I'm Stephen Morse, a Professor of Epidemiology at Columbia University's Mailman School of Public Health. I work to understand the factors leading to emerging infectious diseases like Zika, and can answer your questions on the current outbreak. AMA!

Prof$_S$*tephen*$_M$*orse*[1]*andr*/*ScienceAMAs*[1]

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April 17, 2023

Abstract

From 2009-2014, I was co-director of PREDICT, the part of the USAID Emerging Pandemic Threats Program for identifying potential emerging infections and their sources. I'm the founding chair of ProMED—the nonprofit international Program to Monitor Emerging Diseases. In 1994, a few colleagues and I created ProMED-mail, an international network for outbreak reporting and disease monitoring using the Internet, a free service available to anyone interested. A bit about the Zika virus: Zika virus is spread to people through mosquito bites. The most common symptoms of Zika virus disease are fever, rash, joint pain, and conjunctivitis (red eyes). The illness is usually mild with symptoms lasting from several days to a week. Severe disease requiring hospitalization is uncommon. In May 2015, the Pan American Health Organization (PAHO) issued an alert regarding the first confirmed Zika virus infection in Brazil. The outbreak in Brazil led to reports of Guillain-Barré syndrome and pregnant women giving birth to babies with birth defects and poor pregnancy outcomes. The World Health Organization is meeting today discuss emergency response to the spread of the disease. I will be answering questions starting at 11am ET (8am PT). Ask Me Anything! EDIT: Hi everyone, I'm going to start answering questions now. EDIT: Thanks everyone for the terrific questions! I'm signing off now. Good health!

the WINNOWER

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Science AMA Series: I'm Stephen Morse, a Professor of Epidemiology at Columbia University's Mailman School of Public Health. I work to understand the factors leading to emerging infectious diseases lik

PROF_STEPHEN_MORSE R/SCIENCE

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CORRESPONDENCE:

DATE RECEIVED:
February 02, 2016

DOI:
10.15200/winn.145432.28993

ARCHIVED:
February 01, 2016

CITATION:
Prof_Stephen_Morse , r/Science , Science AMA Series: I'm Stephen Morse, a Professor of Epidemiology at Columbia University's Mailman School of Public Health. I work to understand the factors leading to emerging infectious

Hello I am also a public health official, and have several questions.
1. After infection does the patient develop immunity to the virus and if so is that immunity life long? 2. What percentage of pregnant women infected develop the microcephalic cluster of birth defects 3. I assume the infection needs to take place in the first 20 weeks or so of gestation, is this correct? 4. Is there any identified reservoir for the virus other than the human/mosquito connection? I.e. canids, birds, other primates, etc and if so has there been any other environmental effect on their offspring detected? This could be used as a early warning system similar to H5N1 if so.

Thanks for your time. (I needed the education!) Edit: spelling. And thanks for all the upvotes.

angry_doc

1. Yes, but we don't know if immunity is lifelong.
2. We don't have exact figures of how many people are infected, but it is probably a small percentage.
3. Some people think so, but it still being analyzed.
4. Yes, Zika was originally found in a non-human primate. We don't know what other species may be a reservoir.

diseases lik, *The Winnower* 3:e145432.28993 , 2016 , DOI: 10.15200/winn.145432.28993

Hello, Professor Morse, thank you for this AmA!

I am a medicine student in Brazil and therefore I've been following the Zika outbreak since it started spreading in our country, when the brazilian Ministry of Health "considered *confirmed* the relationship between the Zika virus and microcephaly, after finding the presence of the virus in a baby that died of microcephaly and other malformations".

Needless to say, I was very confused about making the bold claim of confirming the relationsip with a sample of one. The Ministry has now corrected themselves (though that took a while) and said that relationship wasn't confirmed, but suspected.

