Centers for Disease Control and Prevention
MMWR
Morbidity and Mortality Weekly Report
Early Release / Vol. 65
March 22, 2016

Preventing Transmission of Zika Virus in Labor and Delivery Settings Through Implementation of Standard Precautions — United States, 2016

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Zika virus transmission was detected in the Region of the Americas (Americas) in Brazil in May 2015, and as of March 21, 2016, local mosquito-borne transmission of Zika virus had been reported in 32 countries and territories in the Americas, including Puerto Rico and the U.S. Virgin Islands.* Most persons infected with Zika virus have a mild illness or are asymptomatic. However, increasing evidence supports a link between Zika virus infection during pregnancy and adverse pregnancy and birth outcomes (*1*), and a possible association between recent Zika virus infection and Guillain-Barré syndrome has been reported (*2*). Although Zika virus is primarily transmitted through the bite of *Aedes* species of mosquitoes, sexual transmission also has been documented (*3*). Zika virus RNA has been detected in a number of body fluids, including blood, urine, saliva, and amniotic fluid (*3*–*5*), and whereas transmission associated with occupational exposure to these body fluids is theoretically possible, it has not been documented. Although there are no reports of transmission of Zika virus from infected patients to health care personnel or other patients, minimizing exposures to body fluids is important to reduce the possibility of such transmission. CDC recommends Standard Precautions in all health care settings to protect both health care personnel and patients from infection with Zika virus as well as from blood-borne pathogens (e.g., human immunodeficiency virus [HIV] and hepatitis C virus [HCV]) (*6*). Because of the potential for exposure to large volumes of body fluids during the labor and delivery process and the sometimes unpredictable and fast-paced nature of obstetrical care, the use of Standard Precautions in these settings is essential to prevent possible transmission of Zika virus from patients to health care personnel.

Use of Standard Precautions in Health Care Settings

Health care personnel should adhere to Standard Precautions in every health care setting. Standard Precautions are designed to protect health care personnel and to prevent them from spreading infections to patients. They are based on the premise that all blood, body fluids, secretions, excretions (except sweat), nonintact skin, and mucous membranes might contain transmissible infectious agents and include 1) hand hygiene, 2) use of personal protective equipment (PPE), 3) respiratory hygiene and cough etiquette, 4) safe injection practices, and 5) safe handling of potentially contaminated equipment or surfaces in the patient environment (*6*). Because patients with Zika virus infection might be asymptomatic, Standard Precautions should be in place at all times, regardless of whether the infection is suspected or confirmed. Health care personnel should assess the potential for exposure to potentially infectious material during health care delivery and protect themselves accordingly, based on the level of clinical interaction with the patient and the physical distance at which care is provided (*6*). In addition, health care providers should use soap and water or alcohol-based products (gels, rinses, foams), at a minimum, before and after a patient contact and after removing PPE, including gloves (*6*).

Use of Standard Precautions in Labor and Delivery Settings

Pregnant women lose an average of 500 mL of blood during uncomplicated vaginal deliveries, with higher losses during complicated vaginal deliveries and cesarean deliveries (*7*). Amniotic fluid volume at the time of full-term delivery typically exceeds 500 mL (*8*). Eye protection used during deliveries has been

* http://www.cdc.gov/zika/geo/active-countries.html.

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demonstrated to be contaminated with blood and body fluids (*9*), and when double layers of gloves are used for procedures and surgeries, the outer layers often have significant perforations, whereas the inner layers are intact or have many fewer perforations (*10*). Although health care personnel in these settings are at substantial risk for exposure to blood and body fluids, varying levels of adherence to Standard Precautions have been reported in health care settings, including in labor and delivery units (*11*). Numerous barriers to the appropriate use of PPE have been cited, including the perception that PPE is uncomfortable and limits dexterity, fogging of goggles or face masks, the misperception that prescription eyeglasses provide adequate eye protection, lack of available PPE, forgetting to use PPE, lack of time in urgent clinical situations to don appropriate PPE, the perception that the patient poses minimal risk, and concerns about interference with patient care (*11*). Given the theoretic risk for transmission of Zika virus through contact with body fluids in a health care setting in which female health care personnel might be pregnant, or male or female health care personnel might be trying to conceive a pregnancy, the outbreak of Zika virus disease provides an opportunity to emphasize the importance of maintaining appropriate infection control.

The goals of Standard Precautions include 1) preventing contact between a patient's body fluids and health care personnel's mucous membranes (including conjunctivae), skin, and clothing; 2) preventing health care personnel from carrying potentially infectious material from one patient to another; and 3) avoiding unnecessary exposure to contaminated sharp implements. Health care personnel must assess the likelihood of body fluid exposure, based on the type of contact and the nature of the procedure or activity, and use appropriate PPE. For example, because the risk for splashes to areas of the body other than the hands is small when performing vaginal examinations of pregnant women with minimal cervical dilation and intact membranes, only gloves are required. Placement of a fetal scalp electrode when membranes have already been ruptured or handling newborns before blood and amniotic fluid have been removed from the newborn's skin require protection of health care personnel's skin and clothing using gloves and an impermeable gown. In contrast, when performing procedures where exposure to body fluids is anticipated, such as an amniotomy or placement of an intrauterine pressure catheter, protection of mucous membranes, skin, and clothing are recommended, with a mask and eye protection, in addition to gloves and an impermeable gown.

