associated with *different mental disorders*. The review of 167 articles selected out of an initial 48,937 articles also found that *vitamin D supplements improved the antidepressant effects of antidepressant medications*.[587] This is not surprising because many articles record anti-depressant action of vitamin D alone.

Mental Illness + Bones + VDD + VDS: In 2011, researchers published finding VDD in most children and adolescents they studied with *severe mental illness*. They noted that VDD should be corrected, especially during an age when bone construction is high, to help prevent higher risk of *hip fractures* at a later age. They concluded that children and adolescents with VDD, especially those with *severe mental illness*, need VDS regardless of type of disease or treatment.[588]

Metabolic Syndrome: Known as syndrome X, *metabolic*

syndrome is common and describes a group of conditions including high blood sugar, increased blood pressure, excess fat and abnormal levels of cholesterol or triglycerides that increase the risk of diabetes, heart disease and stroke.[589] By 2015, several published studies already reported that VDD increased the risk of developing *metabolic syndrome*. In 2015, researchers published that blood 25(OH)D levels had a significant inverse relationship to metabolic syndrome risk. *As 25(OH)D levels increased the risk of metabolic syndrome decreased*. Conclusions stated improved vitamin D status may help reduce the public health burden of metabolic syndrome and related health conditions, *including type 2 diabetes and cardiovascular disease*.[590]

Migraine Headache Pain: In 2014, VDD was found to be present and worse in *migraine patients*.[591]

Migraine and Tension Type Headache: In 2010, researchers found a significant relationship between the frequency of both *migraine and tension-type headache*, and latitude—where VDD can be more common. Results of the literature review suggested VDD plays a role in the generation of *head pain*.[592]

Military Bone Stress Fractures: In 2017, a special operations military medicine journal published finding rates of *stress fractures* in army basic trainees to be much higher than active duty service members. Males had 633% higher rates of *stress fractures* and women had 2,666% higher rates. Inadequate vitamin D intake was named a factor & VDS was advised.[593]

Military Dependents: In 2013, researchers published results of a military dependent study in sunny Hawaii and found *93% of military dependents had VDD at birth*. Researchers called for increased routine VDD screening and VDS when needed.[594]

Mood Disorders in Young Women: In 2008, VDD was reported to be very related to higher incidences of *four mood*

disorders. Four studies found VDD in *premenstrual syndrome, non-specified mood disorder, major depressive disorder and seasonal affective disorder*.[595]

MRSA -- Methicillin-Resistant Staphylococcus Aureus Infection: In 2010, VDD was found to greatly increase the risk of being a *MRSA nasal carrier*.[596] In 2015, researchers published finding worse VDD in *MRSA-infected patients* than in the non-MRSA infected patients.[597]

Muscle Weakness: In 2014, researchers reported VDD related *muscle weakness*, *fatigue* and *periodic limb pain* are health issues in industrialized countries needing VDD prevention.[598]

Multiple Sclerosis (MS): In 2010, researchers published that VDD was a possible risk factor for *MS*, especially at the early stages of MS. Several studies implicated VDD in *MS* because vitamin D was known to play a significant role in the *immune system* and to influence *T-cells* that play a role in *MS* disease. Researchers noted VDD was seen in most *MS* patients.[599] In 2011, researchers wrote similar opinions.[600] In 2013, researchers reported results of a review of 1969 to 2012 published literature. *VDD was found to be very common in MS patients and advised VDD be avoided in MS patients*. They new vitamin D is a potent regulator of *MS inflammation* and suggested keeping optimum levels of vitamin D in the general population might reduce the risk of developing *MS*.[601]

Multiple Sclerosis & The Neonate (Newborns): By 2017, research already suggested in-utero VDD may raise *MS risk*. In 2017, researchers published *MS* study findings where they observed VDD in neonates was related to a higher risk of *MS*. They found that a 10 ng/ml increase in neonatal 25(OH)D produced a 30% decreased risk of *MS*. Researchers indicated their findings were important for public health, because VDD in pregnant women was very common. But they did not call for either increased VDD screening or increased VDS.[602]

Muscle Disease & Osteoporosis: *Muscle disease*, known as *myopathy*, is a leading symptom of VDD. *Myopathy* along with *severely impaired muscle function* may be present before signs appear to confirm the presence of VDD related *osteoporosis* bone disease. Research published in 2000, determined that a vitamin D test was the only reliable test to assess the presence of VDD related *myopathy*. *Myopathy*, when present, would then reveal the possible presence of *osteoporosis*. In 2000, researchers reported finding VDD *myopathy* required 6 months or more of high dose VDS to normalize.[603]

Musculoskeletal Pain: In 2010, researchers published results of a study of 3,075 men aged 40 to 79 years old. They found VDD more common in those with *musculoskeletal pain* compared to pain-free patients. Researchers noted their findings had implications for the long-term health of individuals with VDD and *musculoskeletal pain*. They did not appear to call for diagnosing VDD or providing needed VDS treatment.[604]

Mustard Gas (MG) + Sulfur Mustard (SM): Sulfur Mustard was once used to treat the skin condition *psoriasis* although it has no medical use today. *SM* was first used as a chemical warfare agent in World War I. *SM* can be released into the air as *MG*, released into water, or even placed into food. MG exposure can cause numerous effects including painful skin lesions and burning, lung disease, DNA damage and even death.[605] In 2016, researchers published finding that *vitamin D protected against SM exposure damage and was the first known intervention to prevent SM-induced mortality*. They concluded vitamin D was a safe, novel, and very available potential countermeasure after mass toxic exposure to *SM*.[606]

Myasthenia Gravis (MG): In 2012, researchers reported finding VDD common in *MG* patients and VDS D3 improved *MG* symptoms including *fatigue* after supplementation.[607]

Myelofibrosis: In 1966, researchers found that VDD caused

myelofibrosis was reversible.[608] In 1999, researchers reported that VDS reversed *myelofibrosis* rapidly.[609] *Myelofibrosis* is a *serious bone marrow disorder* with normal production of blood cells disrupted. It can result in *bone marrow scarring, severe anemia, weakness, fatigue and an enlarged spleen*.[610] In 2005, researchers reported a rare case of a 6-month old infant with *myelofibrosis* and *rickets* due to severe VDD and noted *severe infant blood disorders* can result from VDD *rickets* which is not just a *skeletal disorder*.[611]

Neurological Disorders: In 2012, researchers published that VDD is associated with multiple *neurological disorders* including *multiple sclerosis* and *cognitive disorders*. They also noted VDD may play a role in neurological related functional disorders such as *muscle weakness, instability and falls*.[612] In 2013, researchers published that VDD is associated with a higher risk of developing *neurological disorders*. They noted VDD related with higher risk of *multiple sclerosis* (MS), *higher rate of MS relapse and higher number of MRI lesions*. They noted VDD in elders leads to *worse cognitive performance* and VDD is a risk factor for developing *Alzheimer's disease, ischemic stroke, carotid atherosclerosis and Parkinson's disease.* The also reported VDD is linked to higher incidence and *poorer prognosis* in some of these major *neurological disorders*.[613] In 2016, researchers published that several clinic trials found vitamin D to be protective against *neurological conditions including MS, amyotrophic lateral sclerosis, Parkinson's disease and Alzheimer's disease*. VDD was found to increase disease onset, increase disease progression and predict *worse disease prognosis or outcomes*.[614]

Non-dipper Hypertension: In 2013, researchers reported finding VDD related to blood pressure and maybe *non-dipper hypertension, increasing the risk of sickness and death*.[615]

Nosebleed (Epistaxis): In 2016, researchers found very low blood 25(OH)D under 20 ng/ml in children with *epistaxis*.[616]

Obese & Depressed & VDS: In 2008, researchers published finding high dose VDS (20,000 to 40,000 IU per week) seemed to improve *depressive symptoms in obese subjects*.[617]

Obesity: In 2009, researchers reported that *higher doses of VDS* may be needed for overweight & higher BMI persons.[618]

Obesity in Children & Adolescents: In 2007, researchers found VDD in over 55% of obese children and adolescents.[619] In 2017, researchers reported finding VDD highly common in severely obese children which could be modified with VDS to decrease the risk of *obesity related cardiovascular disease*.[620]

Obstructive Sleep Apnea Syndrome (OSAS) & Heart: In 2016, researchers reported finding widespread VDD in people with *OSAS*. ***98% of OSAS cases had VDD levels < 30 ng/ml and 72% had VDD levels < 20 ng/ml.*** VDD levels were found to be lower in *OSAS* cases than in matched controls. Researchers also found significant, independent and inverse relationships between VDD and *two known heart disease risk factors--apnea-hypopnea index and sleeping heart rate*. They concluded that VDD and *OSAS* were related.[621]

Opioid Fentanyl For-Pain-Dose Need Decreased with VDS: In 2017, researchers published that safe and simple *VDS (4,000 IU/day) significantly helped cancer patients reduce pain and infections*. After 1 month of VDS, cancer patient pain decreased so significantly, patients needed less fentanyl opioid. After 3 months of VDS, less infections were noted.[622]

Opioids in Cancer Patients: In 2015, researchers published results of a study of cancer patients using opioids for pain. They noted VDD was already linked to an increased risk of *pain, depression and infections in palliative cancer patients*. Their research found a significant relation between vitamin D levels and opioid dose *linking VDD to higher opioid dose consumption*. A study side conclusion confirmed previous

findings that increased CRP levels and low albumin levels helped predict survival time in palliative cancer patients.[623]

Oral Squamous Cell Carcinoma (OSCC): In 2015, severe VDD was found in *OSCC* patients. Researchers noted that vitamin D may be a useful treatment for *OSCC*.[624] In 2016, researchers published finding a vitamin D3 analog (eldecalcitol—ED-71) has potential *anti-cancer* effects on *OSCC*.[625]

Osteogenic Sarcoma & D3: In 1984, vitamin D3 was reported to inhibit the growth of *osteogenic sarcoma cancer cells*.[626]

Osteomalacia: In 1983, VDD was found to be a risk factor for *osteomalacia (bone softening)* in the aged.[627] In 2000, VDD was reported to be overlooked often in patients at risk for *osteomalacia* and researchers advised VDD is not as rare as believed. They suggested the diagnosis might be missed due to lack of physician awareness of the condition.[628]

Osteomalacia Myopathy: In 2009, researchers published that VDD was found to be an important, common and treatable cause of *osteomalacic myopathy (muscle weakness)*. *Osteomalacia* is considered an uncommon cause of *myopathy* that can lead to a wheel chair bound state. *Pain in the back, hips and lower limbs are very common in those with this disorder*. The diagnosis of VDD is reported to be frequently delayed or even missed in these patients. Researchers called for increased needed VDD screening in myopathy patients to diagnose a very treatable disorder. *Researchers reported that all patients studied with severe osteomalacic myopathy had "remarkable" recovery after VDS*.[629]

Osteopenia: In 2008, VDD under 30 ng/ml was found to be highly prevalent in 80% of pediatric patients with *osteoporosis and osteopenia*.[630]

