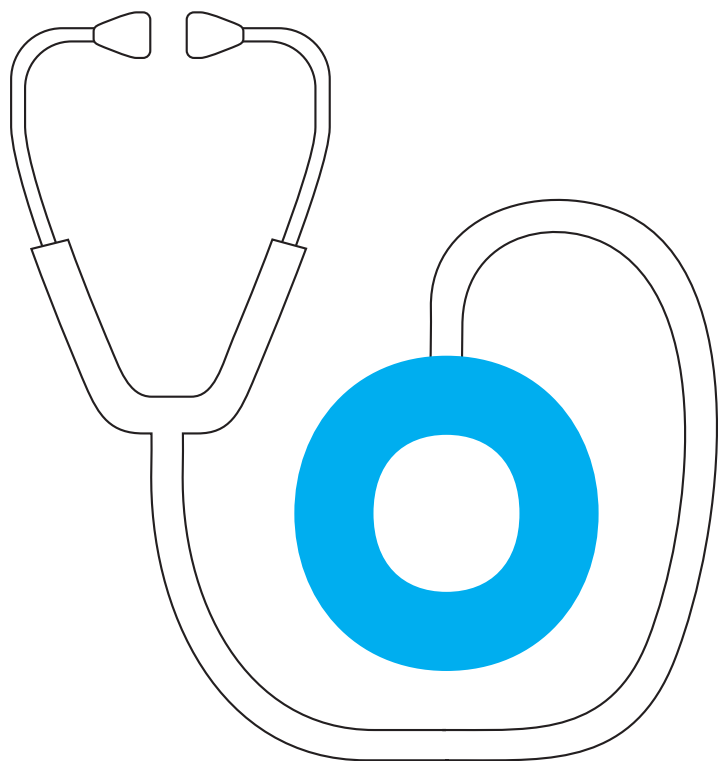


Toxoplasmosis

a hand book
for health professionals



About Tommy's, the baby charity

Tommy's was set up in 1992 to make pregnancy and childbirth safer for both the expectant mother and her child by funding a national programme of medical research into miscarriage, stillbirth and premature birth.

Since the charity was founded in 1992, we have set up centres for maternal and fetal health research in London and Manchester, and funded more than 57 research projects in hospitals and universities across the UK.

Tommy's aims to see the number of baby deaths halved by 2030 but we cannot achieve this aim without increasing our support for the doctors and scientists who are discovering how to protect mothers and babies at risk.

Every parent-to-be hopes that their baby will be born healthy but every year in the UK one in four women and their partners will experience the trauma of miscarriage and around 4,000 babies will be stillborn. More than 100 babies are born too small or too soon every day and two per cent are severely premature, arriving six weeks before their expected birthday. Prematurity is the most common cause of baby death and one in 10 premature babies will develop a permanent disability.

As the UK's leading baby charity we want to find the answers for parents who deserve to know why their baby died or had to fight for life after being born prematurely.

Tommy's is determined to find out the causes of miscarriage, stillbirth and premature birth and to save tiny lives by discovering new ways to encourage healthy pregnancy and prevent problems. We support a nationwide programme of vital research and are already improving the chances of survival of hundreds of babies through our clinical trials. We are examining the processes underlying normal and premature labour, and finding ways to identify women who are most at risk of giving birth prematurely. We are increasing understanding of conditions such as pre-eclampsia which endanger both mother and baby and are making progress in discovering ways to prevent health problems in premature and low birth-weight babies.

Tommy's also provides information about pregnancy health issues for health professionals, parents and parents-to-be. We aim to ensure that information on health in pregnancy and reducing the risks of problems is available to all parents-to-be in the UK, thereby reducing the number of babies' lives lost.

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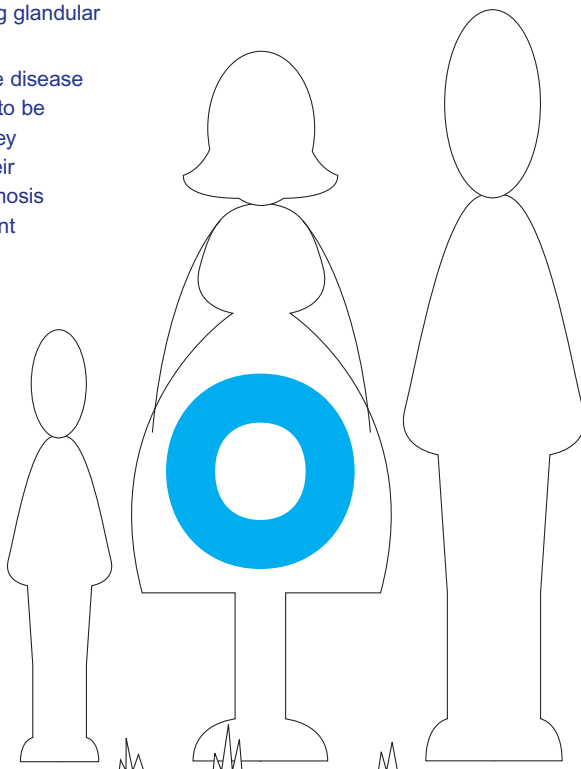


Toxoplasmosis – explanation of the infection

Toxoplasmosis is an infection caused by the parasite *Toxoplasma gondii*, a microscopic single cell organism that can be found in raw and inadequately cooked/cured meat, cat faeces, the soil where cats defecate, and unpasteurised goats milk. The parasite can infect most birds and warm-blooded animals, including humans. Toxoplasmosis is caught from eating anything infected or contaminated with the parasite.

