INTRODUCTION AND PURPOSE OF REPORT

The 21st Century has dawned upon an emerging global society. Alongside the globalization of markets and capital we see increased respect for democratic principles and fundamental human rights.

As an organization which has millions of supporters globally as indicated by 4.75 million signatories to a Petition calling for dogs to be classified as Not for Human Consumption and presented to the Food and Agriculture Organisation (FAO) of the United Nations, Rome, in 2001, Sirius Global Animal Charitable Trust, an NGO with Special Consultative Status with the Economic and Social Council of the United Nations is exercising those rights in requesting that The World Health Organisation give serious consideration to removing dog meat from the human food chain. The purpose of this Report is to show the risks of consuming dogs.

In some places, such as China, the practice of slaughtering dogs for human consumption is expanding and a new dog farm industry is emerging.

LEVEL OF SUPPORT (Formal Letters enclosed)

New Zealand Government
Taiwan Government
Indian Welfare Board of India – Government of India
Victorian Government – Victoria, Australlia
Blue Cross of India
Organisation Internationale pour la Protection des Animaux (an NGO with Consultative Status with the DPI of the United Nations)
Dr John Wedderburn (M.B., Ch.B.) Asian Animal Protection Network
4.75 Million people globally who have signed a Petition (lodged with the FAO).

2.

USE OF DOG PRODUCTS FOR HUMAN CONSUMPTION

Listed hereunder are some dog products used by humans.

Digested dog meat:	Dog meat hydrolyzed by protease
Dog meat powder:	Digested dog meat powder
Dog meat extract:	Water extract of digested dog meat
Dog meat wine:	Wine of wax gourd and digested dog meat fermented by *Acetobacter spp.*
Dog meat red pepper paste:	Red pepper paste fermented with the addition of digested dog meat
Dog meat soy sauce:	Soy sauce fermented with the addition of digested dog meat
Dog meat, red pepperpaste pickle:	Dog meat pickled in red pepper paste
Dog meat Kimchi:	Kimchi fermented with the addition of digested dog meat
Dog intestine sausage:	Dog intestine into which blood of dog, vegetable and dog meat are stuffed.
Dog meat sausage:	Sausage made of dog meat
Dog meat soup:	Dog meat, water, vegetables.

We are an enterprise which process and export frozen dog meat to any country if you are interested in this please connect with us without any hesitation. Dog meat is a new product in the trade field . It contains high nutrition ...(sic)
[China]

More offers from Harbin Qunfu Dogmeatcorp.Ltd

POSTED ON (05 OCT 2006)

The above advertisement is from the Harbin Qunfu Dogfield Corp, China who is now advertising globally wishing to export dog meat to any country. (Details attached).

This company is the first one to get an export license from the Chinese Government. The dog meat is exported to South Korea, Japan and some Southeastern Asian Countries. This information comes from a Chinese national.

3.

RISKS AND THREATS TO HUMAN HEALTH

Introduction

A zoonosis is generally defined as the transmission of an infectious disease from animals to man. Some zoonoses are even fatal. However, there are several diseases that occur primarily in humans and that may also be transmitted between humans and animals, with some animals serving as reservoirs for human infection (eg, *Trichuris trichiura*).

The emergence and re-emergence of zoonotic diseases present challenges not only to veterinarians, but also to all professions concerned with public health. The major factors affecting the likelihood of zoonosis are the endemic diseases carried by the species being slaughtered, handled and consumed, and the hygienic conditions in which the flesh is prepared. People with acquired immune deficiency syndrome (AIDS) are much more susceptible, in general, to zoonotic diseases, including tuberculosis and other related mycobacterial infections; toxoplasmosis; cryptosporidial enteritis, foodborne *Salmonella* infections, and other enteric organisms; *Campylobacter* , *Listeria*, and *Yersinia*.

It is possible that other zoonotic diseases that are dormant or infrequent (eg, leptospirosis, plague, glanders, melioidosis, and pseudoglanders) may emerge in individuals with AIDS or other immunocompromising conditions. Certain haematological malignancies such as leukaemia and lymphoma may be considered amongst these immunocompromising diseases. With the increasing incidence of HIV-AIDS on a global scale zoonoses are particularly important. The 21st century holds the threat of even more emerging diseases, nurtured by an ever-increasing human population. Control of zoonotic diseases and protection of the public health will become even more challenging as world population increases. When overpopulation and crowding occur, water shortages occur, hygiene often cannot be maintained, and malnutrition develops, leading to disease and epidemics. Surveillance and reporting of disease is the first line of defence.

Knowledge of the epidemiology of the disease organisms is the first step in initiating a control program. The ultimate objective is to protect and preserve both human and animal health. There are a number of diseases which are zoonoses and potential zoonoses which are endemic in the dog population in countries in south-east Asia, and the rest of the world.

Clearly then, these are all relevant factors when the consumption of dog meat is considered.

Listed below are a number of obvious hazards and potential hazards from consuming dog meat and from handling their carcasses. In this submission, we include the handling of slaughtered dog carcasses since this presents an occupational health risk to those who are dealing with the flesh, even before consuming it.

Microbiology and Human Pathophysiology

For purposes of simplicity, only the most important micro-organisms and diseases will be discussed in this section.

Dogs are commonly affected by all these organisms and show similar symptoms to those in humans. Those dogs which recover from the acute phase of the disease may continue to carry the organism, usually in the gut, for significant periods of time. They are then called asymptomatic carriers. The risks of transmission from consuming dog meat, especially raw as is the case, must be very high.

Bacterial Diseases

Escherichia coli

Classified as a Gram-negative bacillus of the family, Enterobacteriaceae, this organism is one of the most dangerous transmissible organisms. They are the most numerous aerobic commensal inhabitants of the large intestine, with over 100 serotypes. Certain strains produce toxins that cause diarrhoea, and all strains produce infection when they invade sterile tissues. Especially notable is the strain *E. coli* O157:H7. Other serotypes are also implicated in disease. It may be found as a contaminant of dog meat and is derived from faecal material. Recent studies have found that this organism has become increasingly resistant to anti-microbial therapy. This has far-reaching implications for both dogs and humans alike. In dogs, this bacillus may cause GIT upset causing severe diarrhoea, mastitis, urinary infection, septicaemia.
Transmission to humans may be in undercooked meat as is usually the case or by meat contaminated by infected faeces.
E. coli normally inhabits the GI tract. Enterotoxigenic and enteropathogenic strains are major causes of diarrhoea in infants and traveller's diarrhoea in adults. Enterohaemorrhagic strains of *E. coli*, such as type O157:H7, produce several exotoxins such as cytotoxins, neurotoxins, and enterotoxins, including Shiga toxin, and cause bloody diarrhoea, which, in 2 to 7% of cases, may lead to haemolytic-uraemic syndrome. These toxins have a direct irritant effect on the gut lining, causing the diarrhoea. Such strains have most often been acquired from undercooked meat. Other strains of enteroaggregative *E. coli* are emerging as potentially important causes of persistent diarrhoea in patients with AIDS and in children in tropical areas. If normal intestinal anatomic barriers are disrupted (e.g., by ischemia, inflammatory bowel disease, trauma), the organism may spread to adjacent structures or invade the bloodstream, causing secondary effects on other organs, and a fulminant toxaemia.
Most effects manifested by humans are the consequences from the massive fluid loss from the diarrhoea. Such fluid loss may lead to shock, electrolyte disturbances, prostration and even death.

After ingestion, *E. coli* O157:H7 and similar strains of *E. coli* (termed enterohaemorrhagic *E. coli*) produce high levels of various toxins in the large intestine that are closely related to the potent cytotoxins produced by *Shigella dysenteriae* type 1, cholera, and other enteropathogens. These toxins appear to directly damage mucosal cells and vascular endothelial cells in the gut wall. If absorbed, they exert toxic effects on other vascular endothelia (e.g., renal).
E. coli O157:H7 infection typically begins acutely with severe abdominal cramps and watery diarrhoea that may become grossly bloody within 24 h. Some patients report diarrhoea as being "all blood and no stool," which has given rise to the term hemorrhagic colitis. Fever, usually absent or low grade, may occasionally reach 39° C. Diarrhoea may last 1 to 8 days in uncomplicated infections. About 5% of cases (mostly children < 5 yr and adults > 60 yr) are complicated by the haemolytic-uraemic syndrome, which typically develops in the 2nd wk of illness. Death may occur, especially in the elderly, with or without this complication.

Salmonella spp.

