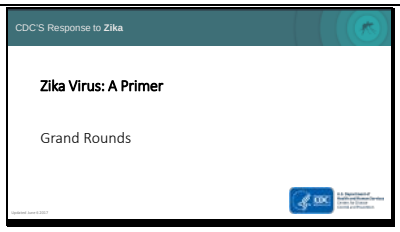
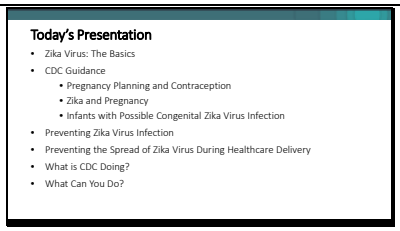
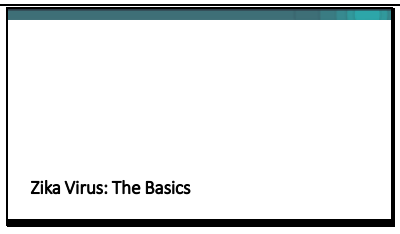
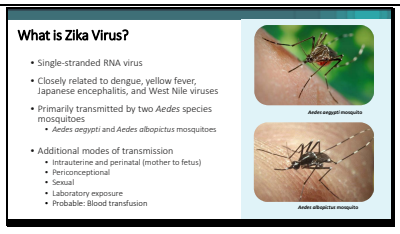
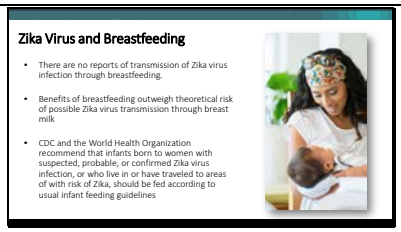
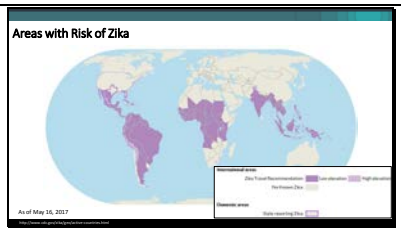
Zika Virus Grand Rounds Facilitation Guide: Nurses

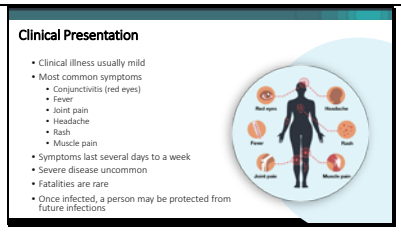
Intended Audience: Nurses

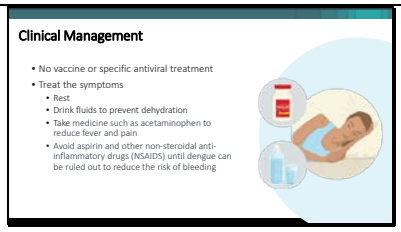
Estimated Length: 60 minutes

Updated August 8, 2017

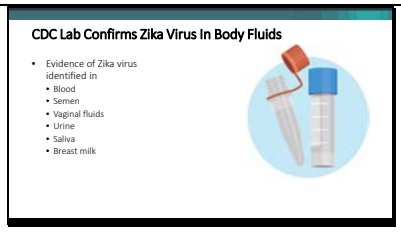
Slide 1		• Good [morning/afternoon/evening]. Today I'd like to share with you what is known about Zika virus.
Slide 2		• Today's Zika virus outbreak is unprecedented. Zika virus was first identified 70 years ago, but the recognition of the potentially devastating effects on pregnancy is a new phenomenon.
Slide 3		• My goal today is to share the most current information available, and encourage you to stay up-to-date as the science advances. Here's a brief outline of my presentation.
Slide 4		• First, let's start with some basics.
Slide 5		• Zika virus is a single-stranded RNA virus that is closely related to dengue, yellow fever, Japanese encephalitis, and West Nile viruses. • It is primarily transmitted by the bite of two *Aedes* species mosquitoes, *Aedes aegypti* and *Aedes albopictus*. • Zika virus is also transmitted through several other routes including

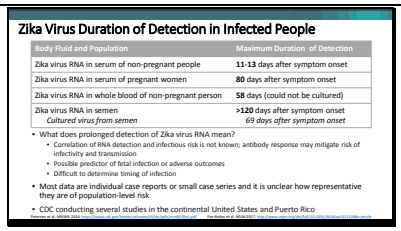
		• Intrauterine and perinatal transmission (transmission from mother to fetus) • Periconceptional • Sexual transmission • Laboratory exposure • And probably blood transfusion. To date, there have been no confirmed transfusion-transmission cases of Zika virus in the United States. However, cases of Zika virus transmission through platelet transfusions have been documented in Brazil.
Slide 6		• While Zika virus RNA has been identified in breast milk, currently, there is no conclusive evidence of Zika virus transmission through breastfeeding • Based on the current evidence, the benefits of breastfeeding outweigh the theoretical risks of Zika virus transmission through breastmilk. • CDC and the World Health Organization recommend that infants born to women with possible or confirmed Zika virus infection, or who live in or have traveled to areas with risk of Zika, should be fed according to usual infant feeding guidelines.
Slide 7		• This map shows countries and territories with risk of Zika. • Purple shading of a country doesn't necessarily mean that Zika virus is being spread across the entire country; it just means that Zika virus spread by local mosquitoes has been reported in at least one area of that country. Some countries with purple shading may have had Zika virus transmission in the past, are likely to have Zika virus transmission, or have low rates of steady Zika virus transmission. Visit the CDC website for more specific information about where Zika virus is locally transmitted. • To date, Florida and Texas have been the only states in the United States that have reported the spread of Zika through locally infected mosquitos. This occurred in small areas only in Miami-Dade County, Florida, and Brownsville, Texas.

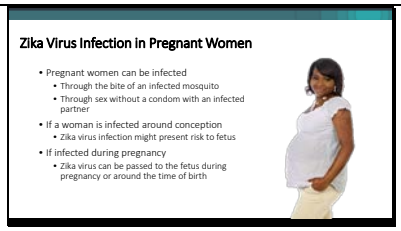
Slide 8		• Now I would like to switch gears and talk about some of the clinical aspects of Zika virus infection.
		  • Many people infected with Zika virus won't have symptoms or will only have mild symptoms.
		  • When symptoms do occur, the most common ones are fever, rash, headache, joint pain, conjunctivitis (red eyes), and muscle pain.
		  • Symptoms typically last several days to a week.
		  • Severe disease requiring hospitalization has been uncommon and fatalities have been rarely reported.
		  • Based on similar infections, once a person has been infected with Zika virus and, it is believed that he or she may be protected from future infections.

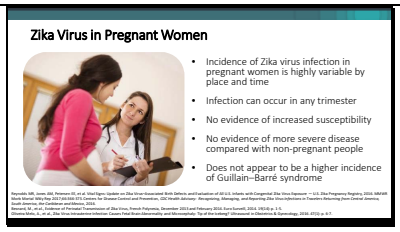
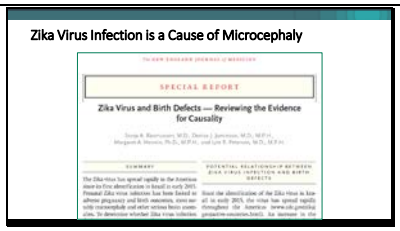
Slide 9		• Although research is underway, there is currently no vaccine or specific antiviral treatment for Zika virus.
		• The cornerstone of treatment is supportive care. Patients should be advised to treat the symptoms, including recommending
		  • Rest
		  • Drink fluids to prevent dehydration.
		  • Take medicine, such as acetaminophen to reduce fever and pain.
		  • However, aspirin and NSAIDS should be avoided until dengue can be ruled out to reduce the risk of bleeding.

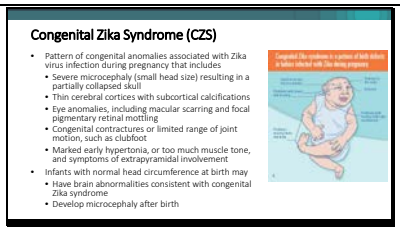
Slide 10		• Zika virus has been found in fetal tissue.
		• Evidence of Zika virus has been detected in
		  • Amniotic fluid
		  • Placenta
		  • Fetal brain tissue
		  • Products of conception
		• This image shows immunohistochemical staining of Zika virus antigen (red stain) in fetal brain tissue. This staining is present in the same areas where neuronal cell death in the fetal brain was identified by microscopic review of tissue morphology.
		• A CDC study released December 13, 2016, found that Zika virus can continue to replicate in infants' brains even after birth. This information could have important implications for Zika virus-exposed babies born with microcephaly and for babies who are born without visible evidence of congenital Zika infection.

