Chikungunya Virus - An Emerging Threat to the Americas

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Presenter: J. Erin Staples, MD, PhD

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Coordinator:
At this time all participants are in a listen-only mode. After the presentation we will conduct a question and answer session. If you’d like to ask a question you may press * then 1. Today’s conference is being recorded. If you have any objections you may disconnect at this time. Your host of today’s call is Leticia Davila. Thank you. You may begin.

Leticia Davila:
Thank you (Keondra). Good afternoon. I am Leticia Davila and I am representing the Clinician Outreach and Communication Activity (COCA) with Emergency Communications System at the Centers for Disease Control and Prevention. I’m delighted to welcome you to today’s COCA Webinar, Chikungunya Virus - An Emerging Threat to the Americas.

We are pleased to have with us today Dr. Erin Staples from the Centers for Disease Control and Prevention. She will provide information on the virus epidemiology, clinical findings, diagnosis, treatment and prevention. Additionally, she will describe the importance of early recognition and reporting of suspected cases to mitigate the risk of local transmission. You may participate in today’s presentation by audio only, via Webinar, or you may download the slides if you are unable to access the Webinar. The PowerPoint slide set and the webinar link can be found on our COCA Website at emergency.cdc.gov/coca. Click on COCA Calls. The Webinar link and slide set are located under the call in number and call passcode.

At the conclusion of today’s session the participant will be able to: describe which patients to test for the infection, explain testing, treatment and prevention measures and understand the importance of early recognition and reporting of cases.
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Today’s presenter Dr. Erin Staples is a Medical Epidemiologist in the Arboviral Diseases Branch in the Division of Vector-borne Diseases at the CDC in Colorado. She is responsible for a wide variety of arboviral diseases focusing particularly on yellow fever, chikungunya, blood and transplant associated arboviral infections and tick-borne arboviral diseases. Her past work experiences include bacterial zoonotic diseases at CDC, vaccine development in industry and clinical work in pediatric infectious diseases. Dr. Staples has both a medical degree and a doctoral degree in microbiology and immunology and she has published on a variety of scientific subjects.

In addition to today’s presenter Dr. Mark Fischer, a Medical Officer from CDC’s Division of Vector-borne diseases will be available to answer any questions during the Q&A section of today’s call. Again the PowerPoint slide set and Webinar link are available from our COCA Web page at emergency.cdc.gov/coca. At this time please welcome Dr. Staples.

**Dr. Erin Staples:**

Thank you Leticia.

**Leticia Davila:**

Chikungunya Virus – An Emerging Threat to the Americas
Tuesday, February 18, 2014 2 PM (ET)
Dr. Erin Staples:

Chikungunya is a mosquito-borne viral disease that is characterized by the acute onset of fever and often severe polyarthralgia. The disease often occurs in large outbreaks with high attack rates affecting 1/3 to 3/4 of a population in an area where the virus is circulating. Outbreaks of chikungunya have occurred in countries in Africa, Asia, Europe and the Indian and Pacific Oceans. However, in late 2013, the first locally acquired cases of chikungunya were reported in the Americas among islands in the Caribbean.

This map depicts countries that have ever reported locally acquired cases of chikungunya. Until 2004 cases occurred predominantly and often sporadically in Africa and to some degree in the Indian subcontinent. However starting in 2004, there was a large expansion in the number of chikungunya disease cases reported throughout many countries in the Indian and Pacific Ocean and even a few countries in Europe.

Since the first local - first case of locally-acquired chikungunya was reported in St. Martin in the Caribbean in early - in December 2013 seven countries have reported locally-acquired cases. These countries have already reported over 1,000 laboratory confirmed cases. However, data released late last week and even today suggests it’s currently closer to 2,000 laboratory confirmed cases. Several other countries in the region have identified cases in travelers returning from these countries. Given the large amount of travel in the presence of known mosquitoes that transmit the virus in the region, we expect chikungunya to continue to spread to new areas in the Americas.

Chikungunya virus is not currently found in the United States or its territories in the region. From 2006 through 2009, 106 laboratory confirmed cases were identified in travelers visiting or returning to the United States. None of those cases however triggered a local outbreak. However the cases - however with the outbreaks occurring now in the Caribbean, we anticipate the number of chikungunya cases among US travelers will likely increase. These reported cases may result in virus introduction and local spread to some areas of the United States.
On Slide 10 with chikungunya virus, chikungunya virus is a single stranded RNA virus of the genus Alphavirus family, Togaviridae is closely related to other Alphaviruses that cause similar disease in humans such as Mayaro, O’nyong-nyong, and Ross River virus.

Chikungunya viruses predominantly transmitted to humans by Aedes aegypti or Aedes albopictus mosquitoes shown here at the bottom of the slide. These are the same mosquitoes that are primarily responsible for transmitting dengue virus and they’re widely distributed throughout the Americas. Mosquitoes are aggressive daytime biters which means a typical prevention messages for West Nile to reduce evening and nighttime mosquito exposures are less effective.

Similar to dengue virus, chikungunya virus is maintained in an anthroporonic transmission cycle which means people infected with chikungunya virus develop high levels of virus in their blood and are capable of infecting mosquitoes that feed on them while they’re viremic. These mosquitoes can then transmit the virus to other people leading to person to mosquito to person transmission of the virus.

