Zoonotic diseases present a risk to all personnel involved in caring for and interacting with animals. Instigating basic infection control practices (standard precautions and transmission based precautions) reduces the level of risk for all staff. Women who are pregnant or trying to conceive are more susceptible to some diseases. This is important because the number of female veterinarians entering the profession continues to rise and the majority of veterinary nurses are female [1, 2].

Employers have a responsibility to promote workplace health and safety for staff, animals and clients. Employees also have a duty of care with promoting best and safe practice [3].

These guidelines identify zoonotic diseases that can be contracted in Queensland. Zoonotic diseases of particular concern to pregnant women are listed separately. They are categorised according to small, large or exotic animals, with species listed for each group. Recommended infection control practices are provided for each disease. Indirect transmission via food and water is not specifically discussed. See the CDC website for further information. Major forms of disease transmission are listed with suggested precautions available in downloadable poster format. Additional disease information is provided in a link, with Australian information provided when available.

The guidelines do not include the level of risk to the individual and do not extend to those working in research / laboratory areas. Risk profiles will need to be considered for each individual.

Seeking medical attention early is recommended if an individual is concerned about contracting a zoonotic disease or after an injury, such as a dog bite, as these can become fulminant within hours.

Read in conjunction with the Australian Veterinary Association 2017 Guidelines for Veterinary Personal Biosecurity and Guidelines for veterinarians handling potential Hendra virus infection in horses Version 5.1.

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Dr Justine Gibson, School of Veterinary Science, The University of Queensland

Dr Kathryn Wilks, Infectious Diseases & Medical Microbiology, Sunshine Coast University Hospital

Disclaimer

These guidelines aim to combine a review of the available evidence with current clinical practice. They are designed to provide information based on the evidence available at the time of publication to assist in preparation of personal biosecurity plans and decision-making. The Australian Veterinary Association gives no warranty that the information contained in this document and any online updates available on the AVA website are correct or complete.

Infection prevention and control guidelines are necessarily general and are not intended to be a substitute for a veterinarian's professional judgment in each case. The Australian Veterinary Association shall not be liable for any loss whatsoever whether due to negligence or otherwise arising from the use of or reliance on this document.

1. Veterinary Nurses Council of Australia, *Gender breakdown of veterinary nurses in Queensland.* 2019.
2. Commonwealth of Australia. *Veterinary Nurses*. 2019 [cited 2019 28 October 2019]; Available from: https://joboutlook.gov.au/Occupation?search=alpha&code=3613.
3. Workplace Health and Safety - Work Cover Queensland. *Work Health and Safety Act 2011*. 2018 2 July 2018 [cited 2019 22 July 2019]; Available from: https://www.worksafe.qld.gov.au/laws-and-compliance/workplace-health-and-safety-laws/laws-and-legislation/work-health-and-safety-act-2011.

Zoonotic diseases, pregnancy and the Veterinary profession in Queensland

Summary

Zoonotic diseases, diseases that are transmitted from animals to humans, present a risk for those who work with animals.

Some zoonotic diseases are a greater risk for women during pregnancy, either because they are more likely to contract the disease (due to immunosuppression) or due to the impacts of that disease. This risk can be reduced with standard precautions, such as performing hand hygiene, using personal protective equipment, and maintaining a clean environment. Some diseases require vaccination of the person or animal to confer protection.

Women in the veterinary profession

In 2019, almost two of three (62%) veterinarians in Queensland were female (1, 2). Given the gender makeup of veterinary student cohorts (at least 80% female (3)), further feminisation of the workforce is likely.

Female veterinary nurses/technicians make up 97% of the estimated 11,600 veterinary nurses in Australia, with an average age of 29 years (4).

Female veterinarians, 20 to 39 years of age comprise 55% of all veterinarians (1).

How can pregnant women reduce their risk?

Personal risk can be reduced for pregnant women by the following:

Avoidance of high-risk activities and cases - refer to colleagues.

Practicing good hand hygiene. Wash hands before and after touching animals, and before and after blood or body fluids exposure. Wear disposable gloves for additional protection. Wash hands before and after putting on gloves.

Use recommended personal protective equipment.

Avoid wearing long sleeves with any patient contact.

Avoid aerosol contact with aborting animals.

Never perform unprotected mouth to mouth resuscitation on neonates.

Report needlestick injuries, bites, scratches or other trauma and complete an incident report.

Encourage regular vaccinations and anthelmintic prophylaxis for clients' pets.

Avoid emptying cat litter trays.

When suspected infectious animals are present, practise standard and transmission-based precautions, including isolation and barrier nursing.