Osteoporosis: In 1998, VDD under 20 ng/ml was found in

80% of children, which increased the risk of *osteoporosis* later in life.[631] In 2007, VDD was reported to be common in older adults with *osteoporosis* along with costly related bone fractures. VDD screening and VDS therapy was recommended as critical to help manage *osteoporosis*.[632]

Otitis Media (OM): In 2018, VDD was found to be associated with the development of *OM* with effusion. Researchers discovered that VDD had a significant association with *OM* with effusion and with *OM* follow-up prognosis and outcomes.[633]

Pain: In 2014, VDS was reported to *reduce pain* scores in adult VDD patients with *musculoskeletal pain*.[634]

Pancreatic Cancer: In 2013, VDD was found to be common in patients with *pancreatic adenocarcinoma* and VDD under 20 ng/ml *predicted a poorer prognosis*.[635]

Pancreatitis: In 2016, VDD was found to be highly prevalent in *chronic pancreatitis patients* in a meta-analysis study.[636]

Parachutes & Observations & Random Controlled Trials: In 2003, *researchers published an article in support of science by observation* rather than demanding evidence-based study. Randomized controlled trials can be very time consuming, complicated by design, often predictable, allow much more room for bias, and they are often expensive. The authors made a super point to those who oppose observation results and radically support evidence-based medicine. *They offered to those who belittle observation to take a spot in a double blind, randomized, placebo controlled, cross-over trial of the parachute--since no evidence existed of such a study*.[637]

Pemphigus Vulgaris (PV): In 2012, VDD was found in most patients studied with *PV* and *vertebral fractures*, and most patients with *potentially fatal bullous pemphigoid*.[638]

Peripheral Artery Disease (PAD): In 2014, researchers published that individuals with VDD with or without *PAD* had faster functional decline.[639] In 2015, researchers published results of a meta-analysis that included six case-controlled studies and 6418 individuals. They found lower 25(OH)D blood levels in patients with *PAD* than patients without *PAD*. The association was strongest in patients with *critical limb ischemia*.[640] In 2017, researchers published finding VDD increased the risk of *PAD* in both blacks and whites studied.[641]

Pet Cancer: In 2011, researchers reported VDD in Labrador Retriever dogs, like in humans, may increase the risk of very *common cancer tumors*.[642] *Hemangiosarcoma* is the most common and *aggressive blood cell cancer* in dogs and it is usually fatal. *In 2014*, ***researchers reported that 75% of dogs have VDD.*** Dogs may need blood levels near *100 ng/ml* to be protected from *cancer & other immune-related diseases*.[643]

Physical Fitness: In 2016, researchers published that VDD is *widespread among athletes*. Since vitamin D plays a role in preserving *athlete health*, especially *physical fitness* and *endurance*, proper vitamin D levels must be VDS maintained.[644]

Plaque Psoriasis (PP): In 2014, researchers reported VDD is worse in patients with *Plaque Psoriasis*. Using narrowband UVB light can increase vitamin D levels and the *antimicrobial peptide LL-37* that work together to reduce *inflammatory plaque psoriasis*.[645] In 2016, VDD was found in both *plaque psoriasis* patients and controls indicating a general need for increased VDS. VDD was worse in *PP* patients in the winter time indicating an even greater need for VDS.[646]

Platelets: In 2014, researchers found a strong association between VDD and *high platelet volume* which can promote *cardiovascular disease*.[647] In 2017, researchers reported finding VDD inversely related to *platelet count* and *mean platelet volume* in adults, which increased the risk of several diseases

including *metabolic syndrome* and *cardiovascular disease*.[648]

Pneumonia: In 2013, researchers published results of a study investigating the risk of *hospitalized pneumonia* in men and women aged 53-73. They found a very strong inverse relation between aging patients with VDD and the risk of getting *pneumonia*.[649] In 2015, researchers published findings that VDD was present in 80% of patients who were hospitalized with *community-acquired pneumonia (CAP)*. They also found VDD notably predicted higher 28-day *all-cause mortality*.[650] In 2016, researchers investigated long-term mortality in adults hospitalized with *CAP*. VDD was already known to be related to short term (30 day) mortality. They found a high rate of VDD in hospitalized adults with *CAP*. VDD related to *higher risk of mortality* in the long-term in these patients.[651]

Polycystic Ovary Syndrome (PCOS): In 2017, researchers published that *endometriosis* and *PCOS* are two of the most frequent causes of *female infertility*. Several studies in past decades have reported that VDD plays a role in *endometriosis* and symptoms associated with *polycystic ovary syndrome*.[652]

Postmenopausal Osteoporosis: In 2013, researchers reported *postmenopausal* women with VDD and high levels of vitamin A (retinol) had *eight times increased risk of osteoporosis*.[653]

Postpartum Depression: In 2016, VDD was found related to *postpartum depression* which can affect women, infants and family.[654] In 2016, a higher intake of milk during pregnancy was found to reduce the risk of *postpartum depressio*n symptoms.[655] In 2016, in women at risk for *depression*, early pregnancy VDD was found associated with *higher depression scores* in early and late pregnancy.[656]

Pregnancy: In 2017, *VDD during pregnancy was called a worldwide epidemic*.[657] In 2017, VDD was found to be *widespread among mothers and neonates* with a high risk of VDD

in infants born to un-supplemented mothers.[658] In 2017, VDD during pregnancy was reported to be related to disorders associated with pregnancy. VDD during critical fetal development is considered very important to overall health of a child later in life because VDD can impact fetal metabolic imprinting.[659] In 2017, VDD in pregnancy was found related to a higher incidence of *pre-eclampsia, gestational diabetes, bacterial vaginosis, fetal miscarriage* and *impaired fetal and childhood growth and development*. ***A vitamin D blood level above 30 ng/ml before pregnancy and maintained during pregnancy seemed to have protective and beneficial effects.*** Researchers were clear to point out that clinicians need to identify and correct VDD promptly during pregnancy, because of the great risks associated with untreated VDD.[660]

Pregnancy Assisted Reproductive Treatment (ART): In 2018, VDD was reported to increase the risk of *abnormal pregnancy implantation* along with *pre-eclampsia* and *small fetal growth type obstetric complications*. Proper vitamin D levels increased chances of *successful pregnancy* and *live birth* compared to women with VDD.[661]

Pregnancy Birth Outcomes: In 2016, ***vitamin D levels over 30 ng/ml were found to be pregnancy protective*** *and reduce the risk of in-utero complications* such as *pre-eclampsia* and *small-for-gestational-age birth*.[662] In 2016, researchers found that VDD can be common in pregnant women. They discovered that VDS during pregnancy increases blood 25(OH)D levels at term and may reduce the risk of *pre-eclampsia, low birthweight and preterm birth*.[663]

Pregnancy Caesarean Section: In 2015, researchers reported study results where VDD, 25(OH)D3 *below 30 ng/ml*, during pregnancy may increase the risk of *caesarean section*.[664]

Pregnancy Complications & Recurrent Miscarriage: In 2014, researchers reported it was a known *VDD in pregnant*

women increased the risk of obstetrical complications such as gestational diabetes mellitus, pre-eclampsia, preterm delivery related to bacterial vaginosis and small-for-gestational age births. Researchers found that *women with recurrent miscarriage (pregnancy losses) had higher rates of VDD*. They noted VDD increased the risk of *auto and cellular immune abnormalities* in women with *recurrent pregnancy losses*.[665]

Pregnancy Immune Function of Vitamin D: In 2017, VDD was reported to potentially affect a mother and directly affect *fetal outcomes like pre-eclampsia, gestational diabetes, and recurrent miscarriage*. Researchers noted that vitamin D was critical for *healthy growth and development processes including the regulation of cell proliferation, differentiation, apoptosis, immune function, inflammatory responses and the maintenance, stability and functions of genes*.[666]

Pregnancy Miscarriage: In 2012, researchers published findings that low plasma 25(OH)D may be associated with an increased risk of *late miscarriage*.[667] In 2015, researchers noted that miscarriage was known as the most common negative outcome of pregnancy. Their study found that *VDD doubled the risk of first-trimester miscarriage*. After finding VDD to be associated with miscarriage, they suggested VDS in early pregnancy or before conception may decrease the risk of *miscarriage*.[668] In 2016, researchers reported *miscarriage was* much more common in pregnant women with VDD.[669] In 2016, researchers published that the *abnormal immune response* observed when VDD was present with *recurrent miscarriages* might be regulated with VDS.[670] In 2018, researchers published findings that VDD in late pregnancy was associated with higher risk of *small for gestational age (SGA) and low birth weight (LBW) baby*. VDD in early pregnancy was found to be related to *pregnancy loss*. Vitamin D status from early to late pregnancy was inversely associated with *SGA, LBW and preterm delivery* and therefore plays a role in healthy pregnancy.[671]

Pregnancy Pre-eclampsia: In 2007, researchers published study findings that women who developed *pre-eclampsia* in early pregnancy had worse VDD compared to study controls. They found a *20 ng/ml decline in blood vitamin D doubled the risk of pre-eclampsia*. Researchers concluded maternal VDD may be an independent risk factor for *pre-eclampsia*, so VDS should be explored as an option to prevent *pre-eclampsia* and promote new born well-being.[672] *Pre-eclampsia* is a complication of pregnancy that can be dangerous and deadly. It can result in increased blood pressure, swelling of hands and feet, protein in urine, seizures, fluid in the lungs, organ failure and even maternal and infant death.[673] In 2015, researchers published findings that early pregnancy maternal VDD (defined as 25(OH)D <12 ng/ml) may independently increase the risk for *pre-eclampsia*. In their conclusions, they recommended future research should investigate VDS for women of childbearing age to help reduce *pre-eclampsia* and nurture healthier pregnancies.[674] In 2016, researchers published that vitamin D levels of **30 ng/ml or higher** in mothers at the start of their study and in late pregnancy were associated with a lower risk of *pre-eclampsia*.[675] In 2017, researchers published that vitamin D played a role in regulating the *immune system* as related to the *pre-eclampsia* disease process. They found vitamin D to be a safe and effective potential addition to the current mediation used to treat women with *pre-eclampsia*.[676]

Pregnancy Pre-eclampsia Prevention & VDS: In 2016, researchers published randomized controlled trial results that found VDS during the third trimester of pregnancy, reduced the risk of *pre-eclampsia*.[677] In 2018, researchers published that 2-8% of all pregnancies may involve *pre-eclampsia* and VDS could significantly reduce the risk and onset of pre-eclampsia.[678] In 2018, researchers found that a fetus exposed to a small amount of extra vitamin D in fortified food related to a reduced risk of later life *pre-eclampsia*.[679]

Pregnancy Pre-eclampsia Recurrence Prevention: In 2015,

researchers published results of a study of women at risk for *pre-eclampsia* given 9 weeks of multi-mineral and vitamin D supplements (calcium, magnesium, zinc and D3). They found maternal circulating levels of supplements increased, maternal sympathetic and diastolic blood pressure decreased, and the newborn's length increased.[680] In 2017, researchers reported that to reduce the risk and incidence of *pre-eclampsia* in at risk women, multi-mineral with vitamin D during pregnancy can be a low-cost and affordable way to reduce *pre-eclampsia* the incidence.[681] In 2017, a randomized controlled clinical trial found VDS protected against recurrent *pre-eclampsia*. The study also found VDS reduced the incidence of *gestational hypertension related pre-eclampsia*.[682]

