

ONE HEALTH

“One Health” concept was introduced at the beginning of the 2000s. This idea had been known for more than a century; that **human and animal health are interdependent and bound to the health of the ecosystems** in which they both exist. One Health is a collaborative, multisectoral, and trans-disciplinary approach - working at local, regional, national, and international levels - to achieve optimal health and well-being as well as recognizing the interconnections between people, animals, plants and their shared environment. One health is an approach to designing and implementing programmes, policies, legislation and research in multiple sectors communicate and work to achieve better public health outcomes. This concept is implemented by the OIE as a collaborative global approach to understand risks for human and animal health (including both domestic animals and wildlife) and ecosystem health as a whole. The concept of one health recognizes the fact that health of human beings is directly or indirectly connected to health of animals and environment and therefore is gaining importance as most of the contagious diseases are zoonotic in nature.

“One Health” is been defined by many ways. One Health is a collaborative approach to issues that intersect human, animal and environmental health.

Although One Health is not a new issue, it has become more important in the recent years. Interactions among people, animals, and the environment continue to change over time. The expansion of human and animal populations, changes in climate and land use, and increased national and international travel and trade provide opportunities for disease spread. Studies have shown that approximately 75% of recently emerging infectious diseases affecting humans are diseases of animal origin; approximately 60% of all human pathogens are zoonotic.

One Health includes the health professions as well as wildlife specialists, anthropologists, economists, environmentalists, behavioral scientists, and sociologists, among the others. One Health embraces the idea that complex problems present at the human-animal-environmental interface can best be solved through multidisciplinary communication, collaboration, and cooperation and is being acknowledged by national and international institutions for the same .

A German scholar from the mid 1800's, Rudolf Virchow, is known to be an early proponent of One Health. He said, “Between animal and human medicine there is no dividing line nor should there be. The object may be different but the experience obtained constitutes the basis of all medicine.”

In the 1980's, an epidemiologist Calvin Schwabe called for a unified human and veterinary approach to combat zoonotic diseases, providing the modern foundation for One Health.

Zoonotic diseases are all those diseases which spread between humans and animals naturally though the route may be different. Zoonotic diseases outbreaks have surged in the last two decades and can be transmitted by following modes:

Direct contact: Coming into contact with the saliva, blood, urine, mucous, feces, or other body fluids of an infected animal. Examples include touching animals, and bites or scratches.

Indirect contact: Coming into contact with areas where animals live and roam, or objects or surfaces that have been contaminated with germs. Examples include aquarium tank water, pet habitats, barns, plants, and soil, as well as pet food and water dishes.

Vector-borne: Being bitten by a tick, or an insect like a mosquito or a flea.

Foodborne: Eating or drinking something unsafe, such as unpasteurized (raw) milk, undercooked meat or eggs, or raw fruits and vegetables that are contaminated with feces from an infected animal.

Waterborne: Drinking or coming in contact with water that has been contaminated with feces from an infected animal.

As part of our mandate to study, assess and control zoonotic diseases, Institute of Animal Health & BP, Zakura has taken up work on two important zoonotic diseases:

1. Brucellosis
2. Glanders

Brucellosis: An important Zoonotic Disease caused by Gram Positive bacteria Brucella. Several strains of Genus Brucella are Zoonotic in nature though the severity of infection may vary according to their virulence. Various species include Brucella abortus, Brucella melitensis, Brucella ovis, Brucella neotomae, brucella suis, brucella canis etc.

Brucellosis is primarily a disease of animal origin causing reproductive failures and other severe consequences in animals such as Cattle, Buffaloes, Sheep & Goat etc. It is transmitted to humans mainly through consumption of infected animal products such as meat and milk or through contact with infected aborted fetus and placenta.

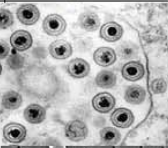

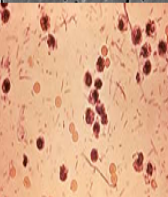
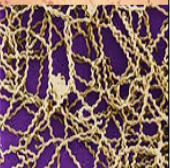
A collaborative study is undergoing between the Department of Social and Preventive Medicine, Government Medical College Srinagar and IAH&BP, Zakura Srinagar on



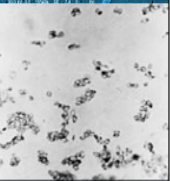

" Brucellosis in Humans and Animals", wherein IAH&BP, Zakura conducts Brucella tests on animals (RBPT and indirect ELISA) and Department of SPM conducts Brucella testing in human handlers.


