

## Zoonotic infections

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# A WORKING GUIDE TO ZOO NOTIC INFECTIONS

## WHAT ARE ZOO NOSES?

Zoonoses are diseases that can be passed from animals to humans. About 40 potential zoonoses exist in the UK.

They are transmitted by viruses, bacteria, parasites, prions and fungi. Animals carrying zoonotic germs may be unaffected and appear healthy, but the effects of infections on people can range from mild to deadly.

Workers, employers and the general public can underestimate the threat and severity of infections.

About 300,000 workers are at risk of infection. These include employees in animal-related occupations, forestry workers and engineers who may be exposed to ticks when walking through bracken.

The law requires employers to implement and follow precautionary and preventative measures to control risks where possible.

## HOW MIGHT I BE EXPOSED?

The five most common routes to a zoonotic infection are:

- **direct contact** with an infected animal's saliva, blood, urine, faeces, nasal secretions or other bodily fluids
  - **indirect contact** (fomite transmission) with inanimate objects that have been contaminated, such as feeding bowls, shovels, clothing etc
  - **vector-borne transmission** through mosquito, tick and flea bites or contact with flies
  - **oral transmission** for example by eating contaminated food or ingesting infected aquarium tank water
  - **aerosol transmission**, where pathogenic agents are carried in aerosol droplets (this can also occur with dust)
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## WHO IS MOST AT RISK?

Anyone, including the very healthy, who comes into contact with zoonotic germs can contract a zoonotic disease.

However, some people are more vulnerable to certain zoonotic diseases than others.

These people include:

- workers in at-risk occupations
  - agriculture, sewage and water treatment, forestry, laboratory research, veterinary services, abattoirs, nature conservation, zoos and animal or bird keepers
- pregnant women
- anyone with a weakened immune system
  - for example, someone with HIV or a cancer patient undergoing chemotherapy
- children under the age of five and adults over 65
- water sports, rambling and other outdoor leisure pursuit enthusiasts.

## HOW CAN I AVOID A ZOO NOTIC INFECTION?

You can take steps to protect yourself and your family from zoonotic diseases:

- good hand hygiene is essential
    - always wash your hands properly after being around animals, even if you haven't touched them
  - prevent mosquito, tick and flea bites
  - avoid bites and scratches from animals
  - handle food safely
    - this applies equally to preparing food for your family and for any pets or other animals
  - be aware of zoonotic diseases at home and find out about local ones at locations you may be travelling to, eg
    - petting zoos or other animal exhibits
    - unfamiliar tourism or business destinations.
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## LIST OF ZONOTIC DISEASES

Disease	Main channels	Usual mode of transmission to humans
<b>Anthrax</b>	livestock, wild animals, environment	direct contact, ingestion
<b>Animal influenza</b>	livestock, humans	may be reverse zoonosis
<b>Avian influenza</b>	poultry, ducks	direct contact
<b>Bovine tuberculosis</b>	cattle	milk
<b>Brucellosis</b>	cattle, goats, sheep, pigs	dairy products, milk
<b>Cat scratch fever</b>	cats	bite, scratch
<b>Cysticercosis</b>	cattle, pigs	meat
<b>Cryptosporidiosis</b>	cattle, sheep, pets	water, direct contact
<b>Enzootic abortion</b>	farm animals, sheep	direct contact, aerosols
<b>Erysipeloid</b>	pigs, fish, environment	direct contact
<b>Fish tank granuloma</b>	fish	direct contact, water
<b>Campylobacter</b>	poultry, farm animals	raw meat, milk
<b>Salmonella</b>	poultry, cattle, sheep, pigs	food borne
<b>Giardiasis</b>	humans, wildlife	water borne, person to person
<b>Glanders</b>	horse, donkey, mule	direct contact
<b>Haemorrhagic colitis</b>	ruminants	direct contact (and food borne)

<b>Hantavirus syndromes</b>	rodents	aerosols
<b>Hepatitis E</b>	not yet known	not yet known
<b>Hydatid disease</b>	dogs, sheep	ingestion of tapeworm eggs excreted by dogs
<b>Leptospirosis</b>	rodents, ruminants	infected urine, water
<b>Listeriosis</b>	cattle, sheep, soil	dairy produce, meat products
<b>Louping-ill</b>	sheep, grouse	direct contact, tick bite
<b>Lyme disease</b>	ticks, rodents, sheep, deer, other small mammals	tick bite
<b>Lymphocytic choriomeningitis</b>	rodents	direct contact
<b>Orf</b>	sheep	direct contact
<b>Pasteurellosis</b>	dogs, cats, many mammals	bite/scratch, direct contact
<b>Plague</b>	rats and their fleas	flea bite
<b>Psittacosis</b>	birds, poultry, ducks	aerosols, direct contact
<b>Q fever</b>	cattle, sheep, goats, cats	aerosols, direct contact, milk, fomites
<b>Rabies</b>	dogs, foxes, bats, cats, other animals	bite
<b>Rat-bite fever (Haverhill fever)</b>	rats	bite/scratch, milk, water