Pregnancy Pre-eclampsia – Severe: In 2017, researchers published finding VDD at a high rate in a study of 13,806 pregnant women, and VDD was worse in women who developed *severe pre-eclampsia* compared to women who did not. They also found a strong association and increased risk of *severe pre-eclampsia* when maternal VDD was present at 23-28 weeks of gestation. The researchers called for more studies to explore whether VDS can be used to improve pregnancy outcomes and reduce the risk of *severe pre-eclampsia*.[683]

Pregnancy Premature Delivery: In 2015, researchers reported finding *maternal VDD associated with severe preterm birth before 31 weeks of gestation*.[684] In 2015, researchers reported finding 25(OH)D levels of about ***36 ng/ml significantly decreased the risk of preterm birth*** before 37 weeks gestation. Study conclusions noted that preventing VDD was protective against preterm birth.[685] In 2016, researchers reported results of a meta-analysis review of 10 studies including 10,098 pregnant women. They published finding *increasing risk of preterm birth in pregnant women with VDD (maternal blood 25(OH)D levels <20 ng/ml)*.[686] In 2017, researchers reported finding ***VDD blood levels below 30 ng/ml directly and inversely related to the risk of preterm birth.***[687]

Pregnancy Premature Delivery in Minorities: In 2017, researchers published finding that VDD increased the risk of *preterm birth in ethnic minorities*. They noted how VDD below 30 ng/ml was already known to increase the risk of *preterm birth*. They reported finding ***VDD below 12 ng/ml related to a 4.05 times greater risk of preterm birth disparity than ethnic minorities at the 30 ng/ml level.***[688]

Pregnancy & Vitamin D Supplementation: In 2017, VDS to prevent or treat VDD was recommended to help insure proper levels of vitamin D in a mother and child. Sufficent vitamin D can greatly *decrease the risks of birth complications and disease development* in the mother and fetus.[689] In 2017, VDS was called a safe & low-cost way to prevent pregnancy complications and increase maternal and fetal health. VDS can also *decrease the risks* of developing *gestational diabetes, pre-eclampsia, preterm birth and small for gestational age birthweight*. Public health initiatives need to embrace VDS.[690] In 2017, VDS was reported as a single important way to decrease maternal VDD & reduce the risk of pre-term birth.[691]

Premenstrual Syndrome (PMS): In 2016, VDD and *PMS* were studied. *PMS* can be so severe that it interferes with social relationships. Girls 15-21 years old with severe *PMS* related symptoms and low vitamin D levels equal to or below 10 ng/ml were studied in two groups. Group 1 received vitamin D supplements that achieved a normal range of 35-60 ng/ml. Group 1 then had notable decreased scores in anxiety, irritability, crying easily, sadness, and disturbed relationships. Group 2 had no appreciable changes. The study concluded that *vitamin D therapy can be a safe, effective and convenient mode for improving the quality of life in young women with severe VDD and PMS related mood disorders*.[692]

Preventive Medicine: In 2003, VDD was generally accepted as being involved in the disease *osteoporosis*. Research was starting to accumulate and show VDD related to *tuberculosis,*

rheumatoid arthritis, multiple sclerosis, inflammatory bowel disease, hypertension, & specific forms of *cancers*. Research was also beginning to show VDS lowered *hypertension blood pressure, improved diabetic blood glucose*, and *improved rheumatioid arthritis and multiple sclerosis symptoms*. The vitamin D RDA dose was called too low to be effective.[693]

Proteinuria: In 2013, researchers reported vitamin D3 decreases *proteinuria* & prevents podocyte *kidney cell injury*.[694]

Prostate Biopsy Outcomes: In 2014, VDD was reported to predict *prostate biopsy outcomes*. VDD was found associated with increased odds of *biopsy diagnosis of prostate cancer*. Severe VDD was positively associated with *higher prostate cancer Gleason grade and tumor stage*.[695] [24789033]

Prostate Cancer (PC): In 2007, researchers knew VDD was a common public health problem in the U.S. and that men with VDD had a significantly higher risk of *aggressive PC*. They published that higher levels of vitamin D seemed to play an important role in *preventing progression* of prostate cancer because *higher D levels significantly lowered the risk of total and aggressive prostate cancer*.[696] In 2011, researchers reported finding VDD *stimulates prostate cancer growth in bone*.[697] In 2016, researchers published that low vitamin D was found to be associated with increased odds of *adverse pathology* in men having *radical prostatectomy*. They proposed blood 25(OH)D may be a useful biomarker for determining the aggressiveness of *PC*.[698] In 2017, researchers again published that vitamin D was found to be lower in patients with *PC* and that low vitamin D status was also associated with *inflammation* in patients with *PC*.[699]

Prostate Cancer in African Americans: In 2016, researchers published finding VDD to be a factor in the higher rates of *aggressive prostate cancer found in African Americans*.[700]

Psoriasis: In 1991, researchers reported *psoriasis* treatment with *topical D3* was highly effective and improved *psoriasis* faster than oral D3, with no adverse effects.[701] In 1992, researchers reported finding well studied calcipotriol, a form of vitamin D, safe and very effective for treating *psoriasis*.[702] In 1993, researchers reported calcipotriol effectively treated *psoriasis* and *psoriasis vulgaris*.[703] In 2000, researchers noted that *topical D3* was proven for nearly a decade to be effective for treating *psoriasis*, and topical D3 (available as a calcipotriol ointment, cream and scalp lotion) was safe, well tolerated and could be used long term.[704] [705] In 2001, researchers published that *scalp psoriasis* was common and could reduce the quality of life in about 2% of people. In reviewing numerous treatments, they found vitamin D3 had substantial *anti-psoriatic effects*.[706] In 2012, researchers found VDD in most patients with *chronic plaque psoriasi*s and noted it was even more common (81%) in winter.[707]

Psoriasis Related Systemic Diseases: In 2013, researchers published that diagnosis of visible *plaque psoriasis* in 1-2% of the population is simple. They reported *severe psoriasis* may signal the co-presence of *metabolic syndrome, hypertension, ischemic heart disease, type 2 diabetes, hyperlipidemia, inflammatory bowel disease, lymphoma, non-melanoma skin cancer, COPD, uveitis & venous thromboembolism*.[708]

Psoriatic Arthritis: In 2012, researchers published that oral vitamin D was effective, inexpensive, and readily available for *psoriasis treatment* and VDS added a benefit of improving psoriatic arthritis. Researchers also stated that VDS had many other proven known health benefits such as improved *cardiovascular health, cancer prevention*, etc.[709]

Psychiatric Disorders: In 2015, VDD was found to be very common in patients with psychiatric disorders. Researchers discovered VDD was worse in *psychiatric inpatients* with *mood disorders* than with *schizophrenia*.[710] In 2016, VDD

was found to be strongly related to *depressive symptoms* in *psychotic disorders*.[711]

Psychiatric Inpatients: In 2008, VDD was found in 69% of private psychiatric clinic *psychiatric illness* inpatients.[712] In 2012, VDD was found in 94% of high security *psychiatric inpatients* given *neuroleptic* and *anti-epileptic medications* with inadequate vitamin D intake and sunlight.[713] In 2012, researchers found VDD prevalent in *psychiatric inpatients*.[714] In 2012, researchers published finding VDD in a high percentage of *psychiatric patients*. Younger patients aged 18 to 34 had higher risk with 71% having VDD.[715] In 2016, researchers reported finding 67% of *teaching hospital psychiatric inpatients* had VDD.[716]

Psycho-geriatrics: In 2013, researchers published finding VDD common in elderly *psychiatric inpatients* aged 65 or older. Many were diagnosed with *major depressive disorder*, *dementia, delirium, anxiety* or *bipolar disorder*.[717]

Psychotic Disorders: In 2015, researchers reported VDD to be common in patients with *psychotic disorders* and very often coexisting *depression*. They suggested that vitamin D testing should become routine for certain groups of patients.[718]

Public Health Action Is Needed: In 2017, researchers wrote that major evidence shows ***VDD is common, unacceptably high globally and requires public health action.***[719]

Pulmonary Hypertension: In 2016, researchers published study results that found patients with *pulmonary hypertension* and VDD significantly improved with VDS. Improvement was recorded in *right ventricular size & 6-minute walk test*.[720]

Quality of Life & VDS: In 2015, researchers published that improved vitamin D status in seniors paralleled improved *health-related quality of life (HRQOL)* and quality-adjusted

life years. They studied a preventive program that included vitamin D and found that improved vitamin D status related independently to improved problems with *mobility, usual activities, pain, discomfort, depression and anxiety*. The study concluded a real-world preventive health program with VDS can to be cost-effective and improve *HRQOL* in seniors.[721]

QT Heart Interval: In 2015, VDD in *type 2 diabetic patients* was found related to a prolonged *QT heart interval* between the start of the *heart's electrical cycle and the cycle end*.[722]

Racial Disparities: In 2016, VDD was *found at higher rates in blacks than in whites*, and both responded to VDS treatment proportionately.[723]

RDA May Be Set Too Low: In 1991, researchers reported that the RDA was set too low for homebound seniors who are at risk for VDD because they do not get regular sun exposure.[724] In 2000, researchers found that the RDA was too low to prevent deficiency even in sunny countries where naturally produced vitamin D can occur in skin when exposed to UVB light.[725] In 2012, researchers published results after reviewing records of 72,093 patients with VDD. *74% of the VDD patients still had VDD after VDS*, indicating standard VDS regimens for VDD may be inadequate.[726]

Rehabilitation Patients: In 2011, researchers reported finding VDD in *77% of acute rehabilitation patients at admission*.[727]

Respiratory Disease: In 2011, researchers reported that taking vitamin A and D in adequate amounts (using cod liver oil) could help prevent VDD and *respiratory tract infections*.[728]

Respiratory Disease in Childhood: In 2015, researchers published finding 25(OH)D levels 20 to 50 ng/ml seemed to be *immune protective* against *RTIs* & several other disorders. They noted there is no consensus on vitamin D levels for dis-

ease prevention and treatment, but VDD has been shown in numerous studies to increase the risk of *respiratory tract infections (RTIs)* in children. *RTIs* are a most common cause of sickness and death in children. They reported that data connects VDD to the risk of *child tuberculosis*, *recurrent otitis media*, and *severe bronchiolitis*. Their conclusions stated that maintaining adequate vitamin D levels may be an inexpensive and effective way to prevent some *RTIs*.[729]

Respiratory Tract Infection (RTI) & Well-being: In 2015, researchers found VDS might benefit patients with frequent *respiratory tract infections*. They also found that 70% of patients taking 4000 IU/day for one year mentioned, and research showed, that a ***vitamin D level above 31.4 ng/ml related to increased chance of better well-being.***[730]

Rheumatoid Arthritis (RA): In 2016, researchers published results of a meta-analysis that found VDD prevalent and very low in *RA* patients. They discovered *RA* activity to be inverse to vitamin D levels.[731] In 2016, other researchers reported VD inversely correlated with *RA* activity & body mass index.[732]

Rheumatology Patients: In 2011, researchers found VDD in 86% of outpatients at one *rheumatology clinic*. Only 25% of the 38% of patients taking VDS achieved normal D values.[733]

