

Science AMA Series: I'm Catherine Spong—OB/GYN, deputy director of an NIH institute, researcher, and mom. Let's talk about Zika virus and its impact on child development. AMA!

NICHD_{NIH}¹*and*/ScienceAMAs¹

¹Affiliation not available

April 17, 2023

Abstract

Hello reddit! I'm Cathy Spong, and I am deputy director of NIH's Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD). At NICHD, we focus on the entire life process rather than a specific disease or body system. We support research on physical and intellectual developmental disabilities, rehabilitation, population health, fertility, pregnancy, and childhood conditions. Last year, I hosted an AMA on Zika and its effects on pregnancy. Today, I'd like to discuss Zika's effects on child development, and how we are at the tip of the iceberg in terms of understanding how the virus affects development. Microcephaly is only one of the many severe complications of Zika exposure in the womb. Children born to Zika-infected mothers can face many other health problems, and what has been reported to date likely represents only the most severe cases. Because Zika is spread by Aedes mosquitoes and through sexual contact, people should pay attention, even if they do not live in a Zika-endemic area. To fully understand the impact on children, including the subtle effects, we need to conduct a full, long-term assessment of the exposed child, including monitoring for physical symptoms, as well as for signs of intellectual and developmental disabilities. Careful monitoring and evaluation of behavior, developmental stages, and achievement of milestones will improve our understanding of prenatal Zika exposure and help us identify potential medical treatments and other interventions, such as physical therapy. I've talked about Zika's threat to child development in a Huffington Post blog. I urge researchers, especially those who do not study infectious diseases or pregnancy, to consider how their work can help. Collaboration across medical specialties will be vital. I will be answering questions starting at 2 p.m. ET (11 a.m. PT). Ask Me Anything! EDIT: Hi, everyone! That wraps our chat up for today. Thank you for your questions – this was a great opportunity to discuss Zika virus and its impact on child development. We will be closing this AMA thread, but if you have follow-up questions, please send us a reddit message, Facebook message, or tweet at us.

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Science AMA Series: I'm Catherine Spong—OB/GYN, deputy director of an NIH institute, researcher, and mom. Let's talk about Zika virus and its impact on child development. AMA!

NICHD_NIH [R/SCIENCE](#)

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Last year, I hosted an AMA on Zika and its [effects on pregnancy](#). Today, I'd like to discuss Zika's effects on child development, and how we are at the tip of the iceberg in terms of understanding how the virus affects development.

Microcephaly is only one of the many severe complications of Zika exposure in the womb. Children born to Zika-infected mothers can face many other health problems, and what has been reported to date likely represents only the most severe cases. Because Zika is spread by Aedes mosquitoes and through sexual contact, people should pay attention, even if they do not live in a Zika-endemic area.

To fully understand the impact on children, including the subtle effects, we need to conduct a full, long-term assessment of the exposed child, including monitoring for physical symptoms, as well as for signs of intellectual and developmental disabilities. Careful monitoring and evaluation of behavior, developmental stages, and achievement of milestones will improve our understanding of prenatal Zika exposure and help us identify potential medical treatments and other interventions, such as physical therapy.

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CORRESPONDENCE:

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Hello, I have a few questions:

-What percentage of pregnancies where the mother has confirmed Zika result in microencephaly? -What are the other complications of Zika that have been shown or are hypothesised? -Of the babies that do not have microencephaly do we have any idea what percentage are likely to be effected by other complications? -Are babies being born to mother's with confirmed Zika being enrolled in large long term prospective cohort studies in heavily effected parts of the world currently?

Thank you.

[blue_orchid18](#)

NICHD_NIH , r/Science ,
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CDC recently reported an update on Zika-associated birth defects among U.S. infants who were exposed while in the womb. (<https://www.ncbi.nlm.nih.gov/pubmed/28384133>) They found that Zika virus-associated birth defects were reported in 5% of the fetuses/infants from completed pregnancies with laboratory evidence of possible recent Zika virus infection (51/972 completed pregnancies). The proportion increased to 10% when restricted to pregnancies with laboratory-confirmed Zika virus infection (24/250 completed pregnancies). And for women with confirmed Zika virus infection in the first trimester of pregnancy, birth defects were reported in 15% of fetuses/infants.

