

Pregnancy

Pregnancy during travel carries important risks that should be considered carefully prior to booking the trip

Key Messages

With careful preparation, most pregnant women are able to travel without experiencing health problems.

Pregnant women should see their travel health advisor 6-8 weeks before travel (for those with less time an appointment is still worthwhile).

Women should research health risks and medical facilities at their destination and obtain comprehensive travel health insurance prior to travel.

Pregnant women have an increased risk of developing severe malaria and dying from malaria compared to non-pregnant women. If travel to a risk area is essential, careful insect bite avoidance is important, antimalarial tablets should be taken (see below) and women should seek prompt medical advice if symptoms of malaria occur.

Inactivated vaccines can be given if clinically indicated. Live vaccines pose a theoretical risk to a fetus, they may be considered following expert consultation for those at particular risk of disease.

Pregnancy increases the risk of venous thromboembolism (VTE), for travel over four hours, women should mobilise their legs at regular intervals and wear properly fitted, below knee, graduated compression stockings. For those with additional risk factors low weight molecular heparin may be advised.

Overview

Limited data suggests that many pregnant women travel without experiencing health problems [1]. However, pregnancy during travel carries important risks that should be considered carefully prior to booking the trip.

Pregnant women with a significant obstetric history, an inadequately controlled or newly diagnosed medical condition, or those who are planning to travel to malaria affected areas, or areas without access to medical care, should be advised against non-essential travel. If travel is essential, the advice below should be discussed.

A careful review of the travel plans and medical history should guide the pre-travel health advice. Pregnant travellers should be encouraged to access information on pregnancy and travel. See resources for travellers below.

Destination-specific health advice can be found on the [Country Information pages](#).

Comprehensive travel insurance is essential for all travellers. A full declaration of medical conditions, including pregnancy, should be made to the insurers. Insurance policies differ in their terms and conditions, pregnant women should check that the policy will cover the cost of medical treatment if a pregnancy related problem occurs, including the care of the pre term baby and repatriation costs if appropriate. All equipment and planned activities should be covered.

Pre-travel preparation

The early pregnancy scan (usually performed between 10 to 13 weeks gestation) should ideally be performed prior to travel to ensure the viability of the pregnancy and confirm the gestation.

Travel with certain pre-existing medical conditions or obstetric complications is not recommended, specific advice should be obtained from the obstetrician. Conditions such as cervical insufficiency, pre-eclampsia, premature rupture of membranes, placental abruption, suspected ectopic pregnancy and vaginal bleeding are likely to be considered contraindications to travel [2].

Specific advice should also be obtained for those with complicated past or current pregnancies such as history of miscarriage, ectopic pregnancy or infertility, multiple gestation (e.g. twins, triplets etc).

Ante-natal records and next of kin details should be carried when travelling.

Appropriate gynaecological, obstetric and neonatal care may be limited or non-existent in some areas. Emergency plans should be made in advance of travel.

Journey risks

Fitness to fly

Commercial air travel is considered safe in uncomplicated pregnancies up to 36 weeks and up to 32 weeks for a multiple pregnancy [3]. Pregnant women should check the airline's requirements when booking flights.

After 28 weeks most airlines require a medical certificate confirming the estimated date of delivery and that there are no complications [3].

The date of the return journey should also be considered.

Women with high-risk pregnancies, including placental abnormalities or risk of premature labour, should avoid flying (see details in the pre travel preparation section).

Cruise liner companies may decline to carry pregnant women in the mid to later stages of pregnancy. Pregnant women should check the individual cruise line requirements when booking and take into account any restriction relating to connecting flights [4].

Travel-related Venous thromboembolism (VTE)

Pregnancy increases the risk of venous thromboembolism (VTE) including deep vein thrombosis and pulmonary embolism. This is especially a concern when flying, as legroom may be restricted and passengers can be required to sit still for long periods of time. On long haul flights over four hours, pregnant women are recommended to wear properly fitted, below knee, graduated compression stockings providing 15 to 30mmHG of pressure at the ankle during travel [5].

Pregnant travellers should also walk around the cabin at regular intervals during the flight and regularly flex and extend the ankles to encourage blood flow from the lower legs.

Those with additional risk factors for VTE may be advised to have low weight molecular heparin whatever the duration of the flight [6, 7].

Further information on Travel Related Venous Thromboembolism (VTE) is available on the Travel Health Pro website.

Motion sickness

Motion sickness can exacerbate pregnancy-induced nausea [6, 8].

Food and water-borne risks

Unpasteurised dairy products, under-cooked meat and soft cheeses must be avoided during pregnancy. Pregnant women risk serious complications if they contract hepatitis E [9] or other diseases such as listeriosis or toxoplasmosis [1].