Which leads me to the question (sorry for taking so long!): epidemiologically-wise, how does one go about confirming the relationship between a viral infection and such outcomes (be it congenital malformations or Guillain-Barré syndrome)? How can a causal relationship be confirmed beyond doubt?

vasavasorum

Thanks for your question. First you have to confirm the viral infection. They have done this in about 500 of the 4,000 microcephaly cases so far. The next step is to look for and rule out other factors. Sometimes historical evidence is helpful. We don't know if there are other factors involved such as another infection, the health status of the mother, other diseases, etc. This is what epidemiologists do.

I've heard that there was a case of transmission of zika from a man to a woman, possibly sexually. As a man who has plans to travel to Brazil in the next year and is also considering starting a family in the same time frame, what do you recommend? Is the transmission story true and how do you think it occurred?

Kehrnal

There is one really well documented case sexual transmission from male to female. That was a researcher who was studying Zika in Polynesia and came back to the U.S., fell ill with Zika, and his wife became infected shortly afterwards. There has been one other case, but the evidence isn't quite as strong.

If a man comes back from travel to a Zika-affected area and becomes sick, he should wait to have sex a few weeks after recovery.

News outlets like this one are sharing speculation that Zika may have crossed over from *A. aegypti* into the more common Culex genus of mosquitos. How well-founded are these reports, and how does this change the at-risk area for the Zika virus?

A more radical approach to eliminating mosquito-borne illnesses is to release gene drives into the environment to drive a species like *A. aegypti* into extinction. What are your thoughts on this approach versus a more conventional vaccine-based approach?

Cersad

Too soon to tell about Culex crossover. It's being tested. Regarding the at-risk area, it would increase it because Culex species are widely distributed. Mosquito control measures would be the same.

Gene drives are promising and could really work, but we still have to sort out the environmental risks.

Hello and thank you! How long does Zika remain in the body during an infection? As a corollary: Can a woman get Zika and become pregnant a significant time later and still have risk to her fetus?

hotbutteredtoast

We're still learning about this, but usually the virus remains in the body for maybe a couple of weeks.

There is insufficient data on the question of whether it is safe for a woman who has been infected with Zika to get pregnant later. But given what we know so far, she should probably be safe after recovery.

With Carnivale starting in Brazil this month, thousands upon thousands of people from all over the world will be in the hotspot of this outbreak. All officials are recommending is to cover up and use repellant. Is that enough to stop the spread of this virus? Tourists who have possibly gotten infected will go home. When the warm weather brings out the mosquitoes, won't the virus spread?

pinkroziz

This was true before with Dengue carried by the same mosquito. The virus will only spread in places with the right ecological conditions--such as areas with the right mosquitos to transmit the virus. The normal precautions for avoiding mosquito bites are always good, but never perfect.

Hi Professor Morse, thanks for your time today, where did the virus originate from and why is it predicted to undergo such an explosive period of growth in the near future? What are the best countermeasures afflicted countries can take?

Finally I am very interested in agent based disease spread models, do you know of people applying them to this disease outbreak and if not are more classic extrapolations being made of the disease spread?

Thanks very much!

InterGalacticMedium

Zika was first found in a forrest in Uganda in 1947. It seems there were some small outbreaks until it got to Polynesia about 10 years ago. It seems to have moved from there to Brazil in 2014. A likely reason for its explosive growth recently is that the virus got into more densely populated areas in Brazil and the whole Caribbean area where there is more travel and higher population density. Zika is new to these areas, which makes a bigger outbreak possible when people haven't been previously exposed and haven't developed immunity.

What states are likely to see this virus before the end of summer and what can we do about it?

Sendinthegimp

We've already seen imported cases in a number of states. Probably, most of them will not spread.

The Gulf States, including Florida, have the conditions where the virus could gain a foothold. Mosquito control is still important and will make the difference.

What is your view on the suggestion that humans should attempt to eradicate the planet of mosquitoes? (Links suggesting this approach: http://www.bbc.co.uk/news/magazine-35408835, http://www.nature.com/news/2010/100721/full/466432a.html)

sb452

We don't know what the effects of ridding the planet of mosquitos would be. They are food for animals like bats. Obviously, it would be good to greatly reduce their population, especially those that carry disease.