Several other modes of chikungunya virus have been documented though they are rare. In utero transmission early in the second trimester has resulted in three abortions where chikungunya viral RNA could be detected in fetal tissue. Intrapartum transmission also has been documented when the mother was viremic during delivery. The virus has been documented through percutaneous needle sticks and laboratory exposures through infected blood or viral culture. Given that humans develop high levels of viremia, it’s expected but not yet documented that transmission can occur through blood transfusion and organ or tissue transplantation. One study evaluating breast milk from viremic women did not identify chikungunya virus or viral RNA in the milk making transmission through breastmilk less likely.

The majority of people infected with chikungunya virus develop clinical symptoms. The range of symptomatic infection is documented through sero surveys and follow-up questionnaires have been between 72% and 97% of affected persons. This is different than the proportion of persons who develop symptoms from other mosquito-borne viruses such as West Nile or dengue where
the majority of persons are asymptomatic following infection. For symptomatic chikungunya virus infections the incubation period from the mosquito bite to disease onset is usually between three and seven days with a range of one to 12 days. The primary clinical symptoms of chikungunya virus infections are fever, and polyarthralgia.

The fever seen with chikungunya has an abrupt onset with temperatures often greater than 39°C. Most people develop joint pain that’s often severe and debilitating. The word chikungunya means that which bends up and describes the often stooped and bent postures seen with patients. With some outbreaks people have been described as unable to get out of bed due to their joint pain. The joint pains are usually involve multiple joints; they’re typically bilateral and symmetric and most commonly in the hands or feet but can be seen in the more proximal joints as well.

Other clinical signs and symptoms that are seen with chikungunya virus can include headache, myalgia, arthritis, conjunctivitis, nausea, vomiting, or maculopapular rash. The rash typically occurs two to five days after the onset of fever and involves the trunk and extremities but can include palms, soles and face. The rash can also present as a diffuse erythema that blanches with pressure.

Some of the clinical laboratory findings that can be seen with chikungunya virus infection include lymphopenia, thrombocytopenia, elevated creatinine or elevated hepatic transaminases.

During large outbreaks of the disease that occurred roughly ten years ago, a number of atypical disease manifestations were noted including eye involvement with uveitis or retinitis. Also seen was hepatitis, nephritis or myocarditis. Hemorrhage was also noted in a small proportion of cases but this had also been previously noted in older outbreaks as well. There were several neurologic disease manifestations noted such as myelitis, cranial nerve palsy, Guillain-Barre syndrome or meningoencephalitis. Finally, unusual dermatologic manifestations were reported such as bullous skin lesions that were described primarily in neonates who were exposed to the virus during the intrapartum period.
Groups identified as having an increased risk for more severe disease or namely hospitalization or atypical disease include neonates exposed intrapartum, adults over 65 years of age and people with underlying medical conditions such as diabetes, hypertension or cardiovascular disease.

The acute onset - the acute symptoms of chikungunya typically resolve within seven to ten days. Mortality is rare and mostly occurs in older adults. Some patients will have relapses of rheumatologic symptoms such as polyarthralgia, polyarthritis, tenosynovitis, Raynaud’s syndromes in the months following their acute infection. Studies have reported variable proportions ranging from 5% to 60% of patients will have persistent joint pains from months to years following their illness. Risk factors for persistent joint disease include pre-existing joint disease, high initial viremia levels or in one study HLA type B27 was found to be associated with persistent symptoms.

There are a number of diagnostic tests for chikungunya including culture to detect virus, RT-PCR to detect viral RNA, serology to detect IgM and confirmatory neutralizing antibodies or serology to detect 4-fold or greater rise in virus specific quantitative antibody titers on paired sera. The virus specific titers can be determined either by plaque reduction neutralization tests referred to as a PRNT or immunofluorescent assay or IFA. According to the *Biosafety and Microbiological and Biomedical Laboratory* publication, chikungunya virus should be handled under biosafety level 3 conditions.

This table shows the optimal timing for using some of the diagnostic tests discussed in the last slide. The virus can often be cultured from the blood of a symptomatic person within the first three days post-illness onset. RT-PCR can often be - can detect viral RNA within eight days after illness onset. And IgM is usually detected starting about three days after illness onset.

On Slide 23 lists the laboratories that offer diagnostic testing currently in the United States. Those include CDC’s Arboviral Diseases Branch, several state health departments including California, Florida and New York and one commercial laboratory namely Focus Diagnostics. You can order chikungunya testing from a number of other commercial laboratories but the samples will be sent to Focus for testing.
There’s currently no specific antiviral therapy to treat chikungunya virus infections. Therefore, the mainstay of treatment is supportive care with fluid and rest. Non-steroidal anti-inflammatories or NSAIDs can be used to help with acute fever and pain. Aspirin use however is discouraged due to the theoretical risk of hemorrhage derived syndrome. In some dengue endemic areas, acetaminophen or paracetamol is the preferred first line of treatment for fever and joint pain until dengue can be ruled out in order to reduce the risk of hemorrhage. For patients with persistent joint pain the use of NSAIDS, cortical steroids including topical preparations and physiotherapy may help lessen the symptoms.