The effect of gastrointestinal illness in pregnancy can be significant for both mother and fetus. Careful food, water and personal hygiene should be emphasised.

Medications licensed for use in pregnancy can be prescribed to treat gastrointestinal illness. Specialist advice should be sought before prescribing unlicensed products. Ciprofloxacin and loperamide are not recommended for pregnant women.

Oral rehydration solutions should be used to prevent dehydration if travellers' diarrhoea occurs; these are relatively cheap and lightweight to carry in the first aid pack.

Pregnant women should seek prompt medical attention if they are showing signs of dehydration or if diarrhoea is prolonged, there is blood/mucous in the stool or a fever.

Vector-borne risks

(Including malaria and the viruses chikungunya, dengue and Zika)

All pregnant women who live in or travel to areas where mosquito-borne diseases are known to occur should take measures to avoid being bitten. Malaria is transmitted by *Anopheles* mosquitoes, a night-biter; chikungunya, dengue and Zika viruses are transmitted by *Aedes* mosquitoes, a day-biter.

DEET has a good safety record in pregnancy; repellents containing up to 50 percent DEET can be recommended [10, 11]. Pregnant women should also use protective clothing and sleep under an insecticide treated mosquito net, if they are not in air-conditioned accommodation. Excessive application of repellents should be avoided [10]. DEET can be applied to natural fibres such as cotton clothing and exposed skin. Repellent can be washed off when returning to air conditioned accommodation or before sleeping under an insecticide treated bed net [10].

Malaria

Malaria is transmitted by *Anopheles* mosquitoes which bite from dusk to dawn. Pregnant women are more susceptible to mosquito bites and therefore more vulnerable to malaria [11].

Pregnant women should be informed of the risks of travel to countries where malaria is known to occur. They should consider postponing their trip, unless travel is unavoidable [11].

Avoidance of mosquito bites is extremely important in pregnancy, as pregnant women are particularly attractive to mosquitoes. Ideally, pregnant women should remain indoors between dusk and dawn. If they must be outdoors at night, they should adhere rigorously to bite precautions [11].

Malaria in pregnancy increases the risk of maternal death, miscarriage, stillbirth and low birth weight, with associated risk of neonatal death [11, 12].

Diagnosis of falciparum malaria in pregnancy can be difficult as parasites may not be detectable in blood films due to sequestration in the placenta [11].

If travel is essential, the 'ABCD' of malaria prevention should be discussed:

- **A**wareness of the risk
- **B**ite prevention
- **C**hemoprophylaxis (antimalarial medication)
- **D**iagnosis and prompt treatment

Pregnant women and those planning to conceive should be **A**ware of the risks, understand the importance of effective mosquito **B**ite prevention; DEET has a good safety record in pregnancy and DEET repellents of up to 50% concentration can be recommended [11]. Appropriate **C** hemoprophylaxis should be taken and pregnant women should be aware of the symptoms of malaria (particularly high fever) and the importance of prompt **D**iagnosis and treatment.

Contraindications, side effects and drug interactions must be considered carefully prior to prescribing antimalarials in pregnancy.

Chloroquine and proguanil are safe in all trimesters. However, these drugs offer poor protection against malaria in many areas due to widespread *Plasmodium falciparum* drug resistance. Pregnant women who take proguanil should also take 5mg of folic acid daily, for at least the first trimester [11].

Doxycycline is contraindicated in pregnancy but may, in special circumstances, be considered if required before 15 weeks gestation where other options are unsuitable. The full course of doxycycline, including the four weeks after travel must be completed before 15 weeks gestation [11]. The [UK teratology information service \(UKTIS\)](#) states that exposure to doxycycline at any stage in pregnancy would not usually be regarded as medical grounds for termination of pregnancy or any additional fetal monitoring. However, they highlight that other risk factors may be present in individual cases which may independently increase the risk of adverse pregnancy outcome. Clinicians are reminded of the importance of consideration of such factors when performing case specific risk assessments [13].

Mefloquine can be prescribed in the second and third trimesters provided there are no contraindications. It seems unlikely that mefloquine is associated with adverse fetal outcomes and mefloquine can be used, with caution, in the first trimester. Use is justified if travel to a malarious area is essential and chloroquine-resistant *P.falciparum* risk is high. Inadvertent use of mefloquine just prior to or during the first trimester does not constitute grounds to terminate the pregnancy [11].

