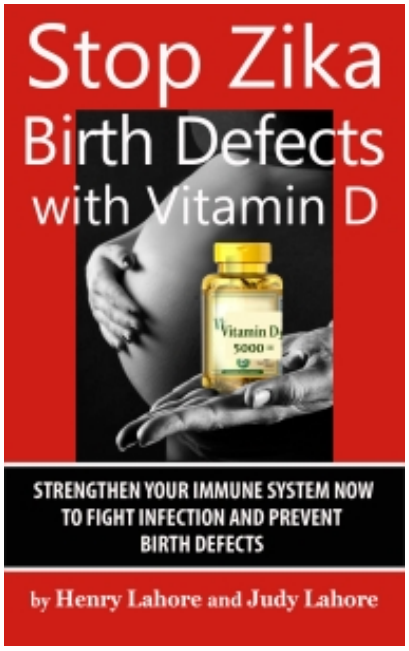
Stop Zika Birth Defects with Vitamin D

Strengthen your immune system now
to fight infection and prevent birth defects



Ebook by VitaminDWiki Sept 2016
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links to Amazon version and Discussion forum

Preface

This book arose out of a concern by retired engineer Henry Lahore that a new menace was on the horizon in the form of the Zika virus. Zika had no vaccine or cure available, and it was primed to cause considerable suffering worldwide. From a 6 year interest in Vitamin D after Henry's sore back was helped by the vitamin, an explosion of research has expanded his website, VitaminDWiki, into a huge compendium of information that now provides links and summaries on over 6,000 scientific studies on Vitamin D.

As knowledge has accumulated, Vitamin D is proving to be ever more beneficial and indeed essential, to human health. Realizing that Vitamin D does not just improve, but actually enables critical parts of the immune system to function, Henry thought Vitamin D was the key to providing a real defense against the Zika virus. Hence this book.

In the book you will find numerous hyperlinks via the web or VitaminDWiki to further information on the various topics and studies mentioned, and much more.

The book will soon be available in Spanish and Portuguese editions with human translation, and in 101 other languages via Google translation.

We hope that you, the pregnant woman concerned about your baby, will find value in our practical, fact-based approach to successfully fight the Zika virus, prevent a possible birth defect in your child, and realize the enormous health benefits of Vitamin D.

Acknowledgments

We wish to than the following individuals who graciously gave their time to review a draft of this book: Rich Blumenthal, Rufus Greenburg, Dr. Dwight Williamson, and Dr. William Grant. Their contribution were invaluable and greatly appreciated.

Medical disclaimer

This eBook contains information that is intended to help the readers be better informed consumers of health care. It is presented as general advice on health care. Always consult your doctor for your individual needs.

Quick book summary

Take action ahead of time

Buy Vitamin D, Permethrin and Picaridin
Start taking vitamin 50,000 IU every two weeks (or 4,000 IU daily) (larger dose if obese, etc)
– First take single capsule and see if you get a rare mild allergic reaction in 3 days

When Zika is near you

Start using Permethrin on clothes (all US military combat uniforms have it)
Start using Picaridin (not DEET) on skin in morning and evening
Abstain from sex or else use condoms – for up to 6 months if partner has been infected
Take a Vitamin D loading dose over 2 weeks (unless you have had VitD for 3 months)
If suspect bitten, take at least 350,000 IU loading dose that day (unless had Vitamin D for 3 months)

Zika Facts

Zika: 1% of babies are Microcephalic (one study found 29% Microcephalic)
Zika: 30% of babies have Birth Defects (unclear % pregnancies with miscarriage, still birth)
80% of those bitten have no symptoms (an itch is not a symptom)
– Typically Zika symptoms are similar to flu, and last 2-7 days
Zika can come from blood transfusion – ALL US blood transfusions will be tested by Dec 2016
Zika in semen at 6+ months – probably still infectious
– Women have twice the male rate of Zika infection, probably due to sexual transmission
Zika primary mosquito is Aedes aegypti
Aedes aegypti eggs must be laid in a dry area and can hibernate for 1 year
Aedes aegypti live primarily indoors and in storm drains
Aedes aegypti primarily fly in morning and evening, not in middle of the day nor night
Tests detect Zika only in a narrow time frame – the 1-2 weeks after start of symptoms
Permethrin and Picaridin are very good ways to stop your getting and spreading Zika
– except in Puerto Rico where surviving mosquitoes have become immune to Permethrin

Found by at least one study, but not confirmed

Aerial spraying does very little good, and may actually make the mosquito problem worse
– Spraying kills mosquito larva eaters such as mosquito fish
– Spraying kills good insects as well (bees, butterflies)
– Spraying may reduce bird population (fewer insects to eat)
Zika might be spread by DEET (DEET caused lab mosquitoes to bite more people)
Zika might be passed on by tears or cornea transplant
Zika might be passed on by kissing – it is in saliva
Zika might be passed on by animals – Zika has been detected to sheep, cows, ducks, rodents, etc.
– so far no evidence that infection in animals is passed on to humans,
Zika might be passed on by mosquito larva – and appears many months later
– About 0.3% of larvae from Zika mosquitoes have Zika
Zika might degrade human memory after 2 years – Zika degraded the memory of adult mice
Aedes aegypti can actually fly up to 20 times further than the 100 yards stated by the CDC
– It seems pointless to protect your property unless most neighbors are also doing so.

Introduction

This book will teach pregnant women what you need to know to prevent or greatly reduce your chances of devastating birth defects from the Zika virus with Vitamin D.

You are probably aware of the threat of your baby being born with microcephaly if you are bitten by a Zika-carrying mosquito. But microcephaly is only the most visible of several incapacitating brain defects due to the Zika virus. Others can be equally life-destroying, and are even more common. But you can fight the infection and have a good chance of preventing a Zika birth defect from happening to your baby if you take enough Vitamin D early enough in your pregnancy or immediately after being bitten.

You need to know that there there are two types of mosquitos presently carrying the Zika virus, both from the Aedes family of mosquitoes. We will show you where these live and what to do to protect yourself from them. Of course, avoiding all mosquito bites would be ideal, but isn't always possible. Zika can also be transmitted through humans and animals. Having an excellent immune system is a great defense, whether you are pregnant or not.

When bitten, your success in preventing infection will depend on many factors: how soon after the bite you take Vitamin D; your stage of pregnancy; your weight, skin color, and prior immune system health; and how much Vitamin D you take. Of course, taking Vitamin D before you get pregnant or in early pregnancy, especially before you get bitten, provides the best protection.

We explain why we are confident that large initial doses of nontoxic Vitamin D3 are safe for you in pregnancy and really can work to prevent Zika infection. This has been proven with many other similar viruses. You will learn how Vitamin D can contribute in many ways to your healthy pregnancy and newborn, beyond just fighting Zika. We'll tell you how best to supplement with Vitamin D for your individual situation, and link you to numerous scientific studies that back up our recommendations.

We truly believe that since there is presently no vaccine or cure available for the Zika virus, cheap, safe Vitamin D provides the best and only defense for pregnant women - and for everyone else.

The Zika virus

Zika is a mosquito-borne flavivirus. The flaviviruses include the West Nile virus, dengue virus, Japanese encephalitis, yellow fever, Zika, and several other viruses. Zika is also classified as an enveloped virus, which produces a viral envelope that binds to host cells to invade and destroy them. But unlike many other enveloped viruses, such as influenza, dengue, chikungunya, yellow fever, HIV, and Ebola, Zika is relatively harmless to its immediate victims. It seldom causes death. However, unlike most of these more deadly viruses, it can cause great harm to the fetus and newborn, and many miscarriages and stillbirths.

Eighty percent of people infected with Zika do not experience any symptoms, and it is likely that these people have strong immune systems. For the unlucky 20 percent, the symptoms are relatively mild: fever, rash, joint pain, conjunctivitis (red eyes), light sensitivity, muscle pain, and headache. Symptoms last 2 to 7 days, similar to a bout of the flu. There is some evidence that people who previously had dengue fever, and have antibodies, appear to be more susceptible to Zika.