It’s important to consider and distinguish dengue from chikungunya virus infections. The viruses are transmitted by the same mosquitoes. The disease has similar clinical features and the viruses can co-circulate in the same area and cause co-infections. Finally, it’s important to rule out dengue as a proper clinical management can improve the outcome for patients with dengue.

This table shows the clinical features of chikungunya virus compared with dengue virus infections. The number of plus signs indicate the frequency at which symptoms were reported in studies comparing chikungunya and dengue in the same population where the virus was circulating at the same time. In comparison to dengue, chikungunya is more likely to cause a slightly higher fevers, arthralgias and arthritis. The frequency of headaches is similar though retro-orbital headaches are often more classically described with dengue. Chikungunya is more likely to cause a rash while dengue causes more myalgia and hemorrhage. Shock is only seen with dengue virus infections.

This slide shows - this slide is similar to the last and it shows the clinical laboratory features of chikungunya compared to dengue. Lymphopenia is more commonly seen with chikungunya while neutropenia, thrombocytopenia and elevated hematocrits are more often seen with dengue virus infections.

The differential diagnosis of chikungunya will depend on the clinical signs and symptoms as well as where a person is suspected of being infected. So for returning travelers from the...
Caribbean for instance dengue and leptospirosis should be considered. For travelers to other areas malaria rickettsial infections are also in the differential. Other diagnosis to consider include parvovirus, enterovirus, Group A *streptococcus*, rubella, measles, adenovirus, post-infectious arthritis or rheumatologic conditions. Again depending on the travel history, other alphaviruses could be considered such as Mayaro virus which is found in South America, Ross River and Barmah Forest viruses in Australia, O’nyong-nyong virus in Africa and Sindbis virus from many areas in Eastern Hemisphere.

Travelers going to areas with known ongoing virus transmission should be informed about the risk of the disease, ways to prevent the infection and to report to health care if they get sick during or following their travel. Chikungunya should be considered in patients with the acute onset of fever and polyarthritis, particularly travelers coming back from the Caribbean at this time. Finally clinicians and public health officials are encouraged to beware of possible local transmission of the virus in areas where *Aedes* species of mosquitoes are active.

Healthcare providers should report suspected chikungunya cases to their state or local health department to facilitate the diagnosis and mitigate the risk of local transmission. State health departments are encouraged to report laboratory-confirmed cases to the CDC through ArboNET, the national surveillance system for arboviral diseases. This will allow for tracking the location of known cases, the location where they may have become infected and will also help to assess the risk of local transmission and identified additional modes and risk factors for infection and severe disease.

There is no vaccine or medication available to prevent infections or disease. The primary prevention measure therefore is to reduce mosquito exposure. Furthermore, consider advising persons who are at risk for severe disease to avoid travel to areas of ongoing outbreaks. Finally protecting infected people from further mosquito exposure during the first week of their illness will prevent them from infecting naive mosquitoes and contributing to the spread of the virus.

Specific mosquito prevention and control measures include the use of air-conditioning or windows or door screens to keep mosquitoes out of a house or a room, the use of mosquito
repellents on exposed skin, weather permitting wearing long-sleeved shirts and long pants, empty standing water from outdoor containers to cut down on potential mosquito breeding sites and supporting local vector control program.

This slide shows a handful of selected references that can be used to get more details on chikungunya virus disease. As already noted this slide presentation is posted on the COCA Web site if you wish to have access to this list following the call.

Slide 34 is the final slide that shows the number of additional references about chikungunya that contain information - general information to prevention measures as well as travel specific information and a link to the preparedness and response guidelines that was written by the Pan American Health Organization and the CDC and published in 2011 prior to the introduction of the virus in the Americas. With that I’d like to end and open it up potentially for questions.

**Leticia Davila:**
Thank you Dr. Staples for providing our COCA audience with such a wealth of information. As a reminder Dr. Fischer is available to answer any questions you may have. We will now open up the lines for the question and answer session. And also remember you can submit questions during the Webinar system. Operator?

**Coordinator:**
At this time we will begin the question and answer session. To ask a question press *1 and record your first and last name. If you wish to withdraw your question please press * 2. One moment please for your first question.

**Leticia Davila:**
And as we’re queuing up operator we do have some that have come through the Webinar system.

**Coordinator:**
Okay.
Leticia Davila:
The first one says can you discuss the specificity of the IgM tests?

Dr. Erin Staples:
Yes so the IgM ELISA that’s currently available there is always a potential for any sort of ELISA to have nonspecific reactivity that could occur.

Thankfully there are not many endemic alphaviruses that will cause a nonspecific or I’m sorry cross reactivity due to that.

So the IgG assay will be useful potentially in telling someone if they’ve had a past infection of chikungunya. However it’s more the IgM that you would want to use to look for more recent infection or at least indication of a more recent infection.

So the IgM assay again would have some limitations as already discussed, particularly the ELISA’s with nonspecific reactivity.

That’s why here at CDC we go on to traditionally do neutralization testing to confirm the specificity of those antibodies and to confirm the infection in someone.

Leticia Davila:
Thank you. Operator?

Coordinator:
Our first question is from (Silaga Roj), MD. Dr. your line is now open. You can ask your question.