Toxoplasmosis can be dangerous to humans if their immune system is underdeveloped or compromised, as in the case of an unborn child, a person with HIV, or a person on immuno-suppressant drugs. In these cases the immune system is unable to restrict the spread of the parasite, which can then cause damage. In healthy adults and children, the infection may cause mild 'flu-like symptoms or no symptoms at all. Occasionally a person may suffer from a prolonged and debilitating glandular fever-type illness.

Once a person has had the disease they are generally thought to be protected for life, unless they suffer an impairment of their immune system. Toxoplasmosis is therefore only a significant risk to an unborn baby if caught for the first time during pregnancy or within 2–3 months before conception.



How humans catch toxoplasmosis

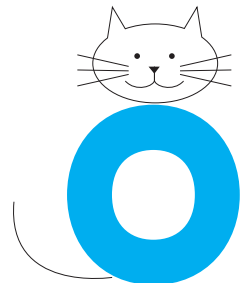
- Toxoplasmosis is caught by swallowing anything infected with the parasite.
- Undercooked meat is thought to be the main source of human infection.
- The organism completes its sexual cycle in the gut of members of the cat family. When first infected the cat sheds infectious faeces for about 14 days. A healthy cat will not normally be a source of infection again.
- Soil where cats have defecated may remain infected for 18 months or more. Humans are at risk because they could accidentally swallow contaminated soil during gardening or when eating inadequately washed fruit or vegetables.
- Other animals can become infected when they eat feed contaminated by cat faeces. Humans become infected by eating the meat of these infected animals. Thorough cooking destroys the organism as does freezing to -22°C .
- There is a risk of catching toxoplasmosis from lambing or handling newborn lambs. In this instance the organism may enter the body through cuts or abrasions in the skin.
- The organism has been isolated in goats milk, so unpasteurised goats milk and products are a possible, although rare, source.

Humans may become infected by five routes:

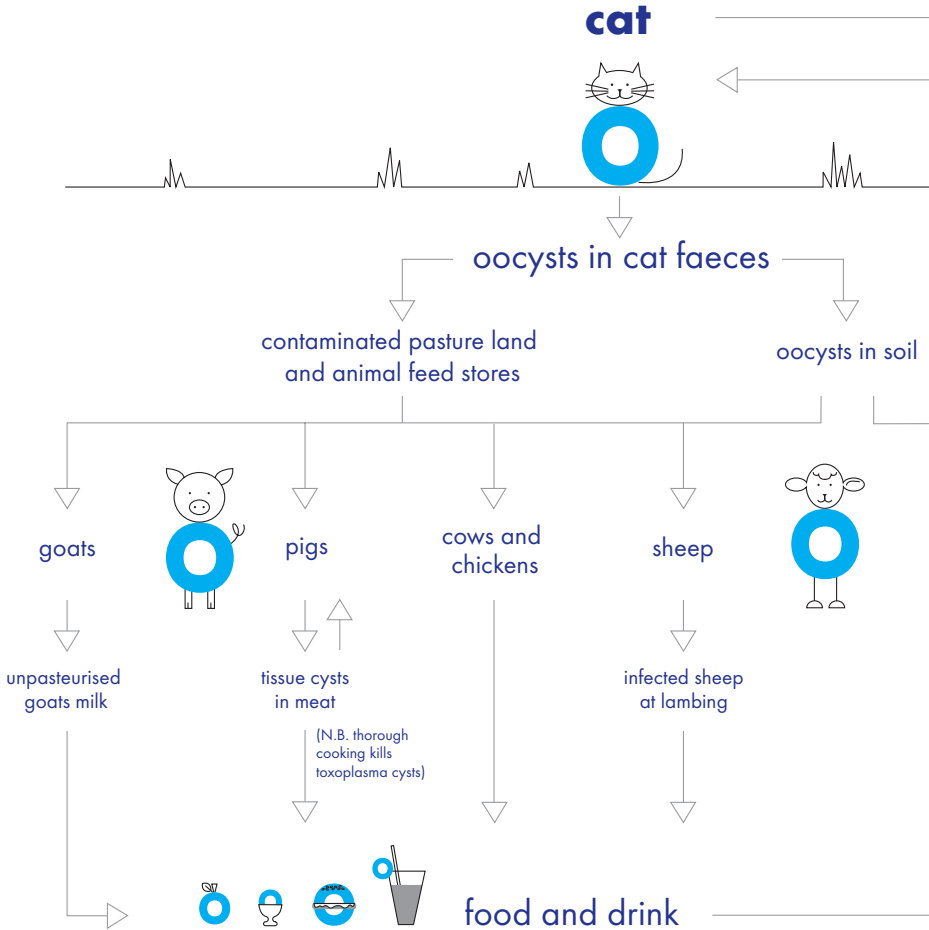
- ingestion of oocysts from soil or water contaminated with cat faeces
- ingestion of viable tissue cysts in raw or undercooked meat or tachyzoites in milk from infected intermediate hosts (e.g. cows, sheep or goats)
- incorporation of tissue cysts or tachyzoites from transplanted organs from other humans with acute or latent toxoplasmosis
- transplacental transmission 4–8 weeks after the onset of maternal infection
- infection by inhalation of sporulated oocysts is possible although rare.