The Salmonella bacteria are, like the coliforms, Gram-negative, aerobic bacilli of the family Enterobacteriaceae. *Salmonella* taxonomy is complicated. As of December 7, 2005, there are two species within the genus: *S. bongori* (previously subspecies V) and *S. enterica* (formerly called *S. choleraesuis*), which is divided into six subspecies. There are also numerous (over 2500) serovars within both species, which are found in a disparate variety of environments and which are associated with many different diseases. The vast majority of human isolates (>99.5%) are subspecies *S. enterica*. For the sake of simplicity, the Centres for Disease Control (CDC) recommend that *Salmonella* species be referred to only by their genus and serovar, e.g., *Salmonella typhi* instead of the more technically correct designation, *Salmonella enterica* subspecies *enterica* serovar Typhi.
Note that, with the exception of typhoid and paratyphoid, salmonellosis is not a blood-related infection, as is commonly believed. The focus of this discussion will be on non-typhoidal, *Salmonella spp*. infections.
Disease-causing *Salmonella* species have recently been re-classified into a single species, *Salmonella enterica*, of which there are 2,000 serovars worldwide. A wide variety of animals carry this organism, and amongst these are dogs. It is found very commonly on a global scale. Transmission to humans of any of the other *Salmonella spp.* is via foodborne infection, especially in the elderly, infants, or immunosuppressed; and also by occupational exposure.
Many dogs and cats are asymptomatic carriers of salmonellae. Clinical disease is uncommon, but when it is seen, it is often associated with hospitalisation, and may be manifested as gut upset causing severe diarrhoea. This is often associated with another infection or a debilitating condition in adults, or exposure to large numbers of the bacteria in puppies and kittens.
The distribution of infection with any of the Salmonella organisms is worldwide. And the incidence is high. Many dogs and cats are asymptomatic carriers of salmonellae. Clinical disease is uncommon, but when it is seen, it is often associated with hospitalization, another infection or debilitating condition in adults, or exposure to large numbers of the bacteria in puppies and kittens.
Transmission occurs by eating contaminated food, mainly of animal origin, or by faecal contamination from an infected person or animal.

The consequences to humans are enteritis and sepsis. *Salmonella* infection may present as gastroenteritis, enteric fever, a bacteraemic syndrome, or focal disease. Gastroenteritis usually starts 12 to 48 h after ingestion of organisms, with nausea and cramping abdominal pain followed by diarrhoea, fever, and sometimes vomiting. Usually the stool is watery but may be a paste-like semisolid. Rarely, mucus or blood is present. The disease is usually mild, lasting 1 to 4 days. Occasionally, a more severe, protracted illness occurs. The most dangerous consequence of *Salmonella spp*. infection is marked dehydration from fluid loss.
Enteric fever in a less severe form than typhoid is characterized by fever, prostration, and septicaemia.
Focal *Salmonella* infection can occur with or without sustained bacteraemia, producing pain in or referred from the involved organ—the GI tract (liver, gallbladder, and appendix), endothelial surfaces (atherosclerotic plaques, ileofemoral or aortic aneurysms, heart valves), pericardium, meninges, lungs, joints, bones, GU tract, or soft tissues. Pre-existing solid tumours will occasionally be seeded and develop abscesses that may, in turn, become a source of *Salmonella* bacteraemia. The formation of abscesses is not uncommon. Death of humans is unlikely unless the patient is heavily immunocompromised, has underlying disease or is malnourished as is so often seen in the Asian and Oriental population, especially those who live in rural areas. Although in order to treat infections caused by *Salmonella spp*, long and aggressive antibiotic therapy is warranted which in turn may cause a number of side-effects and sequelae in the patient. Avoidance of any potential infective material is a good preventative measure.

Shigella spp.

Again, this organism is a Gram-negative bacillus of the family Enterobacteriaceae. It is closely related to both *Escherichia coli* and the Salmonellas. Unlike the Salmonellas, the classification of the Shigellas is very straightforward with four serogroups, each of which have a number of serovars.
Shigella infection is typically via ingestion (faecal–oral contamination); depending on age and condition of the host as few as ten bacterial cells can be enough to cause an infection. *Shigella* cause dysentery that results in the destruction of the epithelial cells of the intestinal mucosa in the caecum and rectum. Some strains produce enterotoxin and Shiga toxin, similar to the verotoxin of *E. coli* O157:H7. Both Shiga toxin and verotoxin are associated with causing marked watery diarrhoea and haemolytic uraemic syndrome. Other superficial mucosal ulcerations may also result.
Shigella organisms invade the host through penetration of the lower small intestine epithelial cells. Using a Type III secretion system acting as a biological syringe, the bacterium injects Ipa protein into cell, triggering bacterial invasion, and the subsequently lysis of vacuolar membranes. It utilizes a mechanism for its motility by which its IcsA triggers actin polymerization in the host cell with a "rocket" propulsion action.
Although essentially a human intestinal pathogen, dogs may become infected after contamination of their food or water supplies with infected human faeces. Clinically, infected animals usually display severe hemorrhagic, mucoid, large-bowel diarrhoea. However, dogs are relatively resistant to infection with *Shigella*, while cats are highly resistant. Not all infected dogs display symptoms of disease, but can still shed the organism. *Shigella spp*. has been isolated from dogs in many places of the world.

Transmission to humans may be through preparing the carcass which may have faecal material all over it, by consuming flesh that is not properly cooked and has been contaminated by infected faecal material, and if the intestines are used to make sausages containing dog meat.
The incubation period is 1 to 4 days. The most common presentation, watery diarrhoea, is indistinguishable from other bacterial, viral, and protozoan infections that induce secretory activity of intestinal epithelial cells.
In adults, initial symptoms may be episodes of gripping abdominal pain, urgency to defaecate, and passage of formed faeces that temporarily relieves the pain. These episodes recur with increasing severity and frequency. Diarrhoea becomes marked, with soft or liquid stools containing mucus, pus, and often blood. Rectal prolapse and consequent faecal incontinence may result from severe tenesmus. However, adults may present without fever, with non-bloody and non-mucoid diarrhoea, and with little or no tenesmus. The disease usually resolves spontaneously in adults—mild cases in 4 to 8 days, severe cases in 3 to 6 wk. Significant dehydration and electrolyte loss with circulatory collapse and death occur mainly in debilitated adults and infants < 2 yr.
Rarely, shigellosis starts suddenly with rice-water or serous (occasionally bloody) stools. The patient may vomit and rapidly become dehydrated. Infection may present with delirium, seizures, and coma, but little or no diarrhoea. Death may occur in 12 to 24 h.
In young children, onset is sudden, with fever, irritability or drowsiness, anorexia, nausea or vomiting, diarrhoea, abdominal pain and distension, and tenesmus. Within 3 days, blood, pus, and mucus appear in the stools. The number of stools may increase to ≥ 20/day, and weight loss and dehydration become severe. If untreated, a child may die in the first 12 days. If the child survives, acute symptoms subside by the 2nd wk.
Secondary bacterial infections may occur, especially in debilitated and dehydrated patients. Severe mucosal ulcerations may cause significant acute blood loss. Other complications are uncommon but include toxic neuritis, arthritis, myocarditis, and, rarely, intestinal perforation. The haemolytic-uraemic syndrome may complicate shigellosis in children. Infection does not become chronic.

Yersinia spp.

Yersinia bacteria are Gram-negative, facultative anaerobic bacilli; which means that they may or may not require the presence of oxygen in which to survive. They are a genus in the family Enterobacteriaceae, similar to those mentioned above. However, why they have been classified in this family is unclear as they do not have any marked effect on the gut. Although rodents are the natural reservoirs of the bacillus, other mammals can also serve as hosts. The Yersinias are known to be facultative intracellular parasites. Infection may occur through blood or via the alimentary route; ingestion of contaminated food products, most particularly meat. An interesting feature peculiar to some of the *Yersinia* bacteria is the ability not only to survive, but also to proliferate under extremes of temperature, for instance temperatures as low as 1-4 degrees Centigrade (e.g., on cut salads and other food products in a refrigerator). They are thus well-adapted to survive in the environment.
Three most important species of *Yersinia* exist; *Yersinia pestis*, *Yersinia enterocolitica* and *Yersinia pseudotuberculosis*. The first causes the classical pneumonic or bubonic plague. The organism is carried within fleas which in turn

reside on mammals. Dogs can become infected through the bite of infected fleas or eating a rodent, rabbit, or other animal carrying infected fleas. They are generally resistant to plague; they may become infected, but generally, only develop swollen lymph nodes (lymphadenopathy) and seldom other signs. It is unlikely that a human will contract plague from consuming dogs, however, the eating of a dog which has plague symptoms should be discouraged. There is a high risk of contracting plague just by the mere handling of infected animals.

The pathophysiology of plague has been established, and is not going to be repeated in this submission. However, emphasis must be placed on the fact that the mortality rate for untreated patients with bubonic plague is about 60%, with most deaths occurring from sepsis in 3 to 5 days. Most untreated patients with pneumonic plague die within 48 h of symptom onset. Septicaemic plague may be fatal before bubonic or pulmonary manifestations predominate.

By far the most important Yersinnial zoonoses transmitted to man from dogs are the latter two. *Y. enterocolitica* is a common cause of diarrhoeal disease and mesenteric adenitis. *Y. pseudotuberculosis* more commonly causes mesenteric adenitis and has been suspected in cases of interstitial nephritis, haemolytic-uraemic syndrome, and a scarlet fever-like illness. Both species can cause pharyngitis, septicaemia, focal infections in multiple organs, and reactive arthritis. Mortality from septicaemia may be as high as 50%, even with treatment.

Campylobacter spp.

These organisms are Gram-negative bacteria that normally inhabit the GI tract of many domestic animals including fowl. Several species are human pathogens. They are motile, and the organisms have a somewhat curved, rod-shaped appearance. Some may be slightly spiralled. At least a dozen *Campylobacter* species have been implicated in human disease with *Campylobacter jejuni* and *Campylobacter coli* being the most common. They are not classified in the family Enterobacteriaceae, although they do cause gastric symptoms.