Rickets: In 2009, researchers reported *subclinical VDD* & nutritional *rickets* may be very common in early adolescent populations.[734] In 2011, researchers noted VDD *rickets* can be life threatening to infants who can *suffer cardiac arrest*.[735]

Rickets + VDS: In 2010, researchers published that most studied infants and toddlers with VDD rickets had complete healing after VDS treatment with one mega dose of D3 by IM injection, in just 3 months. The study evaluated common *signs of VDD rickets including delayed teething and walking, hypotonia, bowed legs, enlarged wrist joints, knobby ribs and*

irritability. Bowed legs were largely improved in 66% of children. Radiographic evidence of rickets showed complete healing in 95% of children. VDD clinical signs, symptoms and *biochemical abnormalities* all had significant cure in just 3 months. In summary, researchers recommended that short children be checked for VDD and the likelihood of needing VDS.[736] In 2012, a similar study in adolescents and children with severe VDD had similar "complete healing" results. This study used an IM injection dose of 10,000 IU/kg (maximum of 600,000 IU).[737]

Salmonella Infection: In 2016, researchers published finding vitamin D3 promotes *autophagic removal* of Salmonella and protects against negative effects of *immense inflammation*.[738] In 2016, researchers reported finding D3 protective against *Salmonellosis*, which continues to be a major public health problem globally and a most common food-borne disease.[739]

Schizophrenia: As early as 2010, a published article stated that developmental VDD may play a part in the risk of developing *schizophrenia*. The article also reported on a case-control study that found a significant association between neonatal vitamin D status and later risk of *schizophrenia*.[740] A 2012 publication stated that *schizophrenia* may be the most severe psychiatric disorder, yet the cause remains a puzzle.[741] In 2014, researchers published that severe VDD was found in patients having an acute episode of schizophrenia. They concluded patients with *schizophrenia*, especially in long term care, should have blood vitamin D levels measured. They also recommended vitamin D supplements and diets rich in vitamin D for patients with *schizophrenia*.[742] In 2016, researchers published findings that lower levels of VDD were related to increased severity of *schizophrenia*. They concluded that *schizophrenia* treatment should include assessment of blood vitamin D levels but fell short of recommending VDS.[743] In 2017, researchers published that VDD had already been linked with *schizophrenia* and they found VDD was present

in first episode patients, especially those with a final diagnosis of *schizophrenia*. While noting their results should generate further research interest, they did not call for VDD screening or VDS therapy when needed.[744] In 2017, researchers found vitamin D levels in patients with schizophrenia were much lower than in controls. They reported a significant association between *schizophrenia* and VDD. Researchers called for regular VDD screening of patients with *schizophrenia* to allow for appropriate VDS therapy when needed.[745]

Sepsis: As a top killer in the U.S., *sepsis* is a life-threatening complication of an infection. Unless treated promptly, *sepsis* can rapidly lead to tissue damage, organ failure and death.[746] In 2015, researchers published findings after a systematic review and meta-analysis of prior *sepsis* studies. Previous studies found low vitamin D related to the risk of life-threatening *sepsis* (bloodstream infection). They looked at incidence, prevalence and relative risk of having *sepsis* by comparing VDD patients to controls. *They found that VDD increased risk of sepsis*.[747] In 2017, researchers published findings that ***75% of patients with severe sepsis had VDD***. They also found that patients with severe VDD had a much higher mortality rate.[748]

Sepsis + ICU Mortality + VDD Levels: VDD and mortality in intensive care unit (ICU) patients has been well documented. In 2016, researchers published that VDD (they defined it as less than or equal to 20 ng/ml) was found in *93.5% of patients upon ICU admission. In the 53% of patients with VDD levels under 7 ng/ml, sepsis related mortality was the highest*. Pneumonia VDD patients had longer mechanical ventilation. The study concluded that since VDD on admission can greatly impact clinical outcome, benefits of VDS therapy should be better explained.[749]

Sexual Dysfunction in Young Women: A 2016 pilot study found VDD associated with *abnormal sexual functioning in*

females. The *severity of sexual dysfunction* was found to be dependent upon the degree of VDD.[750] A 2018, researchers designed a study to evaluate whether *sexual function (sexual desire, orgasm and satisfaction) and depressive symptoms* could be affected by treating VDD. They found that vitamin D supplements given to young females with VDD improved their *sexual function and depressive mood*.[751]

Sick Sinus Syndrome (SSS): In 1990, a patient history was published involving a 77-year-old woman with *SSS*. She was treated with anti-arrhythmic heart medications unsuccessfully for 5 years. In the 5th year she developed *chronic atrial fibrillation*. She started taking vitamin D for unrelated reasons two years later & soon stopped having *atrial fibrillation*.[752]

Sickle Cell Disease (SCD): In 2004, researchers published results of a study of children between 5 and 18 years of age. They found VDD very common in black children with *SCD* compared to healthy children with normal vitamin D blood levels. Researchers found lowest vitamin D levels in the spring.[753] In 2008, researchers reported *African-Americans ages 5 to 18 with SCD had 5.3 times greater risk for VDD than healthy African-American children*.[754] In 2015, researchers found VDD to be very common in *SCD* patients and it related to *acute SCD pain*. They stated that correcting low vitamin D may offer a simple and low-cost way to help reduce acute *SCD complications and pain*.[755] In 2017, researchers noted that the symptoms of VDD and *chronic pain* overlap in those with *SCD*. Their study found that VDD in *SCD* children may be associated with increased frequency of acute pain episodes. They concluded that VDS should be considered in *SCD* patients with VDD and frequent pain episodes.[756]

Signs of VDD: There are over 300 ways VDD can affect your health and your life. VDD is such a silent killer, and ***King of All Silent Killers***, that most healthcare providers miss, dismiss or overlook it. Secondary VDD diseases such as psoriasis,

acne, vitiligo and hair loss can rather easily be seen. VDD can best be diagnosed by a simple vitamin D blood serum lab test. Days, weeks and thousands of dollars can be spent on diagnostic tests for a single condition as ordered by multiple health providers. A simple $100 to $200 test for VDD, a condition that can often be "cured" for $20 to $40 per year, is really a deal. It is likely best not to wait to join the sick and dying in a hospital, where about 83% of inpatients have VDD.

Sjogren's Syndrome (SS): In 2012, researchers reported finding VDD in *SS* patients was worse when *lymphoma* or *peripheral neuropathy* were also present.[757] In 2015, researchers found VDD frequent and worse in *SS* patients.[758]

Skin & Potent D3: In 1992, researchers published how vitamin D3, newly known to be a hormone, showed potential for treating *skin ichthyosis, cancer and autoimmune diseases*, because ***D3 is about 200 times more potent than calcipotriol***.[759] In 2018, researchers noted that *VDD was a risk factor for many skin disorders including psoriasis, alopecia areata, atopic dermatitis, polymorphous light eruption, vitiligo, mycosis fungoides, systemic lupus erythematosus and melanoma*.[760]

Spina Bifida: In 2016, VDD was found in 81% of children with *spina bifida*.[761]

Spinal Cord Injury: In 2010, VDD was found in 93% of rehab inpatients with *spinal cord injury*.[762]

Spinal Fusion Surgery: It has been known for decades that vitamin D plays a critical role in establishing *optimal bone health*. Healthy bone is vital to *spinal arthrodesis* (fusion of vertebrae). In 2013, researchers published results of a retrospective study which found very high rates of VDD in patients needing *spinal fusion* for *degenerative spondylosis*. They stated that young adults with *spinal disabilities* were in an age bracket where vitamin D screening was often over-

looked and should not be, because they are likely to have VDD pre-surgery and less likely to take D supplements prior to surgery.[763] In 2015, VDD was found to be common in patients undergoing spinal fusion for *degenerative spinal spondylosis*.[764] In 2015, researchers reported the number of spinal fusion surgeries is constantly increasing due to the constantly increasing number of patients with *low back pain*.[765]

Spinal Fusion Surgery -- Improving Outcomes: In 2016, a published review of research concluded that correction of VDD in potential spinal fusion patients gives the maximum chance for successful arthrodesis and helps achieve optimal surgical outcomes. The literature review found that *patients with VDD suffered higher rates of recurrent and persistent low back pain. The study found lower fusion rates in patients with VDD* than those with normal vitamin D levels. It also found that when patients with VDD were given vitamin D supplements after surgery, they had significant improvement in intensity of low back pain, better patient-reported outcomes scores, and better fusion rates as compared to controls.[766]

Spinal Tuberculosis (TB): In 2016, researchers published results of studying 14 patients with *spinal tuberculosis* who did not respond to 10 months of traditional anti-TB treatment. 7 sick patients were partially dependent and 7 were totally dependent on others for daily living activity help. Just 2-6 weeks after adding vitamin D 600,000 IU to traditional anti-TB therapy, all previously non-responding patients had good clinical responses, and all but one became independent.[767]

Staphylococcus Infection: In 2015, researchers reported that children with VDD have more *recurrent S. aureus skin or soft tissue infections* and VDS & LL-37 can be protective.[768]

Stroke: VDD is common in *stroke* patients. In 2015, researchers published finding low blood 25(OH)D independently associated with *larger & worse ischemic stroke infarct vol-*

ume. They noted that poor vitamin D status could partially explain why ischemic patients with VDD were observed to have *worse outcomes*.[769] In 2016, researchers noted that VDD in *acute ischemic stroke* was associated with a *worse functional outcome*.[770]

Stroke Recurrence: In 2016, researchers found patients with *recurrent stroke* had blood 25(OH)D levels that were much lower than patients without *recurrent stroke*. They concluded that VDD levels can predict the risk of *repeat stroke*.[771]

Suicide Attempters: In 2014, researchers published finding VDD more common and worse in *"suicide attempters"* than in depressed non-suicidal patients or healthy controls. They noted previous studies already found VDD may play a role in *psychiatric disorders* such as *depression*, *psychosis symptoms* and *schizophrenia*. They called for routine VDD testing of patients with *suicidal symptoms*, so VDS therapy could have a chance to help *suicidal patients* with VDD.[772]

Sunscreen: In 1995, researchers concluded sunscreens do not protect against melanoma skin cancer.[773] In 2000, researchers reported ***sunscreen users had an increased risk of malignant melanoma***.[774] In 2018, researchers noted skin cancer, the most common form of cancer, has doubled over the past 30 years just as sunscreen use has risen dramatically. Vitamin D, an immune booster and key cancer fighter, is made in the skin when exposed to UVB rays. Sunscreens block UVB rays and contain chemicals now suspected of adding to the harm.[775]

Systemic Lupus Erythematosus (SLE): In 2001, researchers published findings where half of study patients with either *SLE* or *fibromyalgia* had vitamin D levels ***below 20 ng/ml***.[776] Study results published in 2006 noted VDD to be a possible risk factor for *SLE*. Researchers called for future studies to look at the potential role of vitamin D in the prevention and/or treatment of *SLE*.[777] In 2009, researchers published that VDD

was found to be very common in patients with *SLE*. They called for VDS therapy and re-evaluation in *SLE* patients with VDD.[778] In 2012, researchers published results of a large cross-sectional study of *SLE* patients where they found vitamin D levels to be inversely related with *SLE* disease activity. The study also found VDD was associated with dyslipidemia but not subclinical atherosclerosis.[779] In 2015, researchers published that VDD in *SLE* patients independently predicted *cognitive impairment*. They concluded that VDD, a cognitive damage risk factor, could be modified by VDS.[780]