There are scientific publications that estimate microcephaly risks for women exposed to Zika during their first trimester. However, the studies used statistical modeling that's based on limited data, so we need studies that can provide actual data to refine the estimates. For instance, it will be important to include data from asymptomatic Zika infections.

Children born to Zika-infected mothers can experience severe complications, which collectively are called congenital Zika syndrome. Most people think of microcephaly, but that's just one of many complications. Some conditions, such as growth restriction and arthrogryposis (joints that are permanently bent and do not straighten), are detectable via prenatal imaging or during postnatal exams, while others, such as brain abnormalities and hearing and vision loss, can be subtle and require additional tests. Children who appear physically normal at birth can have developmental delays or even develop microcephaly or other problems later in infancy. You can learn more about Zika's effects on the developing brain in this [infographic](#).

One of our funded studies, the [Zika in Infants and Pregnancy \(ZIP\) Study](#), is following women and their infants, whether or not they have Zika infection or show symptoms. ZIP is a multi-country study that is enrolling pregnant women, ages 15 year and older, at nine sites in five countries: Puerto Rico, Brazil, Colombia, Guatemala, and Nicaragua. Participants are being followed through their pregnancies. Infants will be followed for at least one year after birth. This long-term study will evaluate the magnitude of health risks that Zika virus infection poses to pregnant women and their developing fetuses and infants. Enrollment is at a few thousand and counting. You can read more about the ZIP study and watch a video here: https://www.nichd.nih.gov/news/releases/Pages/zika_zip_06202016.aspx.

Do you believe the Zika virus will be something that stays in our system permanently? Or is it like the common cold (and eventually goes away after a couple of weeks?) e.g. if a woman gets the virus, is she then in danger of birth defects for her children for the rest of her life? or only for a period of time?

[born_to_engineer](#)

Right now, there is no evidence that prior Zika virus infection poses a risk to future pregnancies.

However, Zika can persist in bodily fluids. Studies are underway to find out how long Zika stays in the semen and vaginal fluids of people who have Zika, and how long it can be passed to sex partners.

Research supported by another NIH institute, the National Institute of Allergy and Infectious Diseases (NIAID), shows that protective immunity can develop in an [animal model of Zika infection](#).

However, we don't know how immunity develops in people. One of NIAID's candidate Zika vaccines is in a [phase 2/2b clinical study](#) to gain safety and immune response data.

My question has kind of been hinted, but I'd like to just bluntly ask:

How long should potential mothers wait after having been exposed to possible Zika carrying mosquitoes before attempting conception?

The reason I ask is because my wife and I had a Caribbean trip planned when the Zika news got popular. Reports on how long the woman must wait ranged from 2 years to 3 months...

[ittimjones](#)

CDC has guidelines for people who have traveled to an area with Zika and for people who live in an area with Zika. You can read their recommendations at: <https://www.cdc.gov/zika/prevention/protect-yourself-during-sex.html>. If you scroll down the CDC page, they offer specific guidance on how long to wait depending if one or both partners travelled.

For women who travel to an area of active Zika transmission she should wait at least 8 weeks after the last exposure before trying to get pregnant. For men who travel to an area of active Zika transmission they should wait at least 6 months after the last exposure before trying to get pregnant.

<https://www.cdc.gov/zika/pregnancy/women-and-their-partners.html>

Do you think the virus is on a spectrum? I'm not sure how to word it. Can some children carry worse cases than other children?

[Emilia0659](#)

Thanks for your thoughtful question! Children born to Zika-infected mothers can experience a range of complications, which collectively are called congenital zika syndrome. Researchers are trying to understand the full impact of Zika infection (i.e., what are all the complications?) and why some fetuses or infants develop some problems while others do not.