Infection with a *Campylobacter* species is one of the most common causes of human gastroenteritis. Animal carriers may be cattle, pigs, poultry, dogs, cats and wild birds. It has a worldwide distribution.

Campylobacter spp. is one of the causative agents of haemorrhagic gastroenteritis in dogs. This is characterized by an acute onset of bloody diarrhoea in formerly healthy dogs. Young, toy, and miniature breeds of dogs appear predisposed. Mortality is high in untreated dogs. The disease is often seen in dogs 2-4 yr olds and is characterised by an acute onset of vomiting and bloody diarrhoea, anorexia, and depression. Most dogs recover if appropriately treated by a veterinarian, but they may remain asymptomatic carriers for life.

Transmission to humans may be via the food-borne, milk, water-borne, or occupational routes. Considering that dog intestines are used in the manufacture of dog intestine sausages, the likelihood of transmission of *Campylobacter* to humans via the food-borne route is high.

The most common presentation is watery and sometimes bloody diarrhoea. Fever (38 to 40° C), which follows a relapsing or intermittent course, is the only constant feature of systemic *Campylobacter* infection, although abdominal pain and hepatosplenomegaly are frequent. Infection can also present as subacute bacterial

endocarditis, septic arthritis, meningitis, or an indolent pyrexia of unknown origin (PUO).
In patients with immunoglobulin deficiencies, these organisms may cause difficult-to-treat, relapsing infections. *C. jejuni* can cause meningitis in infants. There is an association between summer outbreaks of *C. jejuni* diarrhoeal illness and subsequent development (up to 30% of cases) of Guillain-Barré syndrome.

Leptospira spp.

The *Leptospira* are an extremaly varied (over 200 serovars known) group of helix-shaped, motile, Gram-negative bacteria. Pathogenic *Leptospira* have hook-like ends and extensively use axial flagella (one on each end) for penetration into host organism tissue; human infection may occur through even slightly damaged skin, mucus membranes or eyes. Due to high variance of the pathogens, *Leptospira*-caused diseases leave immunity only to a particular serovar that actually caused the infection. This circumstance prevents creation of effective vaccines against leptospirosis. The Leptospiras are placed in the family Leptospiraceae.
Leptospirosis is a worldwide zoonosis affecting many wild and domestic animals. Of the animals where it is most likely to occur, dogs and rodents are the highest proportion. It is most common in temperate or tropical climates. It is an occupational hazard for many people who work outdoors or with animals, especially those who come into contact with contaminated material. It is especially prevalent where hygiene is poor. Humans acquire the infection by contact with the urine of infected animals. In the case of dogs, handling the carcass of slaughtered dogs, as well as preparing the flesh for cooking, represents a significant health risk to humans. Slaughtering of dogs is usually very inhumane, and it is considered that the skinning of a dog whilst it is still alive will cause the release of adrenaline by the adrenal glands, thus tenderising the flesh. Usually, a dog in this extremely painful and stressful circumstance, will urinate on itself, thereby contaminating the flesh. Human-to-human transmission is extremely rare. *Leptospira* enters the host through mucosa and broken skin, resulting in bacteraemia. The spirochetes multiply in organs, most commonly the central nervous system, kidneys, and liver. They are cleared by the immune response from the blood and most tissues but persist and multiply for some time in the kidney tubules. Infective bacteria are shed in the urine. The mechanism of tissue damage is not known. Naturally, if the infected person has been immunocompromised by the HIV, clearing of the organism by the immune response mechanism will be inefficient.
Animals which carry the organisms include cattle, pigs, horses, dogs, rodents and wild animals. They may show signs of illness, but very often have no symptoms. Dogs which have recovered from disease are likely to carry the bacteria for some time afterwards
Dogs are considered the reservoir host for serovar *canicola* . Based on studies that focused on urban populations of dogs, serovars *canicola* and *icterohaemorrhagiae* were considered the most prevalent serovars infecting dogs. Studies that have included more rural and suburban populations of dogs document the predominance of serovars of *grippotyphosa* and *pomona* as causative agents of canine leptospirosis. Other serovars, particularly *bratislava*, have also been implicated.
There is no age or gender predilection, although German Shepherds may be at increased risk compared with other breeds. The incubation period is 4-12 days but

may be as short as 2 days. Acute renal failure occurs in 80-90% of dogs that develop clinically significant disease. Early findings are nonspecific and include fever, depression, lethargy, anorexia, arthralgia or myalgia, and occulo-nasal discharge. This may progress within a few days to a uraemic crisis characterized by vomiting, dehydration, lumbar pain from renomegaly and nephritis, and tongue-tip ulceration and necrosis. Icterus and bilirubinuria, suggestive of cholestasis and/or hepatic necrosis, develop in ~20% of these cases and may be present without renal failure. In dogs that develop milder forms of renal failure, polyuria and polydipsia may be the primary sign. Other syndromes reported in dogs include intussusception, pulmonary haemorrhage, uveitis, pneumonitis, chronic hepatitis, and reproductive failure.

Gross findings can include petechial or ecchymotic haemorrhages on any organ, pleural, or peritoneal surface; hepatomegaly; and renomegaly. The liver is often friable with an accentuated lobular pattern and may have a yellowish brown discoloration. The kidneys may have white foci on the subcapsular surface. Microscopic findings in the liver may include hepatocytic necrosis, nonsuppurative hepatitis, and intrahepatic bile stasis, while swollen tubular epithelial cells, tubular necrosis, and a mixed inflammatory reaction may be seen in the kidneys. Chronic hepatitis and chronic interstitial nephritis are described in less severe cases.

In humans, leptospirosis includes all infections caused by the genus *Leptospira* regardless of serotype including infectious (spirochaetal) jaundice and canicola fever. The incubation period ranges from 2 to 20 (usually 7 to 13) days. The disease is characteristically biphasic. The septicaemic phase starts abruptly, with headache, severe muscular aches, chills, and fever. Conjunctival suffusion usually appears on the 3rd or 4th day. Splenomegaly and hepatomegaly are uncommon. This phase lasts 4 to 9 days, with recurrent chills and fever that often spikes to > 39° C. Defervescence follows. The 2nd, or immune, phase occurs between the 6th and 12th day of illness, correlating with appearance of antibodies in the serum of patients whose immune systems are intact. Fever and earlier symptoms recur, and an aseptic meningitis may develop. Iridocyclitis, optic neuritis, and peripheral neuropathy occur infrequently. If acquired during pregnancy, leptospirosis, even during the convalescent period, may cause abortion.

Weil's syndrome (icteric leptospirosis) is a severe form with jaundice from intravascular haemolysis, and usually azotaemia, anaemia, diminished consciousness, and continued fever. Onset is similar to that of less severe forms. However, haemorrhagic manifestations, which are due to capillary injury and include epistaxis, petechiae, purpura, and ecchymoses, then develop and rarely progress to subarachnoid, adrenal, or GI haemorrhage. Thrombocytopenia may occur. Signs of hepatocellular and renal dysfunction appear from the 3rd to 6th day. Renal abnormalities include proteinuria, pyuria, haematuria, and azotaemia. Hepatic damage is minimal, and healing is complete.

Mortality is nil in anicteric patients. With jaundice, the mortality rate is 5 to 10%; it is higher in patients > 60 yr.

Considering that in dogs the organisms multiply in the tissues, it is accepted that to consume these infected tissues would also transmit the disease to man, resulting in the symtomology presented above.

Pasteurella spp.

Pasteurella is a genus of Gram-negative, facultatively anaerobic bacilli. Some texts state that they are coccobacilli. They are non-motile and pleomorphic, which means that they assume different rod-like shapes and sizes. *P. multocida* is responsible for most human infections. Most *Pasteurella* species are zoonotic pathogens; humans can acquire an infection, however, typically from domestic pet bites. Cats and dogs are especially notorious carriers. Distribution is worldwide. Common symptoms of *Pasteurella* infections in humans include swelling, cellulitis, and bloody drainage at the site of the wound. Infections may progress to nearby joints where it can cause swelling and arthritis. Meningitis may also occur.
In dogs, pasteurellosis may cause systemic or localised infections of the lungs, and other upper respiratory infections. Most often these are manifested only by sneezing. However, most dogs carry the bacterium asymptomatically as part of their normal nasopharyngel flora.
Behaviourists will concur that one of the mechanisms of defense of dogs is biting. Dogs who are being slaughtered will be stressed, frightened and will want to attack their killer by biting. This may lead to a fulminant pasteurellosis in the human. It is also unwise to consume dog flesh which is contaminated by the *Pasteurella* organisms since humans are not normal carriers of the organism, and will show the usual consequences of infection by the organism and subsequent pathology of the disease.
The most common symptom of *P. multocida* infection in humans is a local wound infection, usually following an animal bite or scratch. Complications include abscesses, cellulitis and joint infections. The organism can also infect the respiratory tract and cause sinusitis and ear infections, and more severe symptoms including pneumonia or lung abscesses in those with underlying pulmonary disease, however this is rare. Other uncommon presentations of *P. multocida* infection include cardiovascular symptoms, eye infections, meningitis and gastrointestinal problems.
The mere handling of the carcass of an infected dog, will invariably bring on these symptoms and even death. Since, most dogs are slaughtered in Asia and the East, hygienic conditions are assumed to be poor; overcrowding, poor sanitation and prevalence of the HIV all contribute towards the increased incidence of Pasteurellosis in these areas.