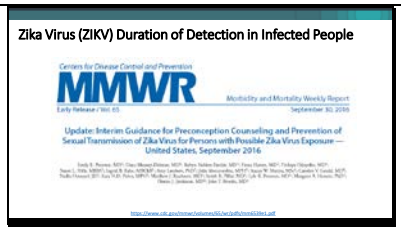
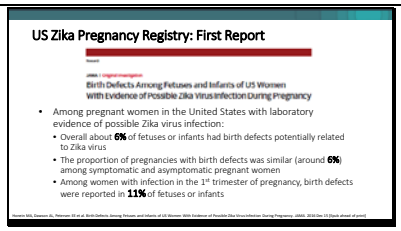
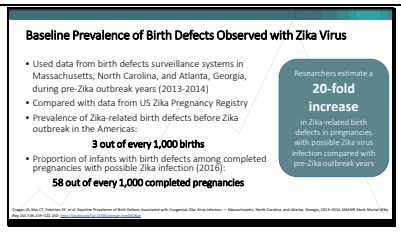
Slide 11		• Zika virus has been shown to be present in the following fluids in adults:
		  • Blood
		  • Semen
		  • Vaginal fluids
		  • Urine
		  • Saliva
		  • Breast milk
		• Zika virus has been detected in these fluids, but the only known modes of transmission are via semen and vaginal fluids. Transmission via blood is probable but has not yet been established.

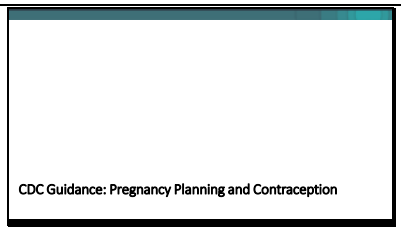
Slide 12		• CDC reviewed data from several studies on virus shedding in blood and semen.
		• Zika virus RNA has been detected in serum by PCR among
		  • Non-pregnant people up to 11-13 days and
		  • A pregnant woman over 11 weeks – 80 days – after symptom onset
		• Zika virus RNA has been detected in whole blood up to 58 days in a non-pregnant person
		  • But, Zika virus could not be cultured from the day 58 specimen
		• Zika virus RNA has been detected in semen 188 days after symptom onset and has been cultured in semen up to 69 days after symptom onset
		• Zika virus could persist in the body longer than has been documented by existing studies. CDC is conducting several studies in the continental United States and Puerto Rico to learn about how Zika virus persists in whole blood, serum, and other body fluids including semen.

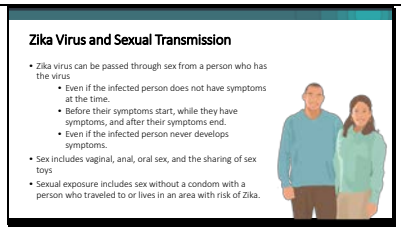
Slide 13		• Pregnant women can be infected with Zika virus through the same routes I discussed earlier, mainly
		  • Through the bite of an infected mosquito or
		  • Through sex without a condom with an infected partner
		  • This includes vaginal, anal, and oral sex and the sharing of sex toys.
		  • At this time there is no evidence to suggest that Zika virus can be passed through saliva during deep kissing.
		• Zika virus may be passed to the fetus early on, around the time of conception. If this happens, the virus might present a risk to the fetus.
		• If a woman is infected during pregnancy, Zika can be passed to the fetus during pregnancy or around the time of birth

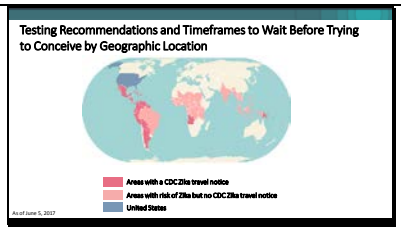
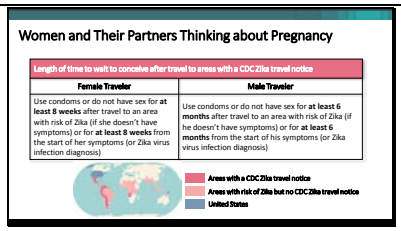
Slide 14		• Incidence of Zika virus infection in pregnant women is not known. • Infection can occur in any trimester. • There is no evidence that pregnant women are more susceptible to Zika virus infection than non-pregnant women. • The clinical course of Zika virus infection is similar for pregnant women and non-pregnant people. • There does not appear to be a higher incidence of Guillain–Barré syndrome in pregnant women.
Slide 15		• Before the current Zika virus outbreak, the relationship between Zika virus infection and microcephaly had not yet been confirmed. • The initial association between Zika virus and birth defects was suspected based on the number of cases over time. But increasing evidence became available because of the recent outbreaks to investigate a causal relationship. • In April 2016, in an article published in the New England Journal of Medicine, scientists at CDC concluded that Zika virus is a cause of microcephaly and other brain anomalies. • To reach this conclusion, the scientists conducted a systematic evaluation of the evidence, which supported a causal relationship between Zika virus infection and microcephaly and other serious brain anomalies.

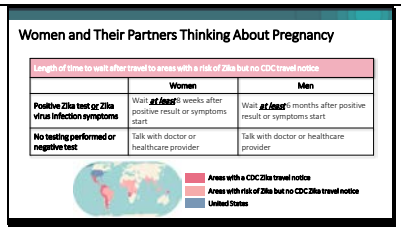
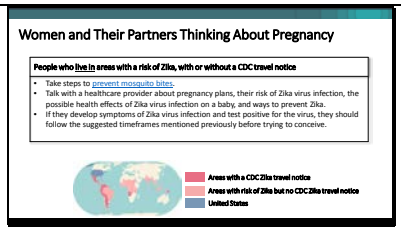
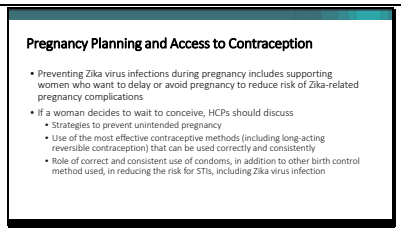
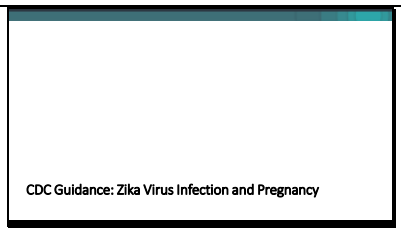
Slide 16		• Congenital Zika syndrome is a recognizable pattern of congenital anomalies associated with Zika virus infection during pregnancy that includes:
		  • Severe microcephaly (small head size) resulting in a partially collapsed skull
		  • Thin cerebral cortices with subcortical calcifications
		  • Eye anomalies, including macular scarring and focal pigmentary retinal mottling
		  • Congenital contractures or limited range of joint motion, such as clubfoot
		  • Marked early hypertonia, or too much muscle tone, and symptoms of extrapyramidal involvement
		• Infants with a head circumference at birth in the normal range can have brain abnormalities consistent with congenital Zika syndrome.
		• In addition, microcephaly from congenital Zika virus infection can develop after birth.

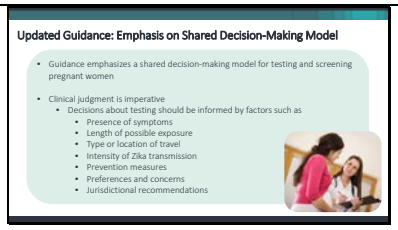
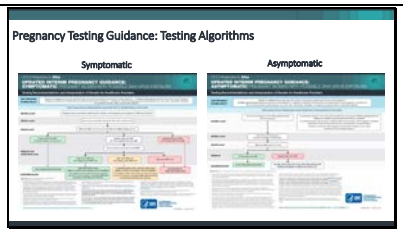
Slide 17		• On September 30, 2016, *MMWR* published an article describing 13 infants with laboratory evidence of congenital Zika virus infection and no microcephaly at birth, who were subsequently found to have brain anomalies. • Some of these infants had other structural or functional abnormalities noted, but this case series illustrates the variety of clinical presentations that congenital Zika virus infection can produce, and clarifies that visible microcephaly at birth is not a required feature of congenital Zika syndrome. • Research to describe the full spectrum of adverse reproductive outcomes caused by Zika virus infection is ongoing.
Slide 18		• A December 2016 report from the US Zika Pregnancy Registry found that about 6% of completed pregnancies in women with laboratory evidence of possible recent Zika virus infection had birth defects potentially related to Zika virus. • The proportion of pregnancies with birth defects was similar (around 6%) among pregnant women who experienced symptoms and pregnant women who were asymptomatic. This emphasizes the importance of screening pregnant women for Zika virus exposure risk and testing them when indicated, because asymptomatic women in this study were just as likely to have babies with birth defects. • The report also found that among women with maternal symptoms OR laboratory evidence of possible Zika virus infection in the first trimester of pregnancy, birth defects were reported in 11% of completed pregnancies. • These data suggest that Zika virus infection during the first trimester of pregnancy poses danger to pregnancy and fetal development. There was not enough data at the time of publication to estimate the risk for pregnancies infected in the 2nd or 3rd trimester. Additionally, there were some limitations of this study, such as some pregnancies were ongoing, and microcephaly cases were still being reported and investigated.
Slide 19		• In a March 2017 report, researchers estimated the baseline prevalence of birth defects observed with Zika virus in pre-Zika outbreak years, so that they could compare it with the incidence after the Zika virus outbreak. • Birth defects of interest for this analysis included brain abnormalities and/or microcephaly, neural tube defects and other early brain malformations, eye defects, and other central nervous system problems.