Most people think of microcephaly (small head), but that's just one of many complications. Some conditions, such as growth restriction and arthrogryposis (joints that are permanently bent and do not straighten), are detectable via prenatal imaging or during postnatal exams, while others, such as brain abnormalities and hearing and vision loss, can be subtle and require additional tests. Children who appear physically normal at birth can have developmental delays or even develop microcephaly or other problems later in infancy. These are all long-term conditions that require medical treatments and therapy.

You can learn more about Zika's effects on the developing brain in this [infographic](#).

One of our funded studies, the [Zika in Infants and Pregnancy \(ZIP\) Study](#), is following women and their infants, whether or not they have Zika infection or show symptoms. ZIP is a multi-country study that is enrolling pregnant women, ages 15 year and older, at nine sites in five countries: Puerto Rico, Brazil, Colombia, Guatemala, and Nicaragua. Participants are being followed through their pregnancies. Infants will be followed for at least one year after birth. This long-term study will evaluate the magnitude of health risks that Zika virus infection poses to pregnant women and their developing fetuses and infants. Enrollment is at a few thousand and counting. You can read more about the ZIP study and watch a video here: https://www.nichd.nih.gov/news/releases/Pages/zika_zip_06202016.aspx.

Does Zika pose any risks or affect development if contracted by young children?

[chefymum](#)

Currently, CDC's travel advisories are limited to pregnant women and couples trying to become pregnant. Based on research from CDC (https://www.cdc.gov/mmwr/volumes/65/wr/mm6539e2.htm?s_cid=mm6539e2), Zika infection in children is typically mild. In the study, only two children were hospitalized, and no deaths occurred. Serious complications of Zika virus disease, such as Guillain-Barré syndrome, were not reported for any children in the analysis - 129 (82%) children had rash, 87

(55%) fever, 45 (29%) conjunctivitis, and 44 (28%) arthralgia, or joint pain.

However, we do not have much information on the impact of Zika infection on a newborn or infant who was not exposed during pregnancy. We know that development continues beyond pregnancy, and the brain continues to develop well past the adolescent period. It is important to study Zika infection very early after delivery, to evaluate whether the impact of Zika is similar to an infection that occurs at the end of pregnancy.

Been trying to get pregnant for a long time. Will I ever be able to visit the Caribbean or all these places with Zika or. Or until I am finished have a family and then how old do my children need to be to safely take them to a Zika area?

[PolarIceCream](#)

Thank you for sharing your concerns. If you are pregnant or trying to get pregnant, the recommendation is that you avoid travel to areas with Zika risk, and this includes [areas in the Caribbean and South America](#).

However, the mosquitoes that spread Zika usually do not live at high elevations, so travelers who plan to only be in areas above a certain elevation (in a Zika-endemic country) may have a lower risk of getting Zika from a mosquito, although you're still at risk of sexual transmission. CDC explains here, <https://wwwnc.cdc.gov/travel/page/q-a-zika-risk-high-elevations>. There's no travel advisory for children. Based on research from CDC (https://www.cdc.gov/mmwr/volumes/65/wr/mm6539e2.htm?s_cid=mm6539e2), Zika infection in children is typically mild. In the study, only two children were hospitalized, and no deaths occurred. Serious complications of Zika virus disease, such as Guillain-Barré syndrome, were not reported for any children in the analysis - 129 (82%) children had rash, 87 (55%) fever, 45 (29%) conjunctivitis, and 44 (28%) arthralgia, or joint pain.

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I heard a while back that there was progress on creating a vaccine for Zika but the absolute earliest it would be available is 2018. Do you know if it is still on track for 2018? May it be potentially pushed back due to funding cuts under the current U.S. administration? Do we have a reasonable idea of how well the vaccine will work (for example the flu shot may not prevent you from getting the flu but it will reduce the severity of your case), especially if there is a lower than 90% vaccination rate?