Zika is named after the Zika Forest of Uganda, where the virus was first isolated in 1947. Until 2007, it appeared to be confined within a narrow equatorial belt from Africa to Asia. But from 2007 to 2016, the virus spread eastward across the Pacific Ocean to the Americas, where the 2015–16 Zika virus epidemic reached pandemic proportions. Only in 2015 was the connection made between the Zika virus and birth defects. As of August 2016, the illness cannot be prevented by medications or vaccines, and there is no cure.

The Zika virus is carried by two mosquitoes of the Aedes family, primarily the Aedes aegypti, but also the Aedes albopictus. The Zika virus is spread from human to human and from animal to human via mosquitoes that bite more than once. As the virus extends into new territories, other "sipping" mosquitoes may also prove to be carriers. Zika is also transmitted by sexual contact, through blood transfusion, and possibly through saliva.

Zika can also spread from a pregnant woman to her fetus. It is transmitted to the fetus through the infected mother's placenta, or at birth through the mother's perineum. It may possibly be transmitted after birth to an infant through breast milk.

Fetal transmission can result in microcephaly, severe brain malformations, and other brain-related birth defects. Zika infections in adults ages 20 to 60 may occasionally result in Guillain–Barré syndrome, formerly an extremely rare paralyzing disease found only in the elderly.

An August, 2016 mouse study indicates that Zika may cause brain damage similar to Alzheimer's in adults with poor immune systems.

Testing for Zika

The current tools available to accurately diagnose Zika infections are flawed. Available diagnostics have mainly been used to test individuals who have experienced viral symptoms. It is unclear how they perform in asymptomatic individuals, who

comprise approximately 80% of infected individuals, and who may possibly be carriers of the infection.

The Zika test has to be administered within a few weeks to catch the virus before the immune system remove it from the blood. Given that the Zika virus can be found in urine for up to 7 days longer than in blood serum, urine may provide a useful sample when there is a delay in getting the blood tested.

Testing to sort out the Zika virus is tricky. Special assays are often used that first target multiple flaviviruses, followed by amplification and Zika-specific sequencing. Detection of circulating antigens is currently not available for the Zika virus. And anti-Zika virus antibodies are highly cross reactive, so that other flaviviruses such as dengue, Japanese encephalitis, West Nile virus, and yellow fever can confuse test results. The same mosquitoes carry some of these other viruses, and initial symptoms can be the same. Women may also have antibodies from some of these other viruses from previous vaccinations.

Test results are unreliable. Based on similar tests, our educated guess is 10% false positives and 10% false negatives.

Testing can take a long time – up to several weeks – so even a perfect result showing positive Zika infection would come in too late to prevent a possible birth defect, miscarriage, or stillbirth.

Testing for Zika is helpful in tracking the disease, but is virtually useless in preventing birth defects. Women are only tested after showing symptoms, which is too late. Results take weeks to appear, and the test has sufficient false positives and negatives as not to be sufficiently reliable. It is also expensive.

Don’t wait for the test. If you are in an area with a Zika outbreak, see a bite and feel an itch, assume that you already have Zika. Don't even wait for the symptoms. Take preventive measures now.

Should you be tested for Zika anyway?

Should all pregnant women who have potentially been exposed to the Zika virus be tested, even if they are asymptomatic? CDC says they should, when sufficient laboratory capacity is available. Although testing every pregnant woman would be useful for tracking the virus, at $150 to $750 apiece the tests are too expensive to use for general testing, and too costly even for individual testing in many cases.

We think most pregnant women should not be routinely tested for Zika, even if they show symptoms, unless the government simply wants to track incidence of the virus. Zika testing is too slow, expensive, and inconclusive to be of any use to the individual pregnant woman in preventing a Zika birth defect in her own unborn child.

That said, if there is proven or suspected microcephaly, as shown, for example by ultrasound, testing for factors other than Zika is important to determine the actual cause. Testing is needed to rule out rubella, CMV, toxoplasmosis, herpes simplex virus, varicella zoster virus, HIV, and chikungunya virus, as well as other noninfectious possible causes. So later, maybe, if there is suspected microcephaly, you should be tested.

Zika birth defects

Unlike other mosquito-borne viruses, such as dengue and West Nile fever, the Zika virus was initially thought to be much less of a concern, seldom causing fatalities and producing only mild flu-like symptoms. But then a sudden increase in what had previously been a rare condition was detected in newborns from mothers diagnosed with Zika. It was noticed in 2015 that the incidence of microcephaly, or babies born with abnormally small heads, had recently exploded from a previously stable rate of 2 to 12 per 10,000 live births, to 10 or 100 times that rate. In a small Brazilian study, fetal abnormalities, including microcephaly, were detected in 12 of 42 (29%) Zika virus positive women.

Microcephaly is defined as a head circumference more than 2 or 3 standard deviations below the mean for the infant’s age and sex. The brain does not develop properly in the fetus, so that the back of the head fails to grow. The face continues to develop to a normal size, with a receding forehead. A microcephalic baby is likely profoundly mentally retarded, has physical difficulties, poor growth, and will require intensive care throughout its short life.

Zika birth defects reported in a New England Journal of Medicine study included microcephaly, hardened calcium deposits in the brain, breakdown of brain tissue, brain swelling, and poor growth of the fetuses. There were also 2 stillbirths, and one emergency C-section, due to insufficient amniotic fluid also associated with Zika. Zika has been linked to other brain-related problems in infants as well, including eye defects, hearing loss, seizures, poor motor function, and poor speech. All Zika birth defects appear to concern the brain.

Zika birth defects are now lumped under what is called "Congenital Zika Syndrome" or CZS. The principle characteristics of CZS are microcephaly, facial disproportionality, thickened, wrinkled scalp, increased muscle tension and contraction (hypertonia/spasticity), various brain abnormalities, and hearing and visual abnormalities.

The Zika virus can be passed from a pregnant woman to her fetus during pregnancy or at delivery, through the mother's placenta or perineum. Microcephaly occurs in fetuses infected in early pregnancy, between 9 and 13 weeks, but other Zika-related abnormalities may occur later in pregnancy, or begin at birth, or even afterwards. Zika may also possibly be passed to an infant through an infected mother's breast milk.

It is estimated that about 1% of fetuses of mothers infected in the first trimester will have microcephaly, and 10 to 20% of babies born to mothers infected at any time during pregnancy will have significant birth defects. Most microcephaly can be detected by an expensive FRMI scan before birth, though 20% are not detected. About 50% can be detected by low cost ultrasound. Other birth defects are virtually impossible to detect before birth, and may not be noticed at birth or may not even appear until age 3.

Even if they don't have obvious or significant brain damage at birth, babies exposed to Zika will likely be affected later in life. Babies born with CZS, especially microcephaly, will require care for up to 20 years that may cost up to $10 million per child.

Rubella, or German measles, came to the attention of the world in the early 1960s, when a pandemic infected 10 million people, indirectly killed 20,000 infants, and caused serious birth defects in 30,000 more. Although it is not a mosquito-borne virus, there are many similarities to Zika, so scientists are hoping to learn from rubella how to manage Zika. [Wikipedia]

As with Zika now, rubella infected pregnant women pass the virus on to their unborn children who get birth defects. And as with Zika, there was no vaccine at the time of the 1963 rubella outbreak. A relatively cheap vaccine became available in 1969 – 6 years later – and most children are now vaccinated, especially in the US, virtually eliminating the disease here. But many countries still cannot afford the vaccine, and rubella remains a threat. If it takes as long to develop a vaccine to Zika as it did to rubella, women have a long wait to become pregnant if this wish to avoid Zika without Vitamin D. And, given the high prices of new drugs these days, most women will not be able to afford the Zika vaccine when it comes.

Fortunately Zika, like rubella, is of a class of viruses, the enveloped viruses, that Vitamin D has proven particularly useful in fighting effectively. Women can now protect themselves at very low cost from birth defects from both Zika and rubella.