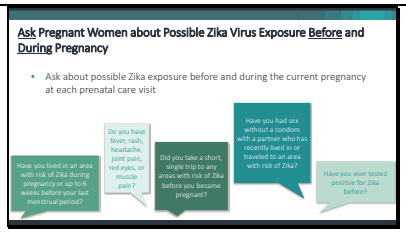
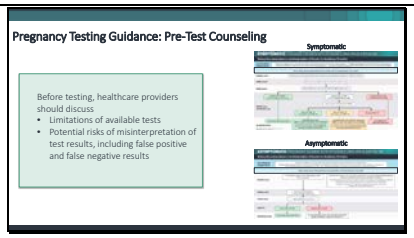
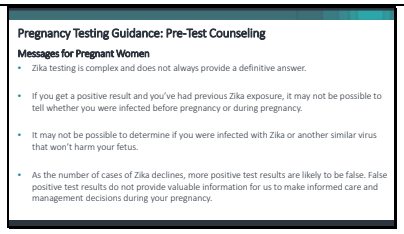
		• Using data from three birth defects surveillance systems in the United States, scientists identified 747 infants and fetuses with one or more of these conditions from systems in the states of Massachusetts and North Carolina, and the city of Atlanta, GA, born from 2013-2014. • This translated to a rate of 3 babies per 1,000 births in the pre-Zika years • Data from the December USZPR report identified 26 infants and fetuses with these same birth defects among the 442 completed pregnancies of women with possible Zika virus infection from January through September 2016. This translates to a rate of 58 babies per 1,000 births – an approximately 20-fold increase. It is important to note that this is only among pregnant women included in the US Zika pregnancy – that is, those with lab evidence of possible Zika virus infection during pregnancy.
Slide 20		• A CDC Vital Signs report updated previously published estimates of the proportion of fetuses or babies with birth defects among pregnant women with possible Zika virus infection reported to the US Zika Pregnancy Registry. • From January 15 to December 27, 2016, nearly 1,300 pregnant women with evidence of possible Zika virus infection were reported in 44 states. According to the report, which includes data from all US states and the District of Columbia (DC). • Of these women, almost 1,000 pregnancies were completed by the end of 2016 and more than 50 of those babies had Zika virus-related birth defects. • This is the first study to include a subgroup of pregnant women with laboratory confirmed Zika virus infection. • Of the 250 cases of pregnant women with confirmed Zika virus infection in 2016, 24 – or about 1 in 10 of them – had a fetus or baby with Zika virus-related birth defects. • Only 1 in 4 babies with possible congenital Zika virus infection were reported to have received brain imaging after birth, which is recommended by CDC. Brain imaging at birth is critical to identify babies who may appear healthy but have underlying brain defects and to ensure they receive the care that they need.
Slide 21		• Now, I will speak about CDC'S current guidance regarding pregnancy planning and contraception.

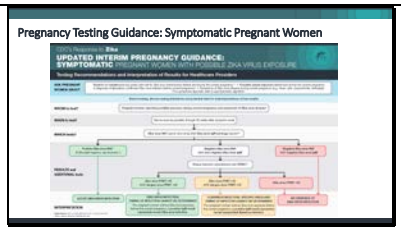
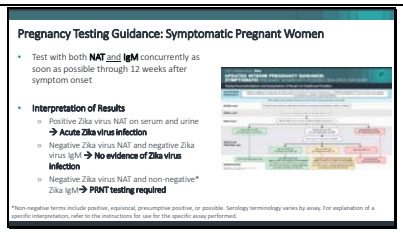
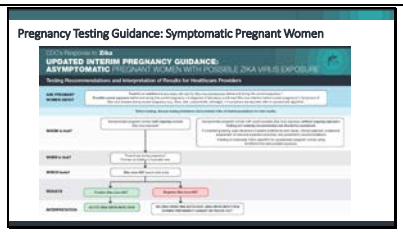
Slide 22		• Zika virus can be passed through sex from a person who has Zika to his or her sex partners, so travelers to areas with risk of Zika are encouraged to use condoms or not have sex.
		  • Zika virus can be passed through sex even if the infected person does not have symptoms at the time.
		  • It can be passed from an infected person before their symptoms start, while they have symptoms, and after their symptoms end.
		  • The virus may also be passed by a person who has been infected with the virus but never develops symptoms.
		• Sex includes vaginal, anal, oral sex, and the sharing of sex toys
		• Zika virus has been found in genital fluids, including semen and vaginal fluids. Sexual exposure includes sex without a condom with a person who traveled to or lives in an area with risk of Zika.

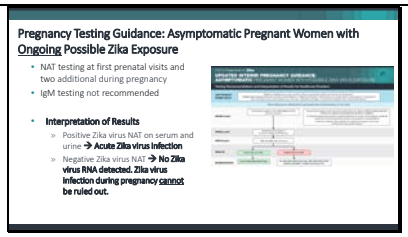
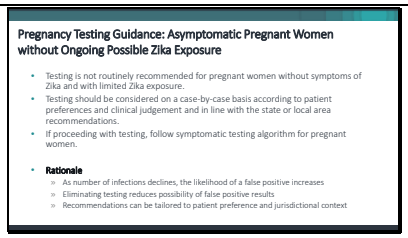
Slide 23		• Here is a map of the world classifying countries based on their potential risk for Zika virus. Countries that are marked in dark pink are areas that have a CDC Zika travel notice. These are countries where the virus has been newly introduced or reintroduced and local mosquito-borne transmission is ongoing. The countries marked in light pink are areas with risk of Zika. The current level of risk for becoming infected with Zika virus in these areas is unknown. The dark blue area indicates the United States. The recommendations for areas in the United States with local transmission differs slightly. • CDC recommends periods for waiting to conceive aligned with these risk categories and differentiated by presence of a Zika travel notice.
Slide 24		• The table on this slide shows the suggested timeframes for waiting to get pregnant after possible exposure to Zika virus via travel to an area with a CDC travel notice: • Female travelers should wait at least 8 weeks after the last possible exposure or after symptoms start (if she developed symptoms) before trying to conceive. • Male travelers should wait at least 6 months after last possible exposure or after symptoms start (if he developed symptoms) before trying to conceive. • CDC does not recommend Zika virus testing for asymptomatic men, children, or women who are not pregnant and have traveled to areas with a CDC Zika travel notice.

Slide 25		• The following recommendations are for people considering pregnancy who traveled to areas with risk of Zika but no CDC Zika travel notice. • Because the level of risk in this area is unknown and information is limited about the risk of infection around the time of conception, women and their partners should talk with their healthcare provider if they have not had Zika test or received a negative test result. • If women or men develop symptoms consistent with Zika virus infection and/or test positive for the virus, they should follow the suggested wait timeframes mentioned earlier before trying to conceive.
Slide 26		• People who **live** in areas with a risk of Zika, with or without a CDC travel notice, should: • Take steps to prevent mosquito bites. • Talk with their healthcare provider about pregnancy plans, their risk of Zika virus infection, the possible health effects of Zika virus infection on a baby, and ways to protect themselves from Zika. • If they develop symptoms of Zika virus infection and test positive for the virus, they should follow the suggested timeframes above before trying to conceive.
Slide 27		• Preventing Zika virus infections during pregnancy is CDC's top priority for the Zika virus response. This includes supporting women who want to delay or avoid pregnancy, in order to avert Zika virus-related pregnancy complications. • Healthcare providers should discuss strategies to prevent unintended pregnancy, including counseling on family planning and the use of the most effective contraceptive methods that work for the woman and her partner's lifestyle and can be used correctly and consistently. • Healthcare providers should also advise patients to consider using condoms correctly and consistently, in addition to other birth control methods. Correct condom use willreduce the risk of acquiring or transmitting Zika virus and sexually transmitted infections.
Slide 28		• Now, I will speak about CDC'S current guidance regarding pregnancy and Zika virus testing.