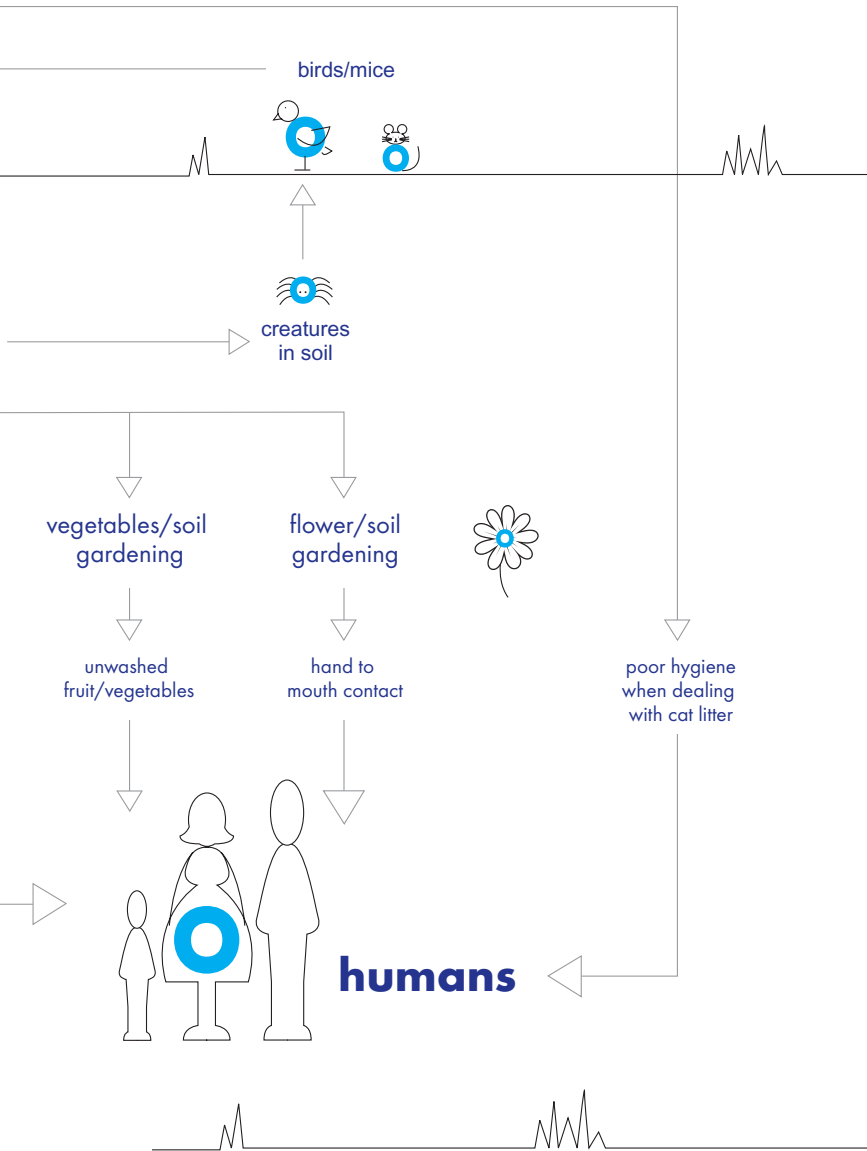
There is no person-to-person transmission, except *in utero* and following organ transplantation.

Infection is followed by parasitaemia and the invasion of organs and tissue. The incubation period is 5–23 days. Host immune responses lead to the formation of tissue cysts which contain viable organisms and may persist in the body for decades, even for life.



Life cycle of *T. gondii*





Toxoplasmosis in pregnancy

How common is toxoplasmosis?