Bordetella spp.

Bordetella is a genus of small, Gram-negative coccobacilli of the phylum proteobacteria. *Bordetella* species, with the exception of *B. petrii*, are obligate aerobes as well as highly fastidious. Three species are human pathogens (*B. pertussis*, *B. parapertussis*, *B. bronchiseptica*); one of these (*B. bronchiseptica*) is also motile. *B. pertussis* and occasionally *B. parapertussis* cause pertussis or whooping cough in humans, and some *B. parapertussis* strains can colonise sheep. *B. bronchiseptica* rarely infects healthy humans though disease in immunocompromised patients has been reported. *B. bronchiseptica* causes several diseases in other mammals, including kennel cough in dogs. *B. bronchisepticum* is especially carried in dogs. Transmission to humans is via exposure to infected saliva and sputum. It is highly unlikely that transmission to humans will be through eating the flesh of infected dogs, however handling the infected tissue will represent a high risk of transmission of the organisms.

In dogs, *Bordetella bronchisepticum* presents with kennel cough, also known as infectious tracheobronchitis. It is a mild, self-limiting disease but may progress to fatal bronchopneumonia in puppies or to chronic bronchitis in debilitated adult or aged dogs. The illness spreads rapidly among susceptible dogs housed in close confinement, for example, kennels and dog farming facilities such as are seen in countries where dogs are bred for human consumption.
The prominent clinical sign is paroxysms of harsh, dry coughing, which may be followed by retching and gagging. The cough is easily induced by gentle palpation of the larynx or trachea. Affected dogs demonstrate few if any additional clinical signs except for partial anorexia. Body temperature and WBC counts usually remain normal. Development of more severe signs, including fever, purulent nasal discharge, depression, anorexia, and a productive cough, especially in puppies, indicates a complicating systemic infection such as distemper or bronchopneumonia. Stress, particularly due to adverse environmental conditions and improper nutrition, may contribute to a relapse during convalescence. Dogs who have recovered will have a carrier status.
In both animals and man, the mechanism of action of this organism is that it is able to bind directly to cilia, rendering them unable to move within 3 hours of contact. Secondly, it secretes substances that disable the immune cells normally responsible for consuming & destroying bacteria.
Found very rarely in humans, those humans who are immunocompromised by whatever means such as concomitant infection with the HIV or those who have leukaemia are highly likely to contract the disease. In humans it generally produces a relatively non-threatening, "whooping cough"-like syndrome in immunocompetent individuals. However, *B. bronchiseptica* has also been associated with endocarditis, peritonitis, meningitis and wound infections. In all cases, a direct connection to infected animals is obvious. *Bordetella bronchiseptica* is being isolated increasingly from immunocompromised hosts with respiratory tract infections ranging from sinusitis to a severe pneumonia and pleuritis.

Brucella spp.

Brucella is a genus of Gram-negative bacteria. They are small, non-motile, encapsulated coccobacilli. Slow-growing, *Brucella* species require complex media for isolation.
Brucella is the cause of brucellosis, a true zoonotic disease (i.e. human-to-human transmission has not been identified). It is transmitted by ingesting infected food, direct contact with an infected animal, or inhalation of aerosols. Minimum infectious exposure is between 10 - 100 organisms. Brucellosis primarily occurs through occupational exposure (e.g. exposure to cattle, sheep, pigs and dogs), and direct contact to secretions from infected animals, but also by consumption of unpasteurised milk products. Brucellosis, also called undulant fever or Malta fever, is primarily a disease of domestic animals (goats, pigs, cattle, dogs, etc.) and humans and has a worldwide distribution, mostly now in developing countries.
The disease is transmitted either through contaminated or untreated milk (and its derivates) or through direct contact with infected animals, which may include dogs, pigs, camels and ruminants, primarily sheep, goats, cattle, bison. This also includes contact with their carcasses. It is now also accepted that the ingestion of the flesh of an animal with brucellosis will lead to human infection. Parturition rests are extremely rich in highly virulent brucellae. Brucellae, along with Leptospirae have the

unique property of being able to penetrate through intact human skin, so infection by mere hand contact with infectious material is likely to occur.
There are several species of *Brucella*, however for purposes of this discussion only one, namely *Brucella canis* will be dealt with.
The causative agent of brucellosis in dogs is *Brucella canis*. It is transmitted to other dogs through breeding and contact with aborted foetuses. Brucellosis can occur in humans that come in contact with infected aborted tissue or semen. The bacteria in dogs normally infect the genitals and lymphatic system, but can also spread to the eye, kidney, and intervertebral disc, causing discospondylitis. Symptoms of brucellosis in dogs include abortion in bitches and scrotal inflammation and orchitis (inflammation of the testicles) in males. Fever is uncommon. Infection of the eye can cause uveitis, and infection of the intervertebral disc can cause pain or weakness. Brucellosis may lead to infertility in dogs. It is treated with antibiotics as with humans, but it is difficult to cure. Dogs may carry the bacteria quiescent in the reproductive organs and eating the genitalia, especially testicles, could result in infection of the human producing a debilitating disease called undulant fever. This is the same principal that applies to drinking of unpasteurised milk. *Brucella canis* has caused sporadic infections in humans.
The incubation period varies from 5 days to several months and averages 2 wk. Onset may be sudden, with chills and fever, severe headache, joint and low back pain, malaise, and occasionally diarrhoea. Onset may also be insidious, with mild prodromal malaise, muscular pain, headache, and pain in the back of the neck, followed by a rise in evening temperature. As the disease progresses, the temperature increases to 40 to 41° C, then subsides gradually to normal or near-normal with profuse sweating in the morning.
Typically, intermittent fever persists for 1 to 5 wk, followed by a 2- to 14-day remission when symptoms are greatly diminished or absent. In some patients, fever may be transient. In others, the febrile phase recurs once or repeatedly in waves (undulations) and remissions over months or years.
After the initial febrile phase, anorexia, weight loss, abdominal and joint pain, headache, backache, weakness, irritability, insomnia, depression, and emotional instability may occur. Constipation is usually pronounced. Splenomegaly appears, and lymph nodes may be slightly or moderately enlarged. Up to 50% of patients have hepatomegaly.
Patients with acute, uncomplicated brucellosis usually recover in 2 to 3 wk, even without treatment. Some go on to subacute, intermittent, or chronic disease. Complications are rare but include subacute bacterial endocarditis, meningitis, encephalitis, neuritis, orchitis, cholecystitis, hepatic suppuration, and osteomyelitis.

Listeria spp.

Unlike the preceding bacteria, *Listeria spp*. are Gram-positive organisms. It is a bacterial genus containing six species and is typified by *L. monocytogenes*, the causative agent of Listeriosis. The genus was named in honour of Joseph Lister, the pioneer of surgical asepsis. *Listeria monocytogenes* is a small, motile, gram-positive, non-sporeforming, extremely resistant, diphtheroid, facultatively anaerobic coccobacillus that grows under a wide temperature range; 4 - 44°C. It is a ubiquitous saprophyte that lives in a plant-soil environment and has been isolated from ~42 species of domestic and wild mammals and 22 species of birds, as well as fish, crustaceans, insects, sewage, water, silage and other foodstuffs, milk, cheese,

meconium, faeces, and soil. Listeriosis is a rare but lethal food-borne infection that has a devastating mortality rate of 25 - 50%.

In order for the bacterium to be pathogenic, it has to invade the cells. To invade, *Listeria* induces macrophage phagocytic uptake by displaying D-galactose receptors that are then bound by the macrophage's polysaccharide receptors (Notably, in most bacterial infections it is the host cell, not the bacteria, that displays the polysaccharide). Once phagocytosed, the bacterium is encapsulated by the host cell's acidic phagolysosome organelle. *Listeria*, however, escapes the phagolysosome by lysing the vacuole's entire membrane with secreted haemolysin, now characterized as the exotoxin listeriolysin O. The bacteria then replicate inside the host cell's cytoplasm.

Listeria must then navigate to the cell's periphery to spread the infection to other cells. Outside of the body, *Listeria* has flagellar-driven motility. However, at 37°C, flagella cease to develop and instead, the bacteria usurps the host cell's cytoskeleton to move. *Listeria*, inventively, polymerizes an actin tail or "comet", using host-produced actin filaments with the promotion of virulence factor ActA. The comet forms in a polar manner and aids the bacteria's migration to the host cell's outer membrane. Gelsolin, an actin filament severing protein, localizes at the tail of *Listeria* and accelerates the bacterium's motility. Once at the cell surface, the actin-propelled *Listeria* pushes against the cell's membrane to form protrusions called filopods or "rockets". The protrusions are guided by the cell's leading edge to contact adjacent cells which subsequently engulf the *Listeria* rocket and the process is repeated, perpetuating the infection. Once phagocytosed, the *Listeria* is never again extracellular: it is an intracytoplasmic parasite.

The organism has virulence genes which are thermoregulated. Once inside the body, at 37°C, these genes are turned on which allows for these genes to be expressed.