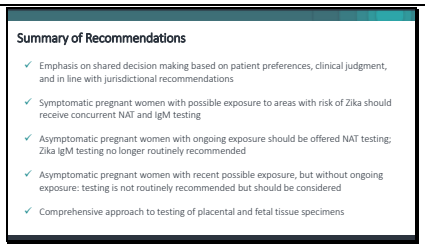
Slide 29		• CDC Updated its guidance for testing pregnant women in July 2017. • The guidance emphasizes the importance of shared patient-provider decision-making for testing and screening pregnant women. • Shared decision-making is a process in which clinicians and patients work together to make decisions and select tests, treatments, and care plans based on clinical evidence that balances risks and expected outcomes with patient preferences and values. • During this process, the health care provider's clinical judgement is imperative and when deciding whether or not to advise testing, factors such as potential symptoms, length of possible exposure, type and location of exposure as well as protective measures taken, timing of pregnancy, preferences and concerns, and jurisdictional recommendations, should be considered.
Slide 30		• There are two algorithms – one for pregnant women with symptoms of Zika virus disease and one for asymptomatic women. • The symptomatic algorithm also applies to pregnant women with possible Zika virus exposure who have a fetus with prenatal ultrasound findings of possible Zika-virus associated birth defects. • In the guidance, each algorithm begins with a reminder for healthcare providers to ask patients about their possible Zika exposure and Zika symptoms. • Before deciding whether to test, we have included a reminder for pretest counseling, to prompt healthcare providers to discuss the limitations of the testing and potential risks of misinterpretation of test results. • From there, the algorithms outline who to test, when to test, which tests to order, and how to interpret test results.

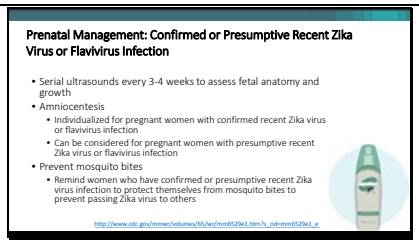
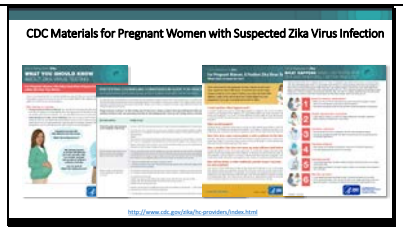
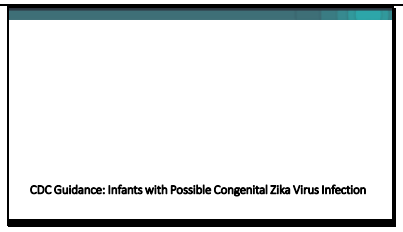
Slide 31		• All pregnant women should be asked about possible Zika virus exposure before and during the current pregnancy at each prenatal care visit.
Slide 32		• If, based on screening, the pregnant woman is eligible for testing, providers and counselors should provide appropriate pretest counseling to inform decisions on whether or not to test. • Pre-test counseling is recommended <u>before and after</u> testing. • Counseling includes a discussion of the limitations of the tests and the potential risks of misinterpretation of test results, including **false positive and false negative results**. • If, during the testing screening, a patient reports extensive exposure to any area with risk of Zika prior to her current pregnancy, she should be informed that Zika IgM antibody test results may be difficult to interpret and may have limited utility for clinical decision-making. • Patients may choose not to be tested with Zika IgM testing.
Slide 33		• All pregnant women should be informed that Zika testing is complex and does not always provide a definitive answer. • They should also be informed that in some cases, it may not be able to determine if they were infected with Zika virus or another virus that is potentially harmless to their fetus. • Healthcare providers should explain to women with extensive exposure to Zika prior to pregnancy that a positive test may not provide helpful information about whether they were infected before or during their current pregnancy. • Asymptomatic women with limited exposure should be informed that false positive **results** are a major concern for testing women without symptoms and that is why testing in this group is not recommended.

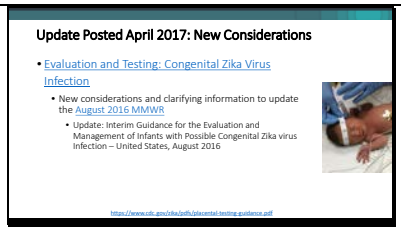
		• CDC has developed sample scripts that can guide healthcare providers during these complex conversations and provide ideas about how to explain things to patients in an easily understandable way.
Slide 34		• Now, I will discuss the guidance for testing symptomatic pregnant women with possible Zika virus exposure.
Slide 35		• Previously, CDC guidance recommended that a pregnant woman with symptoms be tested first with either NAT if they presented less than 2 weeks after symptom onset or IgM if they presented 2 to 12 weeks after symptom onset. • In the updated guidance, testing is now recommended to occur concurrently, through 12 weeks after symptom onset. • This condensed, simplified algorithm is designed to ensure appropriate and complete testing is performed, and could potentially provide a greater number of diagnoses, including more definitive diagnoses, for pregnant women. • However, by extending the window for NAT testing, the potential for false positives may increase. The concurrent testing with IgM and recommendations for repeat testing for certain scenarios should address this.
Slide 36		• Now, I will discuss the guidance for testing asymptomatic pregnant women with possible Zika virus exposure.

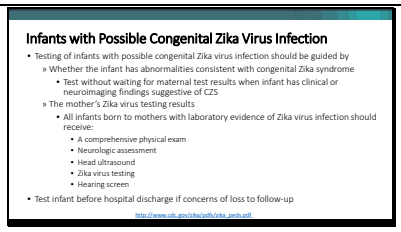
Slide 37		• Previously, CDC guidance recommended that asymptomatic pregnant women with ongoing exposure to any area with Zika transmission before their current pregnancy be tested with IgM and reflex NAT testing, if indicated, during their first and second trimesters. • In the updated guidance, testing for Zika virus should continue to be offered to pregnant women because it might identify infection during pregnancy and provide information that can be used to guide clinical care. • NAT testing should be offered at the initiation of prenatal care, and if Zika virus RNA is not detected on clinical specimens, two additional tests should be offered during the course of the pregnancy coinciding with prenatal visits. • Zika IgM testing is no longer recommended, because of the emerging data indicating challenges in determining whether positive results represent an infection that occurred during the current pregnancy versus prior to conception. • Given the limited value of IgM testing and what we covered earlier, these changes should help prevent misinterpretation of Zika test results for this group of women. However, while a positive NAT provides useful information for a woman and her healthcare provider, a negative NAT for these individuals cannot rule out Zika virus infection during the current pregnancy.
Slide 38		• Previously, CDC guidance recommended that a pregnant woman without symptoms who had recent possible exposure to Zika but did not have ongoing possible exposure be offered testing with either NAT or IgM based on timing of last possible exposure. • In the updated guidance, testing is no longer routinely recommended for this group. Testing should be considered using a shared decision-making model that includes the based patient preferences and clinical judgement and the state or local area's recommendations. • Healthcare provider's clinical judgement is imperative; when deciding whether or not to advise testing, healthcare providers should consider potential risk factors unique to their patients, including: potential symptoms, type and location of exposure, length of exposure, whether or not they took regular protection measures, timing of pregnancy, and preference/concerns and state and local area recommendations. • This change is intended to reduce the possibility of false positive results in the setting of the lower pretest probability. • We acknowledge that these changes will have implications for surveillance information from asymptomatic pregnant women, however most positives in the setting of low

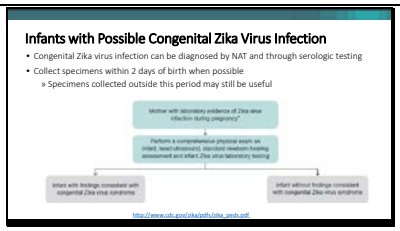
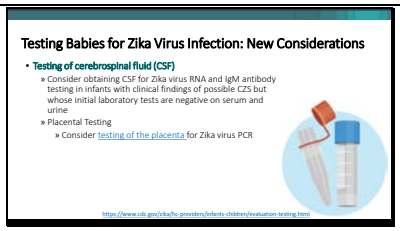
		prevalence will be FALSE positives and could lead to negative repercussions for pregnant women and their care. • There is also the possibility that the lack of routine testing of asymptomatic pregnant women will prevent the early identification of infants without obvious birth abnormalities, but who may have complications from congenital Zika virus infection. To address this, AAP and ACOG will be working closely together to follow up on this guidance. Specifically, they will be assessing the need for additional guidance for infants and children in terms of diagnostics and developmental assessments and updated guidance is anticipated this fall. In addition, the updated guidance will emphasize that pediatricians for pediatricians to assess newborns for congenital Zika exposure at birth and link them to the current infant guidance. • These recommendations can be tailored to patient preference and jurisdictional context.

