OSHA® FactSheet

Preventing and Managing Laboratory Worker Exposure to Zika Virus

Zika virus is primarily spread by the bites of infected mosquitoes. However, workers in biomedical laboratories working with the virus are also at risk of infection. This guidance provides employers and workers with information to prevent and manage occupational exposure to Zika virus. The guidance may be updated as more information becomes available.

How Laboratory Exposures Occur

The Zika virus has been found to spread through exposure to blood, semen and vaginal fluid. Researchers are continuing to investigate whether other materials also spread the virus. However, Zika virus has been detected by viral culture in many other human body fluids, including urine, amniotic fluid, breast milk, saliva, cerebrospinal fluid, aqueous humor (fluid in the eyeball between the cornea and lens) and cervical mucous. Zika virus has also been detected on swabs of the nasopharynx.

For laboratory workers, the most likely sources of exposure to Zika virus include:

- Punctures and cuts from needlesticks and other contaminated, sharp objects.
- Compromised skin with cuts, abrasions or dermatitis that contacts contaminated materials.

Workers may also be exposed to the Zika virus through:

- The eyes, nose and mouth. This may occur by splashes or sprays of infectious liquids or droplets from laboratory samples, accidentally touching the face with contaminated gloves or when handling contaminated waste.
- Bites of infected mosquitoes being studied in the laboratory, particularly if such mosquitoes are not properly contained.
- Contact with blood or other body fluids of infected animals being studied in the laboratory.

Preventing Worker Exposures

Employers and workers in laboratories should follow required and recommended infection prevention and biosafety practices to minimize the risk of infection.

Quick Facts

- Zika can produce not only mild symptoms, but also serious birth abnormalities.
- Sharps injuries are among the most likely sources of laboratory worker exposure to Zika virus.
- Zika virus exposures can be effectively controlled by following existing biosafety guidelines and OSHA standards.
- Generally, work with samples of Zika virus can be done at Biosafety Level 2. Limit access to active work areas and conduct aerosol-generating procedures in biosafety cabinets or other containment devices.
- Workers should always report exposure incidents, including sharps injuries, to their supervisor. Ensure exposed workers receive prompt medical attention.

Employers must identify and comply with standards and regulations requiring control of workers' Zika virus exposure, when applicable (e.g., OSHA's Bloodborne Pathogens (BBP) standard (29 CFR 1910.1030)). In all cases, employers should assess and control their workers' Zika virus exposure risk, consider relevant advisory documents, and review new information as it becomes available, including from the Centers for Disease Control and Prevention (CDC).

Laboratory Risk Assessments

Perform a risk assessment of the work environment when introducing new tasks and as part of developing safety precautions.

Determine whether work with certain specimens or procedures, such as those that could create aerosols, require higher levels of biocontainment or other precautions.

Consider the risk and reproductive effects of Zika virus infection for workers who are or may become pregnant and for workers with sexual partners who are or may become pregnant. Zika virus can be spread between sexual partners or from a pregnant woman to her fetus. Zika virus infection is a cause of serious birth defects, including microcephaly: www.cdc.gov/zika/pregnancy.

Prevention

Whenever workers have occupational exposure to human blood, body fluids or other potentially infectious materials (OPIM), employers must comply with OSHA's Bloodborne Pathogens (BBP) standard (29 CFR 1910.1030). Among other requirements, employers whose workers have occupational exposure, as defined in the standard, must implement universal precautions: www.osha.gov/SLTC/bloodbornepathogens/worker_protections.html.

Laboratory employers also must comply with OSHA's personal protective equipment (PPE) standards (29 CFR 1910 Subpart I), including the Respiratory Protection standard (29 CFR 1910.134), and other applicable OSHA and State Plan requirements for protecting workers from hazards that may be present in the laboratory.

The BBP standard requires the use of engineering and work practice controls to eliminate or minimize employee exposure (29 CFR 1910.1030(d)(2)). For example, where the BBP standard applies, employers must ensure that workers immediately perform proper hand hygiene after any contact with blood and OPIM, as well as promptly after removing gloves or other PPE (29 CFR 1910.1030(d)(2)). The BBP standard also requires that employers ensure that workers immediately flush mucous membranes with copious clean water after any contact with blood or OPIM (29 CFR 1910.1030(d)(2)). Eyes should be flushed with saline or a sterile irrigant.

Immediately report any possible exposures to a supervisor.