Studies have shown that 30% of 30-year-olds and 50% of 70-year-olds in the UK have had a toxoplasma infection. Most of these will not be diagnosed due to the lack of distinct symptoms. Studies carried out in Scotland and Wales suggest that the infection rate in pregnancy is 1 per 500. About 85% of women in the UK booking in for antenatal care are susceptible to toxoplasmosis (i.e. only 15% are immune).

If this is applied to the current estimated pregnancy rate in the UK of ~1 million pregnancies per year, then an average of 2000 women annually will acquire toxoplasmosis in pregnancy. About 40% of these women will pass the infection to their unborn babies, so about 800 babies may be infected each year.

What are the possible effects of toxoplasmosis to the fetus during pregnancy?

The fetus may be miscarried, stillborn, or born with damage to the brain and other organs, particularly the eyes. Most babies born with toxoplasmosis have no obvious damage at birth but some develop symptoms, usually eye damage, during childhood or even adulthood. A few will have more serious symptoms such as blindness and brain damage.

What are the risks to the fetus?

If a woman is infected by toxoplasmosis for the first time during pregnancy or shortly before conception then there is an average 40% risk that the baby will become infected. The degree of risk to the fetus depends on when the mother acquired the infection.

i) Shortly before conception. Infection shortly before conception carries a 1% or below risk of transmission to the fetus, but high risk of miscarriage if the fetus does become infected.

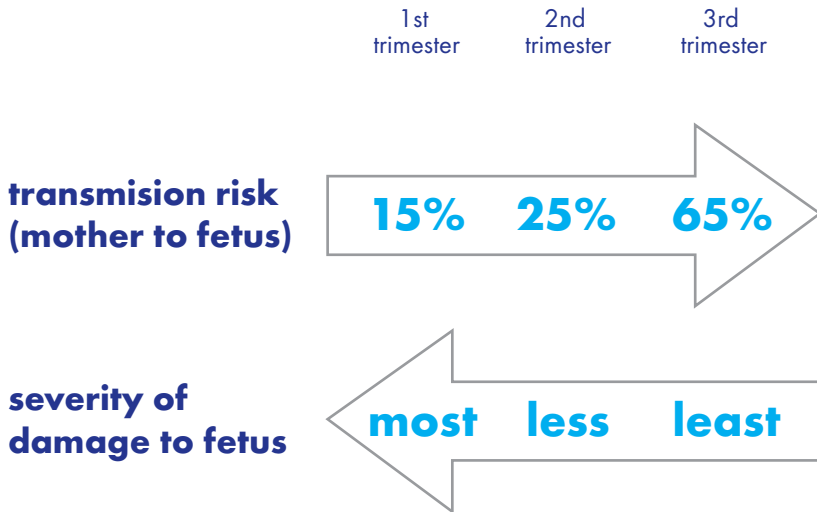
ii) The first trimester. Risk of fetal infection is about 15%. A fetus infected at this stage has a high risk of being miscarried or born with severe symptoms such as hydrocephalus, calcifications of the brain, or retinochoroiditis.

iii) The second trimester. Risk of fetal infection is about 25%. A fetus infected at this stage is less likely to be miscarried but is still at risk of developing severe symptoms as above.

iv) The third trimester. Risk of fetal infection rises again, and may be as high as 65%. Most babies infected will be apparently healthy at birth, but the majority will develop symptoms later in life, usually retinochoroiditis.



Gestational age, fetal infection and fetal damage associated with toxoplasma infection in pregnancy



What can be done for toxoplasmosis in pregnancy?

There are hygienic precautions that pregnant women can take to avoid infection. There are blood tests that can determine whether or not a woman is immune to toxoplasmosis and diagnose either a current or recent infection. There is antibiotic treatment that helps reduce the chance of fetal infection or limit fetal damage.



1. Prevention

Pregnant women can be advised to:

- Only eat well-cooked meat which has been cooked thoroughly right through (i.e. no traces of blood or pinkness).
- Avoid cured meats, such as Parma ham.
- Wash hands and all cooking utensils thoroughly after preparing raw meat.
- Wash fruit and vegetables thoroughly to remove all traces of soil.
- Take care with hygiene when handling dirty cat litter. Wear rubber gloves when clearing out litter, and wash hands and gloves afterwards. If possible, get someone else to do the job.
- Cover children's outdoor sandboxes to prevent cats from using them as litter boxes.
- Always wear gloves when gardening and avoid hand-to-mouth contact. Wash hands afterwards.
- Avoid unpasteurised goats milk or goats milk products (although this route of transmission is rare).

Some women may have lifestyles or occupations which may put them more at risk than others, for example people who work on the land, e.g. sheep farmers, chefs, people who work on the land or in abattoirs etc.