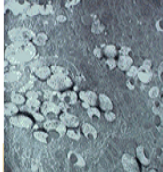


Glanders: It is a contagious zoonotic acute or chronic disease, usually fatal disease of Equines caused by Burkholderia mallei, a Gram negative bacteria. It primarily affects Horses, Mules and Donkeys.

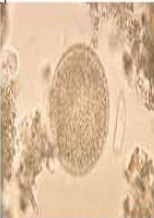
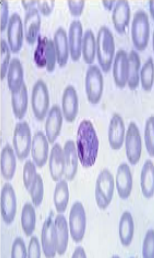
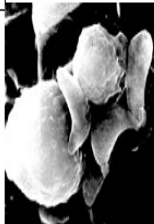

At IAH&BP, Zakura regular testing is being carried out by indirect ELISA. Also during Shri Amarnath Ji Yatra, samples are collected from Baltal route as well as Pahalgam route that witness heavy Equine mobility / movement during Shri Amarnath Ji Yatra period. The samples thereafter are tested at the Institute of Animal Health and Biological Products, Zakura by indirect ELISA.




ZOO NOTIC DISEASES FACT SHEET

| Disease | Pathogen | Genus species | Host Range | Transmission | Symptoms | Incubation | Fact | Treatment | Photo |
|---------------|----------|---|---|--|---|--|---|--|---|
| Brucellosis* | Bacteria | <i>Brucella</i> (<i>B. melitensis</i> , <i>B. abortus</i> , <i>B. suis</i> , <i>B. canis</i>) | Infected animals (swine, cattle, goats, sheep, dogs) | Skin or mucous membrane contact with infected animals, their blood, tissue, and other body fluids | High and protracted (extended) fever. Infection affects bone, heart, gallbladder, kidney, spleen, and causes highly disseminated lesions and abscess | 1-15 weeks | Most commonly reported U.S. laboratory-associated bacterial infection in man | Antibiotic combination: streptomycin, tetracycline, and sulfonamides |  |
| Salmonellosis | Bacteria | <i>Salmonella</i> (<i>S. cholerae-suis</i> , <i>S. enteritidis</i> , <i>S. typhimurium</i> , <i>S. typhi</i>) | Domestic (dogs, cats, monkeys, rodents, laboratory rodents, reptiles [especially turtles], chickens and fish) and herd animals (cattle, chickens, pigs) | Direct contact as well as indirect consumption (eggs, food vehicles using eggs, etc.). Human to human transmission also possible | Mild gastroenteritis (diarrhea) to high fever, severe headache, and spleen enlargement. May lead to focal infection in any organ or tissue of the body) | 6 hours to 3 days | Fatality rate of 5-10% | Antibiotic combination: chloramphenicol, neomycin, ampicillin |  |
| Shigellosis* | Bacteria | All <i>Shigella</i> species | Captive non-human primates | Oral-fecal route | Ranges from asymptomatic carrier to severe bacillary dysentery with high fevers, weakness, severe abdominal cramps, prostration, edema of the face and neck, and diarrhea with blood, mucous and inflammatory cells | Varies by species. 16 hours to 7 days. | Highly infective. Low number of organisms capable of causing infection. Rate of infection in imported monkeys can be high | Intravenous fluids and electrolytes, Antibiotics: ampicillin, amoxicillin, trimethoprim-sulfamethoxazole |  |
| Leptospirosis | Bacteria | <i>Leptospira interrogans</i> | Animal, human urine | Direct contact with urine of infected dogs, mice or rats. Indirect contact with urine contaminated materials. Droplet transmission via aerosols of urine | Phase 1: headache, muscle ache, eye pain with bright lights, chills and fever. Phase 2: fever with stiffness of the neck and inflammation of the nerves to the eyes, brain, spinal column | 7-12 Days | Leptospirosis associated with liver and kidney disease is called Weil's syndrome, characterized by jaundice | Doxycycline and penicillin. Severely ill patients may need IV fluids, antibiotics and dialysis |  |