<b>Rift Valley fever</b>	cattle, goats, sheep	direct contact, mosquito bite
<b>Ringworm</b>	cats, dogs, cattle, many other animal species	direct contact
<b>Streptococcal sepsis</b>	pigs	direct contact, meat
<b>Streptococcal sepsis</b>	horses, cattle	direct contact, milk
<b>Tick-borne encephalitis</b>	rodents, small mammals, livestock	tickbite, unpasteurised milk products
<b>Toxocariasis</b>	dogs, cats	direct contact
<b>Toxoplasmosis</b>	cats, ruminants	ingestion of faecal oocysts, meat
<b>Trichinellosis</b>	pigs, wild boar	pork products
<b>Tularemia</b>	rabbits, wild animals, environment, ticks	direct contact, aerosols, ticks, inoculation
<b>West Nile fever</b>	wild birds, mosquitoes	mosquito bite
<b>Zoonotic diphtheria</b>	cattle, farm animals, dogs	direct contact, milk

## OCCUPATIONAL RISK MANAGEMENT

Employers are required to ensure the general health, safety and well-being of their staff under the Health and Safety at Work etc. Act 1974. But more specific regulations also apply in the workplace for preventing, controlling and reporting zoonotic infections.

Micro-organisms that present a risk to human health are included as substances hazardous to health in the

Control of Substances Hazardous to Health (COSHH) 2002 regulations.

COSHH assessments are required to:

- identify work that may involve exposure to zoonotic pathogens
- establish how they may cause harm
- determine measures to put in place to prevent or reduce the risk of harm.

## EXPOSURE

The most common route to infection in occupational settings is by direct contact. But exposure can also occur through aerosol or vector borne transmission.

The process of infection can be represented as a chain – breaking a link in the chain at any point will control the risk of infection.

When a hazard is identified by an employer, they need to investigate the links in the chain to find the best way to break it and so control the risk.



## TRANSMISSION

For infection to occur, a zoonotic micro-organism has to be transmitted from an animal to a human.

Most zoonotic micro-organisms usually have particular entry routes, but infection can occur by more than one route in some cases.

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People can become infected at work by:

- putting contaminated hands, fingers, pens etc into the mouth, nose or eyes
- breathing in infectious aerosol droplets (eg, in a laboratory that contains pathogens)
- splashing blood or other contaminated animal bodily fluids into the eye or other mucous membranes, such as the nose and the mouth
- broken skin coming into direct contact with a zoonotic micro-organism (or something contaminated by zoonotic micro-organisms)
- penetrating the skin (eg, with a contaminated needle or other sharp object, or by being bitten by an infected animal or insect).

## HOST

Unbroken skin and the lining of the mouth, throat, gut and airways all serve as barriers to infection.

The cells of these linings, and the substances they produce, are the body's first line of defence.

If a pathogen manages to cross these barriers, the immune system is the next line of defence.

## PREVENTION AND PROTECTION

Exposure cannot always be prevented.

When this is the case, the COSHH regulations require employers to adequately control it.

This means reducing the risk of infection to a level that will not harm workers' health.

Two main approaches are used to control infection in the workplace:

- disciplined personal hygiene
- good environmental hygiene and design.

These measures should be applied routinely in

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all workplaces to keep equipment and working areas clean – but especially where contamination with zoonotic pathogens is suspected.

It may be necessary to seek specialist advice from an occupational health service to explore vaccination options for workers foreseeably exposed to pathogens.

## PREVENTING EXPOSURE TO ZOOONOTIC DISEASE

**Prepare:** identify potential zoonotic pathogens by using available resources

**Plan:** identify potential transmission routes

**Execute:** select and implement appropriate safe working practices, including appropriate personal protective equipment (PPE).