Systemic Lupus Erythematosus & VDS: In 2011, researchers published that most newly diagnosed *SLE* patients have VDD at the time of diagnosis. They also found that VDD was associated with *higher SLE disease activity*. For newly diagnosed *SLE* patients they recommended routine VDD screening and prompt VDS treatment for VDD when present.[781]

Systemic Sclerosis (SSc) or Scleroderma: In 2009, researchers reported finding high rates of VDD (82% and 86%) in 2 groups of *SSc* patients in 2 different geographic locations, even in those taking VDS. They concluded SSc patients need higher VDS doses.[782] In 2011, researchers found worse VDD (13.5 ± 9 ng/ml) in *SSc* patients & *tissue fibrosis* inversely related to blood D levels.[783] In 2016, researchers noted finding low levels of vitamin D are common in many *autoimmune disorders*, published finding VDD associated with *skin* involvement and *pulmonary hypertension* in *scleroderma* patients.[784] In 2017, researchers found VDD widespread in patients with *SSC*, like in *several autoimmune diseases*.[785]

Systemic Sclerosis (SSc) + Cancer: In 2006, *SSc patients were found to have significantly higher cancer rates, largely esophageal and oropharyngeal cancers*.[786] In 2009, again, researchers reported finding much higher rates of *cancer* in *SSc* patients, especially *lung cancer,* even in non-smokers.[787] In 2012, researchers found *SSc* patients had a higher risk of

cancer, mainly in the *lung, oral cavity, pharynx & blood*.[788] In 2013, *lung cancer* was found more often in *SSc* patients.[789] In 2013, a meta-analysis confirmed *SSc* patients to have a higher risk of *lung, liver, blood, bladder cancer & more*.[790] In 2013, a meta-analysis found *SSc* patients have a *higher risk of lung, non-Hodgkin's lymphoma & blood cancers*.[791] In 2014, researchers published finding higher than expected rates of *breast cancer* in both *SSc* males and females.[792]

Takayasu's Arteritis (TAK): In 2016, researchers reported finding VDD common in *TAK* patients. They called for VDD screening and VDS when indicated for *TAK* patients. *TAK* is a *chronic blood vessel inflammation* and can be *painful*.[793]

Testosterone: In 2015, researchers published finding vitamin D to be highly associated with total testosterone and sex hormone-binding globulin in men aged 20 and above. They found higher levels of vitamin D related to higher testosterone levels, while *VDD related to lower testosterone levels*.[794] In 2015, researchers studied VDD and testosterone levels, and found VDD associated with male *hypogonadism*. They found VDD associated with higher risk of *total testosterone* deficiencies. They recorded a positive relationship between higher vitamin D levels and *higher testosterone levels*. They also reported finding seasonal variation where vitamin D levels fluctuated with seasons.[795] In 2016, published research concluded that vitamin D status is positively associated with total and bioavailable testosterone levels. *Men with VDD blood 25(OH)D levels below 30 ng/ml had lower total testosterone levels than those above 30 ng/ml*.[796] In 2017, researchers published results of studying middle-aged men (53.2 ± 10.4 years). They found that *testosterone levels, metabolic syndrome and erectile dysfunction* all improved with VDS.[797]

Thalassemia: In 1978, researchers published finding worse VDD in children ages 5-15 with *thalassemia* vs. controls.[798] *Thalassemia* is a calcium balance disorder where calcium

imbalance varies in different populations. In 2008, researchers found ***VDD in 100% of adolescents with beta-thalassemia*** and over 65% of controls studied. Researchers discovered that one IM injection of vitamin D3 (10,000 IU/kg, max. 600,000 IU) was effective VDD therapy in most study adolescents that had VDD. High dose D3 VDS therapy significantly improved VDD symptoms for up to 3 months.[799] In 2014, researchers found ***VDD in 95%*** of patients ages 36 ± 9 years in a study of *beta-thalassemia* and bone mass.[800]

Thyroid Disease & Cancer: In 2015, researchers reported VDD related to 3 *autoimmune thyroid disease types*: *Graves' disease, Hashimoto's thyroiditis*, and *post-partum thyroiditis*.[801] In 2016, researchers found VDD related to *autoimmune thyroid diseases* including *Hashimoto's thyroiditis & Graves' Disease*.[802] In 2018, VDD was found to increase the risk of *thyroid cancer*.[803]

Toxic Shock Syndrome (TSS): In 2013, TSS was described as a rare, deadly illness triggered by certain bacteria (*group A streptococcal* and *Staphylococcus aureus*).[804] VDS for VDD can raise lifesaving levels of the *anti-microbial LL-37*.[805]

Tuberculosis (TB): In 2008, researchers published finding VDD associated with higher risk of active *TB*. They suggested VDS for people with TB and VDD should be studied.[806] In 2011, researchers published VDD to be common in active *TB* patients and vitamin D could pay a role in *TB* treatment just as VDS did before the era of antibiotics.[807] In 2012, researchers noted *TB* to be a major cause of mortality, responsible for 1.68 million deaths worldwide in 2009. They found VDD common in patients with active *TB*, highly prevalent among people with latent *TB* and VDD increased risk of TB disease reactivation. They suggested VDS had potential for a huge positive public health impact.[808] In 2013, researchers published finding VDD to be much more common in *TB* patients than non-TB patients.[809] In 2015, researchers again stated *TB*

was a major global health problem that coincides with VDD and again noted *historically that high doses of VDS were widely used to treat TB in the pre-antibiotic era*.[810]

Tuberculosis (TB) & VDS: In 2014, researchers reported how vitamin D3, which induces the active peptide LL-37 that then restricts Mycobacterium tuberculosis growth, may be used with anti-TB treatments & result in faster *TB* recovery.[811]

Urban Adolescent VDD: In 2004, VDD was found to be prevalent in a sample of teenagers in an urban clinic. VDD was reported to be worse in African Americans & in winter. But VDD was common across sex, season and ethnicity.[812]

Urinary Incontinence (UI): In 2016, VDD was found in 79% of community-living *UI* older adults.[813]

Urinary Tract Infection (UTI): In 2016, VDS was reported to be a possible way to prevent *UTI*.[814] In 2013, VDD was found related to recurrent *UTIs* in premenopausal women.[815] In 2015, VDD was found to be an independent risk factor & predictor of *UTI* after kidney transplants. Checking D levels before surgery might predict complications after transplant.[816]

Urinary Tract Infection in Infants: VDD is associated with an increased odd of *UTI* in infants.[817]

Urticaria (Hives): *Urticaria* is a common skin condition that can be chronic and *even reduce the quality of life*. The cause of urticaria is most often unknown, so antihistamines have historically been the main therapy used to control symptoms. In 2014, published research revealed a significant association was found between VDD and *chronic spontaneous urticaria* (CSU). Researchers also reported that VDS improved both symptoms in 83% of *CSU* patients and quality of life. [818] In 2014, researchers reported that high D3 VDS added to regular *urticaria* therapy improved symptoms.[819] In 2014, other re-

searchers published that high dose Vitamin D3 (4,000 IU/d) could be considered effective and safe treatment for chronic *urticaria*.[820] In 2015, researchers reported finding VDD significantly increased the risk of *chronic idiopathic urticaria* (CIU) and VDD level correlated with *CIU* disease activity.[821] In 2016, researchers published that high dose VDS D3 (300,000 IU/month) showed significant improvement in patients with *urticaria* after 12 weeks. VDS helped improve severity of symptoms and patient quality of life. [822]

Uveitis: In 2002, researchers published finding sixty percent of severe eye *uveitis* patients had a systemic disease.[823] In 2017, researchers reported *acute anterior uveitis* (AAU) patients had notably low VDD and VDS may help *AAU* patients.[824]

Vaginosis: In 2009, researchers published VDD increased risk of *bacterial vaginosis*.[825] In 2015, researchers reported 2000 IU/day VDS stopped asymptomatic *bacterial vaginosis*, preventing disorder symptoms.[826]

Vegetarian Diet: In 1985, researchers published *vegetarian* children were at risk for VDD *rickets* and *vitamin B12 deficiency*.[827] In 2018, researchers reported VDD can occur in mothers, neonates & children if a strict *vegetarian diet* is followed since a main vitamin D source comes from animals.[828]

Ventricular Hypertrophy: In 2014, VDD & insulin resistance were found to be independent predictors of *left ventricular hypertrophy* and *atherosclerotic disease* and associated with *increased cardiovascular risk*.[829]

Venus Leg Ulcers: In 2010, researchers noted about 1% of adults in developed countries get *chronic venous leg ulcer wounds* during their lifetime. Some *ulcers* become infected with *bacteria* and some show no signs of clinical infection. Treatments using systemic antibiotics, topical antibiotics or topical antiseptics have shown limited results.[830] In 2012, re-

searchers reported finding VDD more common in patients with *chronic venous leg ulcers* than in controls.[831] In 2012, published study research reported VDD was more common in patients with *leg ulcers*. *The double-blind and placebo-controlled study of patients with leg ulcers found improved healing with VDS*.[832] In 2018, published research also concluded that micronutrients, including *vitamin D and folic acid, might also help improve leg ulcer wound healing*.[833]

Vertebral & Non-Vertebral Fractures: In 2013, researchers knew vitamin D affected bone and muscle. They reported D3 greatly reduces *spine and non-spine bone fractures*.[834]

Vertigo: In 2013, researchers reported finding VDD highly common in *Benign Paroxysmal Positional Vertigo* (BPPV) patients.[835] In 2016, researchers published finding ***VDD increased the risk of BPPV attacks by a factor of 4.54 times***, and VDS resulted in a major decrease in *BPPV* recurrence.[836] In 2016, researchers published that VDS for VDD in BPPV gave added and stable benefits to *BPPV* rehabilitation.[837] In 2017, researchers reported finding VDD in most *BPPV* patents.[838] In 2017, researchers reported finding VDD could predict the severity and negative prognosis of *BPPV*.[839]

Veterans: In 2011, researchers published finding VDD present in about 40% of veterans and well documented to be related to much higher disease, health services use, and healthcare costs. They also reported that VDD was noted even in those taking vitamin D supplements according to the RDA guidelines. Researchers noted "many studies" had already shown the recommended vitamin D RDA intake should be set "much higher" to achieve a normal 25(OH)D range of 30-100 ng/ml. Study conclusions called for important action to achieve adequate vitamin D status in US veterans for better health. Post-analysis of the 2011 study indicates a much higher level of VDD was likely present in veterans, as the VDD study cut-off was set at a low 25(OH)D <20 ng/ml.[840] In 2015, researchers

found about 44% of female veterans examined between 2001 and 2010 had VDD based on 20 ng/ml.[841]

Veteran Bladder Cancer: In 2013, researchers found VDD common in veterans. *Higher vitamin D levels* at diagnosis & through treatment *improved cancer outcome & survival*.[842]