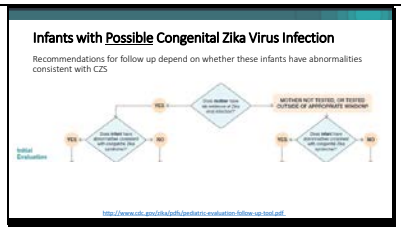
Slide 39		• In summary CDC's updated guidance for the clinical management of pregnant women with possible exposure to Zika recommends:
		  • An emphasis on shared decision-making based on patient preferences, clinical judgement, and jurisdictions recommendations.
		  • Symptomatic pregnant with possible Zika virus exposure should be tested with both Zika NAT and IgM as soon as possible up through 12 weeks after symptom onset.
		  • Asymptomatic pregnant women with ongoing Zika virus exposure should be offered NAT testing at the first prenatal care visit with two additional tests during routine prenatal care visits. Zika IgM testing is no longer recommended because of the challenges in determining whether a positive result represent an infection that occurred during the current pregnancy versus prior to conception.
		  • For asymptomatic pregnant women with recent possible exposure to Zika, but without ongoing exposure, testing is not routinely recommended but can be considered based on patient preferences, clinical judgement and the state and local area recommendations.

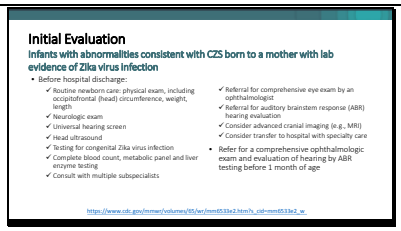
		• The updated guidance also includes a comprehensive approach to testing of placental and fetal tissue specimens.
Slide 40		• Prenatal management is similar for pregnant women with confirmed recent Zika virus or flavivirus and presumptive recent Zika virus or flavivirus infection. • Clinical management includes serial fetal ultrasounds every 3-4 weeks to assess fetal anatomy and monitor growth. • Amniocentesis should be individualized for pregnant women with confirmed recent Zika virus or flavivirus infection and can be considered for pregnant women with presumptive recent Zika virus or flavivirus infection. • It is also important for women who have been found to protect themselves against mosquito bites. • Keeping people infected with Zika virus from getting mosquito bites will prevent Zika virus from passing from these people to mosquitoes and then to other people, and will help protect household members, close contacts, and others from getting Zika.
Slide 41		• CDC has created different tools to help counsel pregnant women on Zika virus testing, including pre-testing counseling, fact sheets, and scripts for clinicians; materials about testing to give directly to the patients, and fact sheets to help women understand the implications of their results.
Slide 42		• Now, I will speak about CDC'S current guidance regarding infants with possible congenital Zika virus infection.

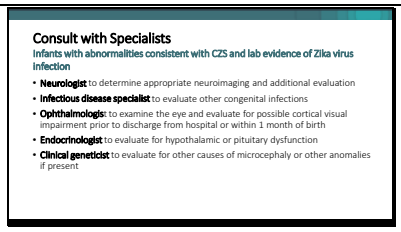
Slide 43		• Recommendations for infant evaluation and management are based on CDC'S August 2016 MMWR on the evaluation and management of infants with possible Zika, and new considerations released by CDC in April 2017.

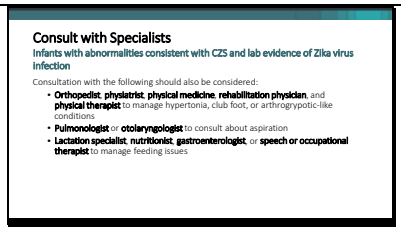
Slide 44		• Maternal Zika virus testing should be performed if the exposure to Zika virus occurred within the last 12 weeks.
		• Testing of infants with possible congenital Zika virus infection should be guided by
		  • Whether the infant has abnormalities consistent with congenital Zika syndrome
		  • In cases where an infant has abnormal clinical or neuroimaging findings suggestive of congenital Zika syndrome and a maternal epidemiologic link suggesting possible exposure during pregnancy, Zika virus laboratory testing is recommended regardless of maternal Zika virus test results.
		  • The mother's Zika virus testing results
		  • All infants born to mothers with laboratory evidence of congenital Zika virus infection during pregnancy should receive a comprehensive physical exam and head ultrasound before discharge from the hospital. They should also receive a neurologic assessment, Zika virus lab testing, and newborn hearing screen.
		  • If maternal test results have not yet been received and the infant appears clinically well, further evaluation, including head ultrasound and infant laboratory Zika virus testing, can be deferred until results from the mother's test are available.
		• If there is concern about loss to follow-up, or negative, or no maternal test results in the setting of an exposure that occurred more than 12 weeks earlier, head ultrasound, ophthalmologic assessment, and testing of the infant's specimens should be considered before hospital discharge.

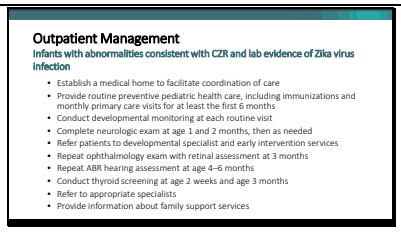
		• A postnatal head ultrasound should be performed on all infants before discharge from the hospital, regardless of maternal and infant testing. This should include those infants with normal prenatal ultrasound findings, because some abnormal findings associated with congenital Zika syndrome might not be readily apparent on prenatal ultrasounds.
Slide 45		• When an infant is tested, a Zika virus NAT test should be performed on both infant serum and urine, and Zika virus immunoglobulin M (IgM) antibody should be performed on infant serum. • Testing should be performed on specimens collected from infants within 2 days after birth; however, testing specimens collected within the first few weeks to months after birth may still be useful in the evaluation for possible congenital Zika virus infection, especially among infants born in areas without risk of Zika. • Further evaluation should be dependent upon whether or not the infant has findings consistent with congenital Zika syndrome.
Slide 46		• CDC interim infant testing guidance recommends that Zika virus testing should be performed on cerebrospinal fluid if it was collected for other reasons; however, there are limited reports of congenital Zika virus infection in which CSF was the only sample testing positive. Therefore, healthcare providers should consider obtaining CSF for Zika virus RNA and IgM antibody testing in infants with clinical findings of possible congenital Zika syndrome but whose initial laboratory tests are negative on serum and urine. • Testing of the placenta for Zika virus PCR should be considered. More information about placental testing can be found on the CDC website.

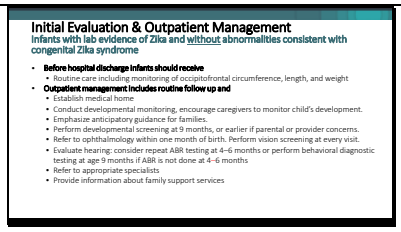
Slide 47		• Recommendations for follow up after initial screening and testing depend on whether these infants have abnormalities consistent with congenital Zika infection. This tool is available at http://www.cdc.gov/zika/pdfs/pediatric-evaluation-follow-up-tool.pdf

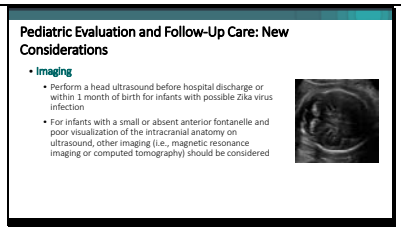
Slide 48		• The initial exam of an infant with abnormalities consistent with congenital Zika syndrome, born to a mother with lab evidence of Zika virus infection, should include
		  • All the components of routine newborn care, which include a physical exam, including head circumference, weight, and length
		  • A neurologic exam
		  • A universal hearing screen
		  • A head ultrasound
		  • Specimen testing for congenital Zika virus infection
		  • Complete blood count, metabolic panel and liver enzyme testing
		  • It may be necessary to consult with multiple subspecialists
		  • Comprehensive eye exam by an ophthalmologist
		  • A hearing evaluation using auditory brainstem response (ABR)
		• Advanced cranial imaging, such as an MRI, and transfer to a hospital that can provide subspecialty care should also be considered.
		• Refer for a comprehensive ophthalmologic exam and evaluation of hearing by ABR testing before one month of age.