Listeria organisms that are ingested or inhaled tend to cause septicaemia, abortion, and latent infection. Those that gain entry to tissues have a predilection to localize in the intestinal wall, medulla oblongata, and placenta or to cause encephalitis via minute wounds in the oral-buccal mucosa. The various manifestations of infection occur in all susceptible species and are associated with characteristic clinical syndromes. Abortion and perinatal mortality is demonstrated in all species. Septicaemic or visceral listeriosis is most common in monogastric animals, including pigs, dogs, cats, domestic and wild rabbits, and many other small mammals. These animals may play a role in transmission of *L monocytogenes*. The septicaemic form affects organs other than the brain, the principal lesion being focal hepatic necrosis.

The uterus of all domestic animals, especially ruminants, is susceptible to infection with *L monocytogenes* at all stages of pregnancy, which can result in placentitis, metritis, foetal infection and death, abortion, stillbirths, neonatal deaths, and possibly viable carriers. The metritis has little or no effect on subsequent reproduction; however, *Listeria* may be shed for ≥1 month via the vagina and milk.

Human infection usually occurs via ingestion of contaminated dairy products, raw vegetables, or meats and is favoured by the ability of *L. monocytogenes* to survive and grow at refrigerator temperatures. Infection also may occur by direct contact and during slaughter of infected animals or by the handling of their carcasses and tissues. Listerial infection can spread antepartum and intrapartum from mother to child and can cause abortion.

Primary listeremia is rare in healthy adults and produces high fever without localizing symptoms and signs. Endocarditis, peritonitis, osteomyelitis, cholecystitis, and pleuropneumonia may occur. Listeraemia can cause intrauterine infection,

chorioamnionitis, premature labour, foetal death, or newborn infection. It is thus particularly dangerous in pregnancy.
Meningitis is due to *Listeria spp*. in about 20% of cases in newborns, in patients older than 60 years of age, and those persons who are innumocompromised. Twenty percent of cases progress to cerebritis, either diffuse encephalitis or, rarely, rhombencephalitis and abscesses; rhombencephalitis presents as altered consciousness, cranial nerve palsies, cerebellar signs, and motor or sensory loss.
Occuloglandular listeriosis can cause ophthalmitis and regional lymph node enlargement. It may follow conjunctival inoculation and, if untreated, may progress to bacteraemia and meningitis.

Bacillus spp.

The genus *Bacillus* currently comprises in excess of 60 species, commonly found in the environment and as laboratory contaminants. *Bacillus* species are Gram-positive rods often arranged in pairs or chains with rounded or square ends and usually have a single endospore. The endospores are generally oval and are very resistant to adverse conditions. Sporulation is not repressed by exposure to air. *Bacillus* species are either obligate or facultative aerobes. Ubiquitous in nature, *Bacillus* includes both free-living and pathogenic species. Under stressful environmental conditions, the cells produce oval endospores that can stay dormant for extended periods. These characteristics originally defined the genus, but not all such species are closely related, and many have been moved to other genera.
Two *Bacillus* species are considered medically significant: *B. anthracis*, which causes anthrax, and *B. cereus*, which causes a foodborne illness similar to that of *Staphylococcus*.
Virulent strains of *B. anthracis* produce a characteristic polypeptide capsule. Most species are motile and haemolytic with the notable exception of *B. anthracis*.
For purposes of this report, we will concentrate on *B. anthracis* only.
B. anthracis is found worldwide and is especially common in Africa, Asia, South America and Eastern Europe.
Anthrax is most common in wild and domestic herbivores (eg, cattle, sheep, goats, camels, antelopes) but can also be seen in humans exposed to tissue from infected animals, contaminated animal products or directly to *B anthracis* spores under certain conditions. Depending on the route of infection, host factors, and potentially strain-specific factors, anthrax can have several different clinical presentations. In herbivores, anthrax commonly presents as an acute septicaemia with a high fatality rate, often accompanied by hemorrhagic lymphadenitis; in dogs, humans, horses, and pigs, it is usually less acute. In addition to direct transmission, biting flies may mechanically transmit *B anthracis* spores from one animal to another. The relative importance of this mode of transmission during epizootics or epidemics has yet to be quantified but is frequently suspected. Raw or poorly cooked contaminated meat is a source of infection for carnivores and omnivores; anthrax resulting from contaminated meat consumption has been reported in pigs, dogs, cats, mink, wild carnivores, and humans.
Although relatively resistant, dogs may develop an acute septicaemia following ingestion of *B anthracis*, characterized by sudden death, oropharyngitis, or more usually a mild chronic form. Oropharyngeal anthrax is characterized by rapidly progressive swelling of the throat, which may cause death by suffocation. In the

chronic form, dogs show systemic signs of illness and gradually recover with treatment. Some later show evidence of anthrax infection in the cervical lymph nodes and tonsils when slaughtered (as apparently healthy animals). Intestinal involvement is seldom recognized and has non-specific clinical characteristics of anorexia, vomiting, diarrhoea (sometimes bloody), or constipation.
It is highly unlikely that dogs who are slaughtered for human consumption ever enjoy veterinary treatment since these animals are bred *en masse*, retrieved off the street or are maintained in appalling conditions in the back yards of people who then kill them and eat them.
Human infection is usually through the skin but has occurred after ingestion of contaminated meat when a break in the pharyngeal or intestinal mucosa facilitates invasion. After entering the body, spores germinate inside macrophages, which migrate to regional lymph nodes where the bacteria multiply. The bacteria produce several toxins that account for their virulence. The predominant toxins are oedema toxin and lethal toxin. Protective antigen binds to target cells and facilitates cellular entry of oedema toxin and lethal toxin. Oedema toxin causes massive local oedema. Lethal toxin triggers a massive release of cytokines from macrophages, which is responsible for the sudden death common in anthrax infections.
Most cases present within 1 to 6 days of exposure, but for inhalation anthrax the incubation period can be > 6 wk.
The cutaneous form begins as a painless, pruritic, red-brown papule. It enlarges with a surrounding zone of brawny erythema and marked oedema. Vesiculation and induration are present. Central ulceration follows, with serosanguineous exudation and formation of a black eschar (the malignant pustule). Local lymphadenopathy is common, occasionally with malaise, myalgia, headache, fever, nausea, and vomiting.
Initial symptoms of inhalation anthrax are insidious and resemble influenza. Within a few days, fever worsens and chest pain and severe respiratory distress develop, followed by cyanosis, shock, and coma. Severe haemorrhagic necrotizing lymphadenitis develops and spreads to adjacent mediastinal structures. Serosanguineous transudation, pulmonary oedema, and pleural effusion occur. Typical bronchopneumonia does not occur. Haemorrhagic meningoencephalitis or GI anthrax may develop.
GI anthrax ranges from asymptomatic to fatal. When swallowed, anthrax spores can cause lesions from the oral cavity to the caecum. Released toxin induces hemorrhagic necrosis extending to the mesenteric lymph nodes. Fever, nausea, vomiting, abdominal pain, and bloody diarrhoea are common. Intestinal necrosis and septicaemia with potentially lethal toxicity ensue.
Oropharyngeal anthrax presents as a mucocutaneous lesion in the oral cavity with sore throat, fever, adenopathy, and dysphagia. Airway obstruction may occur.

Mycobacterium spp.

The Mycobacteria are a genus of the family Mycobacteriaceae. They Mycobacteria are aerobic and non-motile bacteria that are characteristically acid-alcohol fast. Mycobacteria are usually considered to be gram-positive and they do not contain endospores or capsules. While mycobacteria do not seem to fit the Gram-positive category from an empirical standpoint (i.e. they do not retain the crystal violet stain), they are classified as an acid-fast Gram positive bacterium due to their lack of an outer cell membrane. All *Mycobacterium* species share a characteristic cell wall, thicker than in many other bacteria, which is hydrophobic, waxy, and rich in mycolic

acids/mycolates. The cell wall makes a substantial contribution to the hardiness of this genus.

Mycobacteria can colonize their hosts without the hosts showing any adverse signs. For example, billions of people around the world are infected with *M. tuberculosis* but will never know it because they will not develop symptoms.

Mycobacterial infections are notoriously difficult to treat. The organisms are hardy due to their cell wall, which is neither truly Gram-negative nor positive. Unique to the family, they are naturally resistant to a number of antibiotics that work by destroying cell walls, such as penicillin. Also, because of this cell wall, they can survive long exposure to acids, alkalis, detergents, oxidative bursts, lysis by complement and antibiotics which naturally leads to antibiotic resistance. Most mycobacteria are susceptible to the antibiotics clarithromycin and rifamycin, but antibiotic-resistant strains are known to exist. This is especially a problem in developing countries in Africa, Asia and India where multi-drug resistance has been seen to occur over the past few decades. Much time, research and funding has gone into finding drugs or vaccines which will help treat and prevent tuberculosis. A factor complicating the successful treatment of Mycobacterial infections is the high incidence of HIV-AIDS in these countries.

There are many species of Mycobacteria, but for the purposes of this report only those species specific as pathogens to both dogs and humans will be discussed. Only *M. tuberculosis* causes Tuberculosis. The others may cause other pulmonary symptoms similar to Tuberculosis, as well as other pathology.