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| Relapsing fever | Bacteria | <i>Borreliae</i> spp. [<i>B. recurrentis</i> (louse-borne), <i>B. hensii</i> (tick-borne)] | Animals | Tick-borne, blood transfusions | Fever, headache and muscle pain that lasts 4-10 days and subsides. Afebrile period lasting 5-6 days followed by a recurrence of acute symptoms | 5-15 days | Epidemic relapsing fever (transmitted by lice) is more severe than endemic relapsing fever (transmitted by ticks) | Tetracyclines, chloramphenicol |  |
| Tuberculosis | Bacteria | <i>Mycobacterium tuberculosis</i> | Primarily humans, cattle, non-human primates, other animals (rodents) | Inhalation of aerosol droplets, contaminated equipment, bites | Ranges from fever and fatigue to chronic pulmonary disease (fatal). Lungs, kidney, vasculature (affects all parts of body) | 2-5 weeks | Multidrug-resistant TB (MDR TB) is an infection resistant to at least two first-line anti-TB drugs, isoniazid and rifampicin | Isoniazid, rifampin, streptomycin, and ethambutol |  |
| Melioidosis* | Bacteria | <i>Burkholderia pseudomallei</i> (formerly <i>Pseudomonas pseudomallei</i>) | Equines, especially horses and mules; humans are accidental hosts | Transmitted by inhaling dust contaminated by the bacteria and when contaminated soil comes in contact with abraded skin | Cholera-like symptoms (fever, chills, prostration). Skin lesions, swollen lymph glands, abscesses septicemia or pneumonia | 2-4 days | Relatively uncommon disease for humans, but when left untreated, has 95% fatality rate | Chloramphenicol, doxycycline, sulfisoxazole, or cotrimoxazole. IV chloramphenicol for bacteremia |  |
| Tularemia* | Bacteria | <i>Francisella tularensis</i> | Isolated from 100 species of wild animals (e.g., rabbits, skunk), 9 domestic mammals, 25 species of birds, frogs, and reptiles | Arthropods, direct or indirect contact, ingestion of contaminated meats, inhalation of dust, materials contaminated with urine, feces or tissues, bites and scratches | High fever, chills, headache, focal ulcers, swollen lymph nodes | 1-10 days | Bacterium formerly known as <i>Pasteurella tularensis</i> | Streptomycin, tetracycline |  |

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| Vesicular Stomatitis* | Virus | Multiple strains of Vesicular Stomatitis Virus (VSV) <i>Rhabdoviridae</i> | Bovine, equine, porcine animals. | Probably arthropod-borne via the bite of an infected sandfly, mosquito or blackfly; by direct contact with infected animals (vesicular fluid, saliva) | Infuenza-like illness, malaise, fever, headache, nausea and vomiting | 24-48 hours | Documented hazard to personnel (45 laboratory-acquired infections before 1980) handling infected livestock, tissues and virulent isolates | Virus is self-limiting and illness is short in duration. (3-6 days) |  |
| Sub-viral Agents and Related Diseases (i.e., Scrapie)* | non-RNA/DNA Infectious Protein Virus-like particle | Transmissible Spongiform Encephalopathies (TSE): BSE and vCJD (vCreutzfeld-Jacob Disease) | Adult sheep goats, and cows can infect humans | Ingestion or handling of brain tissue or unfixed brain cells from infected animals | Degeneration of the nervous system, severe variable alteration of the grey matter of the brain | 2-5 years | The agent responsible for TSE's is smaller than the smallest known virus and has not been completely characterized | There are no known treatments or vaccines for these TSE's |  |
| Amoebic Dysentery | Parasite (protozoa) | <i>Entamoeba histolytica</i> | Monkeys can readily transmit the agent to humans | Food, water, fomites, insects. Fecal-oral route. Cyst is resistant to drying | Frequent passage of feces/stool, loose stools and vomiting. Variations depending on parasites. Can be frequent urge with high or low volume of stool, with or without some associated mucus and even blood | 2 days to several months to even years | Harmless amoebas can live in the intestines for years without causing symptoms. Attacks can last from a few days to weeks | Antiamoebic drugs (iodoquinol, metronidazole) and antibiotics to treat any associated bacterial infections |  |
| Giardiasis | Parasite (protozoa) | <i>Giardia lamblia</i> | Dogs, monkeys | Drinking contaminated water, person-to-person contact, eating contaminated food, and direct contact with infected animals | Ranges from asymptomatic to nausea, fatigue, anorexia, severe diarrhea and high fever | 3-25 days | Most common waterborne diarrheal disease in humans | Quinacrine hydrochloride, metronidazole, tinidazole, albendazole and furazolidone |  |