Employ direct and indirect precautions – prevent contact with faeces, avoid placing pens or other objects in mouths, avoid food and drink in the work area, and ensure fly control.

Take care with pathology samples and direct patient care, particularly with high-risk cases, such as animals who are:

- In labour,
- Aborting,
- Unvaccinated,
- Stray or feral,
- Fed raw meat diets,
- Housed in crowded conditions,
- Not receiving prophylaxis for internal or external parasites,
- Wildlife, reptiles, amphibians, and
- Exotic or non-native species (5).

Vaccinations for veterinary staff

Please discuss the requirement for any vaccinations with your medical practitioner/s.

Further information can be found in the Australian Immunisation Handbook.

Influenza – Women who are pregnant or breast feeding should receive the influenza vaccine annually.

Q fever – if not vaccinated, you are required to undergo serological and skin testing pre-vaccination. Vaccination should only be done where previous exposure is completely ruled out. Single vaccination confers lifelong immunity.

Rabies – recommended for those that have contact with bats or travel to rabies enzootic regions. Booster doses are recommended if there is ongoing occupational exposure to bats. Serological testing is recommended every two years.

Tetanus – women who are pregnant or breast feeding should receive a single dose of dTpa (diptheria-tetanus-acellular Pertussis) vaccine in each pregnancy (6). Veterinary staff with tetanus prone wounds are recommended to receive a booster dose if the last dose was more than five years ago.

Which diseases are pregnant women more susceptible to?

The following diseases may present a risk to pregnant women (AVA, CFSPH).

- Brucellosis
- Leptospirosis
- Listeriosis
- Psittacosis
- Q Fever
- Salmonellosis
- Toxoplasmosis

Further information can be found in the accompanying table, *Zoonotic diseases with an increased susceptibility during pregnancy*.

Other useful resources

Further information can be found in the following resources:

AVA Biosecurity Guidelines, 2017

AVA Resource 1a - How to protect yourself from animal diseases (large animal and mixed practice)

AVA Resource 1b - How to protect yourself from animal diseases (small animal practice)

Department of Agriculture, Fisheries and Forestry - Guidelines for Veterinarians handling potential Hendra virus infection in horses Version 5.1

Queensland Government, Department of Agriculture, Fisheries and Forestry – Preventing Zoonoses

Queensland Government – Workcover Queensland - PPE for equine veterinarians

National Hand Hygiene Initiative

Worms and Germs Blog

The Center for Food Security and Public Health – Iowa State University Zoonotic Disease Resources

2019 AAFP Feline Zoonoses Guidelines Version 1.0 Nov 2019

Infection Prevention and Control Signage, Australian Commission on Safety and Quality in Health Care

1. Australian Veterinary Association. Australian veterinary workforce survey 2016.2017 Nov 2017. Available from: https://www.ava.com.au/sites/default/files/AVA_website/pdf/AVA-Workforce-Survey-2016-Final.pdf.
2. Veterinary Surgeons Board (Queensland). Gender breakdown of registered Queensland Veterinarians 2019. Email from Registrar, Veterinary Surgeons Board. ed. Brisbane2019.
3. School of Veterinary Science UoQ. Gender breakdown of veterinary science students at University of Queensland. Email ed. Gatton: University of Queensland; 2019.
4. Veterinary Nurses Council of Australia. Gender breakdown of veterinary nurses in Queensland. Email from Executive officer VNCA. ed2019.
5. Elchos B, Scheftel J. Discussion of the compendium of veterinary standard precautions: Preventing zoonotic disease transmission in veterinary personnel. Zoonoses and Public Health. 2008;55(8-10):526-8.
6. Australian Government - Department of Health. Australian Immunisation Handbook. 2018 [cited 4 September 2019]. Australian Government, [cited 4 September 2019]. Available from: https://immunisationhandbook.health.gov.au/vaccine-preventable-diseases/q-fever.