OSHA recommends using engineering controls, following safe work practices, performing proper hand hygiene and flushing mucous membranes (after contact with blood or OPIM) even if no specific OSHA standard applies.

Follow standard biosafety practices for laboratory work involving pathogens

- Controls in place in laboratories that routinely work with potentially infectious samples can also protect workers from exposure to Zika virus.
- Use universal precautions, as required by OSHA's Bloodborne Pathogens (BBP) standard (29 CFR 1910.1030).
- Always work at the appropriate biosafety level (BSL) for the tasks being performed: www.cdc.gov/biosafety/publications/bmbl5. For Zika virus, most work, including related animal studies, can be done at BSL-2 and ABSL-2.
- Follow arthropod containment guidelines for studies involving live, infected arthropods (e.g., mosquitoes): www.astmh.org/subgroups/acme. Work at arthropod containment level (ACL)-2 in areas where Zika virus is established in the resident mosquito population; otherwise, ACL-3.
- Conduct experiments involving recombinant or synthetic Zika virus nucleic acids in accordance with NIH guidelines: www.osp.od.nih.gov/biotechnology/nih-guidelines.
- Consult CDC's Zika-specific guidance: www.cdc.gov/zika/laboratories/lab-safety.html.

Proper hand hygiene consists of scrubbing with soap and water for at least 15 seconds. When hands are visibly soiled, always wash with soap and water. If soap and water are not available, use an alcohol-based hand rub containing at least 60 percent alcohol, but then wash with soap and water as soon as possible.[1]

Where the BBP standard applies, employers must also consider and use safer devices, such as specially engineered sharps designed to minimize exposure risk, wherever possible (see www.osha.gov/OshDoc/data_BloodborneFacts/bbfact02.pdf). OSHA recommends using safer devices even if no specific OSHA standard applies.

If requested by a worker who is pregnant or may become pregnant, or whose sexual partner is pregnant or may become pregnant, consider reassigning the worker to tasks that reduce or eliminate the risk of exposure to Zika virus.

1) U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, "Show Me the Science – When & How to Use Hand Sanitizer."

While there is no evidence of Zika virus transmission through aerosol exposure, it is best to minimize the risk. Always use biosafety cabinets for activities that generate potentially infectious aerosols.[2]

Worker Training

OSHA's BBP standard requires employers to train workers as follows: initially when they are assigned to tasks where occupational exposure to human blood or OPIM may take place, every year after that and whenever changes to a worker's job affect occupational exposures covered by the standard: 29 CFR 1910.1030(g)(2). Train workers who have potential exposure to Zika virus about:

- How Zika virus spreads, their risks of exposure, and signs and symptoms of Zika.
- Adverse birth outcomes, including microcephaly and other problems in fetuses and infants, caused by infection during pregnancy.
- Protecting themselves by following rules and procedures to reduce exposures.
- Seeking medical evaluation after an exposure incident and if signs or symptoms of Zika develop.
- Any applicable requirements of the BBP standard (29 CFR 1910.1030) or other OSHA standards.

More information about protecting workers from occupational exposure to Zika is at: www.osha.gov/zika.

Exposure Incidents

After a suspected exposure incident, it is crucial that workers perform proper hand hygiene and flushing of mucous membranes, as described above.

Post-Exposure Evaluation

Laboratory employers should assess the exposure incident to determine what happened as well as the potential for infection. If the exposure falls under the BBP standard (29 CFR 1910.1030), employers must comply with the post-exposure evaluation and follow-up (as well as other) requirements in the standard.

Refer workers with possible occupational exposure to a healthcare provider who can evaluate the worker and recommend appropriate testing for Zika and other BBP.

Counseling

All exposed workers should receive confidential counseling from a healthcare provider to address their health and safety concerns and their risk of transmitting the virus to others. If the exposure falls under the BBP standard (29 CFR 1910.1030), employers must provide this confidential counseling.

Advise all workers with a suspected occupational exposure to Zika virus (i.e., for whom infection has not yet been ruled out through medical evaluation) to:

- Avoid mosquito bites for three weeks after the suspected exposure.
- Use condoms during sex or abstain from sex with a pregnant partner for the duration of the pregnancy or until Zika virus infection has been ruled out, even if no symptoms of Zika are present: www.cdc.gov/zika/pregnancy.
- With a partner who is not yet pregnant, use a condom during sex or abstain from sex for eight weeks, for exposed women, and for six months, for exposed men, if planning to conceive or until Zika virus infection is ruled out. Even couples who do not plan to become pregnant should use a condom or abstain from sex for the same time periods to minimize the risk of transmitting the virus.[3]

If Signs or Symptoms of Zika Develop

If a worker develops signs and symptoms consistent with Zika within two weeks of exposure, make available to the worker evaluation (or re-evaluation) by a healthcare provider.