2. Testing

If a woman feels she has put herself at risk in pregnancy or would like to know her antibody status prior to pregnancy, she should discuss the benefits and problems of testing with her GP, midwife or obstetrician. If it is decided that it is necessary, then a blood test can be taken. If a woman is concerned about a specific incident then it is necessary to wait 2–3 weeks after possible exposure before taking a test, as it takes this period of time for the antibody response to be detected by the blood test. The initial antibody test is carried out at a local hospital laboratory.

- **If the woman is antibody negative, she has never had the infection and needs appropriate information on the prevention of infection.**
- If the woman is antibody positive (to both IgG and IgM) then the sample will be referred to a Toxoplasma Reference Unit for further testing. Medical microbiological experts can estimate the timing of the onset of infection, assess the risk of fetal infection and give advice about further testing and treatment.



- An initial positive IgM result does not necessarily mean that she has a current infection, but further blood tests need to be done before this can be ruled out.
- If further tests (at the reference laboratory) show that infection has occurred sometime in the past then the woman can be reassured that this and future pregnancies are not at risk.

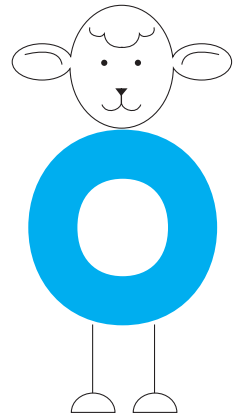
3. Treatment

If a pregnant woman has a current toxoplasma infection then the management may be as follows:

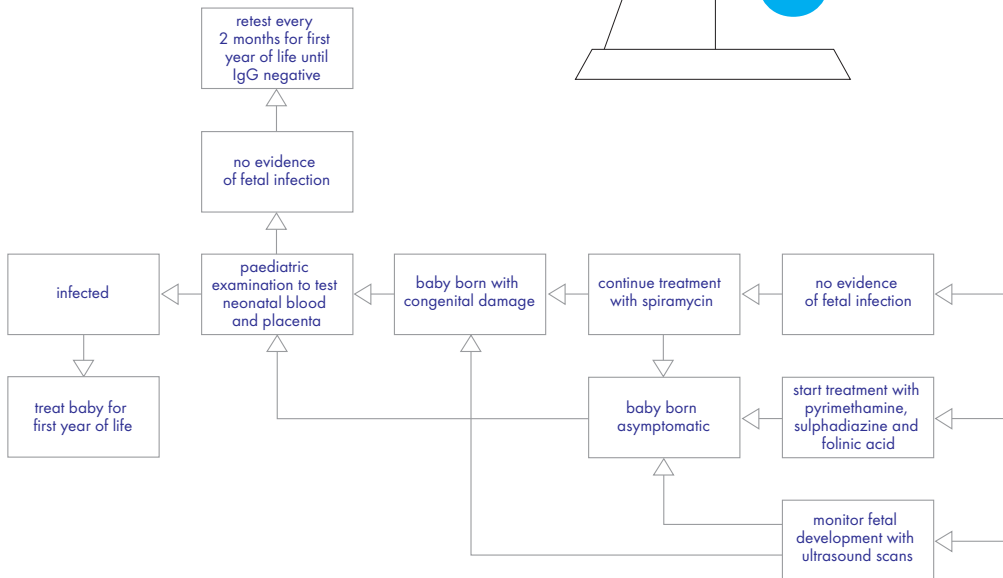
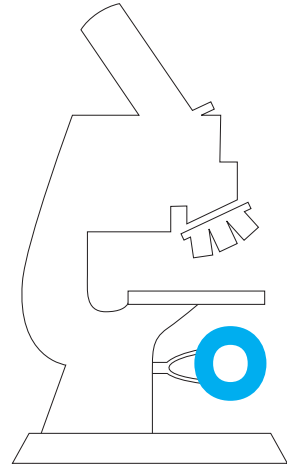
1. A specific antibiotic spiramycin is used to treat toxoplasmosis in pregnancy. It has been claimed that this reduces the risk of transmission of the infection from the mother to fetus by about 60%. It has been used in France for more than 25 years, and the majority of evidence suggests that it is safe for the fetus. Given the length of this experience and the potential effects of toxoplasmosis, spiramycin is currently considered safe and effective for use where clinically indicated.
2. The fetus can be tested for infection either by amniocentesis or cordocentesis. Amniocentesis is now the more favoured option as the procedure is less invasive and the risk of fetal loss is lower; however, this cannot be carried out until after the 15th week of pregnancy. Amniotic fluid (or less commonly fetal blood) is tested for the presence of the parasite. If fetal blood is taken it may also be tested for antibodies.
3. If infection is found to be present then two antibiotics (pyrimethamine and sulphadiazine) plus folic acid can be administered to the mother. These drugs are active against toxoplasma and may help to arrest the progression of disease in the fetus.
4. Termination of pregnancy is a choice for women who have a current toxoplasma infection. However, unless infection is detected by cordocentesis or amniocentesis, or ultrasound shows evidence of fetal damage, then this may mean terminating a healthy, unaffected baby.

