

Occupational Safety Fact Sheet

Working with Aquatic Species

Via its Animal Welfare Assurance, Texas State has committed to comply with the Public Health Service (PHS) Policy on Humane Care and Use of Laboratory Animals. In accordance with this policy, the University must provide information and training regarding potential zoonoses (diseases transmitted to humans from animals) and other potential hazards associated with animal exposure to faculty, staff and students who work with animals on campus or in the field.

This fact sheet is directed toward those involved in the care and use of fish and other aquatic species. It will cover the most common zoonoses, basic safety procedures (e.g., personal hygiene, personal protective equipment) to lessen the risk of exposure, and the procedure to follow in case of injury or illness.

Zoonoses and Risk Factors

While overall incidence of transmission of disease-producing agents from aquatic species to humans is low, there are a number of agents found in aquatic species and aquarium water that have the potential to be transmitted to humans, either directly by handling, or indirectly through exposure to water or holding tanks. In general, humans contract these diseases via:

- **ingestion of infected tissues or aquarium water**
- **contamination of lacerated or abraded skin**

An important feature of many of the disease causing agents is their opportunistic nature. The development of disease in the human host often requires a preexisting state that compromises the immune system.

If you are pregnant, or have any other immune-compromising medical condition or you are taking medications that impair your immune system (steroids, immunosuppressive drugs, or chemotherapy) you are at increased risk for contracting an aquatic zoonosis and should consult your physician about the risks to your health.

The zoonotic diseases associated with care and handling of aquatic species include the following:

Mycobacterium: Organisms from the genus *Mycobacterium* are non-motile, acid-fast rods. Two species *M. fortuitum* and *M. marinum* are recognized as pathogens of tropical fish. Humans are typically infected by contamination of lacerated or abraded skin with aquarium water or fish contact.

A localized granulomatous nodule (hard bump) may form at the site of infection, most commonly on hands or fingers. The granulomas usually appear approximately 6-8 weeks after exposure to the organism. They initially appear as reddish bumps (papules) that slowly enlarge into purplish nodules. The infection can spread to nearby lymph nodes. More disseminated forms of the disease are likely in immunocompromised individuals. It is possible for these species of mycobacterium to cause some degree of positive reaction to the tuberculin skin test.

Salmonella: Salmonellosis is a bacterial disease caused by the bacterium *Salmonella*. Many different kinds of *Salmonella* can make people sick. Most people have diarrhea, fever, and stomach pain that start 1 to 3 days after they get infected. These symptoms usually go away after 1 week. Sometimes, people have to see a doctor or go to the hospital because the diarrhea is severe or the infection has affected their organs. Animals can carry *Salmonella* and pass it in their feces. People get salmonellosis if they do not wash their hands after touching the feces of animals.

Aeromonas spp.: Aeromonad organisms are facultative anaerobic, gram-negative rods. These organisms can produce septicemia (a severe generalized illness) in infected animals. The species most commonly isolated is *A. hydrophilia*. It is found worldwide in tropical fresh water and is considered part of the normal intestinal microflora of healthy fish. Humans infected with *Aeromonas* may show a variety of clinical signs, but the two most common syndromes are gastroenteritis (nausea, vomiting and diarrhea) and localized wound infections. Again, infections are more common and serious in the immunocompromised individual.

Other diseases: Other diseases that can be spread through working with aquatic species are ***Plesiomonas spp.*, *Pseudomonas fluorescens*, *E. coli*, *Klebsiella spp.*, *Edwardsiella tarda*, *Streptococcus spp.*, *Staphylococcus spp.*, *Clostridium spp.*, *Erysipelothrix spp.*, *Nocardia spp.*, and *Cryptosporidium*** through the ingestion of contaminated water. (See Figure 1, next page)

Allergic Reactions to Fish

In the laboratory setting, human sensitivity to fish allergens (proteins which causes an allergic reaction in people) is rare. However, some people do become sensitized to fish proteins through inhalation or skin contact.

Injuries from Handling Animals

People can receive cuts, scratches, or puncture wounds when handling some aquatic species. Infectious organisms from the animals or their tank water can enter skin wounds of handlers and may establish an infection.

How to Protect Yourself

Protecting yourself against these hazards is simple but you must be consistent.

Wash Your Hands: The single most effective preventative measure that you can take is thorough, regular hand washing. You must wash your hands and arms after handling fish or contaminated water or tanks. You should avoid touching your face, eyes, nose or mouth with unwashed hands or contaminated gloves. You must never eat, drink, smoke, or apply makeup in animal rooms.

Wear Personal Protective Equipment: If you are in a situation where you will spend a significant amount of time with your hands immersed in water or if you have any cuts and abrasions on your hands or arms, you should wear sturdy, water-proof gloves of sufficient length to prevent water from entering the glove at the cuff.

What to do if You become Ill or Injured

Tell your supervisor, even if it's minor. If you are a student, contact the University Health Center.

Seek Medical Attention Promptly: Clean all minor cuts and abrasions immediately with antibacterial soap, and then protect it from dirt or animal secretions until it has healed.

Tell your Doctor you Work with Aquatic Species: If you become ill, even if you are not certain that the illness is work-related, make sure to tell your physician that you work with aquatic species. Many zoonotic diseases have flu-like symptoms and would not normally be suspected. Your physician needs this information to make an accurate diagnosis. Questions about your personal health should be answered by your physician.

Per University safety procedure, in the event of a life-threatening emergency, individuals are instructed to seek care at the nearest emergency medical center or call 911.

For Supervisors

In the event of an incident, injury, or illness to an employee while on the job, the occurrence and remedial actions taken must be documented on a Supervisor's Report of Incident, Injury, or Illness form, available on the RMSO website.

Figure 1

Pathogen	ingestion of fish tissue (under cooked or feces cont.)	ingestion of infected aquaria water	dermal contact infected fish	dermal contact infected Aquarium/Sea water
BACTERIA				
Streptococcus	*			
Staphylococcus		*		
Clostridium	+			
Erysipelothrix			+	
Mycobacterium			*	+
Nocardia			*	*
Vibrio	+			+
Plesiomonas shigelloides	+	+		
Aeromonas		+		+
Pseudomonas		*		*
Escherichia	+			
Salmonella	+			
Klebsiella			+	
Edwardsiella	+	+	+	+
Leptospirosis	?	?	?	?
PARASITES				
Anasakiasis	+			
Eustrongyloides	+			
Cestodes	+			
Trematodes	+			
Protozoa	*	*		
VIRUSES				
Calicivirus			*	
FUNGI				
Candida			*	
TOXINS				
Ciguatera Poisoning	+ heat and cold stable			
Scombroid Poisoning	+ cold sensitive			

+ reported cases in humans

* no known cases in humans but the potential risk exists

? exposure route of reported human disease unknown