

Off the Podium: Why Public Health Concerns for Global Spread of Zika Virus Means That Rio de Janeiro's 2016 Olympic Games Must Not Proceed

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Brazil's Zika problem is inconveniently not ending. The outbreak that began in the country's northeast has reached Rio de Janeiro, where it is flourishing. Clinical studies are also mounting that Zika infection is associated not just with pediatric microcephaly and brain damage, but also adult conditions such as Guillain-Barré syndrome¹ and acute disseminated encephalomyelitis, which are debilitating and sometimes fatal.²

Simply put, Zika infection is more dangerous, and Brazil's outbreak more extensive, than scientists reckoned a short time ago. Which leads to a bitter truth: the 2016 Olympic and Paralympic Games must be postponed, moved, or both, as a

precautionary concession. There are five reasons.

First, Rio de Janeiro is more affected by Zika than anyone expected, rendering earlier assumptions of safety obsolete. When in January the International Olympic Committee declared Rio a "safe environment" for the Games, it was speculating, because Brazil's Ministry of Health temporized until February to declare Zika a notifiable disease and begin counting cases.³ Now with those data finally available, the situation seems not so safe: Rio de Janeiro's suspected Zika cases are the highest of any state in Brazil (26,000), and its Zika incidence rate is the fourth worst (157

¹ Cao-Lormeau V-M, Blake A, Mons S, et al. Guillain-Barré Syndrome outbreak associated with Zika virus infection in French Polynesia: a case-control study. *Lancet* 2016; 387:1531-39.

² Brito Ferreira ML. Neurologic Manifestations of Arboviruses in the Epidemic in Pernambuco, Brazil. Abstract presented at the 68th Annual Meeting of the American Academy of Neurology, April 10, 2016. Available at: <https://www.aan.com/PressRoom/home/GetDigitalAsset/12033>.

³ International Olympic Committee, "IOC Statement on Zika", January 29, 2016. Available at: http://www.olympic.org/Documents/Commissions_PDFfiles/Medical_commission/IOC_Statement_on_Zika-eng.pdf

⁴ Government of Brazil, "Notificação de casos pelo vírus Zika passa a ser obrigatória no Brasil", February 18, 2016. Available at: <http://portalsaude.saude.gov.br/index.php/cidadao/principal/agencia-saude/22237-notificacao-de-casos-pelo-virus-zika-passa-a-ser-obrigatoria-no-brasil>.

per 100,000).⁵ Or in other words: according to the Brazil's official data, Rio is not on the fringes of the outbreak, but inside its heart.

Many have suggested that Zika will follow the pattern of other mosquito-borne diseases and decline during Rio's winter months of July to September. While that is probably true, nobody actually knows because Rio has never experienced a winter with Zika before. If one assumes, reasonably, that Zika will behave like dengue fever, because they are caused by related viruses and transmitted by the same *Aedes aegypti* mosquito, then Zika transmission will ebb but not vanish in Rio's winter, just as dengue did in winters past.

However, nobody knows how deep winter's ebb will be, especially this year, because Rio is undergoing a surprising and unexplained disease surge: in Rio de Janeiro city, dengue cases in the first quarter of 2016 are a shocking six fold higher than a year ago (8,133 cases, compared to 1,285 cases).^{6,7} That vertiginous rise is very worrisome, because it roughly coincides with the biggest

military mobilization in Brazil's history, aimed at intensifying mosquito-killing efforts.⁸ It would appear that those impressive efforts did not work as well as hoped in Rio, and with the starting baseline of *Aedes*-borne disease so much higher this year than last, it is far from guaranteed that the coming winter's ebb will make a "safe environment" for the Games.

Second, although Zika virus was discovered nearly seventy years ago, the viral strain that recently entered Brazil is clearly new, different, and vastly more dangerous than "old" Zika. Phylogenetic mapping demonstrates that this particular virus arrived in Brazil from French Polynesia in 2013.⁹ Although the danger went unnoticed in French Polynesia at first, retrospective analyses now show that the risk of microcephaly increased by 23 to 53 fold.¹⁰

Later studies from Brazil now powerfully argue that the relationship is truly causal.¹¹ For example, in Rio de Janeiro—where the Games will take place—a very recent study shows that among women with

⁵ Ministério da Saúde, Secretaria de Vigilância em Saúde. *Boletim Epidemiológico* 2016;47(18). Available at: <http://portalsaude.saude.gov.br/images/pdf/2016/abr/27/2016-014—Dengue-SE13-substitui—o.pdf>

⁶ Prefeitura da Cidade do Rio de Janeiro, Superintendência de Vigilância em Saúde. Número de Casos de Dengue por mês, 2016. Available at: http://www.rio.rj.gov.br/dlstatic/10112/6062171/4159109/denguenotificadosexcetodescartadosMes_2016_21_03_2016.htm

⁷ Prefeitura da Cidade do Rio de Janeiro, Superintendência de Vigilância em Saúde. Número de Casos de Dengue por mês, 2015. Available at: http://www.rio.rj.gov.br/dlstatic/10112/5880996/4153672/denguenotificadosexcetodescartadosMes2015_25_01_2016.htm

⁸ Jonathan Watts, "Zika virus command centre leads biggest military operation in Brazil's history" *The Guardian* March 30, 2016. Available at <http://www.theguardian.com/world/2016/mar/30/brazil-zika-war-virus-military-operation>.