Dr. (Silaga Roj):
Yes, enjoyed the presentation. It was very informative. My question is once you have chikungunya is your immunity permanent or are there any cases of recurrent acute episodes of chikungunya if they get re-exposed to the mosquitoes?

**Dr. Erin Staples:**
That’s a good question and our information on that is a little bit limited. But, we do believe that once you’ve been infected with chikungunya virus you will develop immunity and cannot be reinfected and develop a clinical symptom similar to your acute illness.

However one of the caveats to note is that a number of people who do get infected with chikungunya actually have their symptoms acutely, feel better for a short period of time and then develop some of these more long-term symptoms that we talked about or reoccurrence of a polyarthritis or a polyarthralgia.

And, therefore, in some people it almost might seem like they were reinfected but in fact that is a continuation of the original infection that they had. We would not expect someone potentially to have a relapse of symptoms if they’ve recovered completely years later or technically to be reinfected years later given the information that’s currently available.

**Dr. (Silaga Roj):**
It’s very interesting because on one of my visits to India I got chikungunya and went through a whole seven days of severe polyarthralgia, fever and the symptoms you described. And my whole family was infected and we found different degrees of severity in different individuals all below 60 years of age from a 4 month old baby to a 60 year old. And...

**Dr. Erin Staples:**
Yes I appreciate you tell - sharing your personal information and it seems to correspond. There is at least some data that’s been published to suggest for instance younger children do not necessarily develop as severe symptoms as potentially older adults do. But it is quite variable how an individual may be affected when they are infected with chikungunya. Again some people
though mostly a small proportion will be asymptomatic to other people will develop very severe and de-abilitating arthralgias.

**Dr. (Silaga Roj):**
You know, out of this many people who are in the house all were healthy, not diabetic, no other debilitating conditions. And I got over the chikungunya without any problem while one of my relatives has still after five years arthritis in different joints. So it was the presentation of the infection is so variable it many times you think it may be just another viral infection, some respiratory virus or some...

**Leticia Davila:**
We lost the caller.

**Coordinator:**
Our next question is from (James Keegan). (James) your line is open.

**James Keegan:**
Yes. Are there any particular in hospital infection control measures recommended for patients infected?

**Dr. Erin Staples:**
At this time we do believe it’s mostly going to be kind of direct blood borne transmission. We don’t have any information to suggest that there could be any droplet or respiratory. So the usual precautions would be recommended but nothing additional beyond that for infection control practices.

**James Keegan:**
Thank you.
Leticia Davila:
We do have another one that has come through the Webinar system. Is there a time of year that ChickV is more prevalent or transmission rates are higher?

Dr. Erin Staples:
That’s a good question and chikungunya virus affects a lot of different regions of the world so obviously there’s no one right answer and a lot of it just depends on the local conditions.

So conditions that will help with mosquito breeding such as, you know, warmer temperatures, rainfall -- those things which will help in multiplying mosquitoes can also then lead to amplification and more cases of chikungunya in an environment.

In a temperate climate that we see here in the United States we would expect it to be more seasonal similar to some of our other mosquito-borne viral diseases like West Nile where we would see cases occur during our kind of summer to early fall months when the mosquitoes are most active and then potentially have minimum cases or no cases over kind of our winter months particularly in the northern climate.

Leticia Davila:
Thank you. Operator?

Coordinator:
Our next question is from (China Allen). Your line is open. You may know ask your question.

(China Allen):
Yes hello. This is (China Allen). I was just calling just to get a sense of how closely the longer lasting effects of it might mirror fibromyalgia?

I ask that because for the past four years I spent at least seven to ten days with the last visit there two years ago for two and half weeks. And three days after I returned back to the states from
Belize I spent a considerable amount of time in the jungle and the caves and I had a very, very violent episode of throwing up and diarrhea.

I do not recall fever but it lasted about 2.5 days of being violently persistently ill. And thereafter upon presenting myself to a regular internal medicine physician I was told that I had fibromyalgia because I had very acute joint pain which I still have to this day.

And it’s been two years of solid joint pain and muscle aches and joint pains that are typically unexplained and no one can get to the bottom of it.

And I’m calling today primarily because I’m actually doing some working the - my physicians doing some differential diagnosis to kind of get a line on this because my white blood cells are extremely low.

And there is considerable amounts of concern over that. So and that was one of the questions that was asked of me had I been in a Caribbean country? And the answer to that question was yes extensively.

And then it like I said it occurred to me afterwards that I did have that experience two years ago with the violent illness, no fever. And, you know, what’s lasted is the joint pain that’s diagnosed with fibromyalgia but with no additional workup. And what I’m just wondering is how close could the polyarthritis mirror that when one presents?

Dr. Erin Staples:
Yes, no I appreciate you sharing your history and story with us and the question related to fibromyalgia and chikungunya. You know, obviously it’s going to vary by individual but most of those symptoms with chikungunya are really focused in the joints.

So the muscle aches, the more diffuse pain that can be experienced with people with fibromyalgias would be a little uncharacteristic of what we anticipate. We see people with morning stiffness for instance or pain in their joints that tend to have a more long-term symptoms
that can be described following chikungunya. So it is very much more of a focal joint illness, more of a like a rheumatologic arthritis or another process like that, a little less like a fibromyalgia where the pain can be a little bit more diffuse.