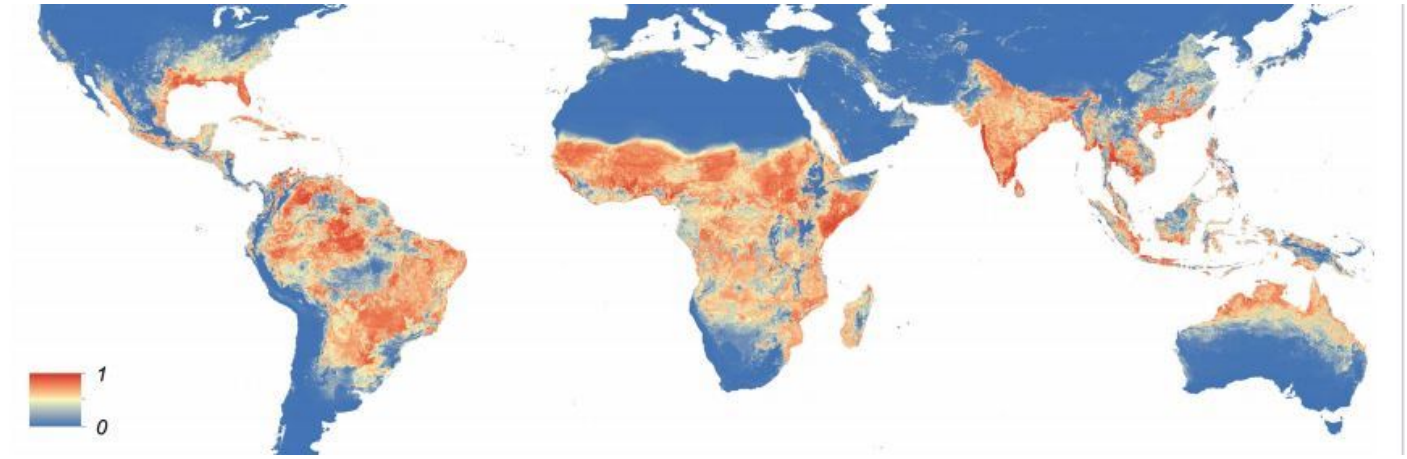
The Zika mosquitoes

Mosquitoes kill more people around the world than wars, auto accidents, or any other animal, including humans – 750,000 vs 480,000[Bill Gates]. And scientists have found that pregnant women attract twice as many mosquitoes as nonpregnant women.

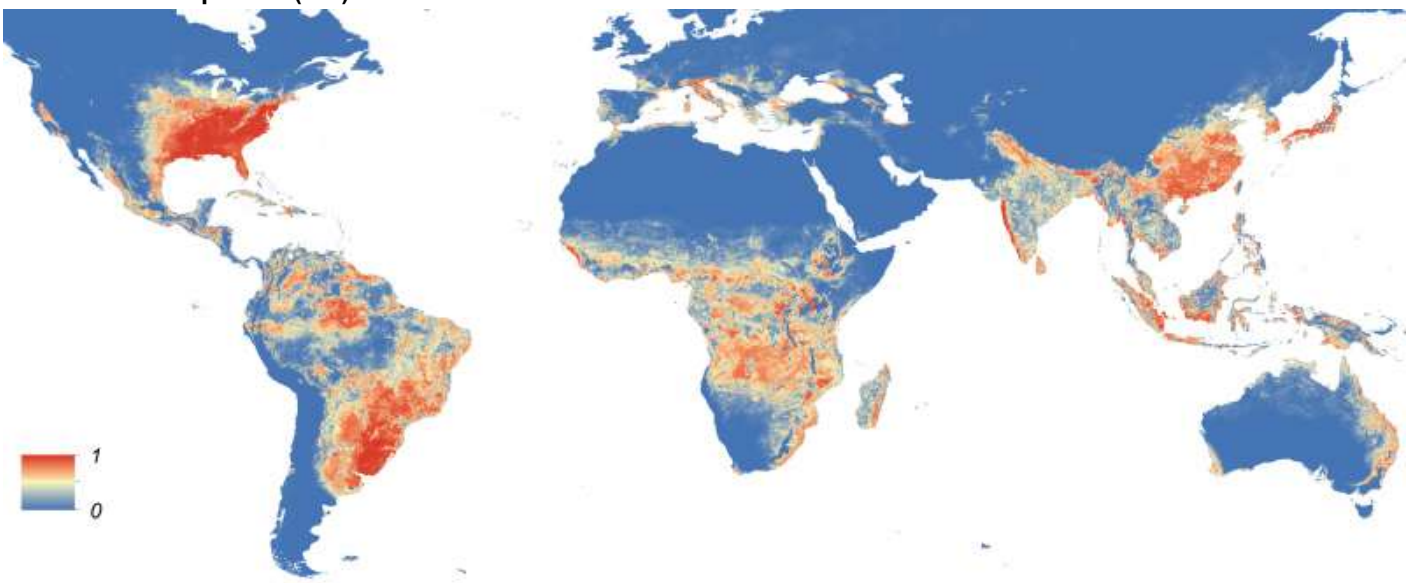
There are 2 species from the Aedes mosquito family that currently are known to carry the Zika virus: **Aedes aegypti** and **Aedes albopictus**. These mosquitoes live primarily in tropical and subtropical regions, but also range into temperate areas.

If you feel safe from Zika mosquitoes because you live in a temperate area, you should be aware of the Aedes aegypti's historic role in causing the young United States of America to move its capital from Philadelphia to Washington, DC. In 1793, a severe outbreak of yellow fever killed 10 percent of the population of Philadelphia , which prompted the move. The Aedes aegypti mosquito ranges up the US East Coast as far north as Connecticut, and through southern states all the way to the Pacific.

Zika Aedes aegypti (red)

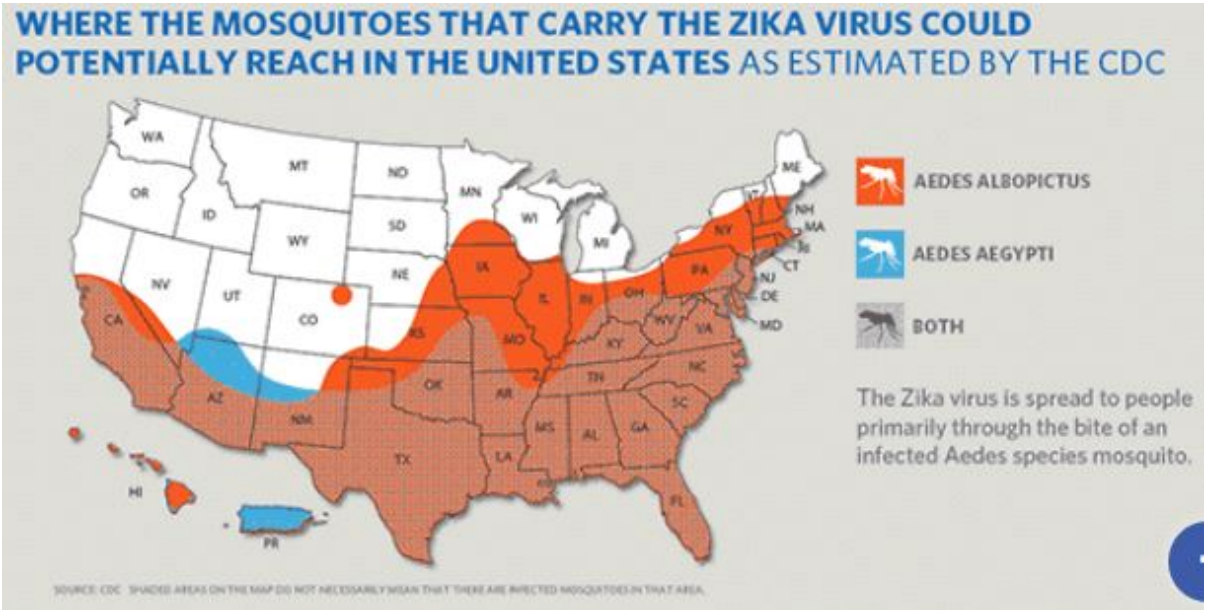


Zika Aedes albopictus: (red)



