

Auxiliary Health Issues Summary: Zoonotic Diseases

Purpose

Humans usually are not always susceptible to infectious diseases of animals. However, there are some important exceptions where infectious agents of animals can produce significant disease in humans. These infections are called **zoonotic diseases**. In many cases, the animals show little, if any, signs of disease. Therefore, one should always be aware of possible consequences when working with each type of animal and then take precautions to minimize the risk of infection. In the event that you become ill with a fever or some other sign of infection, it is important to let the physician caring for you know of the work you do with animals.

Procedure

There are several easy, common-sense methods that can be taken to lessen the risk of infection with zoonotic agents. These include:

1. Always wear disposable gloves and particulate filter mask (or disposable/fitted respirator) when working with animals or animal tissues/fluids. Additional personal protective equipment (PPE) is required when working with BSL-2 agents.
2. Always wash your hands with soap after handling animals or animal tissues/fluids.
3. When injecting large animals with substances, use a two-person team - one individual to restrain the animal, and the other to safely inject the animal. Fractious animals may require chemical restraint as a safety precaution.
4. Discard needles and other sharp objects (including broken glass) into designated puncture-resistant “sharps” containers. **Do not recap needles**; rather, dispose of needles uncapped, directly into the sharps container or use a mechanical barrier system to prevent needle stick injuries.
5. For procedures such as necropsy, cage cleaning, and tissue and fluid sampling, use containment devices such as biological safety cabinets (when possible), safety glasses alone or under face shields, particulate filter masks or disposable/fitted respirators, and other personal protective equipment as indicated by the situation.

Precautions

1. Pregnant individuals may be at particular risk when working with animals or animal tissue/fluids. Exposure to internal parasites, bacteria, and viruses that may be common in wild and domestic animals is a concern. Consult with your physician/obstetrician for more specific guidance.
2. Working with hazardous agents in general and toxic chemicals in particular is discouraged during the first trimester of pregnancy. The Occupational Health Program physician for Notre Dame at the Notre Dame Wellness Center can be contacted at (574) 634-WELL (9355).

Species- Specific Zoonotic Concerns

Non-Human Primates

1. Non-human primates pose a number of zoonotic risks. For example, the Tuberculosis bacterium may be transmitted both from animals to man and from man to animals. In all non-human primate colonies, regularly scheduled TB testing of the animals and the personnel must be done. Common human viruses such as measles and *Herpes simplex* may also pose particular risks for some non-human primates. *Cercopithicine Herpesvirus* or “Herpes B” is carried by Old World primates (especially macaques). It is the non-human primate virus of most concern to people who handle these animals. The virus is often carried asymptotically by monkeys, but some times ulcers on the tongue and lips can be seen. Humans are exposed through contact with the saliva, blood, urine, and possibly the feces of monkeys. Thus, anyone who is bitten or splashed with urine or other body fluids or experiences a puncture wound with an object that has been exposed to a monkey, is at risk. Initially, symptoms are flu-like, with muscle aches, fever, and lethargy being common. The disease progresses rapidly to an often-fatal encephalitis.

2. Non-human primates often carry gastrointestinal bacteria and parasites that pose a risk to man. For example, *Shigella*, *Campylobacter*, and *Salmonella* are bacteria that can cause dysentery in both non-human primates and man. Parasites such as *Entamoeba histolytica* can also be transferred to man and provide further reason for careful hand washing after exposure to primate feces.
3. Protective clothing such as outer garments, gloves, masks, and face shields must be worn when handling non-human primates. More detailed procedures are available from the Freimann Life Science Center office (1-6085).