Anesthesia providers in the labor and delivery setting should adhere to Standard Precautions and wear sterile gloves and a surgical mask when placing a catheter or administering intrathecal injections; additional PPE should be worn based on anticipated exposure to body fluids (*6*). Double gloves might minimize the risk for percutaneous injury when sharps are handled. Patient body fluids also should not come into direct contact with health care personnel clothing or footwear. When performing procedures including vaginal deliveries, manual placenta removal, bimanual uterine massage, and repair of vaginal lacerations, PPE should include (in addition to mucous membrane and skin protection) impermeable gowns and knee-high impermeable shoe covers. Clothing, skin, and mucous membrane protections should be maintained for procedures performed in operating room settings.

Health care personnel should assess their risk for exposure and select PPE appropriate for the situation, and all personnel on a team involved in the same procedures should use the same level of PPE. All health care personnel should be trained in the correct use and disposal of PPE and be able to demonstrate the ability to don PPE quickly in urgent situations and remove it safely. Non–health care personnel in attendance should be positioned away from areas of exposure risk or adequately protected. Any occupational exposures, including mucous membrane exposure following splash of body fluids, sustained by health care personnel should be reported as soon as possible to the facility's occupational health clinic to ensure appropriate assessment of health care personnel, and so that any systemic safety risks can be addressed.

In addition to use of PPE by health care personnel, placement of disposable absorbent material on the floor around the procedure and delivery area to absorb fluid can reduce the risk for splash exposure to body fluids. Infection control supplies should be available and accessible in all patient care areas where they will be needed. Standard cleaning and disinfection procedures for environmental surfaces, using Environmental Protection Agency-registered hospital disinfectants, should be followed.

Importance of Ongoing Education and Training

Standard Precautions represent the minimum infection prevention expectations for safe care across all health care settings. Ongoing education and training of all health care personnel in a facility, including those employed by outside entities, on the principles and rationale for use of Standard Precautions and use of specific PPE help ensure that infection control policies and procedures are understood and followed (*6*). These educational efforts should emphasize that infection prevention strategies enhance the quality of patient care and do not alter the relationship between provider and patient. Barriers (e.g., cost and lack of standardized protocols in facilities) to implementation of Standard Precautions and use of PPE should be addressed as soon as they are recognized. Facility, nursing, and

obstetric leadership is critical for instituting infection prevention policies and promoting routine use of and adherence to Standard Precautions (*6*). Infectious disease outbreaks, such as the current Zika virus disease outbreak, provide an opportunity to emphasize the importance of adherence to published infection prevention strategies to prevent transmission of infectious diseases in all health care settings, including labor and delivery units.

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References

1. Brasil P, Pereira JP Jr, Raja Gabaglia C, et al. Zika virus infection in pregnant women in Rio de Janeiro—preliminary report. N Engl J Med 2016;NEJMoa1602412. Published online March 4, 2016. http://dx.doi.org/10.1056/NEJMoa1602412
2. Cao-Lormeau VM, Blake A, Mons S, et al. Guillain-Barré syndrome outbreak associated with Zika virus infection in French Polynesia: a case-control study. Lancet 2016;0140-6736(16)00562-6. Published online February 29, 2016. http://dx.doi.org/10.1016/S0140-6736(16)00562-6
3. Hills SL, Russell K, Hennessey M, et al. Transmission of Zika virus through sexual contact with travelers to areas of ongoing transmission—continental United States, 2016. MMWR Morb Mortal Wkly Rep 2016;65:215–6. http://dx.doi.org/10.15585/mmwr.mm6508e2
4. Barzon L, Pacenti M, Berto A, et al. Isolation of infectious Zika virus from saliva and prolonged viral RNA shedding in a traveller returning from the Dominican Republic to Italy, January 2016. Euro Surveill 2016;21:30159. http://dx.doi.org/10.2807/1560-7917.ES.2016.21.10.30159
5. Musso D, Nhan T, Robin E, 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;19:20761. http://dx.doi.org/10.2807/1560-7917.ES2014.19.14.20761
6. Siegel JD, Rhinehart E, Jackson M, Chiarello L; Healthcare Infection Control Practices Advisory Committee. 2007 guideline for isolation precautions: preventing transmission of infectious agents in healthcare settings. http://www.cdc.gov/hicpac/2007IP/2007isolationPrecautions.html
7. Likis FE, Sathe NA, Morgans AK, et al. Management of postpartum hemorrhage. Comparative effectiveness review. No. 151. Rockville, MD: Agency for Healthcare Research and Quality; 2015. https://www.effectivehealthcare.ahrq.gov/ehc/products/552/2077/hemorrhage-postpartum-executive-150427.pdf
8. Sandlin AT, Ounpraseuth ST, Spencer HJ, Sick CL, Lang PM, Magann EF. Amniotic fluid volume in normal singleton pregnancies: modeling with quantile regression. Arch Gynecol Obstet 2014;289:967–72. http://dx.doi.org/10.1007/s00404-013-3087-2
9. Kouri DL, Ernest JM. Incidence of perceived and actual face shield contamination during vaginal and cesarean delivery. Am J Obstet Gynecol 1993;169:312–6. http://dx.doi.org/10.1016/0002-9378(93)90081-S
10. Mischke C, Verbeek JH, Saarto A, Lavoie MC, Pahwa M, Ijaz S. Gloves, extra gloves or special types of gloves for preventing percutaneous exposure injuries in healthcare personnel. Cochrane Database Syst Rev 2014;3:CD009573. http://dx.doi.org/10.1002/14651858.CD009573.pub2
11. Gammon J, Morgan-Samuel H, Gould D. A review of the evidence for suboptimal compliance of healthcare practitioners to standard/universal infection control precautions. J Clin Nurs 2008;17:157–67.

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