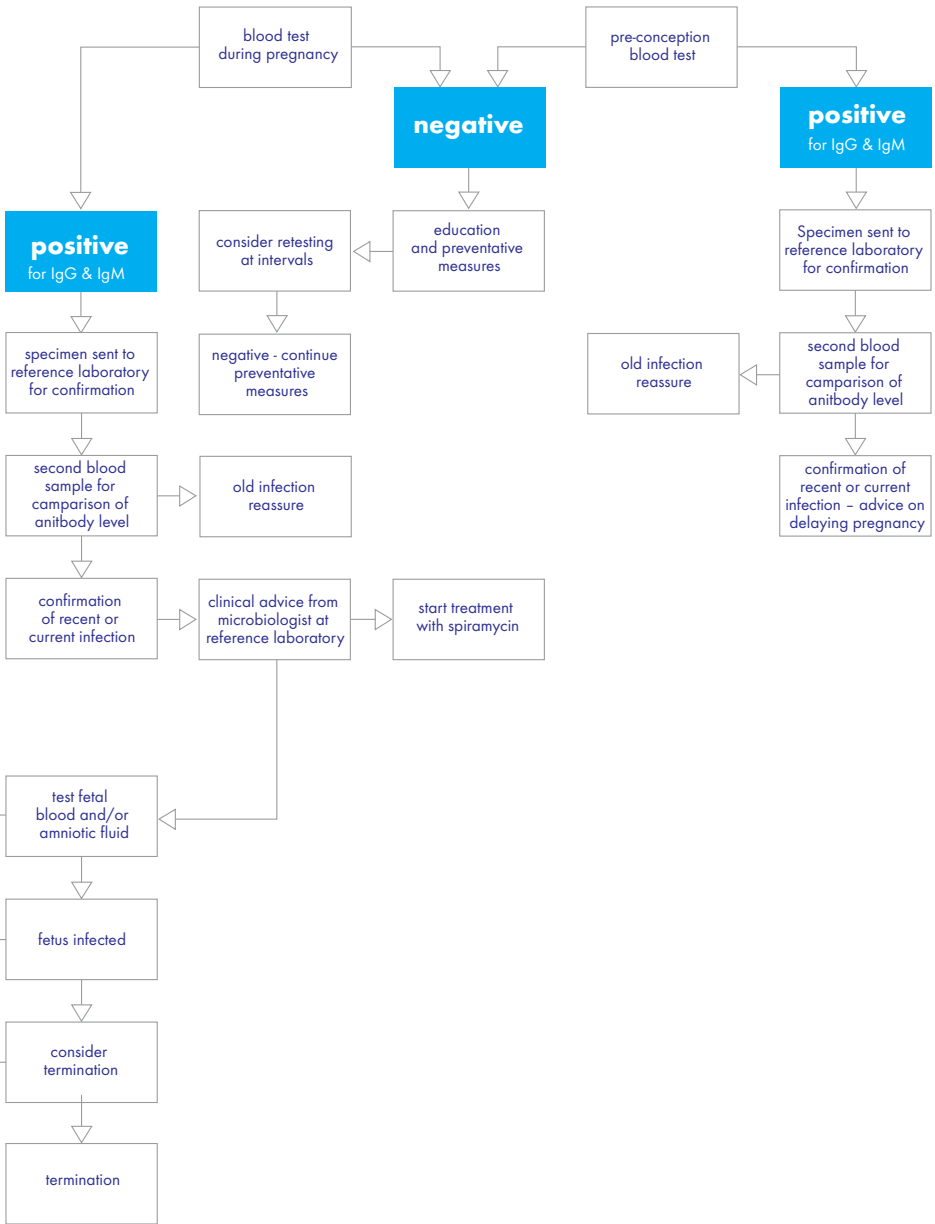
Most specialised testing takes place at Toxoplasma Reference Units and expert opinion about the risk to the baby, if any, should be given with blood test results.

Spiramycin is available on a named-patient basis from IDIS World Medicines (Tel: 020 8410 0700); it will not be readily available at the hospital dispensary or local chemist shop. Spiramycin is an expensive drug, and the cost may be prohibitive to some patients.



Flow chart for testing and management





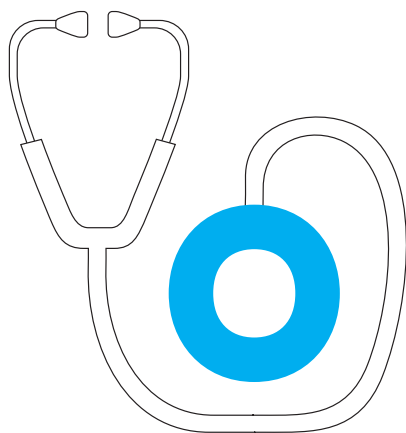
Management of pregnant women who have a toxoplasmosis infection

All babies born to women who have had a recent or current infection in pregnancy should have blood taken at birth, a thorough paediatric examination and follow-up blood tests every two months for the first year of life. Reference laboratories may also request placental samples.