Veteran Costs Increase 39% with VDD: In 2008, researchers published finding overall health care veteran costs were 39% higher in the veterans with VDD. Researchers noted VDD had already been linked to many chronic diseases and VDD often went unrecognized. VDD veterans were found to use more services, more frequent emergency room visits, clinic visits, in-hospital visits and have longer hospital stays. They noted VDS had been shown to "ameliorate" many chronic diseases & even reduce the presence of some cancers. They concluded increased health care costs in veterans were closely linked to VDD.[843] In 2012, researchers published finding ***a high degree of VDD in veterans which directly related to adverse health outcomes and higher health care costs***.[844]

Veteran HIV Positive and Non-HIV: In 2015, researchers published finding VDD prevalent and much higher in HIV-positive compared to HIV-negative veterans.[845]

Veteran Infections Increase Health Costs 500%: In 2010, researchers published finding VDD closely related to adverse health outcomes, and significantly increased costs in veterans with *Clostridium Difficile Infections (CDI) & staphylococcal infections*. Researchers already knew patients with CDI and staphylococcal infections had *higher morbidity, higher mortality* and *higher healthcare costs*. Researchers found that ***veterans with VDD and such infections had five times higher costs than those without VDD***. They also discovered that VDD in such infected veterans resulted in ***four times greater length of hospital stay*** and *significantly higher total hospitalizations* than those without VDD. Researchers recommended

patients be checked for VDD and swift action be taken to restore blood D levels in those with VDD.[846] In 2012, researchers published finding veterans with VDD had *increased hospitalizations* and *healthcare costs;* both closely linked to *Methicillin resistant Staphylococcus aureus (MRSA)* and *Pseudomonas aeruginosa infections*.[847]

Veteran Intensive Care Unit (ICU) Survival: In 2011, researchers published finding 38% of tested veterans had VDD at an average 25(OH)D level of 24.6 ng/ml. ICU stay for veterans with VDD was found to be longer, with higher costs and higher risks of death compared to vets without VDD. They stated ***correcting VDD may reduce costs and increase survival in critically ill ICU vets***. They urged ICUs to routinely check and treat veterans with VDD in the ICU.[848]

Veterans in Nursing Homes: In 2013, researchers reported finding about half of veterans newly admitted to a nursing home for rehabilitation, skilled-nursing care and intermediate care had VDD below 20 ng/ml. VDD independently predicted a *greater number of disabilities in daily living* (feeding, toileting, continence, mobility, dressing, and bathing) and presence of *diabetes mellitus*.[849]

Veteran Prostate Cancer Survival: In 2014, researchers looking at *prostate cancer*, the second most common male cancer, found VDD *decreased cancer survival*.[850]

Vitamin & Mineral Deficiencies: In 2018, the correct number of people with vitamin and/or mineral deficiency is currently unrecorded. But it may soon become recognized and recorded as a leading cause of sickness and death globally.

Vitamin D (VD) is the raw material needed to produce the hormone 1,25(OH)2D. VD is a fat-soluble vitamin well known to be critical for tooth and bone health. Countless VD properties also include regulation of immunity, inflammation,

cell proliferation, differentiation and death (apoptosis), new blood vessel formation (angiogenesis) and so much more.[851]

Vitamin D High Dose VDS Option: In 2011, researchers published results of treating severe VDD in 40 adolescents using high doses of D by IM injection. Those in the study had VDD related disorders and were given about *10,000 IU per kg with a maximum of 600,000 IU*. The high dose IM D injection was determined to be *effective VDD treatment for 3 months*, but not for 6 months in most patients. The mega dose resulted in *complete bone healing* of VDD related pretreatment bone disorders after 1 year--as confirmed by radiographs.[852]

Vitamins D & K: In 2017, researchers published that vitamins K and D given together might be better & more powerful for *bone and cardiovascular health* than the total of each alone. Both vitamins D and K are fat soluble, and both play very important roles in calcium metabolism.[853]

Vitamin D Testing is Important: In 2018, researchers published that clinical practices and clinical researchers need the ability to test for vitamin D because it is so important. They reported knowing vitamin D is critical for *normal human growth and development, kidney function and bone health*. They also noted VDD has been linked to some *autoimmune diseases, cancers and many other body functions*.[854]

Vitamin D Testing & Deficiency & Toxicity: In 2013, researchers published findings after studying the dramatic increase in vitamin D testing at two academic medical centers. ***They found even after increased testing, severe VDD was much more common than vitamin D toxicity***.[855]

Vitiligo: In 2010, researchers found VDD in most patients with *vitiligo vulgaris*.[856] In 2013, researchers noted finding ***VDD in 97.5% of patients with vitiligo.***[857] In 2018, researchers published VDD was related to adult and child *vitiligo* onset.[858]

Vogt-Koyangi-Haranda (VKH) Disease: In 2011, researchers found VDD is involved in *VKH disease development*.[859]

Warts: Vitamin D3 is effective in treating *senile warts* and can do so without pain by *inducing cell apoptosis (cell death)*.[860] Vitamin D3 ointments are widely used to treat skin disorders like *psoriasis*. Clearing *senile warts* on exposed areas without pain, may improve the quality of life of the elderly.[861]

Wheeze: In 2017, VDS during pregnancy was reported to reduce the risk of *wheezing and allergies* in offspring.[862]

Worry & Despair: In 2008, researchers questioned whether vitamin D was something to *worry* about after finding VDD very common in *private psychiatric clinic patients*. VDD does provide two reasons for worry & despair. One is seen in the eyes of psychiatric patients & one is in the eyes of society.[863]

Wound Healing: In 2008, researchers published that vitamin D3, regulated the antimicrobial peptide cathelicidin which can be involved in *wound healing* and a wide range of skin diseases like *psoriasis, rosacea and atopic dermatitis*.[864]

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It is Time to Treat & Prevent VDD & get ALL people above 30 ng/ml for $20 to $40 per person, per year. All healthcare workers can help make this happen once they learn the power of vitamin D3. 50 ng/ml can cut the risk of breast cancer & other cancers by 50% and 60 ng/ml can cut the risk of breast cancer by 80%. Research supports helping most people to get vitamin D levels way above 30 ng/ml. Who wants to be too low? Future **r**esearch and research dollars should look at the health benefits of higher vitamin D levels. **We may THEN find it is much easier to PREVENT & CURE disease than it is to RUN, DIET and DONATE in-order to "Fight It."**

Some Signs You May Have VDD

VDD Signs are Silent, Subtle & Invisible.
VDD Related Illnesses are Easy to See.

Get Sick Often: Colds, Influenza Flu, Pneumonia, etc.
Acne • ADHD • Allergies • Alzheimer's
Anxiety • Anxiety After Stroke • Arthritis
Asthma • Atherosclerosis • Atrial Fibrillation • Autism
Baldness • Bone Fractures • Bone Loss • Bone Pain
Cancer and Recurrence • Carpal Tunnel Syndrome
Celiac Disease • COPD • Crohn's Disease • Dementia
Dental Decay • Dental Disease • Dental Tooth Loss
Dental Severe Early Childhood Cavities
Depression • Depresssion Postpartum & Severity
Diabetes • Neuropathy • Pain • Ulcers
Eczema • Endometriois • Epilepsy • Falling
Frailty • Fatigue • Hair Loss
Heart Attack • Heart Disease • Heart Failure
Hospital Infections • Hospital Sepsis • IBD • IBS
Infertility • Kidney, Liver & Lung Disease
Mental Illness Disorders • Psychatric Inpatients
Multiple Sclerosis
Muscle Pain • Osteopenia • Osteoporosis
Peripheral Artery Disease
Pneumonia • Polycystic Ovary Syndrome
Poor Wound Healing
Pregnancy Complications • Miscarriage • Small Baby
Psoriasis • Plaque Psoriasis • Psoriatic Arthritis
Rickets • Rickets Bowlegs or Knock-Knees
Sickle Cell Disease • Stroke • Suicidal Symptoms
Systemic Lupus • Systemic Sclerosis • Vitiligo
Worry & Despair
etc. etc. etc.

VDD Self-Help Solution

Immediate actions are urgently needed to protect the global population from Vitamin D Deficiency (VDD). It is critical for better health and even national security that all healthcare providers help all people to get blood 25(OH)D blood levels above a minimum 30 ng/ml, using 30-100 ng/ml as a normal range. ***Research shows that 60-80 ng/ml may be even much better!*** We will NEVER know how effective Vitamin D3 is until ALL healthcare providers understand this and act on it.

You, your family & friends can take personal action for better health. You can spend 30-60 minutes laying under the sun, sunbathing, in a bathing suit—every day. You can spend 3-4 hours walking under the sun getting sensible sunshine in a bathing suit—every day. Research shows that you may be better doing so without sunscreen.

If you are like most people & you do not have such time or available sunshine every day, & you are out of the sun most of the time, **then you can take simple, safe & effective over-the-counter vitamin D3 (not Rx D2).** You can choose to take 4,000 or 8,000 to 10,000 IU of D3 daily, as an adult. You could choose to take 50,000 IU of D3 every week, as an adult to fight against 30+ diseases. (see www.VitaminDWiki.com)

It is Time to Treat & Prevent VDD!
(The King of All Silent Killers)

It is Time to Kill VDD by getting most all people to at least 30 ng/ml.

VDD Summary: Audiobook Recap

The book title, *The Global Pandemic of VDD*, *King of All Silent Killers*, might seem a bit scary, but it has deep and broad meaning. Global means a worldwide event that is everywhere. **Pandemic** means a widespread disease that affects a large percentage of people. A **Vitamin** is a nutrient needed by the body because the body cannot make it. **Vitamin D** is a special vitamin because it is a steroid hormone that can affect all cells, tissues & organs of the body. **Vitamin D** is essential for growth, development and maintenance of a healthy body. **Deficiency** means not having enough to function properly. A lack of vitamin D, VDD, can dramatically affect teeth, bones and overall health and wellness in bad ways. A **King** is someone or something that is more important than all others. A **Silent Killer** is a disease that exists with no obvious signs or symptoms that it exists. Hypertension, diabetes, coronary artery disease and colon cancer are examples of some of the dozen or so primary individually diagnosed silent killers. But VDD is King of All Silent Killers because research shows VDD is very involved with all individual silent killers that help to show VDD is King.

The book, *The Global Pandemic of VDD*, is designed for easy learning and arranged for use as a health reference. The book explains how the risk of many human disorders and even death may increase when a person has VDD. The book is meant for both the public and health care professionals to teach the value of diagnosing and treating VDD, and the many health risks of not treating it with simple, safe & cost-effective over-the-counter vitamin D3. Research shows over 300 human conditions are more common with VDD. The book contains many of the over 300 ways VDD can affect your health and your life. Conditions are listed in simple A to Z dictionary fashion. The abridged audio-book lists a few hundred VDD conditions, goes into detail in several dozen,

and includes facts from some of the over 850 EndNote references in the book. The audio-book, like the book, should help you understand why a minimum vitamin D blood test level of 30 nanograms per milliliter, is critical to increase your chances of having a long & healthy life. It should also motivate you to share the information with friends and family that you love.