Download the 2011 Aedes aegypti and Aedes albopictus PDF file

US range for Aedes mosquitoes which can carry Zika



The aegypti is responsible for more Zika than the albopictus, but has a slightly smaller range. Not all Zika mosquitoes currently carry the virus, but the potential for spread of the disease into other parts of their range is definitely there. Already, the Zika virus has spread to more than 40 countries and territories in the Americas and around the world.[Washington Post]

Aedes mosquitoes are mainly human-biters, but also bite animals. The female mosquito is the one that bites, to obtain blood to nourish her production of eggs. She actually has 6 needles in her proboscis, not just one. One needle saws a hole in the skin, 3 widen the hole, one de-clots the blood (the de-clotter in her saliva has the virus and creates itching), and one pumps the blood. The needles together "sniff out" and locate a tiny blood vessel. The same mosquito has to bite at least twice to get the amount of blood she needs. Many mosquitoes only need to bite once, but a Aedes mosquito has to bite at least twice. This is what allows the Aedes mosquito to spread infection. One bite obtains the virus from an infected victim's blood, and a second bite days later, after mosquito saliva is infected, transmits it to another person. In a show of female solidarity, female mosquitoes apparently like female humans better than men. At least they bite us more often.

Most people are unaware of how different Aedes mosquitoes are from most other mosquitoes. While most mosquitoes are night-flying, Aedes mosquitoes are mainly active during the day. Aedes mosquitoes lay their eggs in dry spots rather than on water. And they mainly live and breed near humans inside houses and other buildings rather than outdoors. Conventional control measures used against most mosquitoes, such as draining standing pools of water, night spraying outdoors, and bed netting, are not effective against these mosquitoes.

	Aedes aegypti	Aedes albopictus	Other Mosquitoes
Feeding time	Morning and evening	All day	Night
Feeding on body	Low (ankles)	All over	All over
Lives and feeds	Indoors	Indoors and outdoors	Outdoors
Mosquito eggs	Must dry out first	May be laid on water	Must be laid on water
Egg dormancy	Up to 1 year	No dormancy	No dormancy

The Aedes aegypti mosquito is the main carrier of the Zika virus, accounting for the majority of cases. The Aedes aegypti also carries other, deadlier viruses, including dengue, chikungunya, and yellow fever. It is a low-flying mosquito, biting feet and ankles, and even the elbows, but not the neck and face. It is most active early in the morning and in the afternoon before dark.

The Aedes albopictus mosquito shares many of the attributes of the Aedes aegypti, though it is a more aggressive biter and has a wider range. It will bite anywhere on the body that is not protected, and is active all day long, not just in the mornings and late afternoons. It is commonly called the "Asian Tiger" or "Household" mosquito.

How to protect against mosquito bites in Zika areas

In a nutshell:

- Avoid being bitten: Apply Picaridin to skin in morning and evening
- Avoid being bitten: Apply Permethrin to clothes once every two weeks
- Build a powerful immune system (high level of vitamin D) before being bitten

Advice for travelers

If you are a traveler to a Zika-infested area, you will likely use mosquito repellents, such as DEET or Picaridin, on your exposed skin. **DEET**, a synthetic chemical (N,N-diethyl-m-toluamide) which was developed by the US army in 1946, has been used billions of times by hundreds of millions of people to protect against mosquito bites. It works well, but is smelly and

leaves an oily residue on the skin. It also may dissolve certain plastics and other synthetic materials such as your sun glasses. Depending on concentration, it provides 1 to 8+ hours of protection against mosquitoes, and there are no health risks other than possible skin rash after prolonged exposure. DEET is considered safe for pregnant women at a maximum concentration of 30%.

Picaridin, a newer product, is a synthetic compound developed from a pepper plant. It has been available since 1998 in Europe and Australia – where it is the best-selling insect repellent – but has only been available in the US since 2005. Studies have shown it to be at least as effective as DEET in repelling mosquitoes. But it is odorless, non-greasy, and won't harm your sun glasses or other plastics or synthetics. Costa Rican guides apparently prefer Picaridin to DEET, and find that its only drawback is that they have to remember to wash their hands before meals when using it [VitaminDWiki]. Picaridin is effective at the same or a lower concentration than DEET. It has not been around long enough to assess any long term health risks.

Permethrin, a spray for clothing, is nontoxic and can be effective for several weeks, even through several washes. Spray your clothes, shoes, and hats before going on your trip. Wear long pants and tuck your pant legs into your sox. Expect to find Zika mosquitoes indoors where they actually prefer to hang out. Since most Zika mosquitoes fly during the the morning and evening, bed netting at night will not protect you from them, though it may protect you from other night-flying mosquitoes. Be sure to have your full protection in place as soon as you get up in the morning.

You should not rely on mosquito repellents and killers for more than a few months, as prolonged daily use can cause skin rash for some people. You should be especially cautious using DEET during pregnancy. While concentrations of 50% DEET are considered most effective, providing control for several hours, some websites recommend that pregnant women use a maximum DEET concentration of 30%, and a Picaridin concentration of 20%. [VitaminDWiki] These would have to be applied more often, as the lower concentrations don't last as long. There are no similar restrictions recommended for pregnant women using Permethrin. Incidentally, there are no restrictions on DEET for breastfeeding women.

One problem with DEET and Picaridin is that they don't kill the mosquitoes, they just send them on to bite the next person. One laboratory study suggests that DEET chemically alters mosquitoes' sense of smell. This causes them to avoid the person using the repellant but then take smaller bites than usual and so need to bite more people than they normally would in order to get the blood they need. If this is true in the real world, using DEET could actually contribute to the spread of Zika. We were unable to find any additional studies to confirm this, or similar studies on Picaridin, but you might want to avoid DEET just in case. Permethrin, which is safer for pregnant women anyway, kills the mosquitoes, it doesn't just repel them. We recommend using a combination of Permethrin with Picaridin, and, of course, a bottle of Vitamin D, as discussed below.

Your male sex partner should use condoms. Zika can live a long time in semen, and there is strong evidence that Zika is being increasingly transmitted by sexual contact. You need to be sure that your partner uses a condom if he has had Zika symptoms any time in the past 6 months. [CDC] If he has not been bitten yet, or has not yet experienced symptoms, he may also want to take Vitamin D to build his immune system to defend against the Zika virus. It will likely improve his general health as well.

If you require a blood transfusion you should be aware that the Zika virus can be transmitted in this way.

Advice for residents

If you live in an active Zika area, you should take further protective measures. As mentioned above, the Aedes aegypti mosquito only lays its eggs in dry spots, not in water as other mosquitoes do. You cannot just eliminate standing water, expecting to eliminate the mosquito eggs. The eggs must be dry out after being laid, but then must be wet later to hatch. What is tricky is that the Aedes mosquito will pick a spot that is dry now but has been wet in the past, and that it anticipates will later get wet again, primarily indoors. It can actually smell aquatic bacteria left over from previously dirty water, and seeks out this smell for a place to lay her eggs.

The Aedes aegypti mosquito prefers to live indoors next to humans. A temporarily dry shower floor or bathtub or toilet tank or bowl is a preferred egg-laying location. The dried eggs may hatch in a few days after the next toilet flush, or they may not hatch for many months. Aedes aegypti mosquito eggs can remain viable for more than a year if they stay dry and the temperature doesn't get too cold. Then, when wetted, they will suddenly spring to life and hatch.

Be sure to have tight screens on windows and doors. You might also try buying or making a mosquito trap to use indoors. Spray insecticide on toilet cracks and other possible egg-laying areas, or clean with household bleach and a brush.