So i have a couple of questions I was wondering about this Zika virus that I haven't seen an explanation to yet, and you might not have an answer to but hey it's worth a shot to ask

1. Is this virus easily transmitted through bodily fluids or contracted through close proximity of someone who has it currently?
2. Is this virus anything similar to chicken pox where a victim who has contracted it and now tests negative will no longer be affected?
3. With symptoms so similar to those of the flu, how often do people get tested and of that percentage how difficult is it to test a potential cure?

Thanks for your time and the work you're putting into helping humanity

naughtyoreo

Thank you. I don't think it is easily transmitted through bodily fluids, with a few exceptions. We've seen a few cases of transmission through blood transfusion. And the two reported cases of sexual transmission. Otherwise, we think you need the mosquito to transmit it. We think once you're recovered that the virus is probably gone from the body. (You might be interested to know that with chicken pox, the virus stays in the body; this unlike what we think is happening with Zika.) Probably most people with Zika we think have no symptoms or extremely mild symptoms. The concern is when someone, especially a pregnant woman, develops symptoms like rash, fever, joint pain, or conjunctivitis (red eye).

Thank you for doing this AMA prof Morse! Zika virus and the link to birth-defects has indeed gotten a huge media attention, and I'm sure many users on Reddit will be reading this AMA with great interest.

My question:

Have you observed any pathogenic factors from the viral infection that can be causing the problems with pregnancy? Or do could the virus be kicking off a harmful immunological response, similar to the Dengue virus disease?

lysozymes

We think it's probably the virus infected the developing brain in utero. But we still need more evidence.

Professor, thanks for giving us the chance to ask you about pandemics. My question is why and how a relatively unknown disease as Zika suddenly transforms in a global threat ? And why this disease in particular has the potential of such massive spreading and others don't?

gatsby85

Part of it is that Zika is getting to an area where people haven't encountered it yet and haven't developed immunity, and in areas with higher population density. Dengue has been traveling around the world for years and hasn't gotten as much notice.

Hello! I have three burning questions:

1. What is the potential for the Zika virus to leave demographic scarring? Women are being told to avoid getting pregnant, or having abortions when they've been in contact with the virus. If the virus spreads to a vast proportion of the global population, am I correct in saying that theoretically birthrates will taper further and contribute to the population ageing problem?
2. What is the potential for pathological mutation of this virus? Are the symptoms of this illness likely to change over time? Can the mode of transmission evolve?
3. Does infection with the Zika virus pose any chance of developing secondary conditions for instance in the same way that Epstein–Barr virus is related to autoimmune disease and certain cancers?

Thanks in advance if you choose to answer these questions :)

awwwyisss

Major demographic effects will hopefully be limited in time and place. Of course, not everyone will have access to birth control. I will be surprised if Zika will be enough of a problem to make a large difference with demographic trends. On mutation, we really haven't seen this happen with Zika to any significant extent. Of course mutations happen, but we haven't seen it make a significant difference in severity of transmission. I think the same with mode of transmission. We haven't seen examples of mode of transmission changing with any virus. On secondary conditions, probably not. Although we've seen Guillain-Barre, a nerve disease of the extremities. That's still fairly rare.

I am wondering if zika infected mosquitoes pass zika to their offspring. I've seen it say that the mosquito passes it from person to person, but do they pass it on to themselves?

whoopin

Transovarial transmission has been described with other related viruses, but we don't know.

Hi and thanks for your time!

If a pregnant woman is infected with the virus, how well can we detect if the foetus is infected? After how much time? What are the odds for a foetus to end up with microcephalia if it is indeed infected? Can it be detected soon enough that abortion can be considered? Should abortion even be considered? (will the baby suffer heavy problems all his life or will he actually mostly recover from this?)

mtlredditor

CDC recommends that pregnant women who have been in Zika-affected areas and get the symptoms within two weeks should be tested. The fetus should also be monitored using the usual ultrasound. We don't know about the longterm effects of microcephaly but a few children have already died and many seem severely affected, but it will take time to determine the extent of the problems. They won't recover since brain development has been damaged. It is a question of how much in each case. Abortion is an issue people feel strongly about. It's a personal choice.