Zoonotic diseases with an increased susceptibility during pregnancy

Disease name	Agent name	Small animal	Large animal	Exotics	Risk in Qld	Recommended personal infection control practices	Animal control measures	Comments
Brucellosis **References** AIDAP, 2016 AVA, 2017 Williams et al, 2015 NSW DPI 2017 NSW Govt 2019 OAHN Factsheet, 2019. QH, 2019	*Brucella suis*	Dogs, particularly those used for pig hunting or with feral pig exposure. Caution with animals presenting with orchitis, spondylitis.	Feral Pigs and possibly commercial pigs		Yes	Transmission: Contact, aerosol • Standard precautions • Airborne Precautions • Contact precautions - Direct and indirect. Full PPE (P2/N95 mask, eye goggles, gloves and disposable gown) with whelping, caesarians or handling of newborn puppies. Hand hygiene. Cover wounds with waterproof dressing. Caution with exposure to blood, serum, body fluids, faeces, foetal membranes, urine, vaginal secretions or tissue from suspect animals, including aborted tissues & foetuses, or high-risk dogs with blood contact.	Isolate suspect dogs. Avoid feeding dogs feral pig meat. Feral pig control.	Notifiable disease – human Notifiable - DAF Reproductive risks **Female** - spontaneous abortion, foetal death, birth defects. **Male** - testicular enlargement, orchitis, epididymitis.
Hepatitis E **References** Aus Govt, 2015 NSW Gov, 2014 Pavio et al, 2010 Qld Govt 2012 WHO, 2019	Hepatitis E		Pigs		Emerging	Transmission: Contact • Standard precautions • Contact precautions - Direct and indirect. Hand hygiene Gloves Cover wounds with waterproof dressing. Caution with exposure to blood, and bodily fluids from suspect animals. Avoid raw / undercooked pork.	Good herd biosecurity.	Pregnant women, especially third trimester, prone to fulminant disease. Notifiable disease – human

LCMV Lymphocytic Choriomeningitis Virus **References** AVA, 2017 Williams et al, 2015 Qld Gov (Animal Contact Guidelines), 2014	Lymphocytic Choriomeningitis Virus			Mice Hamster Guinea pigs	Yes	Transmission: Contact, aerosol • Standard precautions • Airborne Precautions • Contact precautions - Direct and indirect. Hand hygiene P2/N95 mask, Avoid cleaning cages Avoid contact with wild rodents	Rodent control.	Reproductive risk - birth defects, abortion
Leptospirosis **References** Ag Vic, 2017 AVA, 2017 CCAR, 2008 Williams et al, 2015 NSWGov 2018 Theiler, 2008 Wildlife Health Australia, 2018 Worksafe Qld	*Leptospira* spp.	Dogs Cats-rarely.	Cattle Sheep Goats Pigs Horses	Rodents Wildlife e.g. Kangaroos, Possums, bandicoots) Platypus Flying foxes	Yes	Transmission: Contact, aerosol • Standard precautions • Airborne Precautions • Contact precautions - Direct and indirect. Hand hygiene, particularly after handling animals or urine. Gloves and gown Cover cuts with water-resistant dressing. Long sleeved shirts, dry, full cover boots/shoes, gloves and apron when handling animals, soil, vegetation or animal feed that may be contaminated. Gloves, eye goggles and P2/N95 mask when handling reproductive fluids or exposed to urine. Avoid potentially contaminated surface waters or mud.	Vaccination of cattle and dogs in affected areas. Rodent control. Feral pig control. Environmental control. Integrated programs (e.g. Leptosure)	Notifiable disease – human Reproductive risk - abortion
Listeriosis	*Listeria monocytogenes*	Dogs Cats	Cattle Sheep Goats Pigs	Poultry	Yes	Transmission: Ingestion, inhalation, direct contact • Standard precautions • Airborne Precautions • Contact precautions - Direct and indirect. Hand hygiene	Restrict grazing of herbivores on stubble or with parturient animals.	Reproductive risk - miscarriage, stillbirth, premature birth. Neonates born with listeria – increased risk of sepsis, meningitis.

References Ag Vic, 2017 AVA,2017 CCAR, 2008 Chan 2015 Moore, 1993 Williams et al, 2015 QH 2019						Gloves, P2/N95 mask, disposable gown Avoid nasal discharge, urine, faeces, milk and uterine discharge. Avoid handling aborted fetuses Care with caesarians, calving, lambing or necropsies. Wear cut proof glove on non-dominant hand. Avoid contact with sick birds or poultry carcasses. Caution if animals fed raw food diets. Care with faecal material.		Notifiable disease – human
Psittacosis Ornithosis **References** Ag Vic, 2017 AIDAP, 2016 AVA, 2017 CCAR, 2008 Williams et al, 2015 Spickler, 2017 Qld. Govt- WH&S, 2019	*Chlamydia psittaci* (and possibly other species)		Horses	Birds Care with abortions/ stillbirths or examining aborted fetuses from horses or other livestock	Yes	Transmission: Contact, aerosol • Standard precautions • Airborne Precautions • Contact precautions - Direct and indirect. Hand hygiene Full PPE (P2/N95 mask, eye goggles, gloves and disposable gown or other removable clothing). Care handling bird faeces and other excretions. Damp cleaning of cages Adequate ventilation. Necropsies should be performed in a biosafety cabinet. Wear cut proof glove on non-dominant hand. Care with abortions/stillbirths or examining aborted fetuses from horses or other livestock.	Restrict pet bird contact with wild birds.	Reproductive risk – abortion Notifiable disease – human
Q fever Coxiellosis	*Coxiella burnetii*	Cats Dogs	Cattle Goats Sheep Camelids	Wildlife – Macropods Bandicoots	Yes	Transmission: Contact, aerosol, vector • Standard precautions • Airborne Precautions • Contact precautions - Direct and indirect.	Regular tick control. Isolate suspect	Notifiable disease – human Reproductive risk – premature delivery,