[nothertheothergirl](#)

Vaccine research at the NIH is supported by the National Institute of Allergy and Infectious Diseases (NIAID). In addition, other agencies and industry are actively working on vaccines. [Clinical testing of an investigational Zika vaccine](#) began in November 2016. [In February](#), NIAID launched a Phase 1 clinical vaccine trial to provide broad protection against a range of mosquito-transmitted diseases, such as Zika, malaria, West Nile fever, and dengue fever, and to hinder the ability of mosquitoes to transmit such infections. One of NIAID's [candidate Zika vaccines](#) is in a phase 2/2b clinical study to capture safety and immune response data.

What are some important milestones and roadblocks in the development of a Zika vaccine?

[Gskran](#)

Another NIH institute, the National Institute of Allergy and Infectious Diseases (NIAID), is working on several candidate Zika vaccines. You can read about them here, <https://www.niaid.nih.gov/diseases-conditions/zika-vaccines>.

If Zika has been around for ages (at least 50-60 years I believe), what do you believe are contributing factors to it becoming an epidemic? Do you think that incidence has increased because of diagnostic tools and confirmation of cases based on them, or is it a true increase in cases? Thanks so much!

[Insomniac2four](#)

The virus was first identified in 1947 and caused minimal adverse outcomes in adults, so it got little notice prior to the current outbreak and the adverse pregnancy outcomes that have been observed. It's believed that in areas where Zika has been circulating for a long time (Africa and Asia), people may have developed protective immunity early in life, so they do not experience adverse health outcomes to the degree we are currently seeing in the Americas.

It's possible that other cofactors may be involved with a pregnant woman's risk and the risk of developing adverse complications in the infant, and we are studying those cofactors in our [Zika in Infants and Pregnancy study](#). We'll be examining co-infections such as dengue, chikungunya, CMV (cytomegalovirus), toxoplasmosis, herpes, and syphilis. Other cofactors include pesticides and other environmental factors, nutritional status, and socioeconomic factors. We will also be storing specimens from participants in the study so that we can retrospectively look at other factors we did not consider up front.

Hi Dr. Spong! I work at NIH in the library. Over the past few months I have spent a lot of time with molecular biologists from NIAID exploring molecular visualization in virtual reality. I am not a scientist, but have witnessed first hand their enthusiasm for VR to aid in designing better drugs faster. What, if any, emerging technologies are you most excited about? And do you or any on your team plan to integrate them into your research?

[cfortney92](#)

We are very excited about NIH's [Human Placenta Project](#), which supports the development of new technologies for safe, real-time assessment of placental development across pregnancy.

Past studies of the human placenta have focused largely on the organ after delivery. But to fully understand the placenta and how it works, we need to be able to study it during pregnancy, while it's still doing its job. The placenta performs multiple functions, acting as the lungs, kidneys, and liver, and the gastrointestinal, endocrine, and immune systems for the fetus.

What are the chances of someone developing Guillain-Barré syndrome due to the Zika Virus? Is there any case of children having this problem too?

[electric_junk](#)

Zika's link to Guillain-Barre Syndrome (GBS) was first reported in July of 2015. Currently, only a small proportion of people with recent Zika virus infection get GBS. Researchers are still investigating this link, and you can read about it here: <http://www.cdc.gov/zika/healtheffects/gbs-qa.html>.

Based on research from CDC (<https://www.cdc.gov/mmwr/volumes/65/wr/mm6539e2.htm?>

[s_cid=mm6539e2](#)), Zika infection in children is typically mild, and serious complications of Zika virus disease, such as Guillain-Barré syndrome, were not reported for any children in the analysis.

1. What are markers for concern in an otherwise healthy child's development that would point to having been exposed to Zika in-utero? 2. Is it possible in the U.S. there are pregnant women carrying the Zika virus who do not know they were exposed during their pregnancy? 3. What effect might Zika transmission to an infant or toddler have? Thanks for considering these questions.

[randomdrivebyhumping](#)

You have important questions, some I answered in part earlier but I will restate here.