Dogs may be infected with *M. tuberculosis*, *M. bovis*, and occasionally with *M. avium* or *M. fortuitum*, commonly from a human or bovine source. It is a severe wasting disease. Tuberculous lesions are usually found in the lungs, liver, kidney, pleura, and peritoneum; they have a grey appearance, usually with a non-calcified, necrotic centre. Lesions are often exudative and can produce a large quantity of straw-coloured fluid in the thorax. These lesions are clearly visible on gross anatomical pathology dissections. False-negative tuberculin tests are common in dogs. Radiographs and a thorough history are useful in diagnosis. Affected dogs should be humanely euthanased by a skilled veterinarian who is an expert in public health and disease, because of public health concerns. Humans may become infected by all three of the *Mycobacteria spp*. found in dogs.

Transmission of disease to humans from infected dogs may be due to direct handling of the infected carcasses, aerosol dissemination or by consuming the flesh.

Pathology of *Mycobacterium tuberculosis* will not be given in this report as this has been well-established for decades.

Non-tuberculosis pathology in humans may be manifested as pulmonary disease, lymphadenitits, cutaneous disease, wounds and foreign body infections and disseminated disease. In pulmonary disease, cough and expectoration are common, but systemic symptoms are infrequent. The course may be slowly progressive or stable for long periods. Respiratory insufficiency and persistent haemoptysis may develop. X-ray features resemble those of pulmonary TB, but cavitation tends to be thin-walled, and pleural effusion is rare. Children, aged 1 to 5 years of age are especially susceptible to lymphadenitis which becomes chronic and is usually manifested as lesions in the submaxillary, submandibular and cervical lymph nodes. Untreated, fistulas can form which necessitates surgical intervention. Transmission is usually by ingestion of infected meat. Disseminated disease commonly occurs in patients with advanced AIDS and occasionally in those with other immunocompromised states, including organ transplantation and hairy cell leukemia.

Disseminated disease causes fever, anemia, thrombocytopenia, diarrhoea, and abdominal pain.

Viral diseases

Coronavirus

Coronavirus is a genus of animal virus belonging to the family Coronaviridae. Coronaviruses are large, enveloped viruses with a positive-sense, single-stranded RNA genome and a helical symmetry. The genomic size of coronaviruses ranges from approximately 16 to 31 kilobases, extraordinarily large for an RNA virus. The name "coronavirus" is derived from the Latin *corona*, meaning crown, as the virus envelope appears under electron microscopy (E.M.) to be crowned by a characteristic ring of small bulbous structures. This morphology is actually formed by the viral spike (S) peplomers, which are proteins that populate the surface of the virus and determine host tropism. Coronaviruses are known for their propensity to mutate.
Coronaviruses primarily infect the upper respiratory and gastrointestinal tract of mammals and birds. Four to five different currently known strains of coronaviruses infect humans. The most publicized human coronavirus, SARS-CoV which causes SARS, has a unique pathogenesis because it causes both upper and lower respiratory tract infections and can also cause gastroenteritis. Coronaviruses are believed to cause a significant percentage of all common colds in human adults.
Coronaviruses also cause a range of diseases in farm animals and domesticated pets. There are three types of canine coronavirus (CCoV), two that cause mild gastrointestinal disease and one that has been found to cause respiratory disease. In all cases, these viruses are highly pathogenic for dogs. Fatalities have been reported.
It is highly unlikely that CCoV will cause any disease of consequence in humans. However, what must be noted here is that the causative agent of SARS, SARS-CoV, is genetically dissimilar from known human or animal coronaviruses.
SARS-CoV appears to be a new human pathogen that was first detected in the Guangdong province of China in November 2002. Evidence of SARS-CoV infection has also been found in masked palm civets, raccoon dogs, and the Chinese ferret badger. It has a world-wide distribution, but is especially prevalent in South East Asia. It would appear, and it is now accepted that the virus, initially found in animals, mutated as it did a viral jump, transformed into something quite unseen before, and infected humans. Therefore, it cannot be ruled out that since CCoV is highly mutagenic, it might not do the same in the future, and cause equally dire, or even worse, consequences in humans. CCoV is especially prevalent in China and South East Asia.

Rabiesvirus

Rabies virus belongs to the order *Mononegavirales*, viruses which have non-segmented, linear, helically arranged, negative-stranded (antisense) RNA genomes. Within this group, viruses with a distinct "bullet" shape are classified in the Rhabdoviridae family, which includes at least three genera of animal viruses, Lyssavirus, Ephemerovirus, and Vesiculovirus. The genus Lyssavirus includes

the Rabies virus, Lagos bat virus, Mokola virus, Duvenhage virus, European bat virus 1 & 2 and Australian bat virus.
The virus has a bullet-like shape with a length of about 180 nm and a cross-sectional diameter of about 75 nm. One end is rounded or conical and the other end is planar or concave. The lipoprotein envelope carries knob-like spikes composed of Glycoprotein G. Spikes do not cover the planar end of the virion (virus particle). Beneath the envelope is the membrane or matrix (M) protein layer which may be invaginated at the planar end. Also present in the nucleocapsid are RNA dependent RNA transcriptase and some structural proteins.
Rabies has a worldwide distribution except for Australia, New Zealand, UK, Ireland, Scandinavia, Japan, Taiwan and the Western Cape in South Africa. Many smaller islands, including Hawaii, are free of infection. It is known as a central nervous system viral infection. Rabies is an acute viral encephalomyelitis that principally affects carnivores and bats, although it can affect any mammal. It is invariably fatal once clinical signs appear. Reservoirs of rabies vary throughout the world. Canine rabies predominates in Africa, Asia, Latin America, and the Middle East.
More than 99% (> 50,000 human deaths worldwide annually) of all human deaths from rabies occur in Africa, Asia, South America and India; which reports thirty thousand deaths annually. One of the sources of recent flourishing of rabies in the East Asia is the pet boom. China introduced the "One-dog policy" in November 2006 to control the problem.
Rabies is a significant cause of death in humans and dogs. In some areas dogs are the predominant reservoir for the disease. In the terminal stages of infection the virus is concentrated in the brain. If such tissue is poorly cooked and comes into contact with a break in the consumer's skin or indeed the oral mucous membrane, the human is likely to contract the disease. The disease may lie dormant in a dog with little or no clinical symptoms making a lethal meal if the animal is slaughtered and eaten. Rabid humans always die.
Any mammal may become infected with the rabies virus and develop symptoms, including humans. Most animals can be infected by the virus and can transmit the disease to humans. Infected bats, monkeys, raccoons, foxes, skunks, cattle, wolves, dogs or cats provide the greatest risk to humans. Rabies may also spread through exposure to infected domestic farm animals, groundhogs, weasels and other wild carnivores. Squirrels, rodents and rabbits are seldom infected.
The virus is usually present in the nerves and saliva of a symptomatic rabid animal. The route of infection is usually, but not necessarily, by a bite. In many cases the affected animal is exceptionally aggressive, may attack without provocation, and exhibits otherwise uncharacteristic behavior. Transmission may also occur via an aerosol through mucous membranes; transmission in this form may have happened in people exploring caves populated by rabid bats. Transmission between humans is extremely rare, although it can happen through transplant surgery, or, even more rarely, through bites or kisses.
After a typical human infection by bite, the virus directly or indirectly enters the peripheral nervous system. It then travels along the nerves towards the central nervous system. During this phase, the virus cannot be easily detected within the host, and vaccination may still confer cell-mediated immunity to preempt symptomatic rabies. Once the virus reaches the brain, it rapidly causes encephalitis and symptoms appear. It may also inflame the spinal cord producing myelitis.
The period between infection and the first flu-like symptoms is normally two to twelve weeks, but can be as long as two years. Soon after, the symptoms expand to

slight or partial paralysis, cerebral dysfunction, anxiety, insomnia, confusion, agitation, abnormal behavior, paranoia, hallucinations, progressing to delirium. The production of large quantities of saliva and tears coupled with an inability to speak or swallow are typical during the later stages of the disease; this can result in "hydrophobia", where the victim has difficulty swallowing, shows panic when presented with liquids to drink, and cannot quench their thirst. The disease itself was also once commonly known as *hydrophobia*, from these characteristic symptoms. Death almost invariably results two to ten days after the first symptoms; the few humans who are known to have survived the disease were all left with severe brain damage, with the recent exception of Jeanna Giese in 2005 in whom a coma was induced. Future attempts at such treatment have failed.

The general pathology and pathophysiology of rabies in both animals and humans has been well-established and well-documented, and will not be described in this submission.

Numerous recent published accounts exist where humans have contracted rabies, not by bites or by aerosol dissemination, but by the consumption of dogs and their brains. These are described elsewhere in this submission. One cannot also rule out that breaks in the oral mucosa may also lead to easy penetration of the virus into the system, with subsequent migration into the central nervous system.

Fungal Diseases

There are many shared systemic fungal diseases. Not all are proven to be transmitted directly by ingestion or contact, but there is evidence of some enteric pathology passed on by ingestion in the case of *Histoplasma*. In dogs, the GIT is a primary site of infections from whence dissemination into the tissues quickly occurs. There are other highly dangerous fungi such as *Blastomyces, Coccidiodomyces, Cryptococcoides*, *Nocardia*, *Rhinosporidium*, the dermatophytes which cause ringworm (*Microsporum*, *Trichophyton*, and *Epidermophyton spp*.), and even *Aspergillus spp*. which would warrant special care especially in immunodeficient individuals. Contact with the live animal prior to slaughter, with possible phomite transmission would be the main threat to human health.