The Aedes mosquito also lives outdoors. It has been reported that 41% of storm drains in one neighborhood in Brazil were infested with Aedes aegypti mosquitoes.[VitaminDWiki] Unfortunately, the measures many governments use to control other mosquitoes, such as spraying at night or treating standing water, do not work well against the day-flying, dry egg-laying, home-invading Aedes aegypti mosquitoes. You should take proactive measures yourself to seek out and eliminate places where mosquito eggs are likely to be laid around your home, workplace, and school, both indoors and outdoors.

You, like the mosquito, have to look for a depression, former puddle, gutter, emptied swimming pool or old tire or toy or empty container lying around outdoors that is now dry, but once held at least a few drops of dirty water, and might get wet again. It may be a tiny depression, perhaps even a bottle cap. Any empty potential water containers that can be removed should be removed. Aedes aegypti mosquitoes are known to lay their eggs in lawn grass, so it would help to mow frequently and keep the grass short.

It is a curious fact that sometime mosquito bites do not leave itchy weals. If you have been bitten before by the same species of mosquito, your body may become accustomed to that mosquito's bite and not react to later bites by producing the histamine that causes itchiness. However, you may still, if bitten by a virus-carrying mosquito, get symptoms of infection in a few days. This means that if you are a traveler to a Zika area that is a "new" mosquito territory for you, you will likely feel itchiness from the first bite, and should start taking Vitamin D without delay. If you live in a Zika area, however, you may have been previously bitten and not even feel the bite that infects you.

It is estimated that only 20 percent of people bitten by the Aedes aegypti mosquito carrying Zika get symptoms of viral infection (which can include other viruses than Zika that are borne by the same mosquito!). It is likely that the people who do get symptoms have poorly functioning immune systems. You should start up and maintain your Vitamin D defenses right away, as by the time you experience symptoms it will be too late to build your immunity.

Chemical repellents and killers won't give you 100% protection against Zika, nor will you be able to prevent all mosquitoes from living and laying eggs in your area. Whether you are traveling to a Zika area or live there full time, you need the additional protection of a strong immune system, such as provided by Vitamin D.

Emergency Vitamin D

Even though there is a less than 1 percent chance that any one mosquito bite in a Zika outbreak will lead to a birth defect, if you are pregnant and you are bitten, you need to act quickly and decisively to defend against that possibility. This means that you need to buy and keep a bottle of Vitamin D3 on hand, so that you are prepared to take enough to equal 350,000 IU as soon as you are bitten or notice the itch. You must not wait until you experience symptoms – by then it will be too late to build an effective immunity. You may have to take a lot of pills at once – 7 at 50,000 IU each or 70 pills at 5,000 IU, probably over a couple of hours – but you will only have to take this many one time. This megadose (or "loading dose") will give you protection from further bites for 2 months, after which you can start on a much lower maintenance dose of 5,000 IU daily to keep up your immunity. To be clear: Vitamin D won't keep you from being bitten, but it should offer a strong defense against infection.

The immune system, enveloped viruses, and Vitamin D

There are at least 5 paths through which the Zika virus can potentially infect a baby: the male sexual partner's semen; the placenta; the mother's blood and vaginal secretions; the mother's skin; and the mother's immune system. Here we discuss

the immune system

The immune system

The immune system is a system within animals (including humans) that protects against infection. There are actually two immune systems, a quick-acting innate immune system and a slower-acting adaptive immune system.

A physical barrier, such as the **skin**, is the first line of defense to prevent pathogens from entering the body. If that barrier fails – for example, if the skin is penetrated by a mosquito carrying a virus in its saliva – the injured or infected skin cells release cytokines and other chemicals that arouse the innate, or fast-acting immune system.

The **innate immune system** quickly assembles millions of natural killer cells and other defenses to the site of the skin breach to fight off the pathogen. This action causes inflammation. Some of the immune system cells attempt to engulf or eat the pathogen. Natural killer cells destroy cells that have been infected.

In order to be activated, the natural killer cells must be able to recognize these infected cells so that they don't destroy normal body cells by mistake. Recognizing infected cells is difficult in the case of "enveloped" viruses, such as Zika, that mask their presence by creating envelopes around themselves using some of the host cell's material.

If the pathogen successfully evades the innate system, the **adaptive immune system** comes into play, activated by the innate response. The adaptive immune system, as indicated by the name, adapts its response during the infection to improve its recognition of the pathogen and create a memory of it.

The cells of the adaptive immune system are special types of white blood cells called lymphocytes. The major ones are B cells and T cells.

B cells divide and secrete millions of copies of the antibody that recognizes the particular pathogen. They mark the pathogen for destruction, and can also interfere with the receptors that viruses use to infect cells.

T cells can recognize a "non-self" pathogen only after small fragments of the pathogen have been processed and rejected by a "self" receptor molecule that identifies them as not properly belonging to the body. **Killer T cells** kill host cells that are infected with viruses by releasing cytotoxins. Killing off infected host cells is particularly important in preventing the virus from replicating and spreading the infection.
Helper T cells regulate both the innate and adaptive immune responses, and help determine which immune responses the body will make to a particular pathogen. They do not kill infected cells. They release cytokines that influence the activity of killer T cells and other cells

When B cells and T cells are activated and begin to replicate, some of their offspring become long-lived memory cells called **antibodies**. Throughout the animal's lifetime, these antibodies remember each specific pathogen encountered and can multiply quickly to mount a strong response whenever the same pathogen is detected again. This is the basis of vaccination.

Enveloped viruses

Some viruses, such as Zika, produce protein envelopes that help the virus by masking its presence and providing "glue" to bind it to receptors on the host's cell membranes. Once the viral envelope has fused with the host cell, it can enter and infect it. Because the viral envelope contains material from the host cell as well as that from the virus, it can more easily invade the cell and avoid detection by the host's immune system.

The envelope is a problem for the virus because it can "melt" away in heat, or dissolve when attacked by detergents, as may happen when they are outside the body, for example on the skin. This is why it helps to wash hands frequently and keep clothes clean. The viruses have limited survival outside the host, so typically must transfer directly from host to host – as from human to mosquito to another human.

Enveloped viruses can transform themselves quickly to evade the immune system, so it is important that the immune system be able to react quickly to any new virus mutation. Vitamin D enhances the activity of the innate (fast-acting) immune system, so can protect against these viruses.

Vitamin D and the immune system

Cell culture experiments support the idea that Vitamin D has direct anti-viral effects, particularly against enveloped viruses. Though the anti-viral mechanism is not fully understood, it may be linked to Vitamin D's ability to activate certain anti-microbial peptides (LL-37 and defensin 2) in the skin. [VitaminDWiki]

Vitamin D further protects us by properly activating T cells in the innate immune system. When a T cell encounters a foreign pathogen, it extends a Vitamin D receptor. This is essentially a signaling device that allows the T cell to express a gene that converts the pre-hormone version of Vitamin D to the hormone version, **calcitriol**, and binds the calcitriol to the receptor, so that the T cell can perform its intended function. If T cells cannot find enough Vitamin D in the blood, they won't even begin to fight against the pathogen. [link to Nature Immunology study]

Maternal transfer of infection

Unfortunately, maternal Zika infection can be hazardous to the unborn child at any time throughout the pregnancy and birth. The mother's immune system only offers partial protection by the placenta.

The **placenta** functions as a selective maternal-fetal barrier against transmission of many pathogens, especially bacteria. There is apparently some protection against flaviviruses like Zika by certain proteins (iFITMs)in the placenta, but Zika has shown up in the amniotic fluid of pregnant women, so it clearly can cross the placental barrier.

The embryo and fetus have little or no immune function on their own. They depend on the immune function of their mother and the placenta. To protect the baby, the mother's innate immune system must be able to stop a viral infection before it can cross the placenta, or the iFITMs must stop it. If her immune system is weak or her placenta is compromised, the baby can be infected.