In most people, during the first 1-2 weeks of infection, Zika virus can be detected in the blood and is capable of being spread from an infected person to a mosquito that feeds on that person. It also can be spread from an infected person to other people through contact with the infected person's blood or body fluids.

Laboratory Testing

If laboratory testing is recommended or being considered, the healthcare provider should obtain urine and serum (i.e., blood) samples from the worker at baseline (i.e., immediately after the exposure incident).

A healthcare provider can confirm Zika virus infection using baseline and follow-up tests. Evaluating the results of baseline and follow-up tests in the context of other risk factors for Zika virus infection, such as geographic location, local transmission and travel history, may help healthcare providers determine when and how an infection occurred.

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2) U.S. Department of Health and Human Services, "Biosafety in Microbiological and Biomedical Laboratories (BMBL), 5th ed."; Healthcare Infection Control Practices Advisory Committee, "Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings (2007)."

3) U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, "Zika - Sexual Transmission & Prevention."

Once Zika virus infection has been ruled out, but no earlier than two weeks after exposure, no further testing is recommended and additional precautions to prevent the transmission of Zika virus from the exposed worker to others are no longer required. Workers should make sure they receive Zika test results from their healthcare provider even if they are feeling better.

Confirmed Cases of Zika

There is no specific treatment for Zika. CDC and OSHA advise infected individuals, including workers, to:

- Get plenty of rest.
- Drink fluids to prevent dehydration.
- Take medicine such as acetaminophen to reduce fever and pain.
- Do not take aspirin, ibuprofen, naproxen or other non-steroidal anti-inflammatory drugs without a healthcare provider's approval. Under certain conditions, these can increase the risk of bleeding.
- Talk to a healthcare provider before taking any other medications, including prescriptions, for other medical conditions.
- To help prevent others from getting sick, avoid mosquito bites during the first week of illness. Wear clothing that covers skin and use insect repellents to help prevent mosquito bites.

CDC Reporting Guidelines for Healthcare Providers and Health Departments

Zika virus disease is a nationally notifiable condition. To facilitate diagnosis and mitigate risk of local transmission, state, local, tribal and territorial health departments should consult CDC guidelines for reporting information about laboratory-confirmed and probable cases to CDC: www.cdc.gov/zika/public-health-partners.

CDC established the U.S. Zika Pregnancy Registry and is collaborating with state, local, tribal and territorial health departments to collect information about pregnancy and infant outcomes following laboratory evidence of Zika virus infection during pregnancy. Healthcare providers and state, local, tribal and territorial health departments should consult CDC guidelines for reporting information about pregnant women and infants who are eligible for the registry. The guidelines provide further information about who is eligible for the registry: www.cdc.gov/zika/reporting/registry.html.

For More Information

OSHA/NIOSH Zika guidance provides information about signs and symptoms of Zika, steps for preventing exposure, and other tips for keeping workers healthy: www.osha.gov/zika

CDC Zika website: www.cdc.gov/zika

OSHA can provide extensive help through a variety of programs, including technical assistance about effective safety and health programs, workplace consultations and training and education.

OSHA's On-site Consultation Program offers free and confidential advice to small and medium-sized businesses in all states across the country, with priority given to high-hazard worksites. On-site consultation services are separate from enforcement and do not result in penalties or citations. To locate the On-site Consultation Program nearest you, visit www.osha.gov/consultation, or call 1-800-321-OSHA (6742).

Contact OSHA

For questions or to get information or advice, to report an emergency, fatality, inpatient hospitalization, amputation, or loss of an eye, or to file a confidential complaint, contact your nearest OSHA office, visit www.osha.gov or call OSHA at 1-800-321-OSHA (6742), TTY 1-877-889-5627.

Workers' Rights

Under federal law, workers are entitled to working conditions that do not pose a risk of serious harm.

For more information on how to assure a safe and healthful workplace, see OSHA's Workers page: www.osha.gov/workers.

DTSEM FS-3917 09/2017