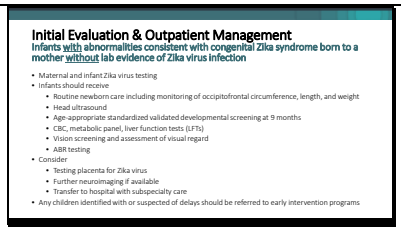
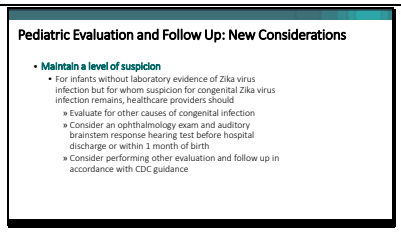
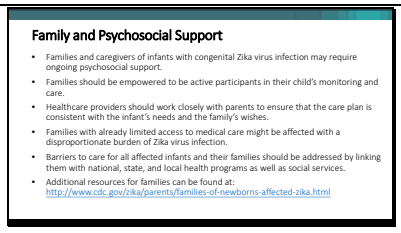
Slide 49		• For infants with abnormalities consistent with congenital Zika syndrome AND lab evidence of Zika virus infection, the following specialists should be consulted to assist in the management of care:
		  • Neurologist
		  • Infectious disease specialist
		  • Ophthalmologist
		  • Endocrinologist
		  • Clinical geneticist

Slide 50		• Clinicians should also consider consulting with an
		  • Orthopedist, physiatrist or physical medicine, a rehabilitation physician, and physical therapist to manage hypertonia, club foot, or arthrogrypotic-like conditions
		  • And a Pulmonologist or otolaryngologist to consult about aspiration
		• Additionally, a lactation specialist, nutritionist, gastroenterologist, or speech or occupational therapist, to manage feeding issues

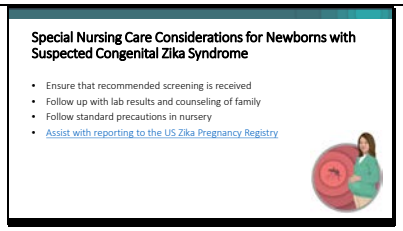
Slide 51		• To effectively manage an infant with congenital Zika syndrome AND lab evidence of congenital Zika virus infection, the following steps should be taken:
		  • Establish a medical home to facilitate coordination of care
		  • Provide routine preventive pediatric health care, including immunizations
		  • Conduct developmental monitoring at each routine visit
		  • Complete a neurologic exam at age 1 and 2 months, then as needed
		  • Refer to developmental specialist and early intervention services
		  • Repeat ophthalmology exam with retinal assessment at 3 months
		  • Repeat ABR hearing assessment at age 4–6 months
		  • Conduct thyroid screening at age 2 weeks and age 3 months
		  • Refer to appropriate specialists
		  • Provide information about family support and early intervention services
		• Additionally family and psychosocial support should be provided. I will go into detail about what this entails a little bit later.

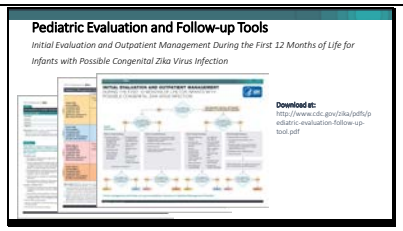
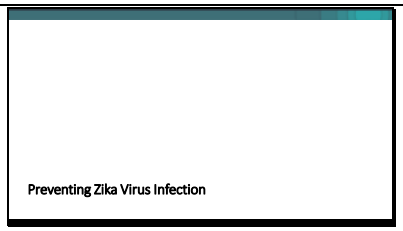
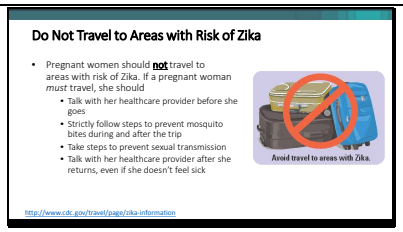
Slide 52		• An infant who is born **with** lab evidence of congenital Zika infection but **without** abnormalities consistent with congenital Zika syndrome should receive:
		  • Routine care including monitoring of head (occipitofrontal) circumference, length, and weight before hospital discharge
		• Outpatient management includes routine follow-up care and:
		  • A medical home should be established for the infant.
		  • Developmental monitoring should be conducted at every visit
		  • Emphasize anticipatory guidance for families regarding developmental milestones, feeding and growth, sleep and irritability, and abnormal movements.
		  • Perform age-appropriate standardized validated developmental screening at 9 months
		  • Infant should be referred to ophthalmologist within one month of birth. Vision screening and assessment of visual regard should be performed at every well child visit.
		  • To evaluate hearing, consider repeat ABR testing at 4–6 months or perform behavioral diagnostic testing at age 9 months if ABR is not done at 4-6 months.
		  • Any children identified with or suspected of delays should be referred to early intervention programs.
		• Family and support services need to be provided.

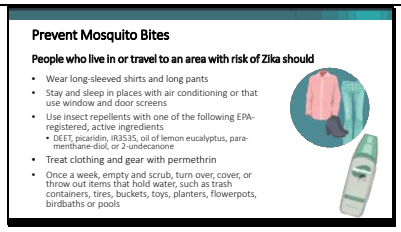
Slide 53		• Perform a head ultrasound before hospital discharge or within 1 month of birth for infants with possible Zika virus infection. • For infants with a small or absent anterior fontanelle and poor visualization of the intracranial anatomy on ultrasound, other imaging (i.e., magnetic resonance imaging or computed tomography) should be considered.

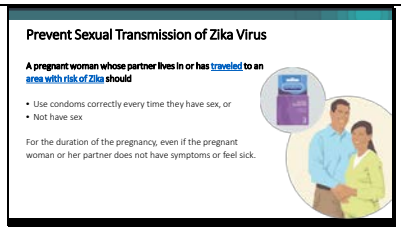
Slide 54		• Initial evaluation of infants with abnormalities consistent **with** congenital Zika syndrome born to a mother **without** lab evidence of Zika virus infection should include • Maternal and infant Zika virus testing • Routine newborn care including monitoring of occipitofrontal circumference, length, and weight • Head ultrasound • Age-appropriate standardized validated developmental screening at 9 months • CBC, metabolic panel, LFTs • Vision screening and assessment of visual regard • ABR testing • Providers may also consider • Testing placenta for Zika virus • Further neuroimaging if available, and • Transfer to hospital with subspecialty care • Any children identified with or suspected of delays should be referred to early intervention programs.
Slide 55		• Because Zika virus testing is not perfect, clinicians should maintain a level of suspicion. For infants without laboratory evidence of Zika virus infection but for whom suspicion for congenital Zika virus infection remains, healthcare providers should • Evaluate the infant (and mother) for other causes of congenital infection • Consider an ophthalmology exam and auditory brainstem response (ABR) hearing test before hospital discharge or within 1 month of birth • Consider performing other evaluation and follow up in accordance with CDC interim guidance for the evaluation and management of infants with possible congenital Zika virus infection
Slide 56		• Families and caregivers of infants with congenital Zika virus infection will require ongoing psychosocial support. Supporting the family of a child with a birth defect is part of the health care provider's job. • Families should be empowered to be active participants in their child's monitoring and care. • Healthcare providers should work closely with parents to ensure that the care plan is consistent with the infant's needs and the family's wishes. • Families with already limited access to medical care might be affected with a disproportionate burden of Zika virus infection • Barriers to care for all affected infants and their families should be addressed through links to national, state, and local health programs.

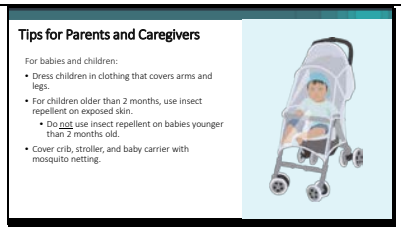
		• Additional resources for families can be found by following the link shown here where you can find other sources of help like support groups, public health and medical services, and current medical information.

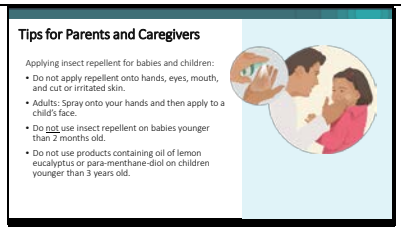
Slide 57		• The following are special considerations for nursing staff working with newborns and families affected by congenital Zika syndrome
		  • Ensure that recommended screening is received
		  • Follow up with lab results and counseling of family
		  • Follow standard precautions in nursery
		  • Assist with reporting to the US Zika Pregnancy Registry
		• CDC has toolkits, algorithms, and other guides to assist nurses and other healthcare providers with these actions.

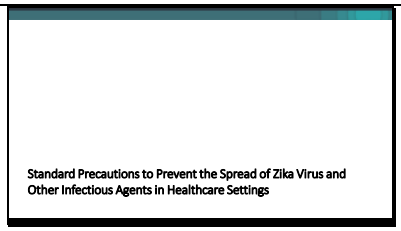
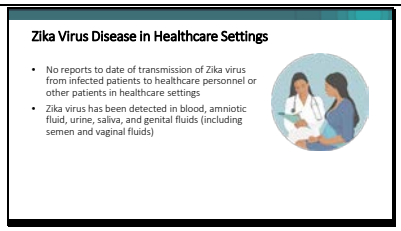
Slide 58		• This guidance on evaluation and outpatient management has also been summarized in a tool or pocket guide for clinicians. You can download this from the CDC website.
Slide 59		• As I mentioned, Zika virus infection has serious potential health implications for pregnant women and their fetuses. Now I will discuss information and tips for Zika virus infection prevention.
Slide 60		• First, CDC recommends that pregnant women not travel to areas with a risk of Zika. • If a pregnant woman must travel to an area with a risk of Zika, she should talk to her healthcare provider before departing and strictly follow steps to prevent mosquito bites and prevent sexual transmission during and after her trip. • She should also talk to her healthcare provider once she returns from traveling, even if she doesn't feel sick.