Fetuses can be protected against bacterial infections when the antibody system is activated, after the first trimester. Then if the mother's adaptive immune system has produced antibodies to bacterial infection, those antibodies, being small, can pass through the placenta to protect the fetus.

But the fetus is not protected at any time from viruses, such as Zika, whose antibodies are too large to cross the placental barrier. So even if a pregnant woman has produced antibodies against Zika, they cannot cross the placenta to protect her unborn child.

The baby is also vulnerable to Zika during the birth process. During birth, babies can be directly exposed to the mother's blood and vaginal fluids. If infected with Zika during birth, the child won't be born with microcephaly, but since the brain continues to develop for years, Zika-related problems can show up later.

It is crucially important that a woman be as healthy as possible during pregnancy. She needs to have a healthy immune system and a healthy, well-functioning placenta to protect her baby from Zika and other infections from conception through birth. She needs Vitamin D.

About Vitamin D

Vitamin D is well recognized for its role in building strong and healthy bones. The link between sunlight and bone health has been known since ancient times. Herodotus, a 5th century BC Greek historian, noticed on an Egyptian battlefield that the skulls of the Persians, who wore turbans, were thin and easily broken, but that the skulls of the Egyptians, who fought bareheaded, were hardly ever broken.[VitaminDWiki]

Rickets and Vitamin D

Much later, in 1645, an English doctor, Daniel Whistler, gave the first medical description of rickets, a common disease of bone deformation in children. By 1918, ultraviolet light was used to treat this condition. In 1922, American researcher Elmer McCollum tested dogs having rickets with modified cod liver oil in which vitamin A had been destroyed. The modified oil cured the sick dogs, so McCollum concluded the factor in cod liver oil which cured rickets was distinct from vitamin A. He called it Vitamin D because it was the fourth vitamin to be named. By 1925, Vitamin D had been linked to sunlight.[Wikipedia]

By 1945, Vitamin D had been added to bottled milk, and rickets had virtually disappeared in the US. Unfortunately, with the recent use of lowfat milk and milk substitutes having less Vitamin D, and for other factors associated with low Vitamin D, rickets is making a comeback in the US, the UK, and elsewhere around the world. Even worse, parents in the US are being accused of abusing their babies, when the real cause of the broken bones in their infants is often actually Vitamin D deficiency.[VitaminDWiki]

Vitamin D, really a hormone

Researchers have long known that Vitamin D is much more than a vitamin, and that it is important for many functions in the body other than promoting good bone health. It's also an important factor in making sure the muscles, heart, lungs and brain work well and that the body can fight diseases such as cancer and infections such as Zika.

As a vitamin, D is unique. Your body can make its own Vitamin D when you expose your skin to sunlight. But your body can't make any other vitamins. You need to get other vitamins from the foods you eat. For example, you can get vitamin C from fruits and vegetables. But only a very small part of the Vitamin D you need is found in food. You need adequate sunlight and, increasingly, Vitamin D supplements, to get all you need.

Also what makes Vitamin D unique compared to other vitamins, is that when your body gets Vitamin D, it turns the Vitamin D into a hormone. The form of Vitamin D that you get from sunlight, food, and supplements, D3, needs to be changed into a more active hormonal form **calcitriol** before it can be used by the body. It is called a "hormone" because the body has to make it.

Conversion of Vitamin D3 into calcitriol is done in the liver, kidneys, and individual cells through enzymes involving genes. In the liver, Vitamin D3 is converted to **calcidiol**. Calcidiol is sent to the placenta of pregnant women, and also shows up in the blood. It is the form of Vitamin D that is typically measured by a blood test.

Part of the calcidiol is converted by the kidneys to calcitriol, the biologically active form of Vitamin D. Calcitriol circulates in the blood, regulating the concentration of calcium and phosphate in the bloodstream and promoting the healthy growth and remodeling of bone. Calcitriol also affects neuromuscular and immune function.

It used to be thought that all conversion of Vitamin D took place in the liver and kidneys. But for a decade it has been known that virtually all cells in the human body have Vitamin D receptors, and it is now recognized that over 50% of the conversion activity takes place at the cellular level. We have already seen how this works in the immune system. And this is one reason why the Vitamin D level shown in a blood test may not accurately reflect the amount of Vitamin D actually available to the body.

Vitamin D deficiency and disease

Over the past few decades, people have increasingly found ways of avoiding the sun, and there has been a huge increase in diseases associated with Vitamin D deficiency. [VitaminDWiki video] Most people are not currently getting enough vitamin D. While doctors and scientists disagree on what constituted "enough" Vitamin D those closest to the research say 60 to 80 ng/mL based on the 25(OH)D blood test is the optimal range for most people. By that standard 90% of the world's population has a sub-optimal level for fighting a viral attack such as Zika.

Over 100 diseases are now linked to low Vitamin D. At least 70 are proven in random controlled trials to be prevented or treated by Vitamin D. Here's a list of about 50 of the major ones: Diabetes, Influenza, Falls, Hip Fractures, Breast Cancer, Pregnancy risks, Chronic Kidney Disease, Cystic Fibrosis, Rheumatoid Arthritis, Osteoarthritis, TB, Rickets, ALS, Respiratory Tract Infection, Lupus, Traumatic brain injury, Multiple Sclerosis, Congestive Heart Failure, Prostate Cancer, Asthma, Depression, Fibromyalgia, Chronic Hives, Obesity, COPD, Vertigo, Restless Legs Syndrome, Metabolic Syndrome, Preeclampsia, IBS, and UTI.[VitaminDWiki]

All 10 of the major disabilities of women are linked to Vitamin D deficiency: Anxiety/Depression, Type 2 Diabetes, Dementia, Ischemic heart disease, stroke, Breast cancer, Lung cancer, COPD, Asthma, and Osteoarthritis. [VitaminDWiki]

All 12 of the top heritable health problems are associated with Vitamin D deficiency: Alzheimer's/dementia, hemophilia, cancer, arthritis, asthma, depression, diabetes, heart disease, high cholesterol, hypertension, pregnancy losses and birth defects, and stroke.[VitaminDWiki]

Clearly, Vitamin D has a major impact in many areas of health and disease, not just bones. Vitamin D deficiency represents a major health threat for many people today, including probably more than half of pregnant women. Fortunately, Vitamin D deficiency is easily preventable.

Pregnancy and Vitamin D

As we have seen, Vitamin D affords protection against Zika. It helps pregnant women avoid Zika. It helps a woman and her male partner avoid Zika before she gets pregnant. It helps infants and children avoid Zika. Vitamin D helps everyone avoid infection from the Zika virus and other pathogens.

Vitamin D helps mothers and infants in many other important ways than just fighting Zika. In this section, we will focus on the many benefits of Vitamin D in pregnancy, using scientific studies to back up our sometimes rather strong statements.

First, it helps the woman get pregnant in the first place – it increases the general health and **fertility** of both partners. [VitaminDWiki]

Vitamin D helps prevent **birth defects**, not just from Zika, but also from other causes. We have shown that Vitamin D protects against Zika birth defects at 5 locations: the skin, the innate immune system, the adaptive immune system, the placenta, and the male partner's semen (actually by preventing Zika from getting into the semen). This protective agency of Vitamin D also fights other infections that cause birth defects, such as rubella.

Vitamin D helps prevent **miscarriages**. These have long been associated with low Vitamin D. Recent studies have found that even a small amount of Vitamin D decreases the recurrent spontaneous miscarriage rate by 3.5 times. Increasing the Vitamin D levels greatly increases the health of the fetus, and thus decreases the chance that it will be rejected by the body. [VitaminDWiki] Of course, preventing Zika miscarriages depends on preventing infection by Zika, which Vitamin D also does.