A large proportion of congenitally infected babies will be asymptomatic at birth, so the lack of any obvious symptoms at birth does not mean a newborn is not infected.

Newborn blood will show maternal IgG antibody but if IgM or IgA is present this may indicate congenital infection. Comparison of antibody profiles in neonatal and maternal blood (by Western blots) may give a rapid diagnosis of congenital infection. Blood tests should be done every couple of months until the level of IgG falls and eventually goes negative, which should be within one year. This confirms that it was maternally acquired antibody and therefore that the baby is not congenitally infected.

If congenital infection is confirmed, sulphadiazine and pyrimethamine (which may be alternated with spiramycin) will be indicated for the first year of life. Regular haematological monitoring will be required as these drugs can affect the marrow, and the opinion of a paediatric infectious disease physician should be sought.



The symptoms of congenital toxoplasmosis

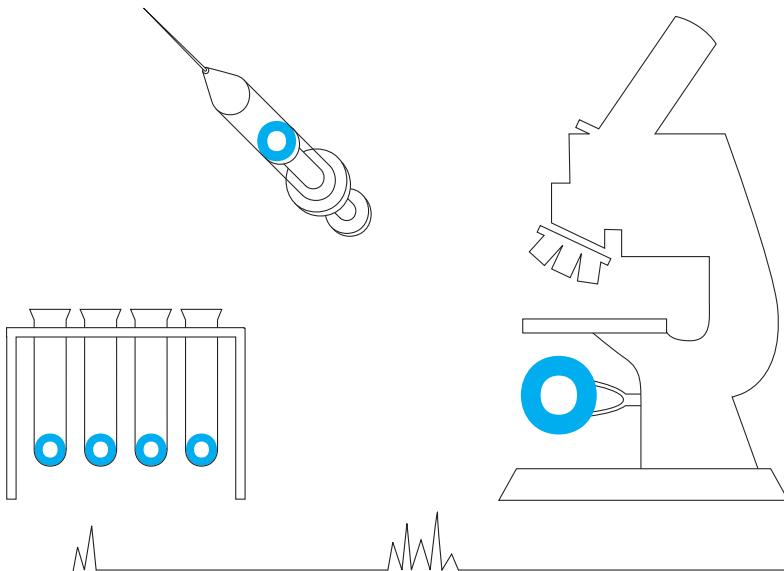
Clinical

This is the clinical disease seen in children infected in early pregnancy and who usually show the symptoms of hydrocephalus, retinochoroiditis, and brain lesions due to calcifications. Some children will show more widespread infection with jaundice, fever, anaemia, and microcephaly. These symptoms or signs may appear singly or in combination at birth or in the first few months of life.

Subclinical

This is the most frequent form of congenital toxoplasmosis. Transmission to the fetus has usually occurred late in pregnancy. Such a baby, apparently normal at birth, may develop symptoms weeks, months or even years later, in particular retinochoroiditis.

A woman with congenital toxoplasmosis herself is not at risk of passing the infection to her unborn baby.



Frequently asked questions

Q My cat had an accident in the house and I cleared it up. Am I at risk?

A There is very little risk from handling cat faeces if you are careful with hygiene. Faeces have to be out of the cat's body for at least 24 hours before becoming infectious. It is better to clear up any mess promptly, wearing gloves and washing hands afterwards, than to leave it for someone else to do later.

Q Is raw cured/smoked meat, like Parma ham safe to eat?

A No. Meat is safe to eat only if it has been thoroughly cooked.

Q Can I catch toxoplasmosis from someone else who has it?

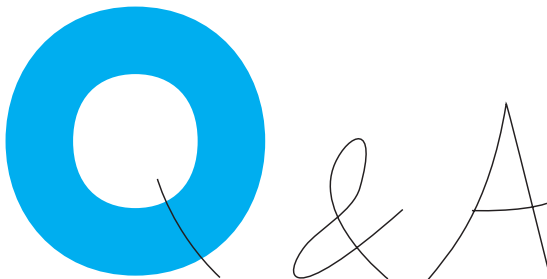
A No. Toxoplasmosis only passes from one person to another in the case of a woman to her unborn baby.

Q Is it OK to visit an open farm with my children?

A Yes, provided good hygiene is maintained. The risk of catching toxoplasmosis from sheep is through being involved in lambing. It is advisable not to go into the lambing shed or handle any newborn lambs.

Q If I think I am at risk, how can I tell if I have a current infection?

A Blood tests help experts to estimate when you caught toxoplasmosis, through looking at the type of antibodies present and whether the levels are rising, falling or stable. However, there are disadvantages to having a blood test. You should discuss the matter with your health advisor.



Q How long do the blood test results take to come back?