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| Balantidiasis | Parasite (protozoa) | <i>Balantidium coli</i> | Monkeys, pigs, and other nonhuman primates readily transmitted to humans | Direct contact with feces, person-to-person transmission | Ranges from asymptomatic to severe diarrhea | 4-5 days | Cysts survive for long periods in the environment | Tetracycline, Iodoquinol, metronidazole |  |
| Malaria | Parasite (protozoa) | Plasmodium species: <i>P. falciparum</i> , <i>P. vivax</i> , <i>P. ovale</i> , <i>P. malariae</i> | Anopheles mosquito | Mosquito bite | Fever, chills sweating, headache, nausea, vomiting, muscle pain, anemia, bloody stools, jaundice, convulsion, coma | 10 days to 4 weeks after infection; symptoms then cycle every 48 days | A malaria vaccine has been developed and is being tested in Africa. Results are promising | Chloroquine, primaquine phosphate, Malarone |  |
| Toxoplasmosis | Parasite (protozoa) | <i>Toxoplasma gondii</i> | Amazing lack of host specificity. Primates, carnivores (felines), rodents, birds, undulates | Consuming under-cooked infected meats; ingestion of oocysts in milk, food or water; inhalation of oocysts; contact with soil containing contaminated cat feces; | Localized lymphadenopathy accompanied with fever, sore throat, rash, pneumonitis, myocarditis, and encephalitis | 10-23 days following ingestion of contaminated meats, or inhalation of aerosols | Affects one third of the human race. Especially infective to immunosuppressed individuals | Sulfonamides (sulfadiazene, sulfamerazine, sulfamethazine), pyrimethamine |  |
| Ascariasis (Roundworm) | Nematode | Multiple Ascaris species (<i>A. lumbricoides</i> , <i>A. suum</i>) | Pigs; Humans are the definitive host | Ingestion of contaminated food or water | Lung damage, intestinal symptoms | 4 to 8 weeks | <i>Ascaris lumbricoides</i> the largest and, globally, the most widespread of all human intestinal roundworms | Pyrantel pamoate, mebendazole, surgery for removal in lung tissue |  |

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| Visceral Larval Migrants (VLM) | Nematode | Nematodes of the <i>Toxocara</i> genus (<i>T. canis</i> , <i>T. felis</i>) | Dogs, cats | Ingestion of eggs through direct contact with feces or contaminated materials | Fever, cough, wheezing, itching/irritation associated with migration of nematodes into tissues. Ocular migration may cause blindness | 4 to 7 weeks | More than 80% of all puppies in the U.S. are infected with this nematode | Usually a self-limiting disease--treatment only given in severe cases (glucocorticoids and bronchodilators for pulmonary disease) |  |
| Strongyloidiasis | Nematode | <i>Strongyloides stercoralis</i> | Dogs, cats, monkeys | Careless handling of contaminated fecal materials | Abdominal pain, diarrhea, and rash. Less commonly, nausea, vomiting, weight loss and cough. Severe infection can cause severe tissue damage, systemic damage of various tissues in the body and potential death | skin 7 hours; lung 1 week; intestines 2 wks; average 4-21 days | The parasite penetrates the skin and migrates to the lungs. Then it travels up to the mouth and is swallowed into the intestinal tract | Ivermectin with Albendazole as the alternative |  |
| Trichinosis | Nematode | <i>Trichinella spiralis</i> | Generally pigs or cattle | Eating undercooked flesh of animals infected with the larvae | Nausea, vomiting, diarrhea, fever, neurological disorders, possible cardiac involvement | Abdominal symptoms: 1-2 days. Further symptoms 2-8 weeks after infection | Over 100 species of animals may be a host of this parasite | Thiabendazole (Mintezol), Albendazole (Albenza), Mebendazole (Vermox), Prednisone |  |