Vitamin D prevents problems of the pregnant mother such as preeclampsia, gestational diabetes, vaginosis, pre-term births, and unplanned Caesarian sections.[See table below]

Preeclampsia (high blood pressure during pregnancy) has been associated with low Vitamin D in many studies. One study found a 7 times increase in the rate of severe preeclampsia with low Vitamin D. A paper that looked at many preeclampsia and Vitamin D studies concluded that low Vitamin D increased the preeclampsia rate by 2 times. About 5% of pregnancies have preeclampsia.[VitaminDWiki]

Gestational diabetes is the increased blood sugar during late pregnancy in women who were not previously diabetic. Gestational Diabetes occurs in about 5% of all pregnancies, but only in about 2% of those pregnancies in which the woman has a good level of Vitamin D. [VitaminDWiki]

Vaginosis occurs in 10% to 30% of all pregnancies. One million pregnant women get vaginosis in the US annually. Vaginosis is typically treated with antibiotics. Vaginosis occurs about 5 times less often in those pregnant women who have a good level

of Vitamin D. Vitamin D decreases vaginosis independent of pregnancy. Bacterial vaginosis has been linked to miscarriage, pre-term delivery, low birth weight, and pelvic infection after childbirth. [VitaminDWiki]

In one study, **Pre-term birth rates** were cut in half in women who were given Vitamin D to raise their Vitamin D levels to above 40 nanograms. This was typically done with a dose of 4,000 IU. [VitaminDWiki] In another study, pre-term births were cut by 60% for African-American women given Vitamin D.

Unplanned Caesarian sections have been found to increase at a rate 2 to 4 times the normal rate if the woman has low Vitamin D.

Vitamin D decreases **depression** both during and after pregnancy. Women are 50% more likely to be depressed during pregnancy if they have low Vitamin D. One study found that postpartum depression was 2 times more likely if the mother had low Vitamin D. [VitaminDWiki]

Vitamin D improves the health of the infant, which, of course brings many benefits. It even saves money. In one study, a single dose of Vitamin D during pregnancy costing $1 reduced infant health care costs by $300 [VitaminDWiki]. And of course, avoiding Zika-induced microcephaly not only prevents great pain and suffering to the families that can go on for years, it may save up to $4 million in care and treatment costs for the child.

Childhood **autism** occurs in about 20% of children when previous siblings were autistic. A study gave Vitamin D to mothers and infants in families who already had autistic children. The autistic rate for the subsequent children decreased to only 5%. No study has been done so far on the decrease in autistic rate with increased Vitamin D in non-autistic families. There are, however, many reasons to believe that Vitamin D greatly decreases the rate of autism in those families as well. [VitaminDWiki]

The future rate of **multiple sclerosis** (MS) was nearly twice as high if the mother had a low level of Vitamin D during her first trimester. This was a major long term Finnish study of people getting MS between the ages of 18 and 27. But since typically 3/4 of MS occurs after age 27, this is likely an underestimate of the actual number affected by low Vitamin D.

Conclusion: Healthy pregnancies need lots of Vitamin D, and not just to prevent Zika.

- **Lots of vitamin D improves pregnant mother & child health in 14 ways**
- 1. Reduces Miscarriage **2.5 times**
- 2. Reduces Pre-eclampsia **2 times**
- 3. Reduces Gestational Diabetes **2 times** RCT*
- 4. Reduces Depression AFTER pregnancy **2 times**
- 5. Reduces Vaginosis **5 times** RCT'*
- 6. Reduces Premature birth **2 times** RCT*
- 7. Reduces C-section - unplanned by **1.6 times**
- 8. Reduces Small for Gestational Age **3 times**
- 9. Infant height, weight, head size within normal limits RCT*5
- 10. Reduces Childhood Wheezing **1.3 times** RCT*
- 11. Reduces Childhood Autism **4 times**
- 12. Reduces later Multiple Sclerosis **1.9 times**
- 13. Reduces Preeclampsia 20 years later **2 times**
- 14. Reduces Mite allergy **5 times**

Supplementing with Vitamin D

It is important for pregnant women – and their kids and male partners – to have sufficient Vitamin D to have a strong immune system to fight Zika, and for general health. These days it is impractical, or virtually impossible, to get enough Vitamin D from sunlight, and there is very little in food. You really must take Vitamin D supplements.

Preventive Vitamin D

Preventive Vitamin D
The best way to defend against Zika birth defects is not to wait to be bitten, but to start a Vitamin D regimen as soon as you discover you are pregnant, or even before you get pregnant, and continue it throughout your pregnancy (or life). That way, you will be building an excellent immune system to fight off Zika and many other infections and diseases.

To prevent Zika, you should aim to build up your immunity in about 2 weeks, so taking 50,000 IU per day for 2 weeks should bring your blood levels of Vitamin D up to the desired level of 40 nanograms per milliliter. After that, you should continue taking a maintenance dose of 5,000 IU per day as long as you are pregnant, then 4,000 IU daily afterwards if you are of normal weight. You may need more or less than that amount, depending on your individual situation. See the sections below for more details.

Loading dose

If you need to quickly build your immune system to fight Zika, you should take a loading dose, or large initial dose, of Vitamin D as soon as possible after you have been bitten, and you may be able to avoid the infection altogether. The normal loading dose for a pregnant woman is **350,000 IU** of Vitamin D3. A larger dose may be required if you are obese or have dark skin.

In this emergency situation, the loading dose should be taken all at once, or over several hours, or over no longer than 2 days. If you have never taken a Vitamin D supplement before, start with a small amount at first and then wait a day to ensure that you are not one of the very few people who have low Magnesium levels, are allergic to the vitamin or to other ingredients in the capsule. Then, if all is well, proceed with the rest of your loading dose.

If you are in a Zika outbreak area, keep a bottle of Vitamin D on hand, so that you can take the loading dose as soon as a suspected mosquito bite begins to itch. Waiting 2 to 4 days for symptoms appear will be too late to prevent the infection, and waiting weeks for Zika test results will be much too late.

You cannot afford to wait until Zika is confirmed, or even until you have symptoms, to start fighting it. You need to act proactively. If you wait for symptoms or to find out for sure that you have Zika, and you do have it, there will be nothing you can do at that point to prevent a possible birth defect short of having an abortion. Taking Vitamin D that late is highly unlikely to stop the infection.

You may also want to take a loading dose as insurance if you are soon traveling to a Zika-infected area, or if Zika suddenly shows up in your area, or if you just want to be confident that you are protected at all times. Since Zika can be transmitted sexually, you may want to protect yourself from a partner who has traveled in a Zika area in the past six months. He may unknowingly have the virus and transmit it to you even if he has not experienced any symptoms.

To remind you, we are giving only a general recommendation here, not medical advice. You may require a different form of the vitamin, or you may have an extremely rare condition that precludes taking Vitamin D altogether. You should talk to your physician.

However, be aware that some doctors will be reluctant to allow you to take that much Vitamin D, especially when you are pregnant. We can assure you that 350,000 IU of Vitamin D3 is not toxic to most pregnant women and their fetuses, even if taken all at once. Over a million people, including pregnant women, have taken a loading dose of this size or greater without ill effect. Some children were given a dose of 600,000 IU several times a year. It not only didn't harm them, it actually improved their health.[VitaminDWiki] But your doctor may not have this information. To reduce the doctor's liability you might phrase your request for Vitamin D this way: "Would you be opposed to my getting more vitamin D?"