(China Allen):
Okay. Thank you for that because it is - it’s very, very acute joint pain just - I just can’t get a handle on where it’s coming from, primarily knees and arms and just in the joints and with no swelling of any kind of arthritic condition of whatsoever.

Dr. Erin Staples:
Yes that would be pretty much a little bit inconsistent. And even without the fever in your initial illness I’d be a little concerned that this might not be chikungunya but I would encourage you to work with your physician to work through it and explore potential causes for this because I can understand how frustrated you might be.

(China Allen):
Thank you for that.

Coordinator:
Our next question is from (Catherine Feldman). (Catherine) your line is open.

(Katherine Feldman):
Hi Erin. It’s (Catherine Feldman) in Maryland. Thank you for the presentation.

Going back to the discussion about the seasonality and I’m wondering if you guys have any thoughts on establishing chikungunya in the US? It doesn’t have an avian reservoir the way West Nile does. And so here in Maryland, you know, we don’t have mosquitoes in the winter, clearly there are areas of the country where there are mosquitoes year around, so just wondering if you have any thoughts about chikungunya actually becoming endemic in the US specifically in the more northern climes?
Dr. Erin Staples:
Yes, and I appreciate the question. You know, we’re not able to really predict yet if chikungunya virus would become endemic to the United States.

We do know as you already alluded to that many areas of the United States have mosquitoes that can be infected and transmit chikungunya particularly the southeastern United States for instance as a fair bit of *Aedes aegypti* mosquitoes.

However with the recent outbreaks we saw of chikungunya in Europe and even our dengue outbreaks in the United States we expect that the chikungunya outbreak might react very similarly so it’d be relatively small and focal in their current. But given this we think it’s very important to maintain and improve our ability to test and check for chikungunya and other mosquito-borne diseases to serve as early indicators potentially allowing early vector control interventions.

So we don’t anticipate particularly in a place like Maryland that you would see necessarily a large outbreak based on what we know currently at the, you know, but time will only tell us how things will evolve with chikungunya.

(Katherine Feldman):
Thank you.

Coordinator:
Our next question is from (Mary Drotsky). (Mary) your line is open.

Leticia Davila:
Before we go on to the next...

(Mary Drotsky):
Thank you. I’m calling from Stevens Point, Wisconsin.
(Mary Drotsky):
I’m just calling, I came in a few slides late so I just wanted to - I did see that they are primarily two species of mosquitoes identified as of the vector.

And I was just wondering if someone did go to the Caribbean, get infected and came back, are there other species of mosquitoes that could possibly transmit this from one person to another if there was a high viral load way up in Wisconsin? I mean I don’t know if we have those two species but could other species of mosquitoes possibly transmit from person to person?

Dr. Erin Staples:
Thanks. That’s a good question and something obviously we thought about a fair bit here at the CDC Arboviral Diseases Branch.

Right now based on what we know about chikungunya it really does like the *Aedes aegypti* or *Aedes albopictus* or that Stegomyia family of mosquitoes.

Those are really the two classic Stegomyia species that we have available in the United States, *Aedes aegypti* and *Aedes albopictus*.

Furthermore right now at least we know that the circulating strain in the Caribbean is of the Asian descent and suggest that it’s going to be predominantly or at least better transmitted with *Aedes aegypti* right now.

However once any virus gets into a new location and new climates and has different sort of ecologic environmental pressures we could see potential mutations of the virus.

For instance in 2004 the outbreak started with a known East African strain that was transmitted well by *Aedes aegypti* but then mutated to be better transmitted in *albopictus* which allowed it to
get into populations that hadn’t seen chikungunya before, didn’t have high levels of population immunity and led to large outbreaks.

So again unfortunately only time’s going to tell us for sure what’s going to happen with chikungunya but for now we think it’s predominately going to be localized into the areas which is - are southern United States and that have Aedes aegypti and potentially might also get into Aedes albopictus.

(Mary Drotsky):
Thank you.

Leticia Davila:
Thank you. Before we move on to the next caller we do appreciate your questions however we will need to limit them for clinicians to talk about treatment and prevention measures. If you do have questions related to your personal health please contact your provider. Thank you.
Operator?

Coordinator:
The next question is from Dr. (Perulla). Your line is open. You may ask your question.

Dr. (Nurella):
Hi. It’s Dr. (Nurella) from New York. My question was if someone has had dengue fever in the past and since chikungunya and dengue are from Aedes aegypti is there any cross protection or anything like that?

And also are there - is there just one strain of this as compared to dengue having four or five now? Thank you.

Dr. Erin Staples:
Yes, no that’s a good question and we would - and that would be nice if it provides cross protection but unfortunately it won’t.
So dengue is a flavivirus while chikungunya is an alphavirus. And there is no cross protective immunity between those two different families of viruses.

So we don’t anticipate that previous dengue infection will provide any protection against chikungunya and I think will complicate, you know, many of the returning travelers’ clinical presentations knowing which disease this is as well as when cases are occurring in the Caribbean and it will further complicate things trying to determine if it’s dengue versus chikungunya given there’s similar clinical presentation and as you said the same mosquito species that are transmitting it.