⁹ Faria NR, do Socorro da Silva Azebedo R, Kraemer MUG, et al. Zika virus in the Americas: Early epidemiological and genetic findings. *Science*. Published online March 24, 2016. DOI: 10.1126/science.aaf5036

¹⁰ Cauchemez S, Besnard M, Bompard P, et al. Association between Zika virus and microcephaly in French Polynesia, 2013–15: a retrospective study. *Lancet* 2016; doi:10.1016/S0140-6736(16)00651-6.

¹¹ Rasmussen SA, Jamieson DJ, Honein MA, Petersen LR. *Zika Virus and Birth Defects — Reviewing the Evidence for Causality*. *NEJM* 2016; DOI: 10.1056/NEJMs1604338.

confirmed Zika infections during pregnancy, fully 29% had fetal abnormalities on ultrasound¹² Further, the Brazilian microcephaly cases have an unusual constellation of congenital defects severer than classical microcephaly, and suggestive of “fetal brain disruption sequence” in which the developing brain and skull collapse while other anatomical features like the scalp skin keep growing.¹¹

The effects on the adult nervous system are only beginning to be studied, but the preliminary findings are not good, and suggest that exposure to the virus is linked to Guillain-Barré disease, increasing the odds 60 fold.¹³ Science cannot yet explain what makes this new Polynesian/Brazilian viral clade exceptionally neuropathological, so the assumption must be that if it spreads to other places, harm to human health will too. Would that we knew for sure, but we don’t, so precaution is called for.

Third, while Brazil’s Zika inevitably will spread globally — given enough time, viruses always do — it helps nobody to speed that up¹⁴ In particular, it cannot possibly help when an estimated 500,000 foreign tourists flock into Rio for the Games, potentially becoming infected, and returning to their homes where both local *Aedes* mosquitoes and sexual transmission can establish new outbreaks.¹⁵¹⁶

All it takes is one infected traveler: indeed phylogenetic and molecular clock analyses

establish that Brazil’s cataclysmic outbreak stems from a single viral introduction event likely between May and December 2013.⁹ A few viral introductions of that kind, in a few countries, or maybe continents, would make a full-blown global health disaster. Scientists can disagree on how much the mass migration of 500,000 foreigners will accelerate the virus’s global spread and make the pandemic worse—but none can possibly argue that it will slow it down or make things better.

Fourth, when (not if) the Games speed up Zika’s spread, the already-urgent job of inventing new technologies to stop it becomes harder. Basic Zika research is already on the fast track, and with time, the odds are excellent that scientists can develop, test and prove an effective Zika vaccine, antiviral drug, insecticide, or genetically-engineered mosquito. But by spreading the virus faster and farther, the Games steal away the very thing – time – that scientists and public health professionals need to build such defenses.

Fifth, proceeding with the Games violates what the Olympics stand for. The International Olympic Committee writes that “Olympism seeks to create ... social responsibility and respect for universal fundamental ethical principles”. But how socially responsible or ethical is it to spread disease? Sports fans who are wealthy enough to visit Rio’s Games choose Zika’s risks for

¹² Brasil P, Pereira JP Jr, Raja Gabaglia C, et al. Zika virus infection in pregnant women in Rio de Janeiro — preliminary report. *NEJM* 2016; DOI: 10.1056/NEJMoa1602412

¹³ Brasil, P, Sequeira PC, Freitas AD, Zogbi HE, et al. Guillain-Barré syndrome associated with Zika virus infection. *Lancet* 2016;387:1482.

¹⁴ See mapping of the 2016 Zika Outbreak at <http://www.healthmap.org/zika/#timeline>.

¹⁵ Oster AM, Russel K, Stryker JE, Friedman MS, et al. Update: Interim Guidance for Prevention of Sexual Transmission of Zika Virus — United States, 2016. *MMWR* 2016;65(12):323-5.

¹⁶ Petersen LR, Jamieson DJ, Powers AM, Honein MA. Zika virus. *NEJM* 2016;374:1552-63.

organization must now break its months-long silence.

Even worse is WHO, which has never issued an official statement on Zika and the Olympics. When I pressed WHO about that in April, through a spokesperson it “agreed with” the IOC’s obsolete statement, but refused to answer the direct question of whether WHO has confidence in Rio’s Games being safe.²⁰ It is deplorable, incompetent and dangerous that WHO, which has both public health expertise and the duty of health protection, is speechlessly deferring to the IOC, which has neither. WHO’s hesitancy is reminiscent of its mistakes with Ebola, all over again.

None of this is meant to deny that the Games are a much-loved event. But where is the love for the possible victims of a foreseeable global catastrophe: the damaged or dead adults, and the babies for whom—and mark these coldly clinical words carefully—*fetal brain disruption sequence* is as terrible as it sounds, and extinguishes the hope of a normal life even before it has begun? With stakes like that, bluntly put, these Olympics are no game at all.

²⁰ Personal communication from Nyka Alexander, WHO Zika media team, April 20, 2016.