The pathology and pathophysiology of these fungi in either dogs or humans will not be mentioned in this submission. Needless to say, all fungal infections that are transmitted to humans via whatever means require aggressive, systemic anti-fungal treatment. Most times, intravenous anti-fungal chemotherapeutics such as amphotericin-B are used.

Endoparasitic Diseases

Endoparasites are organisms which colonise the interior of the body and reproduce there. They are parasitic in that they need hosts in order to survive. They are unable to exist on their own, and use the host to derive nutrition and maintenance. They do not necessarily colonise only the gut, although this is where they most often may be found. They do colonise other tissues as well. For instance, tapeworms may be found in the brain. These endoparasites may be anything from protozoa (single-celled organisms) to more complex trematodes, nematodes and cestodes; all of which are loosely called “worms”. Entry into the body is usually by the oral route, although this is not invariable.

Dogs carry a myriad of endoparasites. A general list is presented below (see report from the CDC in "4" below), and only a few will be elaborated upon as potential pathogens to man. Life cycles will not be described in detail. Treatment for endoparasites is aggressive, specific and long-term. Most of the usual anti-microbial anti-biotics do not have any effect on endoparasites.
In all cases, the results in humans are severe weight loss, diarrhoea, and a malabsorption syndrome due to the parasite consuming most of the digested material found in the gut.

Giardia spp.

The Giardias are a group of flagellated, protozoan parasites that infect the gastrointestinal tract and causes giardiasis. *Giardia* affects humans. It can contaminate water, and this is the most common way by which humans are infected.
Giardiasis is a chronic, intestinal protozoal infection that is seen worldwide in most domestic and wild mammals, many birds, and people. Infection is common in dogs and cats, occasional in ruminants, and rare in horses and pigs. The number of different species and the zoonotic potential of *Giardia spp*. is controversial. There is circumstantial evidence that *Giardia spp*. that infest domestic animals can infest people. It appears that some *Giardia spp*. isolates are infective to a variety of mammals, while others are more species-specific. Wild animals may also be reservoirs. *Giardia spp*. have been reported to be found in 1-39% of faecal samples from pet and shelter dogs and cats, with a higher rate of infection in younger animals.
Flagellate protozoa (trophozoites) of the genus *Giardia* inhabit the mucosal surfaces of the small intestine, where they attach to the brush border, absorb nutrients, and multiply by binary fission. Trophozoites encyst in the small or large intestine and pass in the faeces. The cyst is the infective stage, and transmission occurs by the faecal-oral route. Cyst shedding may be continuous over several days and weeks but is often intermittent. Although occasionally passed in the faeces, trophozoites are not infective. Incubation and prepatent periods are generally 5-14 days. Cysts can survive in the environment, but trophozoites cannot. Overcrowding and high humidity within animal facilities, favour survival of cysts and transmission. Earlier classifications have assigned different species names to the *Giardia* of various hosts; it is generally agreed that all species infecting mammals (except some rodents) are structurally similar.
Surveys have shown that about 14% of the adult dog population and over 30% of dogs under one year of age were infected. Once passed, the cysts can survive in cold water for several months.
The cysts are infective as soon as they are passed, unlike other parasites where a lag period is necessary before the organism is infective. The most common route of infection is faecal-oral. For example, dogs may accidentally eat cysts as they lick around the environment or lick other dogs' coats (particularly if the other dog has diarrhoea).
Transmission from dogs to humans may be by both ingestion of contaminated flesh and incidental contact with the cysts. For instance, it is well known that dogs' intestines are used to make dog meat sausages. Should these intestines be infested with *Giardia spp*., transmission is then by the oral route to humans. In addition, contamination of carcasses by faeces would cause a significant hazard of infection.
Many human cases are asymptomatic. However, asymptomatic people can pass infective cysts, thus perpetuating the cycle. Symptoms of acute giardiasis generally

appear 1 to 2 weeks after infection. They are usually mild and include watery malodorous diarrhoea, abdominal cramps and distension, flatulence and eructation, intermittent nausea, epigastric discomfort, and sometimes low-grade malaise and anorexia. Acute giardiasis usually lasts 1 to 3 wk. Malabsorption of fat and sugars can lead to significant weight loss in severe cases. Neither blood nor white blood cells are found in the stool.
A subset of infected patients develops chronic diarrhoea with foul stools, abdominal distension, and malodorous flatus. Substantial weight loss may occur. Chronic giardiasis occasionally causes failure to thrive in children.
Giardiasis is complicated in individuals who are lactose intolerant.
Treatment is usually with metronidazole. However, this is not without risks and side-effects as metronidozole is a very potent anti-protozoal.

Trichinella spp.

Trichinella is the genus of parasitic roundworms of the phylum Nematoda that cause trichinosis or trichinellosis. Members of this genus are often called trichinella or trichina worms. A characteristic of nematoda are one-way digestive tract, and a pseudocoelom (body cavity made up of only an ectoderm and endoderm). There are many species of *Trichinella*, with *Trichinella spiralis* (the trichinella worm) being the most characteristic.
Trichinellosis is a parasitic disease of public health importance caused by the nematode *Trichinella spirali*. Human infections are established by consumption of insufficiently cooked infected meat.
Infection occurs by ingestion of larvae encysted in muscle. The cyst wall is digested in the stomach, and the liberated larvae penetrate into the duodenal and jejunal mucosa. Within about 4 days, the larvae develop into sexually mature adults. After mating, the females (3-4 mm) penetrate deeper into the mucosa and discharge living larvae (up to 1,500) over 4-16 wk. After reproduction, the adult worms die and usually are digested. The young larvae (0.1 mm) migrate into the lymphatics, are carried via the portal system to the peripheral circulation, and reach striated muscle where they penetrate individual muscle cells. They grow rapidly (to 1 mm) and begin to coil within the cell, usually 1 per cell. Capsule formation begins about 15 days after infection and is completed by 4-8 wk, at which time the larvae are infective. The cell degenerates as the larva grows, and then calcification occurs (at different rates in various hosts). Larvae may remain viable in the cysts for years, and their development continues only if ingested by another suitable host. If larvae pass through the intestine and are eliminated in the faeces before maturation, they are infective to other animals.
Humans become infected by eating raw, undercooked, or processed meat from infected animals. Many infections are asymptomatic or mild. During the 1st wk, nausea, abdominal cramps, and diarrhoea may occur. One to 2 wk after infection, systemic symptoms and signs begin: facial or periorbital oedema, myalgia, persistent fever, headache, and subconjunctival haemorrhages and petechiae. Eye pain and photophobia often precede myalgia.
Symptoms from muscle invasion may mimic polymyositis. The muscles of respiration, speech, mastication, and swallowing may be painful. Severe dyspnoea may occur in heavy infections.

Fever is generally remittent, rising to 39° C or higher, remaining elevated for several days, and then falling gradually. Eosinophilia usually begins when newborn larvae invade tissues, peaks 2 to 4 wk after infection, and gradually declines as the larvae encyst.
In heavy infections, the inflammation may cause cardiac (myocarditis, heart failure, arrhythmia) symptoms, neurological (encephalitis, meningitis, visual or auditory disorders, seizures) symptoms, or pulmonary (pneumonitis, pleurisy) complications. Death may result from myocarditis or encephalitis.
Signs and symptoms gradually improve, and most disappear by about the 3rd month, when the larvae have become fully encysted in muscle cells and eliminated from other organs and tissues. Vague muscular pains and fatigue may persist for months. Recurrent infections with *T. nativa* can cause chronic diarrhoea.
If the infection is heavy, people may experience difficulty in coordinating movements because of central nervous system involvement, and have pulmonary oedema and heart failure. In severe cases, death can occur.
Numerous reports exist which describe the incidence of trichinellosis in humans from the ingestion of dog flesh. This is especially noted in Asia and the Far East, and especially China. The epidemiology of human trichinellosis in China during 2000-2003 showed there were 11.77% of outbreaks caused by eating raw dog meat.
Dog meat has become an important source of *Trichinell*a infection for humans in China. The first documented outbreak of human trichinellosis resulting from the consumption of dog meat occurred in China in 1974. Until 1999, the outbreaks with this source of infection occurred mostly in Northeast of China (81 cases in five outbreaks in Jilin and two in Liaoning), Beijing (six cases), and Henan provinces (two cases). The epidemiological surveys were performed in nine Provinces or Autonomous Regions of China among 19,662 dog samples. Dog trichinellosis prevalence ranged from 7% in Henan to 39.5% in Heilongjiang, with an overall prevalence of 21.1%. Since the *Trichinella* larvae in dog meat are resistant to freezing, caution should be paid to the consumption of dog meat even if it had been frozen.