**Dr. (Nurella):**
And a follow-up was, are they is there any vaccine that’s...

**Dr. Erin Staples:**
So there have been several vaccines that have started in what we call preclinical and early clinical development. But there is nothing that’s in the pipeline now that we would expect to be available anytime in the near future.

**Leticia Davila:**
We have another question from the Webinar system. Can you discuss the importance of the Caribbean viruses do not have the African mutation that facilitates replication in *A. albopictus*?

**Dr. Erin Staples:**
Yes so I briefly alluded to that in response to another question. But right now we do - we have information to suggest that it’s the Asian strain that is circulating in the Caribbean that is preferentially transmitted by *Aedes aegypti* mosquitoes. It can go into *albopictus* but they are not a very confident Vector for that strain currently.

So we don’t anticipate it going into *albopictus* and that will preclude potentially the expansion of the virus. For instance areas up into New York City can have *Aedes albopictus*, but they don’t...
usually have *aegypti*. So the *aegypti* again is kind of located more in our Southeast and Southern states.

There is actually a map on the CDC Website on our vector control fact sheet that shows the depiction of where both of those mosquito species are located in the United States currently, if people want further information about their distribution.

**Leticia Davila:**
Thank you. Operator?

**Coordinator:**
Our next call is from (Connor Bridge). (Connor) your line is open.

*(Connor Bridge):*
Hi. This is (Connor) from the Florida Department of Health. I’m looking to find out what the mortality rate is for co-infection of dengue and this virus?

**Dr. Erin Staples:**
That’s a good question. I think they’re very limited data unfortunately to give you a good answer on that. The mortality rate for chikungunya itself is quite low, less than .1% probably when you deal with large outbreaks of the disease.

Dengue of course has a higher morbidity and mortality particularly in areas where several strains are circulating. So there are two studies that have studied and looked at co-infections and documented the clinical appearance.

In one study, they didn’t see any particular worse or severe disease with co-infections. In the other study they actually did see some more severe infections and some deaths which were mostly attributed to dengue but the person was also co-infected with chikungunya.
So at this time unfortunately given the limited data we don’t know if co-infections will lead to significantly more severe disease or additional mortality on top of what we would expect with dengue.

(Connor Bridge):
Thank you.

Coordinator:
We have one last caller. Caller your line is open. You may ask your question now. Okay there are no more questions for the Q&A at this time.

Leticia Davila:
Thank you. We still have some in the Webinar system. One that has come in, in Spanish. Particularly for in Columbia how do we confirm a probable case?

Dr. Erin Staples:
Yes. So the CDC has been working with the Pan American Health Organization throughout the region to have kind of partner labs throughout the region that can offer testing for chikungunya.

We’ve also worked with ministry of health in some of the key countries in the region to ensure that they have the ability to test for chikungunya.

I don’t believe we’ve actually worked with a specific laboratory in Columbia but working with your Ministry of Health you can obtain testing through our laboratory if not in another laboratory more immediately in the area.

But we can work with the Ministry of Health too and the Pan American Health Organization to figure out the best way to get that testing facilitated for you if you are concerned about chikungunya in a patient of yours.
Leticia Davila:
Thank you. And we do have a lot of questions in the Webinar system so if they’re - they may be duplicates when I ask them, so just be aware. The next question says what is the reason for lack of development of vaccines against chikungunya virus?

Dr. Erin Staples:
Again a fair number of them have developed in the sense of pre-clinical. And there has been attempts to get them further in the clinical development. But I think one of the main limitations is that these outbreaks when they do occur tend to affect a large area of but they burn through a population very rapidly.

So we’ve actually had a pharmaceutical company ask us where would you do an efficacy trial for chikungunya. And, being able to predict when and how chikungunya will spread or what size of an outbreak it might potentially cause is one of the limitations potentially moving a vaccine further on in development.

And again, some of the interests was peaked following 2004 and 2005 in the large outbreaks that occurred around that time and through 2007. How after a lull in that activity some of the interest also waned. So, it’s a combination of factors as to why the vaccines haven’t been developed as far as we would like.

Leticia Davila:
Thank you. The next question, are there competent nonhuman reservoir hosts in the Western Hemisphere for chikungunya?

Dr. Erin Staples:
That’s a good question and truthfully we don’t really know quite yet. There are data suggests that nonhuman primates would be potential hosts or animals that would amplify up the virus and be capable of infecting mosquitoes.
We don’t know however if New World monkeys which are the monkeys such that terminology used to describe monkeys in the Western Hemisphere would be susceptible and good hosts for the virus.

There are several other animal species that have been identified as having antibodies against chikungunya virus but their role as a potential host is either probably negligible or in some cases unknown at this time.

**Leticia Davila:**
Okay. And operator if there are any that queue up on the phone line we could take those as well but I’ll just continue...

**Coordinator:**
Okay.

**Leticia Davila:**
...until we do get another one from the phone.

**Coordinator:**
We do have questions available if you want to do that now?

**Leticia Davila:**
Okay yes please.

**Coordinator:**
All right our next question is from Dr. (Norman Castel). Your line is open. You may ask your question.

**(Norman Castel):**
Thank you. I’m looking at the map and it really doesn’t tell you who - how many cases there are in each country. And it seems odd that adjacent countries particularly in Europe don’t seem to
have this virus. I’m thinking in terms of advising people where to travel. Is there any way to get better information, more detailed information on a map?