1. Children born to Zika-infected mothers can experience severe complications, which collectively are called congenital Zika syndrome. Most people think of microcephaly (small head), but that's just one of many complications. Some conditions, such as growth restriction and arthrogryposis (joints that are permanently bent and do not straighten), are detectable via prenatal imaging or during postnatal exams, while others, such as brain abnormalities and hearing and vision loss, can be subtle and may require additional tests. Children who appear physically normal at birth can have developmental delays or even develop microcephaly or other problems later in infancy. These are all long-term conditions that require monitoring and medical treatments and possibly therapy.
2. Yes. It is possible that there are pregnant women with Zika who do not know they were exposed during pregnancy; approximately 1 in 5 people do not have symptoms of infection.
3. Zika infection in children is typically mild and rarely requires hospitalization. Serious complications of Zika virus, such as Guillain-Barré syndrome, were not reported in the [CDC study](#): 129 (82%) children had rash, 87 (55%) fever, 45 (29%) conjunctivitis, and 44 (28%) arthralgia, or joint pain.

What's the current consensus on the long term effects of carrying the Zika virus in men?

[BRAD-is-RAD](#)

Zika can persist in bodily fluids. Studies are underway to find out how long Zika stays in the semen and vaginal fluids of people who have Zika, and how long it can be passed to sex partners. A recent study in [55 men](#) showed that most cleared Zika from their semen by three months; however, in one case report, Zika's genetic material (RNA)—not live virus—was detected in semen about [six months after symptoms began](#). More research is needed to see if this is a common or rare occurrence.

Mouse studies also have suggested that Zika virus can take a devastating toll on [male reproductive health](#), but we don't know yet if this applies to people. In our ZIP study, we plan on collecting semen samples at some study sites in Latin America to determine whether Zika has the same effect in humans. You can read more about the ZIP study and watch a video here: https://www.nichd.nih.gov/news/releases/Pages/zika_zip_06202016.aspx

What antiviral therapies are available for treatment of infected patients? Will infected women be able to have children at any point in life without the risk of bearing a child with microcephaly?

Also, is why has Zika only become such a problem now rather than before? Was there a different vector for the disease prior to the epidemic, unable to infect humans, etc?

[Jkpark22](#)

There are no specific antiviral therapies or vaccines available for Zika virus. The recommended

therapies of rest, fluids, and acetaminophen or ibuprofen may improve symptoms of infection, such as joint pain and fever. Currently, there are no interventions to mitigate the impact of Zika virus exposure on the fetus.

Right now, there is no evidence that prior Zika virus infection poses a risk to future pregnancies.

See my response to Insomniac2four regarding why Zika seems to be a problem now although it has been around for a long time.

When does the risk of Zika infection end? For example, is the third trimester "safe?" And if it is not, what is the difference between an infection contracted late in pregnancy vs as a neonate?

[KT421](#)

Given that an estimated 80% of people with Zika virus infection have no symptoms, and that published scientific studies have mainly followed women who had symptoms of Zika virus infection, we need to conduct studies in pregnant women who do not have symptoms. By not accounting for this group, we're missing data used to calculate the incidence of Zika-associated birth defects. This asymptomatic group also may have risks that are different from those with symptoms. Our [Zika in Infants and Pregnancy \(ZIP\) study](#) is following symptomatic and asymptomatic pregnant women. The risk for developing complications likely will be affected by additional factors, such as the timing of infection or pre-existing immunity to Zika virus. We need more research to find these answers. For instance, a recent [mouse study in Science](#) showed that pre-existing immunity to dengue or West Nile viruses worsened Zika infection. You ask a really important question on the difference between an infection late in pregnancy vs. as a neonate. We do not have the answer but have included this concept in the design of the ZIP study, where some of the children will not have been exposed to Zika during pregnancy but may become infected after they are born.

My wife and I will soon be trying for our second child; how concerned/proactive/paranoid should we be about mosquito protection this summer? For reference, we live in central North Carolina. Thank you!