A The results may come back in a week, but if they are passed on from a local hospital laboratory to a Reference Laboratory then they will take longer. If you have been waiting for test results for a long time, then your GP or obstetrician may ring the laboratory to find out the results.

Q What can an amniocentesis test show?

A Tests on amniotic fluid can often tell if the baby is infected at that time, but they cannot tell whether the baby will be affected in the future or how seriously a baby might be affected.

Q Can I breastfeed my baby?

A Yes. The parasite has not been isolated in breast milk, and the baby will get antibodies to toxoplasmosis through your milk. It is fine to breastfeed if you have been taking spiramycin.

Toxoplasma Reference Laboratories

The National PHLS Toxoplasma Reference Unit

Singleton Hospital, Sgeti, South Wales, Swansea SA2 8QA

Tel: 01792 285055; Fax: 01792 202320; Out of hours: 01792 205666

Specialist Diagnostic Services Toxoplasma Reference Unit Tel: Ext 5058

The Scottish Toxoplasma Reference Laboratory

Highland Acute Hospitals NHS Trust

Raigmore Hospital, Old Perth Road, Inverness IV3 3UJ

Tel: 01463 704000; Fax: 01463 711322

These reference laboratories are there to confirm positive test results and assess the onset of maternal infection, advise on further testing and treatment, carry out neonatal blood tests and advise on neonatal treatment.



Further reading

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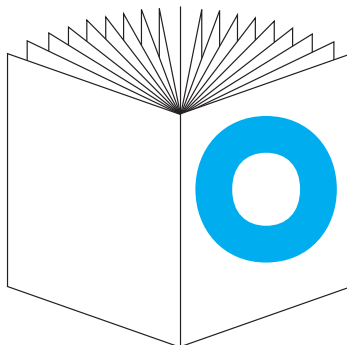
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Royal College of Obstetricians and Gynaecologists (1992). **Prenatal Screening for Toxoplasmosis in the UK**; Report of a multidisciplinary working group.

Dyke R (1998). **Surveying midwives' knowledge of toxoplasmosis**: The Toxoplasmosis Trust's current education work with midwives. RCM Midwives Journal 1 (5).

For more information contact:

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Fax: 020 7928 6628
Website: www.tommys.org
E-mail: mailbox@tommys.org



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Make a Gift today, and help Tommy's, the baby charity, save tiny lives.

Our aim is to prevent the loss of babies' lives through miscarriage, stillbirth and premature birth. As well as providing information to parents-to-be, we also fund a nationwide programme of medical research to discover what causes problems in pregnancy and find out how to prevent them.

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	Postcode	Telephone

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Gift Aid declaration increase your gift by 28% at no extra cost to you.

We can claim back the tax on all your donations if you tick the Gift Aid Declaration below.

Yes I am a UK taxpayer and I would like Tommy's, the baby charity, to treat all donations I have made since 6 April 2000 and all donations I make from the date of this declaration, until I notify you otherwise, as Gift Aid donations. I confirm I have paid or will pay sufficient income or capital gains tax to cover this payment and all other payments. Date

If you do not wish to receive mailings on behalf of Tommy's, please tick this box.

If you do not wish your details to be passed on to other organisations carefully selected by Tommy's, please tick this box.

Further information & publications

Tommy's, the baby charity, publishes information for parents-to-be and for those who have experienced miscarriage, stillbirth or premature birth, as well as providing information on toxoplasmosis. Please indicate below if you would like to be sent further information.

Toxoplasmosis in pregnancy: everything you need to know

General information about toxoplasmosis

Toxoplasmosis and animals

A leaflet for pet owners and farmers about the risks of toxoplasmosis

Toxoplasmosis and pregnancy

Information for parents-to-be who are worried about toxoplasmosis

Healthy Pregnancy leaflet

Ten top tips on getting the best chance of a healthy pregnancy

Healthy Eating leaflet

A guide for mums-to-be on what to eat and what to avoid

Information on miscarriage

Information on stillbirth

Information on premature birth

Annual review

Details about the charity, its fundraising, research and information programme

Research update

An outline of our current research projects

Information on ways to donate regularly to Tommy's

Fundraising information

If you have an idea for a fundraising event/sponsored activity and would like to discuss this with a member of the Community Fundraising team

If you would like to know more about Tommy's annual events for young children.

Please ensure that you have completed your address details on the form opposite.

Re-ordering

To order further copies of Tommy's leaflets, please use the form below and return it to Tommy's, the baby charity, 1 Kennington Road, London SE1 7RR, or contact Tommy's directly on 020 7620 0188, e-mail: info@tommys.org

Toxoplasmosis and pregnancy: everything you need to know

Toxoplasmosis and animals

Toxoplasmosis and pregnancy

You can order up to 10 copies free of charge

But orders exceeding this carry a postage, packing and admin charge. Please send cheques made payable to TOMMY'S THE BABY CHARITY with your order.

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