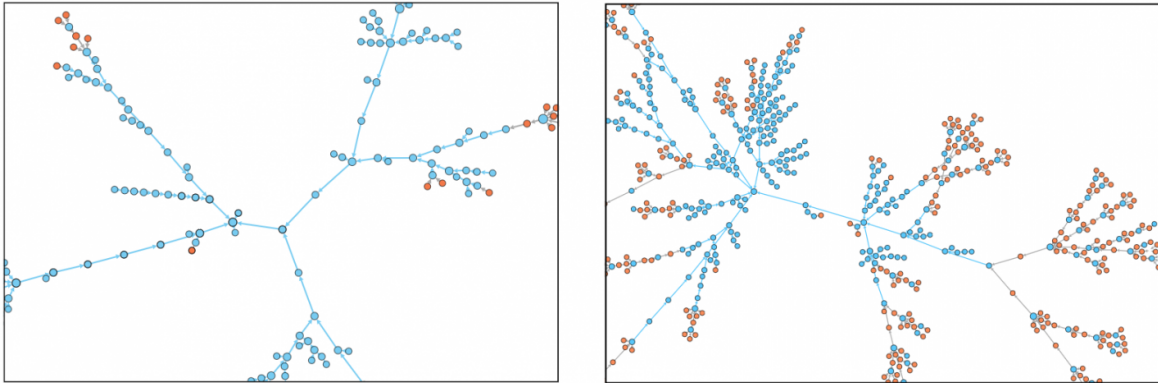


Can a Zika outbreak be sustained sexually?

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Nodes corresponding to males and females are shown in blue and orange, respectively, and arrows indicate who infected whom. Credit: Hebert-Dufresne et al.

In most ways, Zika is a lot like other tropical fevers. People become infected when they are bitten by mosquitos. Infected mothers pass the virus to their unborn children.

But unlike other mosquito-borne outbreaks, Zika doubles as a [sexually transmitted infection](#), passing from person to person in bodily fluids. And that's where things get complicated.

In a new paper, a team led by Santa Fe Institute Research Fellow Laurent Hébert-Dufresne asks under what conditions a Zika [outbreak](#) might be sustained where mosquitos play no role.

"Zika has a lot of unusual characteristics that have caused scientists a lot of confusion," says Hébert-Dufresne. "Infected people rarely have symptoms, and typically only reproducing women get tested, so we know very little about the true extent of Zika's sexual transmission."

One Zika oddity is that infected [males](#) retain the [virus](#) in their semen nearly 10 times longer than women do in their vaginal fluids—180 days rather than 20, on average—making males much more likely to transmit Zika sexually than females.

That raises a question: Could a population of males who have sex with males sustain an outbreak once the virus gets going—when an infected male returns from visiting a place where Zika-carrying mosquitos are active, for example?

To study the problem, the research team generated hypothetical sexual contact networks, randomly assigning sexual orientations to its members. Then they let the networks percolate.

"We wanted to know what's the biggest outbreak we can get," says Hébert-Dufresne.

They found that their random networks quickly developed core-periphery structures, with populations of males who have sex with males forming an outbreak-sustaining core and the heterosexual population experiencing smaller outbreaks on the periphery.

Males who have sex with males, of course, are part of a wider sexual contact [network](#) in which bisexual males pass the virus to their female partners, who pass the virus to their partners, and so on. In the researchers' networks, Zika outbreaks make their way into the heterosexual community but soon peter out under the less-probable female-to-male transmission conditions.

The possibility of silent, sustained outbreaks among populations least likely to get tested for Zika should raise alarms, says Hébert-Dufresne.

"Because people usually don't have symptoms, we mostly care about Zika when it goes into the community of reproducing females," he says. "But if there are hidden reservoirs of Zika infection out there that can get into the reproducing population, we might want to rethink our surveillance and prevention strategies."

Provided by Santa Fe Institute

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