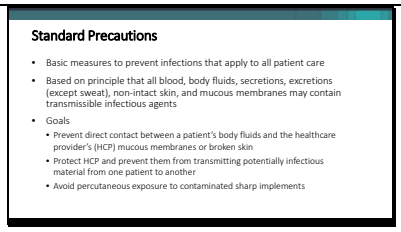
Slide 61		• All people who live in or travel to an area with a risk of Zika can reduce the risk of Zika virus infection by preventing mosquito bites. An asymptomatic infected person who has returned from travel can get bitten by a mosquito which can then spread the virus to others, so it is important to take steps to prevent mosquito bites after returning from areas with risk of Zika. • Mosquito bites can be prevented by wearing long-sleeved shirts and long pants. • Whenever possible, people should also stay and sleep in air-conditioned places or places that have windows and door screens. • The use of insect repellants containing EPA-registered ingredients is important. Insect repellents should contain one of the following active ingredients, such as DEET, listed on this slide. When used as directed, these insect repellents are proven safe and effective, even for pregnant and breastfeeding women. • Finally, items that hold water such as tires, planters, and birdbaths should be emptied and scrubbed, turned over, covered, or thrown out once a week since mosquitoes lay eggs near standing water.

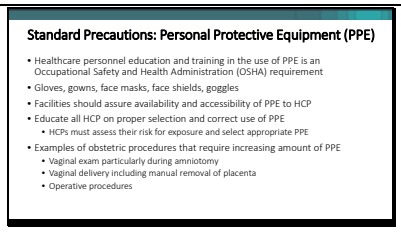
Slide 62		• I discussed sexual transmission earlier in this presentation, but as a reminder, Zika virus can be passed through sex from an infected person to his or her sex partners, so travelers are encouraged to use condoms or not have sex for the duration of the pregnancy, even if the pregnant woman's partner does not have symptoms or feel sick.
		• The following messages should be shared with patients:
		  • Not having sex eliminates the risk of getting Zika virus infection from sex.
		  • Condoms can reduce the chance of getting Zika virus infection from sex. To be effective, condoms should be used consistently and correctly from start to finish, every time.
		  • Not sharing sex toys may reduce the risk of spreading Zika virus to sex partners.
		• It is important to follow these precautions for the entire pregnancy, even if the woman's partner does not have symptoms or feel sick. People can spread Zika virus without ever knowing they had it. It is not yet known how long a person with Zika virus remains infected.

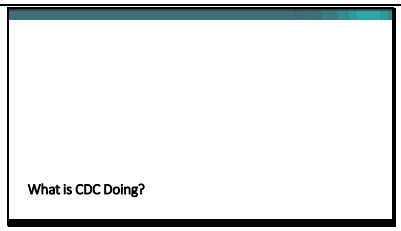
Slide 63		• To help prevent Zika virus infections in children, parents and caregivers in areas with risk of Zika should
		  • Dress their children in clothing that covers arms and legs
		  • For children older than 2 months, use insect repellent on exposed skin.
		  • Do not use insect repellent on babies younger than 2 months old.
		• Cover a child's crib, stroller, and baby carrier with mosquito netting.

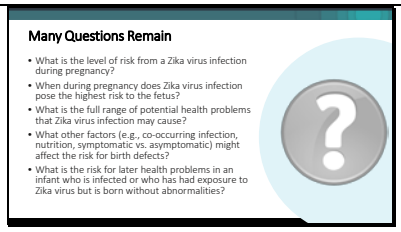
Slide 64		• Remind parents that when applying insect repellant with EPA-registered ingredients, they should follow these rules:
		  • Do not apply repellent onto hands, eyes, mouth, or cut or irritated skin.
		  • Adults should spray the repellent onto your hands and then apply to a child's face.
		  • Do not use insect repellent on babies younger than 2 months.
		• Do not use products containing oil of lemon eucalyptus or para-menthane-diol on children younger than 3 years old.

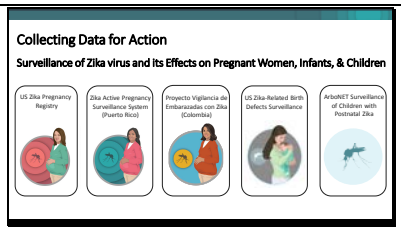
Slide 65		• Now I will discuss Zika virus control and prevention in healthcare settings.
Slide 66		• To date, there have been no reports of transmission of Zika virus from infected patients to healthcare personnel or other patients in healthcare settings. • Zika virus has been detected in blood, amniotic fluid, urine, saliva, and genital fluids (including semen and vaginal fluids), so standard infection prevention precautions are still necessary.

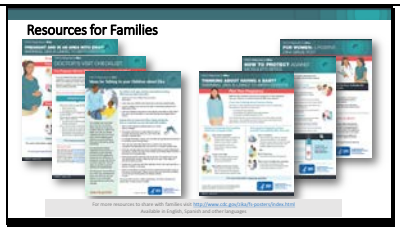
Slide 67		• Healthcare personnel must adhere to Standard Precautions in all healthcare settings.
		• This is existing guidance, but the Zika virus outbreak provides an opportunity to emphasize the importance of following these existing protective recommendations.
		• Standard Precautions are basic measures to prevent infection and are a group of practices that apply to all patients, regardless of suspected or confirmed infection status, in any setting in which health care is delivered.
		• The goals of implementing standard precautions are to
		  • Prevent direct contact between a patient's body fluids and the healthcare provider's mucous membranes or broken skin,
		  • To protect healthcare providers and prevent them from transmitting potentially infectious material from one patient to another; and
		  • To avoid percutaneous exposure to contaminated sharp implements.

Slide 68		• One component of Standard Precautions is the use of personal protective equipment (or PPE), such as gloves, gowns, face masks, face shields, and goggles.
		• Facilities should assure that sufficient and appropriate PPE is available and readily accessible to healthcare personnel. In addition, healthcare personnel should be educated on the proper selection and correct use of PPE.
		• Examples of high risk obstetric procedures that require increasing amounts of PPE in the labor and delivery setting include
		  • Vaginal examinations, particularly during amniotomy, when exposure to fluids would be expected;
		  • Performing a vaginal delivery or manual removal of a placenta when exposure to larger volumes of fluids would be anticipated; and
		  • Procedures in an operating room setting.

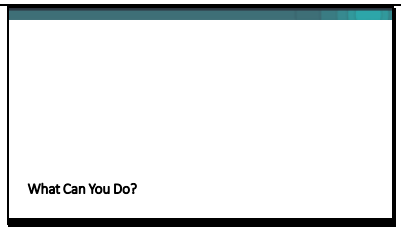
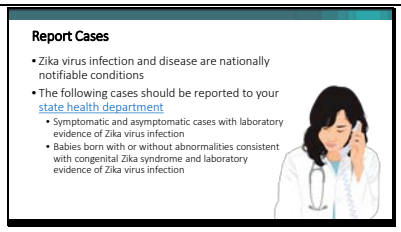
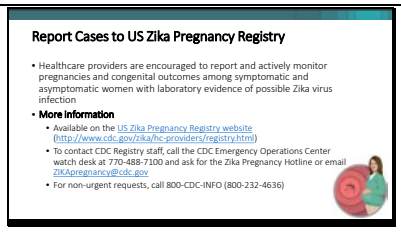
Slide 69		• CDC is working with many partners to better understand the health effects of Zika virus and to identify prevention and control strategies.

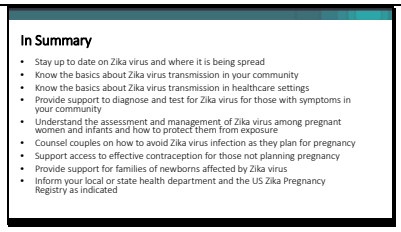
Slide 70		• Our understanding of Zika virus continues to evolve. Although we have learned about the association of Zika and poor pregnancy outcomes in a short amount of time, many questions remain.
		• For example:
		  • What is the level of risk from a Zika virus infection during pregnancy?
		  • When during pregnancy does Zika virus infection pose the highest risk to the fetus?
		  • What is the full range of potential health problems that Zika virus infection may cause?
		  • What other factors (e.g., co-occurring infection, nutrition, symptomatic vs. asymptomatic) might affect the risk for birth defects?
		  • What is the risk for later health problems in an infant who is infected or who has had exposure to Zika virus but is born without abnormalities?
		• Answering these critical questions is a focus of ongoing CDC research and may help improve prevention efforts and ultimately help reduce the effects of Zika virus infection during pregnancy.