References Ag Vic, 2017 AVA, 2017 CCAR, 2008 Ferguson, 2018 Kopecny et al, 2013 Malo et al, 2018 Williams et al, 2015 Tuzio, 2005 Wildlife Health Australia, 2018 Qld. Govt- WH&S, 2019				Birds Rodents Rabbits		Standard Respiratory (airborne) precautions. Vaccination of all veterinary staff. Do not handle blood, urine, genital tracts, placenta, birth tissues, foetal membranes or aborted fetuses without appropriate PPE. Full PPE (P2/N95 mask, eye goggles, gloves and disposable gown) Caution with high-risk animals (particularly ruminants, cats and dogs) presenting with dystocia or requiring caesarians. Consider Q fever serology on animals requiring caesarians. Do not perform unprotected mouth-to-mouth resuscitation on neonates.	patients.	abortion, placental infection.
Salmonella **References** AIDAP 2016 AVA 2017 Qld, Govt 2014 Williams et al, 2015 Spickler 2013 Weese2009 Wildlife Health Australia, 2018 Vogelnest & Portas, et al Middleton in Vogelnest, 2010	*Salmonellosis*	Dogs Cats	Cattle Sheep Goats Pigs Horses Many mammalian species affected.	Reptiles Amphibians Poultry Rodents Echidnas Possums Macropods Birds	Yes	Transmission: Contact • Standard precautions • Contact precautions - Direct and indirect. Hand hygiene Gloves Care with handing faeces Caution if animals fed raw food diets.	Avoid raw food diets.	Reproductive risk – abortion Notifiable disease – human
Toxoplasma	*Toxoplasma gondii*	Cats (definitive host) Rodents	Pigs Sheep Goats Cattle	Birds Poultry Rodents Marsupials Flying Foxes	Yes	Transmission: Contact • Standard precautions • Contact precautions - Direct and indirect. Kittens are highest risk. Hand hygiene	Wild and domestic cats are definitive hosts. Prevent	High risk in pregnant women Reproductive risk - birth defects, abortion Notifiable disease –

References AVA, 2017 Aus Govt 2019 CCAR, 2008 Moore, 1993 Williams et al, 2015 Qld, Govt 2014 Wildlife Health Australia, 2018						Avoid cat litter/cat faeces (parasite not infectious until after 1-5 days) Ensure cat litter cleaned daily Wash hands after handling soil. Women can request serological testing to determine their pre-natal exposure and potential protection. Toxoplasma seronegative individuals receiving allograft stem cell transplants or solid organ transplants are at an increased risk of infection from Toxoplasma seropositive donors organs due to infection reactivation.	cats defaecating outside. Treat positive cats.	human

P2/N95 Mask

Standard precautions

Standard precautions include hand hygiene, appropriate personal protective equipment (PPE), safe sharps use and disposal, routine environmental cleaning, reprocessing of reusable medical equipment and instruments, respiratory hygiene and cough etiquette, aseptic technique, waste management and appropriate handling of linen.

Standard precautions should be used with the handling of blood (including dried blood) and bodily fluids, including urine, faeces, saliva, semen (NHMRC – Infection Control Guidelines, 2019).

Contact precautions

Direct transmission – the transfer of an infectious agent from person to person/animal. Prevent contact with faeces and other bodily fluids.

Indirect transmission – the transfer of an infectious agent through a contaminated intermediate object (fomite) or infected/colonised person/animal. Avoid placing pens or other objects in mouths, avoid food and drink in the work area, and ensure fly control (NHMRC – Infection Control Guidelines, 2019).