**Dr. Erin Staples:**

Yes. So our Division of Global Migration and Quarantine has been working with us and they provide regular updates to travelers.

So the map that you’re probably referring to is the global map. And that is just located - or indicating where locally acquired cases have occurred in the past or anytime in the past.

We are updating our Website also to provide a more dynamic map of what’s going on in the Americas. But the - I would direct you to the Travelers Health Website which you can get from the main CDC Website which is [www.cdc.gov](http://www.cdc.gov).

And they provide kind of up to date and real-time information as it’s available about outbreaks of not only chikungunya but other diseases.

In addition, there’s several links that can be found on our Website for chikungunya that can link you into kind of updated maps that get updated or not maps as much as tables that get updated frequently with case counts of different countries that are being affected particularly in the Americas at this time.

(Norman Castel):

Okay thank you.

**Coordinator:**

Our next question is from (Peter Buck). Your line is open. You may ask your question.

(Peter Buck):

Thank you, (Peter Buck) with Public Health Agency of Canada. Dr. (Staples) thanks very much for your presentation. You mentioned that you anticipate spread and you did cover all personal
I just wondered if you were in a position to make any comments or share information regarding local mosquito programs?

**Dr. Erin Staples:**
Yes thanks Dr. Buck for that question. There is limited information that we have available. We do have routine phone calls with all the partners in that region that we discuss these different things.

Unfortunately, I think the vector control program that would involve either spraying or larvaciding for mosquitoes is somewhat limited and that is best reflected by what happens with dengue in the Caribbean.

And then, that in many locations they’re and able to control dengue given their lack ability to control dengue we would assume that they would not be able to control chikungunya.

However, some of the countries we do know for instance St. Martin did do some spraying around the areas where they knew they had cases. And to what degree that’s mitigating effects I think it’s still early to know but there is limited vector control capacity in many of these locations. So we do anticipate the spread to continue particularly given that limitation.

**Leticia Davila:**
We have another question from the Webinar system. Have you noticed a difference in the symptoms in elderly patients?

**Dr. Erin Staples:**
The data that’s available does suggest that elderly patients potentially end up with more severe disease or at least when you look at them in comparison to younger adults they do have higher odds ratios of having more severe disease and in some cases more atypical disease.
What the actual mechanism behind that is is a little unclear. Again one study did find some correlation with higher levels of viremia in certain individuals and severity of disease and persistence of symptoms.

But we do see that some older individuals will definitely have more pronounced or severe disease or atypical presentations when compared to younger person.

**Leticia Davila:**
Thank you. Operator?

**Coordinator:**
There are no questions pending at this time.

**Leticia Davila:**
Okay we do have a couple of more. Is it known if this virus infects any animals such as horses or dogs?

**Dr. Erin Staples:**
Again I think there’s limited information on that. And again antibodies have been found including in some of those domestic animals. But what degree those will - those animals will develop symptoms I think is what’s unknown.

We haven’t really appreciated a significant burden of animal disease meaning, you know, animals like as horses or dogs with arthritis or arthralgias. But again I think only time will tell how that will involve in this region.

**Leticia Davila:**
Thank you. Operator?

**Coordinator:**
There are no questions at this time.
Leticia Davila:
Okay. Let me see, just give me one - we do have another question. It says what is the preferred specimen for PCR testing blood or CSF?

Dr. Erin Staples:
Yes so with chikungunya probably the best specimen to test because people do have very high levels of virus in their blood is going to be blood sample or more specifically a serum sample. Serum samples can be used both for antibody testing as well as recovery of the virus or PCR testing on a blood sample. So a serum sample would be preferred predominantly. Other samples can be tested for the presence of the virus but again the blood would be the preferred.

Leticia Davila:
Okay. The next question is, is a tissue tropism known for this virus?

Dr. Erin Staples:
We definitely know at least from limited studies that there is - the virus can be found in the joint spaces in concomitant, you know, with the joint occurrence with it. But other than that I think there’s limited data about the potential distribution of the virus and the actual organs and tissues per se. I think that’s all I can add right now.

Leticia Davila:
Okay. And then this question is for clarification. Have there been studies on the relative vector capacity of other US species of Aedes mosquitoes especially albopictus or japonicus? And did I hear that sufficient human viremia for subsequent mosquito transition occurs only within the first seven days of infection?

Dr. Erin Staples:
Yes so the first question we actually have studies ongoing here at the CDC to look at different actual regional mosquitoes to look at their competency to transmit this including species from the
continental United States. So those studies are ongoing. But I can’t comment more about that.
And I forget the second half of that question?

Oh the first seven days...

**Leticia Davila:**
Yes the first seven days.

((Crosstalk))

**Dr. Erin Staples:**
...(unintelligible). So there are limited data that have looked at that and it really depends on the level of virus.

But if the information that we do know you need probably roughly $10^4$ log PFUs per ML of chikungunya virus in the blood. That usually occurs within the first five to six days after illness onset.

