

## Update on Zika Virus Infections

Masoud Mardani<sup>1,\*</sup>

<sup>1</sup>Infectious Diseases and Tropical Medicine Research Center, Shahid Beheshti University of Medical Sciences, Tehran, IR Iran

\*Corresponding author: Masoud Mardani, Infectious Diseases and Tropical Medicine Research Center, Shahid Beheshti University of Medical Sciences, Tehran, IR Iran. Tel: +98-2122439963, Fax: +98-2122439964, E-mail: drmasoudmardani@yahoo.com

Received 2016 May 04; Accepted 2016 May 04.

**Keywords:** Zika Virus, Infection, Microcephaly

Zika virus is a mosquito-borne flavivirus that is the focus of an ongoing pandemic and public health emergency (1,2). Previously limited to sporadic cases in Africa and Asia, the emergence of Zika virus in Brazil in 2015 heralded its rapid spread throughout the Americas. As the Zika virus has widely spread in less than a year, its status has changed from a mild medical curiosity to a disease with severe public health implications (3).

Serosurveillance studies in humans suggest that Zika is widespread throughout Africa, Asia, and Oceania. However, these studies may overestimate the virus's true prevalence, given the serologic overlap between Zika virus and related flaviviruses, such as dengue virus (DENV) and west Nile virus (WNV) (4-6).

Historically, symptomatic Zika virus infections were limited to sporadic cases or small clusters of patients (7). Zika was first reported in May 2015 in continental South America, in Brazil, where 440000 - 1300000 persons were subsequently infected through February 16, 2016. Furthermore, 29 other countries in the Americas have reported autochthonous Zika virus transmission, including Puerto Rico and the U.S. Virgin Islands (8).

Zika virus, like other flaviviruses, is transmitted by mosquitoes, primarily of the *Aedes* (*Stegomyia*) genus (9-11). Mosquito acquisition of the virus likely occurs during a blood meal; after uptake, the virus replicates and is transmitted to a reservoir animal at the next blood meal (12).

Other non-vector modes of Zika virus transmission are congenital, perinatal, and sexual. Possible transmission via blood transfusion, animal bite, and laboratory exposure has been described; however, confounding by contemporaneous vector-borne transmission in these instances cannot be excluded (13-18).

In humans, the incubation period from mosquito bite to symptoms is 3 - 12 days. Infection is likely asymptomatic in 80% of cases. All ages are susceptible (4 days to 76 years), with a slight preponderance in females. When symptoms occur, they are typically mild, self-limiting, and nonspe-

cific, similar to other arbovirus infections. Commonly reported symptoms include rash, fever, arthralgia, myalgia, fatigue, headache, and conjunctivitis. Rash is a prominent feature and is maculopapular and pruritic in most cases; it begins proximally and spreads to the extremities, with spontaneous resolution within 1 - 4 days of onset. The symptoms resolve within 2 weeks, and accounts of longer persistence are rare (7, 12, 19).

More severe clinical sequelae have increasingly been associated with Zika virus. During the ongoing outbreak in Brazil, reports of infants born with microcephaly have markedly increased. Also, severe neurologic sequelae have also been described in adults, including meningitis and meningoencephalitis (20). Non-neurologic sequelae include transient hearing loss, hypotension, and genitourinary symptoms (21-23).

Zika virus disease is usually relatively mild and requires no specific treatment. People sick with this virus should get plenty of rest, drink sufficient fluids, and treat pain and fever with common medicines. If symptoms worsen, they should seek medical care and advice. There is currently no vaccine available (24).

Mosquitoes and their breeding sites pose a significant risk factor for Zika virus infection. Prevention and control relies on reducing mosquitoes through source reduction, and reducing contact between mosquitoes and humans (25). This can be done by using insect repellent regularly; wearing clothes (preferably light-colored) that cover as much of the body as possible; installing physical barriers in buildings, such as window screens, closed doors, and windows; and if needed, the use of additional personal protection, such as sleeping under mosquito nets during the day. It is extremely important to regularly empty, clean, or cover containers that can store water, such as buckets, drums, and pots. Other mosquito-breeding sites should be cleaned or removed, including flower pots, used tires, and roof gutters. Communities must support the efforts of the local government to reduce the density of mosquitoes in

their locality. Efforts must be made soon after rain to eliminate mosquito-breeding sites such as still water, and to prevent its accumulation in discarded containers and waste materials in and around houses (8, 26).

During outbreaks, health authorities may advise the spraying of insecticides. Insecticides recommended by the world health organization's pesticide evaluation scheme may also be used as larvicides to treat relatively large water containers (8, 26).