Airborne precautions

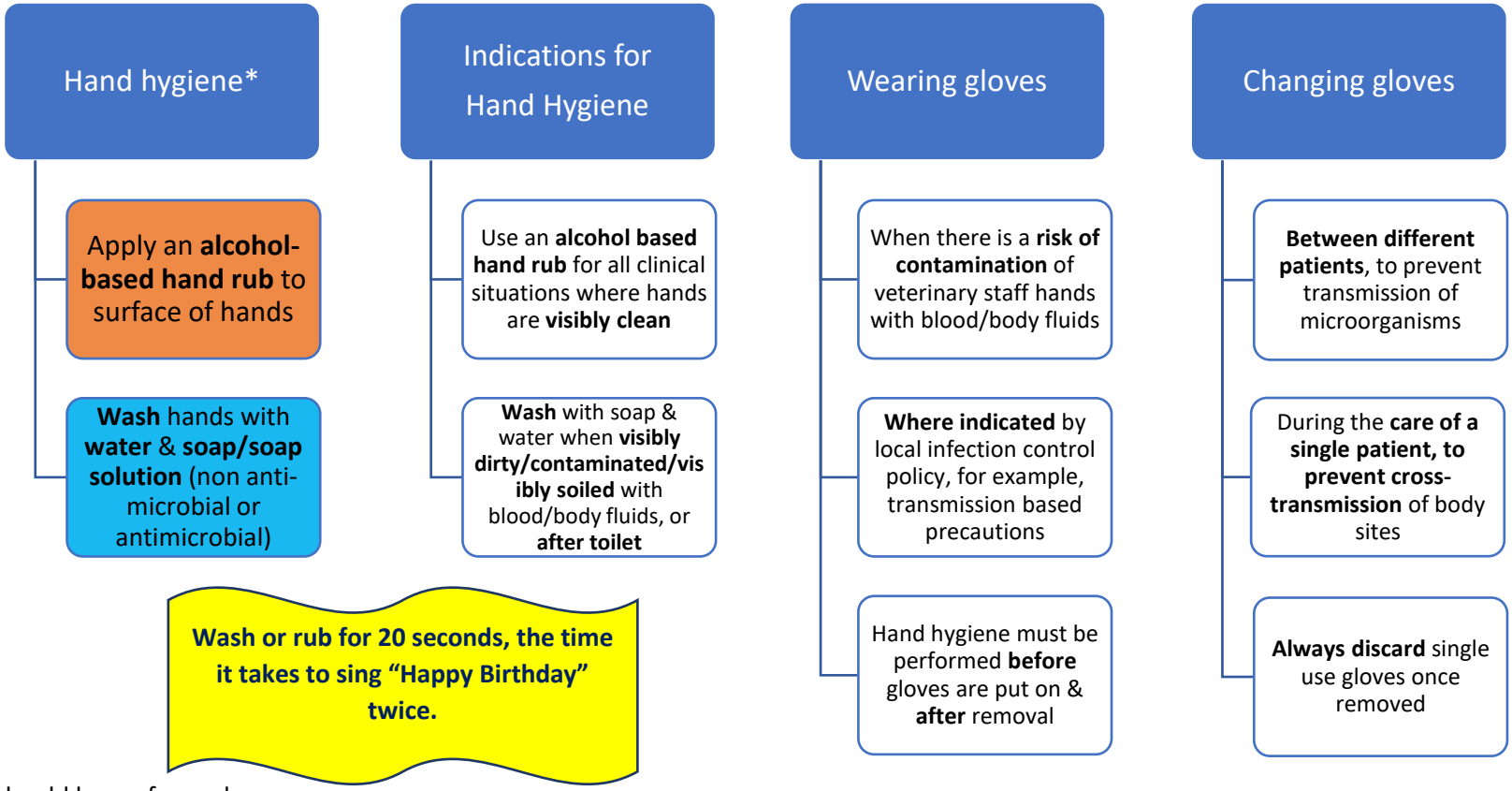
Airborne droplet nuclei or small particles may remain infective in the environment for long periods and travel extended distances. P2/N95 respirators prevents the inhalation of potentially infectious agents (NHMRC – Infection Control Guidelines, 2019).

Droplet precautions

Respiratory droplets, defined as large-particle droplets >5 microns, generated by coughing, sneezing or vocalising. These require close contact for transmission and may contaminate hands and horizontal surfaces. Additional personal protective equipment (PPE) and a surgical (non P2/N95) mask should be worn when interacting with the patient. The patient should be kept in isolation (NHMRC – Infection Control Guidelines, 2019).

Posters available:

- Airborne Standard Precautions
- Contact Standard Precautions
- GPSC HandRub Wash



*Hand hygiene should be performed:

- Before **and** after touching a patient
- Before **and** after a procedure or body fluid exposure risk
- **After** touching patient surroundings, such as the cage or cage card.

How to hand wash poster

How to hand rub poster

Adapted from Hand Hygiene Australia, 2019