[OfRepeated1136](#)

If you are pregnant or trying to get pregnant, CDC recommends that you avoid travel to areas with Zika risk, and this includes [areas in the Caribbean and South America](#).

If you aren't in one of those categories, CDC offers many tips on planning your travel, preventing mosquito bites, and protecting yourself during sex. When you return home from a Zika-endemic area, it's also important to protect your community by using insect repellent and practicing safe sex. After all, nearly 80% of cases in adults are asymptomatic.

Are there any model animals that you can use to study Zika and its effect on fetal development? Are rodents have similar symptoms if infected?

[Nevertrustafish](#)

Good question. There are several animal models used to study Zika, including non-human primate models and mouse models. Information obtained from these studies informs the design of human studies.

For instance, [mouse studies](#) have shed light on Zika's effects on male reproduction. In our [ZIP study](#), we plan on collecting semen samples at some study sites in Latin America to determine whether Zika

has the same effect in people.

Another recent [mouse study](#) has suggested that pre-existing immunity to other flaviviruses (dengue or West Nile) can worsen Zika infection.

An NIH-funded researcher from the University of Madison-Wisconsin, David O'Connor, has been publishing his lab's Zika [research data in real-time](#) so that other scientists can view the animal model data.

How can you distinguish between virus related developmental disabilities and those disabilities stemming from prenatal or infant exposure to the chemical insecticides sprayed to prevent mosquitoes?

[HopeVotes](#)

There's plenty of scientific evidence that Zika virus is linked to microcephaly, and you can read the following review article in NEJM: <http://www.nejm.org/doi/10.1056/NEJMSr1604338>.

It's possible that other cofactors may be influencing a person's risk of developing adverse complications, and researchers are studying these potential cofactors.

One of our funded studies, the [Zika in Infants and Pregnancy \(ZIP\) Study](#), is following women and their infants, whether or not they have Zika infection or show symptoms. We'll be examining co-infections such as dengue, chikungunya, CMV (cytomegalovirus), toxoplasmosis, herpes, and syphilis. Other co-factors include pesticides and other environmental factors, nutritional status, and socioeconomic factors. We will also be storing specimens from participants in the study so that we can retrospectively look at other factors we did not consider up front. You can read more about the ZIP study and watch a video here: https://www.nichd.nih.gov/news/releases/Pages/zika_zip_06202016.aspx.

Hello,

You say above that Zika can be sexually transmitted. Last I read, there was not solid evidence on this. The study was largely disputed. Can you cite where results demonstrate this? Is the transmission bilateral across both genders?

[karch131](#)

Thank you for your question. There are many published studies documenting cases of sexual transmission as well as the presence of Zika virus in bodily fluids, including semen. This WHO publication offers a summary of some literature, including references, in section 2: <http://www.who.int/csr/resources/publications/zika/sexual-transmission-prevention/en/>

We do need to learn more about sexual transmission of Zika so that health organizations can provide the most up-to-date recommendations. Studies are underway to find out how long Zika stays in the semen and vaginal fluids of people who have Zika, and how long it can be passed to sex partners. A recent study in [55 men](#) showed that most cleared Zika from their semen by three months; however, in one case report, Zika's genetic material (RNA)—not live virus—was detected in semen about [six months after symptoms began](#). More research is needed to see if this is a common or rare occurrence.

How much of a threat is there of getting Zika while in Columbia? Is it something that both myself and my husband should be worried about if we are trying to get pregnant. And what is the risk of my husband going there and returning to the US with Zika? Is it a real threat and we should avoid the area

at all costs??

[nodicegrandma](#)

You can find CDC's travel notice on Colombia, South America at <https://wwwnc.cdc.gov/travel/notices/alert/zika-virus-colombia>. Public health officials have reported that mosquitoes in Colombia are infected with Zika virus and are spreading it to people. The website offers information on special precautions for women who are pregnant or are trying to become pregnant.