Safety of atovoquone plus proguanil (AP) combination preparation has not been established in pregnancy. Use of AP combination preparation in pregnancy is generally not advised due to sparse data. However, the individual components have shown no adverse effects on parturition or pre- and post-natal development and animal studies show no evidence for teratogenicity [14]. Therefore, following careful risk assessment, AP can be considered in the second and third trimesters of pregnancy, where other options are unsuitable.

A study of inadvertent AP use from weeks three to eight after conception identified 149 pregnancies and found no significant association between AP exposure in early pregnancy and risk of a major birth defect [15]. An anonymous, internet-based survey to describe outcomes of pregnancies accidentally exposed to AP identified 10 pregnancies with AP exposure in the first trimester. All resulted in full-term births with no birth defects [16].

Inadvertent use of AP combination preparation just prior to or during the first trimester does not

constitute grounds to terminate the pregnancy [11].

Pre-conception and antimalarials

Travellers who plan to become pregnant after taking antimalarials and wish to do so with minimal antimalarial drug present, may elect to observe the following time intervals after completing the course, before attempting to conceive [11]:

- one week following doxycycline use
- two weeks following atovoquone plus proguanil combination preparation
- three months following mefloquine use

Women planning conception in countries with a high risk of chloroquine-resistant *P. falciparum* malaria should seek specialist advice.

- Use of mefloquine may be considered after careful risk assessment [11]
- Doxycycline may be considered in special circumstances if the full course including the four weeks after travel will be completed before 15 weeks gestation (see information above) [11]
- Chloroquine and proguanil provide poor protection in areas with a high risk of chloroquine-resistant *P. falciparum* malaria. Women taking proguanil who are planning to conceive should receive supplementation with 5mg of folic acid daily (prescription dose) throughout the course or if pregnancy occurs, for at least the first trimester.

Chikungunya

Mother to child transmission of chikungunya virus infection has been reported in women who were infected with the virus in the later stages of pregnancy and had fever in the days immediately prior to or during labour [15-18].

Dengue

Dengue is transmitted by daytime biting *Aedes* spp mosquitoes. While pregnancy is not thought to increase the incidence or severity of this disease, some case reports suggest that dengue may predispose women to certain pregnancy complications. It has been suggested that women in late pregnancy should avoid travel to areas of ongoing disease, and those earlier in pregnancy should consider dengue a serious hazard [19].

Zika

Zika virus is a cause of Congenital Zika Syndrome ([microcephaly](#) and other congenital anomalies) [20]. In areas where there is evidence of a current outbreak of ZIKV with significant transmission, pregnant women are advised to postpone non-essential travel until after the pregnancy.

In areas where recent outbreaks have been previously reported, re-introduction of ZIKV or endemic

transmission has occurred, pregnant women are advised to consider postponing non-essential travel until after the pregnancy.

Recommendations for affected countries are found in the 'other risks' section of our [Country Information](#) pages. If travel to a risk area is essential, pregnant women should be aware of this risk and they should be scrupulous with mosquito bite avoidance day and night. Also, pregnant women who visited Zika risk areas while pregnant, or who become pregnant within 2 months after their last possible Zika exposure*, should contact their GP, obstetrician or midwife for further advice, even if they have not been unwell.

This advice does not apply to areas considered to be at "very low risk" of ZIKV (see Country Information pages). [Further information on Zika](#) is available from Public Health England.

*Last possible Zika virus exposure is defined as the later of either the date of leaving a country or area with risk for ZIKV transmission, or the date on which unprotected sexual contact with a potentially infectious partner took place.

Vaccination

Health professionals should refer to the relevant chapters in [Public Health England, Immunisation against Infectious Disease](#) 'Green book' for information about specific vaccines before vaccinating a pregnant woman.

Non-live vaccines

A recent a comprehensive review of the evidence on safety of various non-live vaccines during pregnancy (those based on inactivated virus, inactivated bacteria, and the acellular vaccines and toxoids) revealed no safety issues. Pregnancy should not preclude women from vaccination with these vaccines if medically indicated [21-23].

Since September, 2012 pertussis (whooping cough) vaccine has been offered to all pregnant women in the UK (including those previously immunised), during late pregnancy. This vaccination programme was introduced in response to increased levels of pertussis activity across the UK. The aim of this is to boost immunity in the mother during pregnancy to optimise transfer of antibodies from mother to unborn baby and thereby protect the infant from birth until they reach the age of routine immunisations (2 months) [24]. This inactivated vaccine is given in combination with low dose diphtheria, tetanus and inactivated polio.