## PERSONAL HYGIENE

- wash hands (and arms if necessary) before eating, drinking, smoking, using phones, taking medication, applying make-up, inserting contact lenses etc
  - cover cuts and grazes with waterproof dressings and/or gloves before starting work
  - if cuts and grazes occur at work, wash them immediately with soap and running water and apply a waterproof dressing
  - take rest breaks and meal breaks away from the main working area
  - wear appropriate protective clothing to stop personal contamination
    - eg, waterproof/water-resistant protective clothing, plastic aprons, gloves, rubber boots/ disposable overshoes
  - ensure protective clothing is safely disposed of or, if appropriate, cleaned thoroughly
  - avoid hand-mouth or hand-eye contact
  - dispose of all contaminated waste safely.
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## ENVIRONMENTAL HYGIENE AND DESIGN

- use equipment that is easy to clean and decontaminate
- clean all work surfaces/work areas regularly
- ensure, where possible, that the workplace and its services (eg water systems, laboratory cabinets and air conditioning systems) are designed to be safe to use and easy to clean and decontaminate.

If the work activity could result in:

- a skin piercing/cutting injury
  - control the risk of puncture wounds, cuts or grazes by avoiding the use of sharp objects such as needles, glass, metal, knives etc
  - if this is not possible, use safe working practices for handling and disposing of sharps and provide appropriate protective equipment for workers
- the splashing of any body fluid
  - protect the eyes and mouth with a visor or goggles/safety glasses and a mask
- the generation of aerosols of either dust or liquid
  - take action to avoid their generation or minimise their effect
  - alter the work activity eg, use a vacuum cleaner rather than a brush to clean a dusty workplace
  - contain the work activity eg, in a specialist fume cupboard
  - if this is not possible, use appropriate respiratory protective equipment.

Wearing any respirator requires prior medical clearance.

Half-face or face-fitting respirators require annual fit testing to ensure a proper seal is formed between the respirator and the face.

Strategies that can help protect you from vector-borne

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transmission include:

- wearing an insect repellent containing DEET and/or wearing clothing that has been treated with permethrin
- wearing long trousers and sleeves and tucking trousers into socks or wearing dedicated or disposable coveralls with elastic wrist and ankle closures
- conducting tick checks immediately following field work. Workers at high risk (forestry workers and field engineers) should be issued with tick tweezers
- showering within two hours of returning from the field.

## HEALTH AWARENESS

The true incidence of zoonoses acquired at work in the UK is unknown for most infections. GPs rarely ask patients their occupation, so diseases can go undiagnosed or misdiagnosed and important data may be missed.

Many zoonoses begin with flu-like symptoms which should never be ignored. If you are concerned about your health, tell the doctor about your work – it may help with diagnosis and appropriate treatment.

Some diseases, such as Lyme disease, are missed because the symptoms are confused with neurological diseases such as myalgic encephalomyelitis (ME). Yet early treatment can tackle what can otherwise be a potentially fatal disease.

## REPORTING AN EXPOSURE

Under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 (RIDDOR 2013), all diseases and acute illnesses that require medical treatment must be reported when they can be attributed to a work-related exposure to a biological agent.

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## INDUSTRIAL INJURY COMPENSATION

The Industrial Injuries Advisory Council classifies several zoonoses as diseases. As a result, they are officially recognised as being work-related.

Any member suffering one of these diseases may be entitled to compensation without having to prove negligence by the employer.

Further information is available from the Gov.uk website at: <http://bit.ly/industrial-injuries-list> (Appendix 1)

If you are suffering from a zoonosis that the Industrial Injuries Advisory Council has not prescribed as a disease, you may still be eligible to make a personal injury claim. Visit Prospect's website for more information:

[www.prospect.org.uk/member-benefits/legal/personalinjury](http://www.prospect.org.uk/member-benefits/legal/personalinjury)

## FURTHER INFORMATION

**The Health and Safety Executive** has downloadable leaflets and guidance: [www.hse.gov.uk](http://www.hse.gov.uk)

**Public Health England:** 020 7654 8000

Email [enquiries@phe.gov.uk](mailto:enquiries@phe.gov.uk)

[www.gov.uk/topic/health-protection/infectious-diseases](http://www.gov.uk/topic/health-protection/infectious-diseases)

**Public Health Wales:** 029 2022 7744

Email: [general.enquiries@wales.nhs.uk](mailto:general.enquiries@wales.nhs.uk)

**Public Health Scotland:** 0800 22 44 88 (8am-10pm)

[nhs.HealthScotland-GeneralEnquiries@nhs.net](mailto:nhs.HealthScotland-GeneralEnquiries@nhs.net)