Insect Repellents

This sheet talks about exposure to insect repellents in a pregnancy and while breastfeeding. This information 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, Lyme disease, West Nile virus, and Zika virus. Some insect repellents are better than others at preventing bites and protecting against these diseases. The Environmental Protection Agency (EPA) and the Centers for Disease Control and Prevention (CDC) recommend the following ingredients for protection against bites:

- **DEET** works against mosquitoes and ticks. A 25% preparation provides up to 10 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/pdf/.

- **Picaridin** protects against flying insects, ticks and chiggers. A 20% preparation provides protection against mosquitoes for 4-8 hours.

- **IR3535** may work best against midges and biting flies. In some studies, a 15% preparation protected against mosquitoes for 4-6 hours, although other studies showed shorter protection times.

- **PMD** is the lab-made form of an ingredient in oil of lemon eucalyptus. Some studies suggest a 30% preparation of PMD protects against some insects for about 6 hours.

- **2-undecanone** is found in plants such as rue (Ruta graveolens), bananas, cloves, and ginger. An 8% preparation may provide protection against mosquitoes for 3-5 hours.

Citronella candles, wristbands, or skin moisturizers that do not contain approved insect repellents, and oils of geraniol, lemongrass, or rosemary, are much less effective and not recommended for use in areas where there is a risk 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?
You should use insect repellents only when you need them. Wash them off with soap and water when you are no longer exposed to insects. Apply insect repellents as recommended on the label. Apply repellents only to exposed skin or clothing, not to skin underneath clothing. Do not apply repellents to cuts or irritated skin. To apply repellent to your face, spray it into your hands and then apply it sparingly to the face, avoiding the eyes and mouth. If you are also using sunscreen, apply the sunscreen first and then the insect repellent. Wash your hands thoroughly with soap and water after applying insect repellent, to reduce the risk of getting any into your mouth.

I just found out I’m pregnant. Should I stop using insect repellents?
The benefits of using insect repellents during pregnancy may outweigh any possible risk. Insect repellents such as DEET and picaridin can help protect against mosquito bites that spread diseases like malaria, Lyme disease, West Nile virus, and Zika virus. Having any of these diseases during pregnancy can be harmful to a developing baby. The 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 to protect pregnant women and their unborn babies from diseases that are transmitted by mosquitoes.
Does using insect repellents increase the chance for miscarriage?

Miscarriage can occur in any pregnancy. At this time, there are no studies in humans on the possible effects of insect repellents on the chance of miscarriage.

Does using insect repellents in the first trimester increase the chance of birth defects?

In every pregnancy, a woman starts out with a 3-5% chance of having a baby with a birth defect. This is called her background risk. 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 boy babies born to women who used insect repellents early in pregnancy. This study did not prove that insect repellents cause birth defects.

- DEET: Less than 10% of the total amount of DEET applied on skin enters the bloodstream. There have been a few reports of adverse pregnancy outcomes after a mother’s use of DEET during pregnancy. However, 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.

Could using insect repellents in the second or third trimester cause other pregnancy complications or long-term problems for the baby?

DEET in the bloodstream crosses the placenta late in pregnancy. But when used as recommended, DEET does not appear to cause harmful effects on the baby. A study of 449 women who used recommended doses of DEET daily during the second half of pregnancy did not find an increase in birth defects, or any effects on the children’s development in the first year of life.

Can I breastfeed while using insect repellents?

Diseases spread by insects can have serious health effects on nursing mothers and infants. 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 baby from getting any repellent in the mouth while breastfeeding. Wash your hands after applying insect repellent.

If a man uses insect repellents, could it affect his fertility (ability to get his partner pregnant) or increase the chance of birth defects?

There is no evidence that using any insect repellents will cause problems with a man’s fertility or increase the chance of birth defects in his children. However, not all repellents have been studied for these outcomes. In general, exposures that fathers have are unlikely to increase risks to a pregnancy. For more information, see the MotherToBaby fact sheet Paternal Exposures and Pregnancy at https://mothertobaby.org/fact-sheets/paternal-exposures-pregnancy/pdf/.

Please click here for references.