In April 2016, following a review, the recommendation for pertussis vaccination in pregnancy was changed; vaccination is currently recommended for pregnant women from 16 weeks to 32 weeks of pregnancy, although the vaccine can be offered after 32 weeks (vaccination should be offered from around 20 weeks, on or after the foetal anomaly scan) [24]. Pertussis vaccination administered before 16 weeks gestation may not provide adequate protection against pertussis for the infant; pregnant women requiring protection against diphtheria, tetanus or polio for travel before 16 weeks

gestation should be offered Revaxis®. Such women will, in addition, receive the routine pertussis vaccine at an appropriate time during their pregnancy; a four week minimum interval between vaccines is recommended [25].

Live vaccines

Most live vaccines are contraindicated or not recommended in pregnancy because of the theoretical risk that the live attenuated virus or bacteria (in the vaccine) may cross the placenta and infect the fetus. However, some live vaccines may be considered in circumstances where the risk of disease outweighs the risk of live vaccination during pregnancy [21, 22, 26]. Specialist advice should be sought when travel is essential and live vaccines are being considered.

Yellow fever vaccination should generally be avoided, on theoretical grounds, during pregnancy and particularly the first trimester [26]. However, where travel to a high risk area for YF cannot be avoided, the vaccine can be considered following individual risk assessment, which should take into account potential risk from the vaccine and risk of exposure to YF disease [21, 26].

Inadvertent administration of a vaccine (live or inactivated) during pregnancy does not constitute grounds to terminate the pregnancy [23].

In order to expand the safety data available on vaccines for pregnant women, it is desirable that health care professionals report details of vaccine use during pregnancy to the [UK Teratology Information Service](#), a group commissioned by Public Health England, as well as to the vaccine manufacturers. These groups collect pregnancy outcome information from women who have been exposed to drugs and vaccines in pregnancy.

Pre-conception and vaccines

Vaccinating prior to conception is preferable to vaccination during pregnancy. However, because of the theoretical risk of live vaccine virus transmission to the foetus, women should be advised to delay conception for 28 days after receiving live vaccines.

Other health risks

Altitude

There is a lack of data on the effects of exposures to high altitude during pregnancy [27]. It is prudent to avoid high altitude in the first trimester and advisable that at least one scan has been performed to confirm a healthy intrauterine pregnancy [28]. After 20 weeks gestation short stays (hours to days) at altitudes up to 2,500m without heavy exercise in women with uncomplicated pregnancies are thought to pose minimal risk [29].

The World Health Organization (WHO) state that travel to sleeping altitudes over 3,000m or to

remote areas is not advisable during pregnancy [9].

Women with complicated pregnancies of any gestation should avoid travel to high altitude travel including those with anaemia, chronic or pregnancy-induced hypertension (or risk factors for pre-eclampsia), impaired placental function (ultrasound diagnosis), intra-uterine growth retardation, maternal heart or lung disease and unexplained bleeding.

The Summary of Product Characteristics for acetazolamide states that this drug should not be used during pregnancy, particularly during the first trimester [30].

Heat

Body temperature regulation is not as efficient during pregnancy. In addition, an increase in core temperature, such as with heat stroke, may harm the fetus [2]. If visiting countries with hot climates pregnant women should consider choosing accommodation with air-conditioning and restrict activities in the heat.

Psychological health

Anxiety during pregnancy can be exacerbated by travel. These issues should be discussed prior to travel and/or specialist advice sought when necessary.

Medical care

Pregnant travellers should pack a first aid kit that will also help them manage relevant, common issues affecting pregnant women such as constipation, haemorrhoids, indigestion and morning sickness.

Before travel it is sensible to research the medical facilities available at the destination. Pregnant women should also know when to seek prompt medical advice, for example if they experience abdominal pain, bleeding, contractions, prolonged diarrhoea or signs of dehydration, fever, rupture of membranes, symptoms of preeclampsia, vomiting or other concerning symptoms.

It is advisable to carry the emergency contact numbers for the insurance company; who should be contacted early if medical help is required.

Resources

- [Royal College of Obstetricians and Gynaecologists. Green-top Guidelines No 54A. The prevention of malaria in pregnancy](#)
- [World Health Organization. SAGE Working Group on Yellow Fever Vaccine](#)
- [Morof DF, Caroll D. Pregnant Travellers. In: US Centers for Disease Control \(CDC\) 'Yellow book' Health Information for International Travel 2016, Chapter 8](#)

- [Royal College of Obstetricians and Gynaecologists. Air travel and pregnancy: Information for you](#)
- [NHS Choices. Travelling in pregnancy](#)
- [Food and water hygiene](#)
- [Insect and tick bite avoidance](#)
- [Venous thromboembolism](#)
- [Public Health England: Zika and Pregnancy](#)
- [Zika - Risk Assessment](#)

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