In Iran, there has been increased international travel in recent years, and many Iranians will travel to Brazil for the Olympics in 2016. Attention to travelers returning from countries involved with Zika is critically important. Preparedness and a plan to cope with possible outbreaks is one of the most important tasks of the Iranian center for disease control.

### Acknowledgments

The author of this manuscript appreciates Bitak Pourkaveh for her contribution in collecting data and editing the manuscript.

### References

- Guzzetta G, Poletti P, Montarsi F, Baldacchino F, Capelli G, Rizzoli A, et al. Assessing the potential risk of Zika virus epidemics in temperate areas with established *Aedes albopictus* populations. *EJCB*. 2016;**21**(15).
- Southwell BG, Dolina S, Jimenez-Magdaleno K, Squiers LB, Kelly BJ. Zika Virus-Related News Coverage and Online Behavior, United States, Guatemala, and Brazil. *Emerg Infect Dis*. 2016;**22**(7) doi: [10.3201/eid2207.160415](https://doi.org/10.3201/eid2207.160415). [PubMed: [27100826](https://pubmed.ncbi.nlm.nih.gov/27100826/)].
- Plourde AR, Bloch EM. A Literature Review of Zika Virus. *Emerg Infect Dis*. 2016;**22**(7) doi: [10.3201/eid2207.151990](https://doi.org/10.3201/eid2207.151990). [PubMed: [27070380](https://pubmed.ncbi.nlm.nih.gov/27070380/)].
- Macnamara FN. Zika virus: a report on three cases of human infection during an epidemic of jaundice in Nigeria. *Trans R Soc Trop Med Hyg*. 1954;**48**(2):139–45. [PubMed: [13157159](https://pubmed.ncbi.nlm.nih.gov/13157159/)].
- Korhonen EM, Huhtamo E, Smura T, Kallio-Kokko H, Raassina M, Vapalahti O. Zika virus infection in a traveller returning from the Maldives, June 2015. *EJCB*. 2016;**21**(2).
- Baba SS, Fagbami AH, Ojeh CK. Preliminary studies on the use of solid-phase immunosorbent techniques for the rapid detection of West Nile virus (WSNV) IgM by haemagglutination-inhibition. *Comp Immunol Microbiol Infect Dis*. 1999;**22**(1):71–9. [PubMed: [10099030](https://pubmed.ncbi.nlm.nih.gov/10099030/)].
- Duffy MR, Chen TH, Hancock WT, Powers AM, Kool JL, Lanciotti RS, et al. Zika virus outbreak on Yap Island, Federated States of Micronesia. *N Engl J Med*. 2009;**360**(24):2536–43. doi: [10.1056/NEJMoa0805715](https://doi.org/10.1056/NEJMoa0805715). [PubMed: [19516034](https://pubmed.ncbi.nlm.nih.gov/19516034/)].
- Centers for disease control and prevention. Zika virus disease in the United States 2015. Available from: <http://www.cdc.gov/zika/geo/united-states.html>.
- Dick GW, Kitchen SF, Haddock AJ. Zika virus. I. Isolations and serological specificity. *Trans R Soc Trop Med Hyg*. 1952;**46**(5):509–20. [PubMed: [12995440](https://pubmed.ncbi.nlm.nih.gov/12995440/)].
- Marchette NJ, Garcia R, Rudnick A. Isolation of Zika virus from *Aedes aegypti* mosquitoes in Malaysia. *Am J Trop Med Hyg*. 1969;**18**(3):411–5. [PubMed: [4976739](https://pubmed.ncbi.nlm.nih.gov/4976739/)].
- Grard G, Caron M, Mombou I, Nkoghe D, Mboungou S, Jiolle D, et al. Zika virus in Gabon (Central Africa)—2007: a new threat from *Aedes albopictus*?. *PLoS Negl Trop Dis*. 2014;**8**(2):e2681. doi: [10.1371/journal.pntd.0002681](https://doi.org/10.1371/journal.pntd.0002681). [PubMed: [24516683](https://pubmed.ncbi.nlm.nih.gov/24516683/)].
- Ioos S, Mallet HP, Leparac Goffart I, Gauthier V, Cardoso T, Herida M. Current Zika virus epidemiology and recent epidemics. *Med Mal Infect*. 2014;**44**(7):302–7. doi: [10.1016/j.medmal.2014.04.008](https://doi.org/10.1016/j.medmal.2014.04.008). [PubMed: [25001879](https://pubmed.ncbi.nlm.nih.gov/25001879/)].
