Insect Repellents

This sheet is about exposure to insect repellents in pregnancy and while breastfeeding. This information is based on available published literature. It should not take the place of medical care and advice from your healthcare provider.

What are insect repellents?

Insect repellents are lotions, sprays, or oils that are put on skin or clothing to lower the chance of bites from mosquitoes, flies, ticks, and spiders ("insects"). Insects can carry serious diseases such as malaria, dengue, West Nile virus, Zika virus, and others. Having these diseases during pregnancy can be harmful to a developing baby. The U.S. Centers for Disease Control and Prevention (CDC), the American College of Obstetricians and Gynecologists (ACOG), and other major health organizations recommend the use of insect repellents in women who are pregnant or breastfeeding to protect against insect bites that spread the diseases.

How good are insect repellents at protecting from insect bites?

Some insect repellents are better than others at preventing bites and protecting against diseases. The Environmental Protection Agency (EPA) and the CDC recommend the following ingredients for protection against bites:

- DEET (N,N-diethyl-meta-toluamide) works against mosquitoes and ticks. A 15-30% preparation provides 6-12 hours of protection (lower concentrations may only provide 2 hours of protection). For more information, see the MotherToBaby fact sheet on DEET at https://mothertobaby.org/fact-sheets/deet-nn-ethyl-m-toluamide-pregnancy/.
- Picaridin protects against flying insects, ticks, and chiggers. A 10-20% preparation provides 6-12 hours of protection and appears to be at least as effective against mosquitoes as DEET at similar concentrations.
- IR3535 (3-[N-Butyl-N-acetyl]-aminopropionic acid, ethyl ester) may work against midges and biting flies. It is available in concentrations of 7.5% and 20%. Concentrations that are 10% or higher have also been found to be effective against mosquito bites for several hours. Two studies found that the 7.5% concentration provided limited protection.
- PMD (p-Menthane-3,8-diol) is the lab-made form of an ingredient in oil of lemon eucalyptus. This may work best against mosquitoes, ticks, flies, gnats, and biting midges. A 30% preparation of PMD may protect against some insects for about 6 hours.
- 2-undecanone is found in plants such as rue (***Ruta graveolens***), bananas, cloves, and ginger. A lab-made 8% preparation may provide protection against mosquitoes for 3-5 hours.

Natural insect repellents that are not on the EPA approved insect repellent list might not work to protect against insect bites. These repellents can include citronella candles, wristbands, or skin moisturizers, and oils of geraniol, cedar, peppermint, soybean, lemongrass, or rosemary. They are not recommended for use in areas where there is a chance of disease carried by insects. One study suggests citronella diffusers with approved insect repellent ingredients might be more effective than citronella candles alone.

What is the best way for me to use insect repellents?

- Use insect repellents only when needed.
- Read and follow the directions on the label.
- Apply repellents only to exposed skin or clothing, not to skin that is under clothing.
- Do not apply repellents to cuts or irritated skin.
- Do not apply spray repellants in an enclosed area to minimize breathing in the spray.
- To apply repellent to your face, spray it into your hands and then carefully apply a small amount to the face. Avoid getting the repellent in the eyes and mouth.
- If you are also using sunscreen, apply the sunscreen first and then the insect repellent.

- Wash hands thoroughly with soap and water after applying insect repellent, to reduce the chance of getting any into your mouth.
- Wash the repellants off your skin and clothes with soap and water when you are no longer exposed to insects.

I use insect repellents. Can it make it harder for me to get pregnant?

Studies have not been done to see if insect repellents, when used as directed, may make it harder to get pregnant.

Does using insect repellents increase the chance for miscarriage?

Miscarriage is common and can occur in any pregnancy for many different reasons. Studies have not been done to see if insect repellents, when used as directed, increase the chance for miscarriage.

Does using insect repellents increase the chance of birth defects?

Birth defects can happen in any pregnancy for different reasons. Out of all babies born each year, about 3 out of 100 (3%) will have a birth defect. Based on a limited number of studies, when used as directed, insect repellants are not expected to increase the chance of birth defects.

- DEET: Less than 10% of the total amount of DEET applied on skin enters the bloodstream. One study suggested that hypospadias (a birth defect where the opening of the penis is on the underside rather than the tip) was more common in male infants who were exposed to DEET early in pregnancy. This study did not prove that insect repellents cause this birth defect. Most studies do not find that using DEET increases the chance of birth defects.
- Picaridin, PMD, IR3535, and 2-undecanone have not been studied in human pregnancy. However, when used as directed, only low amounts of these ingredients are expected to be absorbed through the skin into the bloodstream.
- Natural plant oils such as soybean, lemongrass, citronella, peppermint, lavender, geranium, or geraniol have not been studied in human pregnancy.

Does using insect repellents in pregnancy increase the chance of other pregnancy related problems?

Based on limited studies, when used as directed, insect repellants do not appear to increase the chance for pregnancy-related problems such as preterm delivery (birth before week 37) or low birth weight (weighing less than 5 pounds, 8 ounces [2500 grams] at birth).

Does using insect repellents in pregnancy affect future behavior or learning for a child?

Based on 1 limited study, use of insect repellants did not show an increased chance for developmental problems for children at 1 year of age. Studies have not been done to see if using insect repellents can cause behavior or learning issues for the child after one year of age.

Breastfeeding while using insect repellents:

Diseases spread by insects can have serious health effects on people. There is little data on the use of insect repellents during breastfeeding, but it is important to consider the benefit of using them to prevent illness. When applying insect repellents during breastfeeding, follow the same instructions as during pregnancy. Do not apply insect repellents to the nipple area to keep the nursing child from getting any repellent in the mouth. If you are using DEET and suspect the baby has any symptoms, contact the child's healthcare provider Be sure to talk with your healthcare provider about all your breastfeeding questions.

If a man uses an insect repellent, could it affect fertility or increase the chance of birth defects?

Studies have not been done to see if using insect repellents could affect a man's fertility (ability to get a woman pregnant) or increase the chance of birth defects. In general, exposures that men have are unlikely to increase the risks to a pregnancy. For more information, please see the MotherToBaby fact sheet Paternal Exposures at https://mothertobaby.org/fact-sheets/paternal-exposures-pregnancy/.

Please click here for references.