Most of us are not able to spend enough time outdoors daily in what is called "sensible sunlight" which helps the body to make vitamin D. In addition, sunscreens recommended for decades, block the sun's good rays and prevent the body from making natural vitamin D. That is one reason why the debate on using sunscreens is increasing. **In 1999**, published research looking at melanoma could not consistantly demonstrate a protective effect of suscreens. Since then, the sunscreen & vitamin D debate has been growing along with evidence that using sunscreen is unsafe, causes cancer, increases risk of getting melanoma and blocks the ability of the body to naturally make vitamin D. Fortunately, one way to treat and prevent VDD is by taking simple, safe and cost-effective over-the-counter vitamin D3 to help stop, prevent and cure most vitamin D deficiency for $20 to $40 per person, per year. The needed amount of vitamin D3 can vary greatly from person to person. Try to find a healthcare professional who knows the decades of published research on VDD to help you determine the amount you need. Find someone who cares about testing you for VDD, which is currently the only way to know if you have VDD. Look for someone who cares about diagnosing VDD, and is willing to treat VDD, if present, with adequate amounts of over-the-counter vitamin D3. The current normal vitamin D test range for vitamin D is usually considered 30-100 nanograms per milliliter. Search for a health care provider who understands that published research shows it is better to be on the high side of the range near 60-80 nanograms per milliliter than on the low side near 30 nanograms per milliliter--and NOT below 30 ng/ml. You can also ask how much vitamin D3 you can start taking NOW.

Research shows that most people have VDD, 70-99% of some groups. It can take 2 months to raise vitamin D blood levels, so starting as soon can have desired health benefits.

Published research buried deep within the medical database holds treasures of information on VDD. Even today, many healthcare workers do not know that **in 1928**, researchers discovered vitamin D prevented dental cavities and **in 2017** researchers found vitamin D was better than fluoride in preventing decay; or that **in 1987**, researchers reported vitamin D3 inhibited the growth of colorectral cancer cells; or that **in 2002**, vitamin D3 was supposedly "well-known" to have potent action against cancer growth, reduce tumor invasion and even promote cancer cell death, known a apoptosis; or that **in 2007**, researchers reported VDD significantly increased the risk of aggressive prostate cancer; or that **in 2008**, VDD was found to be independently related to all-cause death and cardiovascular death, including heart dysfunction, heart failure and sudden death by heart attack; or that **in 2008**, **veterans with VDD were sicker and had 39% higher overall health care costs and need for services**; or that **in 2010**, researchers found VDD promotes the growth of breast cancer cells in bone; or that **in 2011,** researchers found ill patients with VDD before hospital admission had increased rates of the deadly blood infection called sepsis, and VDD was even a significant predictor of all-cause mortality or death from sepsis; or that **in 2011**, researchers found **a vitamin D blood level of 50 nanograms per milliliter reduced the risk of breast cancer and other cancers, by 50%**; or **in 2012**, researchers reported triple negative breast cancer patients with VDD had worse overall survival, and patients with vitamin D levels above 30 ng/ml increased overall survival; or that **in 2018**, researchers discovered that **a vitamin D blood level of 60 nanograms per milliliter reduced the risk of breast cancer in women by 80%!** I repeat, **a vitamin D blood level of 60 nanograms per milliliter reduced the risk of breast cancer in women by 80%!** Who knew? Now you do!

By now, you should have learned about hundreds of human conditions and illnesses made worse by VDD out of the over 300 VDD related disorders that exist. You should also have learned about a way to FINALLY CUT the exploding costs of healthcare estimated to be $3.5 Trillion in the United States in 2018, or over $10,000.00 per person. **Simple, safe and cost-effective over-the-counter vitamin D3 for only $20 to $40 per person each year can do what nothing else can do--because nothing works better!**

There is a Global Pandemic of **V**itamin **D** **D**eficiency or **VDD**. VDD silently causes premature sickness & premature death. It will become known as ***The King of All Silent Killers***. If you doubt it exists, read just a few published medical journal articles that proclaim it, or read more on page #2 of this book. **In 2008**, The American Journal of Clinical Nutrition published: **"VDD is now recognized as a pandemic."**

In 2011, The Journal of the American College of Nutrition published: **"A global pandemic of VDD exists."** **In 2011**, Military Medicine, the official Journal of The Association of Military Surgeons of the United States, published: **"VDD is a global pandemic associated with increased health care costs..."** **In 2012**, Current Opinion in the Clinical Nutrition & Metabolic Care Journal published: **"VDD is a worldwide health problem."** **In 2013**, Nutrients, a peer reviewed journal published, **"VDD is now recognized as a global pandemic."** **In 2017,** Reviews in Endocrine and Metabolic Disorders published: **"Vitamin D deficiency and insufficiency is a global health issue that afflicts more than one billion children and adults worldwide."** **In 2017,** The Journal of Preventive Medicine and Public Health published: **"Actions are urgently needed to protect the global population from VDD."** **In 2018,** The Journal of Pediatric Endocrinology & Metabolism said, "**VDD in childhood is a re-emerging public health problem in developed countries."**

VDD is not like Ebola hemorrhagic fever with easy to see vomiting & coughing up of blood. It is like scurvy, or vitamin **C** deficiency, where the lack of one nutrient can be silent, dark & deadly. Learn about scruvy and then if you want to see lots of people with VDD, just go to a local hospital.

As early as 1550 BC, Egyptians recorded the symptoms of vitamin C deficiency scurvy. From 1500 to 1800 AD, 1 to 2 million sailors died from scurvy while exploring the new world. It was very visible and a very painful death. One month at sea without refrigeration or food containing vitamin **C** and sailors with scurvy would become weak. Their gums would turn red, soft & spongy. They would start to lose teeth & bone and show signs of skin hemorrhage on arms and legs. When a sailor showed signs of scurvy he would be put into the lower dark hold of the ship to die, because they did not know if scurvy was contagious. Stories were told of ships freely floating with crews of all dead men. When citrus fruit was observed to prevent scurvy, the British Navy ordered lemon or lime juice to be added to the daily ration of rum, called grog. British sailors then became known as limeys.

Both vitamin C & D deficiency can lead to death, but vitamin D deficiency is not easily seen in most people. Secondary signs of VDD related disease can easily be seen. It is rather easy to see acne, psoriasis, vitiligo, rickets-bowed legs, bone loss, baldness, hair loss and poor wound healing. To see about 1 million sick & prematurely dying people with VDD, go to one of the over 5,500 hospitals & look at the inpatients. **Studies show that about 83% of patients in many hospitals have VDD.** That is very unfortunate because research shows vitamin D levels at hospital admission can determine hospital length of stay and whether someone survives. **Most people need a vitamin D blood level in the normal 30-100 ng/ml range & this book will teach you why.** Simple, safe & effective over the counter vitamin D3 is very important, and so is testing. **Do you have VDD?**

What if…?

What if over 90% of people globally actually have VDD at a level under 30 ng/ml? **What if** they do not even know it?

What if a "normal" 25(OH)D lab-test-range of 30-100 ng/ml is incorrect? What if the 30 ng/ml minimum is set too low?

What if the term "D insufficient" was invented to make 20 ng/ml look acceptable and less people diagnosed with VDD?

What if few people were tested for VDD in past decades and few people receive VDS treatment that could help them get above 30 ng/ml, because doctors keep their head in the sand?

What if the minimum 25(OH)D *sufficiency level* should be 50 to 60 ng/ml, or even up to or over the 100 ng/ml maximum?

What if the 2011 vitamin D RDA guideline, set to help keep most healthy people healthy, is set so low it only helps 3-5%?

What if researchers who discovered a "statistical error" in the 2011 vitamin D RDA estimation were correct and instead of 400-800 IU it is really 8,000-10,000 IU daily for an adult?[865]

What if packaged foods, multi-vitamins, and public, private and military food programs, are based on a too-low RDA?

What if fear of being too high in vitamin D blinds us to the massive disease now associated with vitamin D deficiency? As early as 1992, vitamin toxicity was published as a concern. While most of the written concern was regarding vitamin A toxicity, the scarcity of vitamin toxicity research was noted.[866] Even in 2017, warnings can be seen in the medical literature, on television, on the web and in consumer magazines that one should be careful of consuming too much vitamin D.[867]

What if research shows the risk of being too high in 25(OH)D is low, and the risk of being too low in 25(OH)D is very high?

What if fear of rare vitamin D toxicity, called D intoxication, or the unscientific fear of kidney stones has prevented billions of people globally from reaching even 30 ng/ml?

What if those who ignore, miss or dismiss global VDD change and see-the-light and importance of the "sunshine-vitamin? **What if** those who say multiple vitamins do nothing…learn?

What if funding increased for VDD prevention research and researchers targeted the cost-effective health benefits of OTC D3 rather than call for more research to prove it is effective?

What if researchers emphasized the cost-effective benefits of over-the-counter (OTC) D3 vs. costly prescription drugs?

What if researchers had to educate the public about their VDD discoveries as much as they advertise for study subjects. Doesn't this seem fair, since most research funding comes from government and private sources—really from people.

What if public health officials knew more of the VDD research that has already been in the medical databases for decades?

What if public health officials heeded the call to action--well published for over a decade--and urgently acted to treat VDD?

What if public health officials immediately started a public awareness campaign about ***The Global Pandemic of VDD***?

What if going to the dentist (preventive oriented dental doctor, dental hygienist and staff) was something you wanted to do?

You decide!

Medical Dentistry VDD Solution

Since 1900, dental doctors and their staff have made death from oral infection extremely rare. It was a top-five reason for death for centuries.[868] With good patient education and routine preventive dentistry, more people have more teeth now than ever before.[869] This achievement was profound since average U.S. sugar intake per person per year increased from 18 lbs. in 1800 to 130-180 lbs. today.[870] The massive increase in prescription drugs made the battle against oral disease even harder.[871] **High blood sugar and many drugs** can cause dry mouth & increase the presence of bacteria-loaded-decay-causing plaque. **Both can lower vitamin D and make VDD even worse.** *Almost one hundred years ago, vitamin D was known to be needed for teeth and bones, but it was also known to reduce dental caries (cavities).*[872] **All healthcare workers need to be taught that vitamin D is effective for preventing decay and so much more.**

Dental doctors need to take urgent action to help stop the Silent Global Pandemic of Vitamin D Deficiency (VDD), beginning with pre-conception advice. VDD causes massive *global pain*, *suffering* & *death* and can dramatically affect *teeth*, *bone*, *malocclusion* & *overall health--even in utero*. Dental offices worldwide are well positioned to help.