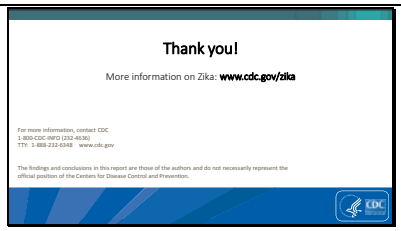
Slide 71		• This slide lists some of what CDC is doing to learn more about Zika virus infection during pregnancy.
		  • CDC established the US Zika Pregnancy Registry in collaboration with state, tribal, local, and territorial health departments in the United States and US territories (excluding Puerto Rico). The Registry collects information about women with laboratory evidence of possible Zika virus infection during pregnancy, whether or not they have symptoms, and their infants.
		  • CDC collaborated with the Puerto Rico Department of Health to develop a similar system in Puerto Rico, the Zika Active Pregnancy Surveillance System.
		  • Additionally, enhanced surveillance of pregnant women with Zika virus infection in Colombia has been established.
		  • CDC funded 50 jurisdictions in the US to establish or enhance Zika-related birth defects surveillance systems that monitor brain abnormalities, including microcephaly, and central nervous system defects, to better understand Zika virus exposure during pregnancy and adverse outcomes.
		  • CDC manages the collection of data through ArboNET in collaboration with state and territorial health departments. ArboNET is the national arboviral surveillance system that collects

		information on laboratory-confirmed Zika virus disease cases reported from US states and territories, including Puerto Rico, the US Virgin Islands, and American Samoa. The data from this system can help us understand the effects of postnatal Zika virus infection. • Data will be used to update recommendations for clinical care, plan for services for pregnant women, their infants and families affected by Zika virus, and improve prevention of Zika virus infection during pregnancy.
Slide 72		• CDC is rapidly translating new findings into public health action, messages for the public and updated clinical guidance. CDC is committed to sharing what we know when we know it. • To that end, CDC has published updated clinical guidelines for healthcare providers caring for pregnant women, infants, and children with possible Zika virus infection, as well as other guidance relating to children's well-being such as for schools and camps. These guidelines are available on CDC's website and are updated as new information becomes available. • In addition, CDC maintains a 24/7 Zika Pregnancy Hotline for healthcare providers of pregnant patients with possible Zika virus infection. Through this service, CDC scientists and clinicians are available for any concerns about clinical management and to answer questions about the US Zika Pregnancy Registry by telephone or email consultation. • Providers and the general public can also ask questions through CDC INFO at 800-CDC-INFO (800-232-4636) or www.cdc.gov/cdc-info.
Slide 73		• As I mentioned earlier, CDC is also continuously developing additional guidance tools for healthcare providers. • All these tools are available online.
Slide 74		• CDC also has many resources available designed for families, as well as scripts and guides to assist healthcare providers when helping families.

Slide 75		• To facilitate coordination of care for families and help improve access to the necessary services, CDC, in collaboration with McKing Consulting Corporation and March of Dimes, established Zika Care Connect. Zika Care Connect is a program to improve access to specialty healthcare services for the management of Zika virus infection during pregnancy and outcomes in infants caused by Zika. • Central to the program is a provider network, accessible through a website and HelpLine, that will help connect pregnant women and families to specialists who can provide care. • The program will be expanded in mid-2017 to include additional jurisdictions and the addition of a web portal with information for clinicians on available laboratory testing. • The website provides access to the provider network and educational resources. • The provider network will be searchable on the website by zip code, with additional information so patients can identify providers that meet their specific needs. • It will help patients establish a medical home by identifying key locations that can provide coordinated care. • It will also include educational resources for patients and providers, and will link to existing resources developed by CDC and its partners. • The HelpLine provides access to the provider network and is staffed by professionals who can help with questions and referrals. • Zika Care Connect is currently enrolling providers in 10 at-risk jurisdictions throughout the US states and territories, with plans for expansion in the near future. • California, Florida, Georgia, Maryland, New Jersey, New York, Texas, Virginia, Puerto Rico, and US Virgin Islands • Selection of the 10 states and territories was completed in October 2016. • The team initially ranked states based on the number of all laboratory-confirmed Zika cases publicly reported on the CDC website. • We then considered other factors known to contribute to barriers to healthcare access, including population with family origin in Latin America or the Caribbean, size of immigrant population, percent of population with a high school degree, percent below federal poverty level.

Slide 76		• Here are some steps that you can take to help:
Slide 77		• In February 2016, Zika virus disease and congenital Zika virus infections became nationally notifiable conditions in the United States. • Healthcare providers should report laboratory-confirmed and symptomatic (probable) cases of Zika virus to their local, state or territorial health department. • The following cases should be reported to your state health department • Symptomatic and asymptomatic cases with laboratory evidence of Zika virus infection • Babies born with or without abnormalities consistent with congenital Zika syndrome and laboratory evidence of Zika virus infection
Slide 78		• Also in February 2016, CDC, in collaboration with state, local, tribal, and territorial health departments, launched a comprehensive surveillance system, US Zika Pregnancy Registry, to report and actively monitor pregnancies and congenital outcomes among symptomatic and asymptomatic women with laboratory evidence of possible Zika virus infection • USZPR casts a wider net than ArboNET and National Notifiable Diseases Surveillance System as it pertains to Zika virus, because the registry includes symptomatic and asymptomatic pregnant women with positive, equivocal, or inconclusive Zika virus test results with or without symptoms. It also includes all infants born to these women, not only those with identified congenital infection, and they will be followed for 1 year.

Slide 79		• In summary, here are a few bulleted key takeaways from this presentation:
		  • Stay up to date on Zika virus transmission and where it is being spread
		  • Know the basics about Zika virus transmission in your community
		  • Know the basics about Zika virus transmission in healthcare settings
		  • Provide support to diagnose and test for Zika virus infection among those with symptoms in your community
		  • Understand the assessment and management of Zika virus infection among pregnant women and infants and how to protect them from exposure
		  • Counsel couples on how to avoid Zika virus infection as they plan for pregnancy
		  • Support access to effective contraception to those not planning pregnancy
		  • Provide support for families of newborns affected by Zika virus
		  • Inform your local or state health department and the US Zika Pregnancy Registry as indicated

Slide 80		• Additional information and resources can be found on the CDC website.
Slide 81		• All of this is the work of many people. Many thanks to all of our collaborators, and thank you all for listening today.

Frequently Asked Questions

How do you define people with possible exposure to Zika?

Possible exposure to Zika is defined as

- Recent travel to areas with risk of Zika
- Living in an area with risk of Zika
- Sexual contact with a partner who traveled to or lived in an area with risk of Zika

What is an area with risk of Zika?

Areas with risk of Zika include both areas with CDC Zika travel notices where local Zika transmission by mosquito has been recently observed, as well as areas where previous Zika transmission by mosquito has been identified but the rate of transmission is unknown at the present time.

What is the cost of testing for Zika virus? Does insurance pay?

The Zika NAT and IgM tests are available through health departments and some commercial laboratories. Prices vary. For information, please contact the commercial lab or health department. Coverage polices vary by health insurance plan.

Are pregnant women prioritized for laboratory testing?

Yes. So that pregnancies affected by Zika virus infection can be prioritized, all laboratory testing requests and results reports for pregnant women should clearly indicate pregnancy status. We are working to incorporate pregnancy status when ordering laboratory testing.

How can clinicians get help with testing?

Healthcare providers should work closely with their state, local, or territorial health department to ensure that the appropriate test is ordered and interpreted correctly. In addition, CDC maintains a 24/7 Zika consultation service for health officials and healthcare providers caring for pregnant women. To contact the service, call 770-488-7100 and ask for the Zika Pregnancy Hotline or email ZIKAMCH@cdc.gov.

Will all pregnant women with Zika virus have a baby with congenital Zika syndrome?
No. Zika virus infection during pregnancy can cause severe brain abnormalities and other birth defects, but not every pregnant woman infected with Zika will have a baby with congenital Zika syndrome. Zika virus infection during pregnancy increases the chances for these problems. Although studies to date have linked Zika virus with certain birth defects or other pregnancy problems, even in places with active Zika virus transmission, women are delivering infants that appear to be healthy.

How should healthcare providers counsel women of reproductive age who want to delay or avoid pregnancy in areas with risk of Zika?

Preventing unintended pregnancy during the Zika virus outbreak is one of the primary strategies to reduce the number of pregnancies affected by Zika virus. Healthcare providers counseling women who want to delay or avoid pregnancy should counsel women on the full range of contraceptive methods and in the context of Zika virus help them to select that most effective method they can use correctly and consistently while recognizing the decision about what type of contraceptive method to use is a personal decision and should be made by the individual or couple in consultation with their healthcare provider.

CDC has contraceptive guidance for healthcare providers that may be used when counseling patients about contraceptive choice, how to use contraceptive methods, and how to manage problems with contraceptive use. CDC has also developed teen pregnancy prevention tools for healthcare providers, including ideas to make clinics youth-friendly and recommendations on how to apply CDC's evidence based guidance to their practices.

Healthcare providers should also discuss how to prevent sexual transmission of Zika virus, if the woman or her partner has had possible Zika virus exposure or Zika virus disease, including the correct and consistent use of condoms to protect against sexual transmission of Zika virus.