Hello! Thank you so much for doing this AMA for us (pretty sure that the ladies over in babybumps appreciate it greatly!) I have two questions.

1) If a newborn, infant or toddler were to get bitten, would the virus cause them issues, or is it just in utero?

2) What other viruses should be on the watch for besides Zika?

Thanks again!

Edit: I forgot how to two

resonance-of-terror

We don't have a lot of data, but Zika infections in young children seems the same as in older people.

Other viruses, great question! We've never predicted these in advance. We have to be watching for anything unusual. Nobody was expecting Zika. Flu is always one to watch for. And since a few species of mosquitos carry a number of diseases, it would help to control the mosquitos effectively. This couldn't have happened 60 or 70 years ago. There was better mosquito control back then. Look up Walter Reed and the Panama Canal with regard to yellow fever: same mosquito.

I saw on the news florida has had 3 reported cases, should floridians be worried? I live in South Florida and there's always mosquitos around.

Abipolarbears

It remains to be seen whether there will be local transmission in Florida and other Gulf States. In the meantime, take the usual precautions against mosquitos such as mosquito repellant, screens on windows, and draining containers with standing water.

Can Zika survive in a male's sperm like other diseases such as Ebola and infect a person's mate or potential fetus?

TheLagginDragon

It seems rare. We've only seen a couple of cases of sexual transmission so far. The virus can probably only persist for a limited time. Maybe a few weeks to a couple months from what we've seen.

Are there any known ocular manifestations of the virus? (Optic neuritis, conjunctivitis, etc)?

icecreamw

Conjunctivitis, yes. Deeper in the eye, we don't know.

Good morning and thank you! I am 15 weeks pregnant. My best friend is 19 weeks, another good friend is 11 weeks. We all live in central Oklahoma. There is a lake in our area and many small farm/personal ponds. My question is:

What steps can we laypeople take to protect ourselves as the weather warms here? I have to assume

that Zika could spread to our area before measures like vaccination, genetic mosquito breeding control, etc. are available for this outbreak. Bug spray? Long sleeves? No lake all summer (please say it ain't so...)? What about family members? If my husband or daughter contract the illness, could it spread to me personally (vs being bitten by an infected mosquito)?

iamequipoised

Not every mosquito carries Zika. The only confirmed vector is Aedes, especially aegypti. Of course, the usual precautions to avoid mosquitos are always useful because they're such a nuisance and there are other diseases like West Nile. I think the CDC and the state health departments are watching this carefully and will be working on mosquito control.

My mother is an anti-vaxxer and is doing anything she can to say this disease is coming from vaccines. Is there a quick and dirty of the disease I could tell her about to say it, in fact, did not come from them?

whoamiwhoareyou2

We've been using the same vaccines for years and this is new. What vaccine does she think it's coming from and why now? I suspect some of the low-income people who are getting it may not be getting vaccinated. And, as you know, there is no vaccine for Zika.

I have read Zika originates from Uganda. Soon I'll be a couple of months in Kenya for my study. Is there a possibility that the virus will return to the region, if yes, what could be good precautions?

SkipDutch

I don't foresee that much will change in Kenya in terms of Zika.

There has been some assertion/speculation that the introduction of genetically modified mosquitos intended to control dengue fever has played a part in this outbreak.

Is there any evidence in support or opposition to this assertion?

Killfile

I haven't seen any evidence to support that. It doesn't seem likely.

What do you think are the chances of the Zika virus making its way to Australia? And do you think that genetically modified mosquito could be used to successfully manage the spread of the virus?

pkstarstorm05

Only if the right mosquitos are there.

What's the likelihood of the virus spreading to Sub-Saharan Africa?

lucassoren

That's where it came from. Zika is named after a forrest in Uganda where it was first identified.

We talk a lot about the effect of the virus on unborn babies. Is there no (dangerous) effect on other people ? (What about old or frail people ?)

Keitea

We haven't seen deaths in adults. From what we know, it doesn't seem especially dangerous. But it's always a good idea to take precautions against mosquito bites.