Dental Doctors & their staff can lead the charge against VDD. The scope of dental practice includes promoting good oral & overall health. ***Medical Dentistry*** first described in the 2003 book ***Your Jaws ~ Your Life*** and prescribing vitamin D tests with OTC vitamin D3 supplements may reduce various diseases and *help people live healthier, happier & longer*. *Vitamin D3 has* hundreds of positive overall body actions including *anti-infection*, *anti-bacterial*, *anti-viral*, *anti-fungal*, *anti-cancer*, *anti-pain*, *anti-inflammation & anti-depression*. **Nothing works better to Do No Harm & Do Know Harm.**

Medical Dentistry Facts

Did you know that some dental doctors have the skills and knowledge to prevent, reduce or even eliminate and cure certain human disorders in two ways? For example:

Bed-wetting, nocturnal enuresis (NE), remains a puzzle for modern medicine, so it is often "managed" and not cured.[873] In 1990, researchers reported that 10 of 10 chronic bed-wetters stopped after only a few months of dental doctor treatment.[874] In 2018, researchers reported 1,000 IU/day of vitamin D and omega-3 combined to cure 45% of NE in children from 7 to 15 years old, adding another treatment Dental Doctors can use.[875]

Heart Disease prevention remains a puzzle for modern medicine after decades of warning against bacon, eggs, milk, cheese, butter, margarine, meat, fat, salt, and cholesterol, etc. In 1995, dental disease was known to "persist" as a major risk factor for heart disease even after adjusting for many life-style factors in the 13 known major risk factors for heart disease.[876] In 2005, one researcher reported the global pandemic of VDD increased the risk of *type I diabetes, multiple sclerosis, rheumatoid arthritis, hypertension, & cardiovascular heart disease*.[877]

Ear Disease remains a puzzle and is not readily preventable by modern medicine. Dental Doctor jaw & tooth saving treatments may prevent & help more people with ear problems, but the medical profession frequently overlooks the possibility.[878] In 2001, researchers reported having *under 17 teeth increases risk 1.64 times for hearing decline*. Every tooth lost after that gives another 4% hearing loss.[879] In 1981, researchers first reported *VDD as a new known cause of cochlear deafness*.[880]

Medical Dentistry disorders like bed wetting, headache, sleep apnea, hypertension & many more need the scope of dental practice changed, so patients can get effective care they need.

VDD Conclusion

In 2012, researchers reported that VDD predicts lower survival in heart failure (HF) and VDS predicts better HF survival outcomes.[881] In 2013, researchers published results of a large study where vitamin D blood level was found to be inversely related to *all-cause* and *cause-specific mortality or death*. VDD at 25(OH)D <12 ng/ml was found to increase the risks of *cardiovascular diseases, cancer, respiratory diseases* and *all-cause mortality*.[882] In 2013, researchers reported VDD was generally accepted as a global problem involved with many acute and chronic diseases including *cancers, infectious diseases, type 2 diabetes mellitus, neurocognitive disorders, autoimmune diseases* and *mortality (death)*. They reported how increasing vitamin D status in children & adults worldwide had a great potential to reduce the risks of countless *chronic illnesses*.[883] In 2015, researchers published that survival of fatal diseases, such as *cancer* & *cardiovascular disease*, can be determined by vitamin D blood levels which can boost and prepare the immune system for when needed. They suggested VDD is an important public health issue since it has major sickness and death consequences. They concluded that VDD is common globally. And simple, safe and cost-effective VDS therapy can be applied easily to treat VDD.[884]

In 2018, *VDD skeptics and VDD cynics remain*. This book presents hundreds of health studies that are decades old. This book reports on hundreds of conditions that can bring sickness and death faster and more often to those with VDD. *There is a time to be born and a time to die… (Bible Source: Ecclesiastes 3) it is mainly a matter of how, when, & why, & if you have VDD*.[885] **Who do you believe?**

"Men occasionally stumble over the truth,
but most of them pick themselves up
and hurry along as if nothing had happened."

Sir Winston Churchill (1874-1965) [886]

It is Time to Treat & Prevent VDD!

See Pages #161 and #162

About the Author

My interest in oral and overall health began before 1980, when I became one of the first third-generation dentists to graduate from The Baltimore College of Dental Surgery, the world's first dental school. **I had a Doctor of Dental Surgery Degree** at the age of 25. As a new dentist, I had the desire to practice the best general dentistry I knew how–just like my father and grandfather. Fortunately, I was able to treat and observe thousands of patients right away in my father's established practice.

My interest in smiles, faces & health grew as I saw how dental & orthodontic treatment results varied greatly. I learned that after-treatment-smiles, faces & health often differed as per the treating dentist and/or their specific approach.

In 2003, I wrote the book, ***Your Jaws ~ Your Life.*** It has 289 references to help teach how vital the airway, teeth, and jaws are to health and life. It explains how *Your Jaws can influence and affect the quality of your life for life*. My 1998, educational website www.SmilePage.com shows what I do.

My interest in overall health grew daily as my clinical observations brought buried published medical research to life. For over two decades now, I have searched medical data bases. As a treasure hunter, I have found volumes of already published research that suggest why sicknesses persist and so many medications are prescribed. In late 2017, for better global overall health, I started to reveal some of what I found at www.VDDKills.com. Now in 2018, my effort to teach and improve oral & overall health globally continues in this book: ***The Global Pandemic of VDD (Vitamin D Deficiency).***

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> "It is not the intention of NLM to provide specific medical advice, but rather to provide users with information to better understand their health and their diagnosed disorders. Specific medical advice will not be provided, and NLM urges you to consult with a qualified physician for diagnosis and for answers to your personal questions."

An Example of How to Use PubMed®:

To read about VDD & Heart Failure, enter the keywords *vitamin D, deficiency, heart*, and *failure* as noted below:

1) Go to **www.PubMed.gov**
2) In the search topic box type the words "vitamin D"
3) Select "Go"
   A list of about 76,868 abstracts should appear.
   You can now read for days about *vitamin D*.

4) In the search topic box add the word "*deficiency*"
5) Select "Go" to refine the article list.
   The list should now focus on about 28,816 articles.
   You can now read about *vitamin D deficiency*.

6) In the topic box add the word "*heart*"
7) Select "Go" to further refine the article list.
   The list should now show about 820 articles.
   You can now read about *VDD and the heart*.

8) In the topic box add the word "*failure*"
9) Select "Go" to further refine the article list.
   The list should now show about 276 articles.
   You can now read about the relationship between VDD and heart failure and even about VDS.

Note: Many articles on the database contain no abstract, so you would have to go to a health library & locate & pick the article to read the abstract summary or the whole article itself.

Caution: Bias in medical literature has been reported to be present in as many as half (50%) of all published articles. So, read for information, but routinely seek your doctor's advice.

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"It is evident that the next great step in medical progress in the line of preventive medicine should be made by the dentists. The question is will they do it?"

Dr. Charles H. Mayo, M.D. (1865 – 1939)

Is VDD *Silently* Killing You?

There are FOUR vitamin D3 steps to better ORAL health and better OVERALL health, and a BOOSTED Immune System!

1) Check to see if you have been tested for Vitamin D. If you had a recent test, ask for the number value. Do not accept "you are ok." If not in the past year, and/or if not at a 30-100 ng/ml level, THEN:

2a) Patients ages 1 to 18 should take 2,000 IUs of OTC Vit. D3 daily (not Rx D2), unless your medical doctor Oks 4,000 IUs D3.
2b) Patients over age 18 should take 4,000 IUs of OTC Vit. D3 daily (not Rx D2), unless your doctor Oks **8,000 to 10,000** IUs D3.

ASK YOUR DOCTOR if you can take 8,000-10,000 IUs/day as an adult until the RDA daily limit of 4,000 IUs is corrected. [See page 1: The Great Vit. D Debate] Some researchers call for a higher limit, because it is hard to get above 40 ng/ml taking 4,000 IUs/day.

3) After taking the advised dose for 2-3 months, the time needed to reach a stable blood level, ask for a 25(OH)D vitamin D test. If your medical doctor will not prescribe it, ask your dental doctor. Since good vitamin D levels are critical to good oral health and to reduce oral disease, dental doctors should have the authority in all states to prescribe a test for vitamin D. A test is the only way to know how much vitamin D is in your blood and whether you need to take more vitamin D3. One current "normal" vitamin D test result range is 30-100 ng/ml. While 30 ng/ml is one stated mimum, studies show disease prevention increases more at 50-80 ng/ml. For example: **New research shows that a 60 ng/ml level can reduce breast cancer risk by 80%. Nothing PREVENTS disease better than simple, safe & cost-effective vitamin OTC D3. It can help you save time, money and pain.** Boosting your immune system is preventive medical dentistry. NOTE: You may have to pay for a vit. D test because many insurance plans will not. After reading this book, you should understand the value of a $60 to $200 test.

4) Report your test results to your doctor. Ask your doctor how you can get on the high side of 30-100 ng/ml using OTC D3.

Steps to Better Overall Health

Step #1: Take more OTC D3. Ask your medical doctor how much more you can take. (See D3 doses on pages 19 & 161)

Step #2: Take 2 Multiple Vitamins with Minerals Daily (One in the morning and one at Night): History teaches that a lack of just vitamin C can result in bleeding tissues, tooth loss, scurvy and death. Millions of sailors & others proved it.

Step #3: Make Preventive Dental Visits Every 2-6 Months: Research shows people who make routine preventive dental visits keep more of their teeth & keep them longer. **Clean Your Mouth Well Every Day:** Research shows good daily oral hygiene, especially before sleeping, saves teeth. **Save Your Teeth and Replace Missing Teeth When Possible:** Research shows those with more teeth & better dental function are healthier & live longer. Learn more about the airway, teeth, jaws & health in the book: ***Your Jaws~Your Life***.

Step #4: Practice Deep Nasal Breathing: Research shows that nasal breathing promotes good health, while mouth-breathing habits damage health. **Sleep with a Nasal Strip:** It increases Nitric Oxide inhalation and aids oxygen absorption. **Get a Blood Oxygen & Airway Check** before needing CPR.

Step #5: Help Yourself: Research your own healthcare needs and search out your treatment options and choices. **Seek Change** and follow the 12 Steps to Future Medical Dentistry outlined on pages 133 and 134 of ***Your Jaws~Your Life.***

Send copies of this book and *Your Jaws~Your Life* to your family, friends & public authorities to bring change. Order both books at www.VDDKills.com or www.SmilePage.com, 1-888-TMJ-JAWS (1-888-865-5297), or www.Amazon.com. ***Available in Audio-Book, eBook, Paperback & Bulk Packs.***

Is VDD *Silently* Killing You?

Vitamin D Deficiency (VDD) is a Global Pandemic!

Do you have VDD? Most patients in hospitals have VDD. Have you ever been tested for VDD? Do you know your vitamin D test level number? Is your vitamin D blood level below the current normal range of **30 to 100 ng/ml**? Do you need more simple, safe and cost-effective over-the-counter vitamin D3 to be or stay healthy?

What if you have VDD? In 2002, vitamin D was reported to kill cancer cells and malignant cancer cells. Research shows VDD promotes aging and many human illnesses including cardiovascular disease, numerous cancers, kidney + liver + lung disease, infectious diseases, many mental illnesses, sepsis, poor hospital survival, and **ALL-CAUSE MORTALITY & DEATH!**

DO NO HARM calls on health care providers to act on behalf of each patient's health and well-being. **DO KNOW HARM** calls on health care providers to know what will and will not harm each patient.
It is time to treat & prevent VDD and universally get vitamin D blood levels **way above 30 ng/ml. Vitamin D3** can help change costly managed health care into cost-effective preventive and cure care!

Alternative Medicine Without Drugs or Surgery

Learn more about VDD and follow updates at
www.VDDKills.com

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