Birds, Rabbits, Reptiles, and Amphibians

1. Unusual research species also carry zoonotic risk. Birds have diseases such as psittacosis and avian tuberculosis which can be transmitted to man. Only birds which have undergone an appropriate quarantine should be used in research or teaching within the animal vivarium.
2. Rabbits pose few risks of infectious disease. Although some rabbits carry the bacteria, *Pasturella multocida*, the rabbits at FLSC are tested to be free of these bacteria. *Pasturella multocida* has been reported in persons exposed through animal scratches, and saliva. Those working with rabbits should be aware of possible allergy to the dander of rabbits.
3. Salmonella is a bacterium that may be harbored in birds, reptiles and amphibians. In humans, infection may result in mild to severe, chronic diarrhea. For this reason, gloves should always be worn when handling animals and hands washed with an antiseptic soap after handling.

Fish and Aquatics

1. There are no reported parasitic, viral or fungal zoonoses that are derived from aquatic species exclusively through handling. Bacteria are the primary causative agents for zoonoses. These agents include *Aeromonas*, *Vibrio*, *Edwardsiella*, *Escherichia*, *Salmonella*, and *Klebsiella* ssp. of gram-negative bacteria. Additionally, aquatic *Mycobacterium* ssp, *Streptococcus iniae*, and *Erysipelothrix rhusiopathiae* are gram-positive bacteria implicated as zoonotic agents. In all cases the primary route of infection is through puncture wounds and contamination of existing abrasions and cuts.
2. The severity of disease varies from localized wound swelling from *Aeromonas*, *Vibrio*, and granulomatous nodules from *Mycobacterium* ssp, and necrotic lesions from *Edwardsiella*, *Escherichia*, *Salmonella*, and *Klebsiella* ssp to systemic arthritis, endocarditis and meningitis from *Streptococcus iniae* and *Erysipelothrix rhusiopathiae*.
3. The most effective way to prevent infections is to minimize direct contact with fish and their water. Because it is likely that contact with the fish, water or both will occur during the course of the experiments, basic hygiene measures need to be taken. Wearing vinyl, latex, or nitrile gloves will reduce exposure of cuts and abrasions on the hands. Canvas or heavy gloves worn over water-proof gloves will protect against cuts from fins or spines. When contact occurs, thorough hand washing is essential. All wounds from fish should be reported and appropriate first aid administered. Gloves should always be worn when cleaning tanks and equipment. *

Rodents

1. Contact with rodents requires taking precautions against such diseases as Toxoplasmosis, tapeworm infection, Lymphocytic Choriomeningitis (LCM), and Salmonellosis. While most of the rodents used in the FLSC are purchased to be free of these pathogens, it is possible for infections to occur. Of course, wild rodents are at a much greater likelihood of carrying such agents, thus personnel participating in studies using wild-caught animals should be particularly diligent in taking precautions. As with other species, personnel should wear gloves and a particulate filter face mask or disposable/fitted respirator when handling these animals or their tissues. In addition, personnel should thoroughly wash their hands with an antiseptic soap after handling animals.
2. Risk of bite wounds, and to a lesser extent scratch wounds, exists when handling rodents. Such wounds should be thoroughly washed with an antiseptic soap. Signs of infection such as redness, swelling, and warmth of the wound site, or discharge from the site should be reported to the employee's supervisor,

the Compliance/Technical Services Team Lead and to a physician if noted. Typically such signs might be seen within 24-72 hours after the injury. With some rodents, particularly rats, bite wounds may become infected with either *Streptobacillus moniformis* or *Spirillum minus*, bacteria which may cause “rat bite fever” in man. This disease is characterized by fever, headache, nausea, joint pain, and an erythematous rash on the hands and feet. Severe cases may progress to enlargement of the lymph nodes and endocarditis. The disease can be effectively treated with penicillin under the oversight of a physician.

Summary

1. A number of zoonotic agents are associated with species used at the FLSC. For this reason, personnel working directly with such animals or with tissues or fluids derived from them should be enrolled in the Occupational Health Program and take the precautions described above.
2. For further information, personnel may contact the FLSC Director at 1-6085, Compliance/Technical Services Lead at 1-6087 or the Occupational Health Program physician for UND at (574) 634-WELL (9355).

* Lowry, T., Smith, S.A. Aquatic zoonoses associated with food, bait, ornamental, and tropical fish, JAVMA, Vol 231, No.6, pp876-880

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