"Because Zika virus is primarily spread by mosquitoes, CDC recommends that travelers to Colombia [protect themselves from mosquito bites](#). The mosquitoes that spread Zika usually do not live at elevations above 6,500 feet (2,000 meters) because of environmental conditions. Travelers whose itineraries are limited to areas above this elevation are at minimal risk of getting Zika from a mosquito."

If your husband travels to Colombia (or an area with active Zika transmission), the recommendation is to use condoms after travel to protect sex partners from Zika, even if you are not pregnant or trying to become pregnant. In addition, on your return you should continue to take steps to prevent mosquito bites for 3 weeks after your trip so you do not spread Zika to uninfected mosquitoes that can spread the virus to other people.

For women who travel to an area of active zika transmission she should wait at least 8 weeks after the last exposure before trying to get pregnant. For men who travel to an area of active zika transmission he should wait at least 6 months after the last exposure before trying to get pregnant.

<https://www.cdc.gov/zika/pregnancy/women-and-their-partners.html>

As a male who in the past 6 months has spent a month and a half in a zika zone, even if I didn't show symptoms is there still a risk that I could be carrying zika and would it put a child at risk if I were to conceive anytime soon?

[MacGyver3298](#)

Thanks for your question. As you may already know, one in five people have no symptoms with Zika infection, so it is possible that you had Zika and were not aware. Zika has been shown to persist in the male reproductive track so, yes, you could possibly transmit the virus sexually. After traveling, the recommendation is to use condoms to protect your sex partners from Zika, at least 6 months after the last exposure before trying to get pregnant. In addition, on your return, you should continue to take steps to prevent mosquito bites for 3 weeks after your trip so you do not spread Zika to uninfected mosquitoes that could spread the virus to other people. This information is available at <https://www.cdc.gov/zika/prevention/sexual-transmission-prevention.html>.

Do you think there is a correlation between gestational week and risk/severity of microcephaly for fetuses of infected women? If so, what causes such a correlation?

[who_cares95](#)

Infection, trauma, or other adverse event affect the fetus differently depending on the timing of pregnancy. Because the fetus grows and develops throughout pregnancy, with the major development of the organ systems occurring in the first trimester, infection in the first trimester often has the most severe effects. Microcephaly has been reported in about 15% of pregnancies that were infected during the first trimester. That said, studies have shown that infection in any trimester can impact the fetus, with brain and growth abnormalities, even if infection occurs in the third trimester. In addition, microcephaly has also been reported after delivery in an infant who was exposed during pregnancy, but who had a normal head size at birth. Studies such as the [Zika in Infants and Pregnancy study](#) will

help us understand these questions.

I have the hardest time understanding the CDC website for risky areas, and there is plenty of conflicting information out there. Will we be able to know before the summer which areas of the East coast are impacted? Is Miami still risky? What about Orlando?

Melolody

If you are pregnant or trying to get pregnant, the recommendation is to avoid travel to areas with [Zika risk](#). This map is interactive. You can search specific cities, states, and countries. You can also click on areas and a pop-up message will explain CDC's Zika travel notice for that area. For instance, if you zoom in on Miami, Florida, and click the yellow area, the map explains that, at this moment, this area is considered a Zika Cautionary area. "Local spread of Zika virus has been identified here, but there is no current evidence of widespread transmission. Although the specific level of risk in yellow areas is unknown, there is still a risk to pregnant women. Visit CDC's [Advice for people living in or traveling to South Florida](#) page to learn more." If you go to Orlando on the map, it is not marked a Zika cautionary area.

If you aren't pregnant or trying to become pregnant, there are many tips on planning your travel, preventing mosquito bites, and protecting yourself during sex also on the CDC website.

Zika travel notices are available at: <https://wwwnc.cdc.gov/travel/page/zika-information>.

Travel tips are available at: <https://wwwnc.cdc.gov/travel/page/guidelines-vfr-chikungunya-dengue-zika>.

And a summary of areas with Zika, including local mosquito-borne transmission in the continental U.S., is available at: <https://www.cdc.gov/zika/geo/index.html>.