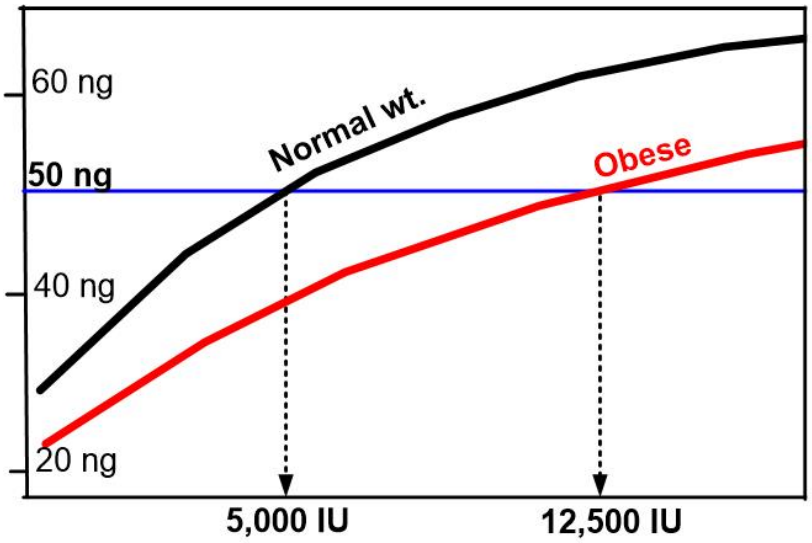
Maintenance dose

If you already have a healthy immune system, you will not need a loading dose, you will likely only need to take a maintenance dose of Vitamin D. But don't just assume that you have a healthy immune system and can skip the loading dose, particularly if you have any health problems or recent illnesses that may have compromised your immune system, or if you know you are Vitamin D deficient. You really don't want to risk the chance of birth defects in your baby or, for that matter, other risks to your pregnancy.

If you have taken a loading dose of Vitamin D, you will be protected for up to 2 months, and you will not have to take any more Vitamin D during that period. After 1 month, you should start on a maintenance dose, to continue to protect your immune system and your general health during the rest of your pregnancy – and after.

A good **maintenance dose** of Vitamin D3 for an average weight non-pregnant woman would be **4,000 IU** daily. When pregnant, she needs **5,000 IU**, and **6,400 IU** while breastfeeding. Obese women with a BMI of 30-36 should take 12,500 UI when not pregnant, more if their BMI is higher than 36. Thin women will need less than 4,000 IU.

Obese need 2.5 times as much vitamin D as normals



- **Normal weight** **Obese** **(50 ng = 125 nanomole)**

Additional Vitamin D, at least 1,000 IU per day, is needed if you are starting from a very low level of Vitamin D, have had a recent birth, are expecting twins, have health problems associated with low Vitamin D, or if you are indoors a lot, live far from the equator, or avoid the sun.

Vitamin D does not have to be taken every day. Your blood will retain extra Vitamin D for up to 3 months, even longer if it is stored in fat. You can take it every other day, weekly, or even a bit less often [VitaminDWiki]. Daily is probably best, but you could, for example, take a 50,000 IU capsule every 10 days to lower your cost. If you miss doses, you can make up all of your missed doses at once.

Most people can take regular Vitamin D3 capsules. Be sure to get Vitamin D3 and not Vitamin D2 – D3 is about 40% more effective in the body as D2. Try to get capsules without additives or oils. Oils may restrict Vitamin D adsorption. If you don't like to take pills, you can use liquid Vitamin D or mix Vitamin D powder from a capsule into your food or drink. If you are vegan, you may want to get a form of Vitamin D3 made from plants such as lichen. You can also find Halal and Kosher Vitamin D, and gut-friendly forms. We generally recommend the Vitamin D3 capsules made by Bio-tech Pharmacal – they contain D3 as a water-soluble powder, have no additives, are non-allergenic, fairly gut-friendly, come in 5,000 IU and 50,000 IU sizes, are Halal and Kosher approved, and are relatively inexpensive. Biotech also makes a vegan form. (Disclaimer: Bio-Tech Pharacal, Inc. is a sponsor of VitaminDWiki.)

Vitamin D can be taken anytime during the day, but it is best for maximum absorption to take it just after your evening meal. If you take Vitamin D too close to bedtime, however, it may keep you awake.

Cofactors – supplements needed with Vitamin D

Last, but not least, you need to know that it is important to take supplemental **cofactors** with Vitamin D, especially when you are taking more than 4,000 IU daily, as we are encouraging you to do during pregnancy. You should be taking supplemental **Magnesium** (Overview Magnesium and vitamin D100mg/day?), **Omega-3 fatty acids** 1 gram/day, and **Vitamin K2** 100 micrograms/day along with your Vitamin D. These cofactors increase the effectiveness of Vitamin D and decrease the chance of allergic reaction associated with low magnesium. They provide additional benefits in themselves, and may be as important to your health as Vitamin D. [VitaminDWiki]

Another cofactor, **calcium**, is a special case. While some calcium is needed by the body, Vitamin D increases the bioavailability of calcium from your food and supplements, and any excess accumulates in the arteries. This can eventually cause hardening of the arteries. (One quick way of telling whether you have excess calcium in your blood is if you are constipated.)

So, with calcium, you may need to actually ***decrease*** the amount you are taking, especially if you are taking over 750 mg/day supplemental calcium along with Vitamin D. Since many general supplements contain calcium, or your doctor is recommending extra calcium while pregnant, you may be getting too much. Fortunately, Vitamin K2 will prevent this interaction of calcium with Vitamin D. Most people get plenty of calcium from their food and shouldn't need a calcium supplement at all. But if you do take a calcium supplement with your Vitamin D, be sure to take Vitamin K2 as well.

Vitamin D is the only supplement we have found that studies agree helps the immune system in many ways. A few studies show that **Zinc** **and** **Omega-3** also help in certain circumstances. No studies show that they help against enveloped viruses.

About Vitamin D testing

You can take a Vitamin D test after taking a loading dose to confirm that you are reaching your goal of 40ng/ml. Be aware, though, that 30% of the time the test can show a 40ng/ml or higher amount of Vitamin D in your blood when in reality your cells, including your immune system, are not getting enough. So the test may provide a false sense of confidence. The yearly cost of buying Vitamin D supplements and cofactors is much less than the cost of a test. So we don't recommend taking a test unless you feel that you are still low or deficient, which could happen for a number of reasons. VitaminDWiki A quick and dirty way to test for Vitamin D deficiency is to press your 2 shins and breastbone. If at least 2 of the 3 are painful, it is a likely indication that you are very low in Vitamin D.

By the way, some scientists have stopped using random controlled trials, altogether, because it quickly becomes apparent who is getting the real Vitamin D. Those participants feel much healthier after a short time. So you should be feeling significantly better a week after your loading dose. If you are not, you probably should get a Vitamin D test.

Vitamin D for men

Vitamin D is not just for pregnant women. It can protect men and their semen from the Zika virus, and from possible future Zika-related dementia, as has been recently demonstrated in mouse studies. The Vitamin D dosing for men is the same as for nonpregnant women, based on weight, around 4,000 to 5,000 UI.

Vitamin D also protects infants and children, and of course nonpregnant women. As we have seen, Vitamin D has many health benefits for all.

WARNING: You should be aware that Vitamin D can interfere with some drugs – often making them more powerful, – so you may need to adjust your prescription if taking Vitamin D. This will especially impact chemotherapy drugs, and could be fatal if your chemotherapy dose is not changed. You may have to stop taking Vitamin D. Check with your oncologist.

Vitamin D to go metric in US?

The FDA (US) announced in Aug 2016 that the Vitamin D designation would change from International Units (IU) to metric units.

IU	micrograms
40	1
400	10
4,000	100
50,000	1,250
400,000	10,000

Conclusion

While Zika is a dreadful disease having the potential to devastate many families, more than 30 life-threatening and debilitating diseases also appear to be on the rise. People around the world no longer seem to have healthy immune systems to fight these infections. Could it be that the advent of mechanization for much outdoor work and air conditioning and increased use of sunscreen and sun-blocking clothing have cut off our major defense against disease? Does less sun mean more disease?

Vitamin D is increasingly being acknowledged as vital to immune system functioning and the health of nearly every system in the body. It is especially needed in the body that is building a new body – the pregnant woman.

We hope you will visit our website, VitaminDWiki, for much more information on Vitamin D, disease, viruses, pregnancy than we could possibly have included in this book. And we hope you will watch our 5-minute video, "Does Less Sun mean More Disease?" (with voiceovers (including Spanish) and closed captions (including Portuguese).

There is a discussion forum for this book on VitaminDWIki.

Thank you.

short url for this page = https://is.gd/VitDZika

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