- Oliveira Melo AS, Malinger G, Ximenes R, Szejnfeld PO, Alves Sampaio S, Bispo de Filippis AM. Zika virus intrauterine infection causes fetal brain abnormality and microcephaly: tip of the iceberg?. *Am J Obstet Gynecol*. 2016;**47**(1):6–7.
- Besnard M, Lastiere S, Teissier A, Cao-Lormeau V, Musso D. Evidence of perinatal transmission of Zika virus, French Polynesia, December 2013 and February 2014. *Euro Surveill*. 2014;**19**(13):20751.
- Musso D, Roche C, Robin E, Nhan T, Teissier A, Cao-Lormeau VM. Potential sexual transmission of Zika virus. *Emerg Infect Dis*. 2015;**21**(2):359–61. doi: [10.3201/eid2102.141363](https://doi.org/10.3201/eid2102.141363). [PubMed: [25625872](https://pubmed.ncbi.nlm.nih.gov/25625872/)].
- Musso D, Nhan T, Robin E, Roche C, Bierlaire D, Zisou K, et al. Potential for Zika virus transmission through blood transfusion demonstrated during an outbreak in French Polynesia, November 2013 to February 2014. *Euro Surveill*. 2014;**19**(14) [PubMed: [24739982](https://pubmed.ncbi.nlm.nih.gov/24739982/)].
- Leung GH, Baird RW, Druce J, Anstey NM. Zika Virus Infection in Australia Following a Monkey Bite in Indonesia. *Southeast Asian J Trop Med Public Health*. 2015;**46**(3):460–4. [PubMed: [26521519](https://pubmed.ncbi.nlm.nih.gov/26521519/)].
- Simpson DI. Zika Virus Infection in Man. *Trans R Soc Trop Med Hyg*. 1964;**58**:335–8. [PubMed: [14175744](https://pubmed.ncbi.nlm.nih.gov/14175744/)].
- Dupont-Rouzeyrol M, O'Connor O, Calvez E, Daures M, John M, Grangeon JP, et al. Co-infection with Zika and dengue viruses in 2 patients, New Caledonia, 2014. *Emerg Infect Dis*. 2015;**21**(2):381–2. doi: [10.3201/eid2102.141553](https://doi.org/10.3201/eid2102.141553). [PubMed: [25625687](https://pubmed.ncbi.nlm.nih.gov/25625687/)].
- Fontes CA, Dos Santos AA, Marchiori E. Magnetic resonance imaging findings in Guillain-Barre syndrome caused by Zika virus infection. *Neuroradiology*. 2016 doi: [10.1007/s00234-016-1687-9](https://doi.org/10.1007/s00234-016-1687-9). [PubMed: [27067205](https://pubmed.ncbi.nlm.nih.gov/27067205/)].
- Picone O, Vauloup-Fellous C, D'Ortenzio E, Huisoud C, Carles G, Benachi A, et al. [Zika virus infection during pregnancy]. *J Gynecol Obstet Biol Reprod (Paris)*. 2016;**45**(5):415–23. doi: [10.1016/j.jgyn.2016.03.005](https://doi.org/10.1016/j.jgyn.2016.03.005). [PubMed: [27079865](https://pubmed.ncbi.nlm.nih.gov/27079865/)].
- Cavalheiro S, Lopez A, Serra S, Da Cunha A, da Costa MD, Moron A, et al. Microcephaly and Zika virus: neonatal neuroradiological aspects. *Childs Nerv Syst*. 2016 doi: [10.1007/s00381-016-3074-6](https://doi.org/10.1007/s00381-016-3074-6). [PubMed: [27080092](https://pubmed.ncbi.nlm.nih.gov/27080092/)].
- Dyer O. US agency says Zika virus causes microcephaly. *BMJ*. 2016;**353**:i2167. doi: [10.1136/bmj.i2167](https://doi.org/10.1136/bmj.i2167). [PubMed: [27083694](https://pubmed.ncbi.nlm.nih.gov/27083694/)].
- Li JD, Li DX. [Epidemiological characteristics of Zika virus disease]. *Zhonghua Liu Xing Bing Xue Za Zhi*. 2016;**37**(3):329–34. doi: [10.3760/cma.j.issn.0254-6450.2016.03.007](https://doi.org/10.3760/cma.j.issn.0254-6450.2016.03.007). [PubMed: [27005530](https://pubmed.ncbi.nlm.nih.gov/27005530/)].
- Borchardt RA. Zika virus: A rapidly emerging infectious disease. *JAAAP*. 2016;**29**(4):48–50. doi: [10.1097/01.JAA.0000481413.11539.bi](https://doi.org/10.1097/01.JAA.0000481413.11539.bi). [PubMed: [26953673](https://pubmed.ncbi.nlm.nih.gov/26953673/)].
- WHO. Available from: <http://www.who.int/mediacentre/factsheets/zika/en/>.