I think one of the things we don’t have good data on is how many days prior to illness onset would a person also be viremic?

And, I think the information we have is that, you know, chikungunya rapidly replicates in the bloodstream. So we’d expect perhaps one to two days before symptom onset a person could also be viremic.

But, in terms of the prevention measures, that is correct. Within the first week we advise that people that have become sick with chikungunya to avoid being bitten by mosquitoes as that could lead to those mosquitoes becoming infected and resulting in further transmission of the virus or local transmission here in United States.
Leticia Davila:
Thank you. The next question it says regarding preventive measures, can you please give an example of a name brand product that is good to prevent the mosquito bite? What ingredient does the product have and what percentage is good for a child versus an adult?

Dr. Erin Staples:
Yes, so I won’t drag out this question because a lot of that information is actually currently available on our Website for instance even for chikungunya, but also West Nile virus disease. There’s no differences in terms of that. So things containing DEET or would be good. There’s oil of lemon eucalyptus, picaridin, IR-3535. Those are all active ingredients that can be used.

In addition to our Website you can also we have links to the EPA Website that talks about the different preparations, their duration of effectiveness. So reading the label, consulting the Website in terms of the different products that can be used and for children and adults would be something that would be good to do.

Leticia Davila:
Thank you. Operator do we have any questions?

Coordinator:
Yes. Our next question is from (Judith Shipley). Your line is open.

Leticia Davila:
Thank you.

(Judith Shipley):
Thank you. Thank you very much for taking my question.

My question is this. If you have a traveler who is returning and presents at your office and you’re going to do a blood sample, do the local laboratories or the hospitals are they equipped to do this blood test or would you suggest that we just send it off to the CDC?
Dr. Erin Staples:
So there was a slide in the presentation that reviewed it. So there’s only limited testing capacity for chikungunya available the United States, so CDC is one place. There are selected state health departments is another place. And then the third is a commercial laboratory Focus Diagnostics.

So if you have a patient, what I would advise if you have a patient where you want to obtain chikungunya testing, I think the best first step would be to contact your state health department.

One they could advise you if they have testing capacity. And two your laboratory will usually be aware of how to get samples to the state health department.

The state health department then can help facilitate, you know, if they feel that it’s a good use or attempt to test the person for chikungunya, they can help facilitate getting that the sample to us here at the CDC. Again you can also explore the commercial testing if that’s what you would rather do.

(Judith Shipley):
Okay sorry to make you repeat all that information. I got into the meeting late. And also just a quick other question doctor. If you’ve already ruled out malaria and dengue fever and you’re waiting to get the blood tests back on the chikungunya, do you recommend just going ahead and treating for it anyway?

Dr. Erin Staples:
Unfortunately there is no treatment, so it’s really symptomatic relief. And I don’t think you would do that much differently than other people other than maybe if you’ve ruled out dengue you would feel more comfortable in using nonsteroidal anti-inflammatory drugs to treat a person rather than using kind of acetaminophen or paracetamol depending on the location that you’re from.
So I think unfortunately it won’t necessarily help you. But knowing obviously the cause of a person’s illness is useful in ruling other conditions in or out and other things that may have specific antibacterial, antimalarial agents that could be used to treat them.

(Judith Shipley):
Okay great. Thank you so much. I appreciate it.

Coordinator:
There are no more questions...

((Crosstalk))

Coordinator:
I’m so sorry, there no more questions at this time.

Leticia Davila:
Okay thank you. We’ll take one more question from the Webinar system. Do you think that given the currently epidemiological situation in the Caribbean islands, more measures should be taken by health authorities in countries in Central and South America given the limitations of laboratory facilities for diagnosis and isolation?

Dr. Erin Staples:
Yes, I know that is definitely it’s probably a question beyond my capacity. But, one of the things that we’ve done is work closely with the Pan American Health Organization. You know, one of the last references I showed you were of the preparedness and response guidelines that were created to help the region respond to chikungunya virus. And again there have been several laboratories that have been trained to do that testing in the region.

The response guidelines does provide not only clinical information, but also in terms of what would you do, in terms of a hospital surge capacity, a vector control response -- other things that
you can do both in the preparation if you’re preparing for chikungunya or trying to prevent chikungunya as well as what to do when a country is - has been affected by chikungunya.

So I would actually refer to the caller particularly to the response and preparedness guidelines as they might find some very useful information in there in regards to other countries and considerations for preparing for potential introduction and what to do once it is potentially been introduced and is spreading in a country.

**Leticia Davila:**
Thank you. On behalf of COCA, I would like to thank everyone for joining us today with a special thank you to Dr. Staples and Dr. Fischer. We invite you to communicate to our presenters after the Webinar.

If you have additional questions for today’s presenters please email us at coca@cdc.gov. Put February 18 COCA Call in the subject line of your email and we will ensure that your question is forwarded to her for response.

Again that email address is COCA@cdc.gov.

The recording of this call and the transcript will be posted to the COCA Website at emergency.cdc.gov/coca within the next few days.

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Thank you again for being a part of today’s COCA Webinar. Have a great day.

Coordinator:
Thank you. This concludes today’s conference. Participants you may disconnect at this time.

END