Tapeworms

Tapeworms are endoparasitic worms of the biological class Cestoda. The Cestodes fall under the broader classification of the phylum Platyhelminthes. They are segmented flatworms with an infinitely high propensity for fulminant and rapid reproduction. Their structure and life cycle will not be dealt with in any great detail here. Very briefly, the cestodes, or tapeworms, all have a flat, ribbon-like body. They inhabit the small intestine and are attached to the mucosa by means of a scolex. The body consists of a chain of segments or proglottids. The proglottids can be immature, mature or gravid, the last of which contain a fully developed uterus full of eggs. Tapeworms do not have a digestive system and they absorb food from the host's intestine. The lifecycle of tapeworms involves both an intermediate and definitive host.
Dogs carry a variety of cestodes, and they are the definitive hosts for these parasites. The most common one is the Hydatid tapeworm or *Echinococcus granulosus*. Suburban, rural, and hunting dogs have more access to various small mammals, in addition to raw meat and offal from domestic and wild ungulates. A number of cestodes can be expected in such dogs. Association with infected dogs may result in

human infection with metacestodes of *E. granulosus* , *E. multilocularis* , *Taenia multiceps* , *T. serialis* , or *T. crassiceps* in various tissues (by ingestion of eggs passed in dog feces), or adult *Dipylidium caninum* in the intestine (by ingestion of infected fleas). The presence of metacestodes in livestock may limit commercial use of such carcasses or offal meats. Thus, cestodes of dogs and cats may be of both economic and public health importance. Adult cestodes in the intestine of dogs and cats rarely cause serious disease, and clinical signs, if present, may depend on the degree of infection, age, condition, and breed of host. Clinical signs vary from unthriftiness, malaise, irritability, capricious appetite, and shaggy coat to colic and mild diarrhoea; rarely, intussusception of the intestine, emaciation, and seizures are seen.

Transmission to humans is mainly by the ingestion of the eggs. At slaughter it is likely the eggs would be released and contaminate the carcass. These eggs are infectious to humans who may become the immediate host. However, in the case of *E. granulosus*, ingestion of the flesh is of much significance. This tapeworm commonly forms large, fluid-filled hydatid cysts in the liver and lungs, and occasionally in other vital organs and tissues. Symptoms are relative to which organ is affected, but brain, lungs, peritoneum and liver are common sites. In many cases a fatal disease is likely to result .Surgery is often not possible for fear of rupture and further gross contamination with hundreds of protoscolices. The fluid in the cyst is highly allergenic and can cause fatal anaphylaxis if the cyst were to be ruptured.

In humans, *Echinococcus* causes space-occupying lesions of organs, eg, lung, liver, kidney, etc. The same general principles apply to humans as have been noted above. The cysts usually have to be surgically excised. There is no known treatment otherwise. It is rarely found in the CNS. However if this does occur as is the case in immunocompromised people, large cysts form in the brain. After a person eats food contaminated with the worm's eggs, larvae migrate to tissues, including the brain, spinal cord, and CSF pathways, and form cysts. Cyst diameter rarely exceeds 1 cm in neural parenchyma but may exceed 5 cm in CSF spaces. Brain parenchymal cysts cause few symptoms until death of the worms triggers local inflammation, gliosis, and oedema, causing seizures (most commonly), cognitive or focal neurologic deficits, or personality changes. Larger cysts in CSF pathways may cause obstructive hydrocephalus. Cysts may rupture into CSF, inducing subacute eosinophilic meningitis. Mortality rate for symptomatic neurocysticercosis is up to 50%.

Roundworms

These are worms of the Nematode family. They are the most common zoonotic enteric parasite of dogs. There are a multitude of species that are transmissible to humans by ingestion of ovae or by direct contact with first stage larvae penetrating the skin or mucous membranes. As humans are not the definitive host, the symptoms are related to the migration route taken by aberrant larval stages in the body.

Short Notes on Anti-Microbial Resistance

It is well-known that bacteria and other pathogenic organisms have shown an increasing resistance to anti-microbial therapy. Anti-microbial resistance has been seen especially within the last decade or so. The emergence of resistant strains of bacteria has challenged the medical and veterinary profession alike.

Resistance to an antibiotic may be inherent in a particular bacterial species or may be acquired as a result of mutations or acquisition of genes from another organism that encode for antibiotic resistance. Resistance genes can be transmitted between 2 bacterial cells by transformation (uptake of naked DNA from another organism), transduction (infection by a bacteriophage), or conjugation (exchange of genetic material in the form of either plasmids, which are pieces of independently replicating, extrachromosomal DNA, or transposons, which are movable pieces of chromosomal DNA). Plasmids and transposons can rapidly disseminate resistance genes. Antibiotic use preferentially eliminates non-resistant bacteria, increasing the proportion of resistant bacteria that remain. This is true not only for pathogenic bacteria but also for normal flora; resistant normal flora serves as a reservoir for resistance genes that can spread to future pathogens.

The World Health Organisation has recently pointed out an alarming increase in the incidence of antibiotic resistant strains of *Salmonella*, which are due to the use of antibiotics in intensive breeding.

In the United Kingdom, Methicillin-resistant *Staphylococcus aureus* (MRSA) is exceptionally problematic, and humans and animals alike have died because of this resistant strain.

Globally, *Mycobacteria* have been found to be highly resistant to even multi-drug regimens. Tuberculosis remains as one of the most difficult diseases to eradicate on a global scale and much time, effort and funding has been advanced in research to find an anti-microbial to eradicate, or at least control, this organism.

The UK Department of Environment, Food & Rural Affairs (Defra) study points to the growing resistance of specific food pathogens to antimicrobials, drugs used to kill them off in animals at the production stage. Up to 29 per cent of the *Campylobacter* pathogens are now resistant to a commonly used antimicrobial, according to a UK survey.

The survey found that cephalosporin resistance in *E. coli* from bacteraemia is increasing. Over half of the *E. coli* bacteraemia isolates were resistant to ampicillin or amoxicillin, and up to 9 to 19 per cent were resistant to ciprofloxacin. Some of the *E. coli* 0157 found in humans showed resistance to tetracyclines, sulphonamides and streptomycin, with some variation by region.

The fact that anti-microbial resistance is so prevalent, is of extreme importance in the consumption of animals, especially dogs. Many of the bacteria and other pathogens found in dogs are resistant to anti-microbial therapy. This poses an enormous public health risk for humans who would be eating them, and dealing with their slaughtered carcasses. And, not only that, should the humans become infected by pathogens, anti-microbial resistance would make effective treatment extremely difficult, leaving the human with untreatable disease and the possibility of death. This is further complicated by factors such as the pandemic HIV-AIDS which causes an immunocompromised state in people, making even simple infections a challenge to treat.

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4.

Report from the Centre for Disease Control and Prevention August 11 2005 (Attached)

"Yes, there are human health hazards associated with consumption of dog meat. Dogs can be infected with parasites, viral agents, and bacterial agents that infect dogs' organs such as the liver, or muscle meat or the blood, or the brain. Given the conditions under which dogs are likely reared and slaughtered and the food cooking preferences of the individuals who consume the meat, the likelihood of transmission of these pathogens to humans who eat this meat is even higher, either through consumption of the meat, or handling of the carcasses.

A partial list of pathogens includes:

Bacterial pathogens – brucella, leptospirosis, campylobacter, listeria, pasteurella, salmonella, shigella
Viral pathogens – rabies, typhus.
Parasites – roundworms, hookworms, whipworms, cysticercosis, baylisascariasis, dioctophymosis, giardiasis, leishmaniasis, schistosomiasis, toxoplasmosis, trypanosomiasis.

We do not recommend human consumption of dog meat as a protein source".

Division of Bacterial and Mucotic Diseases
National Center for Infectious Diseases
Centers for Disease control and Prevention.

5.

DOCUMENTED CASES RELATING TO ILLNESS/DEATH THROUGH CONSUMING DOG MEAT

2006 -

Philippines: **(Sun Star Thursday, June 15, 2006)**

1 dead, 23 feared infected after eating rabid dogs

One man died and 23 others are under observations after eating rabid dogs in Maasin, Iloilo.

Rolando Carmelita Jr., died after he cooked and ate a rabid dog. He also fed the said meal to his relatives. Not contented, they cooked and ate two more rabid dogs.

Carmelita was found to be infected with rabies.

2005

Philippines: (Report the Philippine Star)

Cauayan, Negros Occidental.

Four year old Ressia Mae Edoria succumbed to rabies from the dog meat she ate. Edoria, seventh child of farmer Rentante of Barangay Molobolo in Cauayan, Negros Occidental died on December 13th, 2005 after she ate meat from a rabid dog, which had been served as a *pulutan* (appetizer).

Days after she ate the contaminated meat, she developed a fever, had difficulty standing up and sleeping, couldn't drink liquids, and suffered chest pains and bulging eyes. The girl was eventually brought to doctors who determined she had contracted rabies. They brought her to the Corazon Locsin Montelibano Hospital but she died after several hours. Ressia was heard telling her father she wanted to bite him. After she died her body was wrapped in plastic, placed in a taxi's trunk and brought home because the family was afraid they might catch the virus.

Veterinarian Winston Samaniego said not many Philippinos were aware that the rabies virus, even in cooked canine flesh, can travel all the way to the brain. The rabid dog meat, once ingested and chewed, allows the virus to enter the nervous system via tooth decay, loose teeth or wounded gums. It may pass through the lymph nodes unfiltered and finally reach the brain and lead to death.

The commons symptoms of rabies are fever, headache and general malaise. As the disease progresses, neurological symptoms appear and may include insomnia, anxiety, confusion, slight or partial paralysis, excitation, hallucinations, agitation, hypersalivation, difficulty in swallowing, hydrophobia (fear of water), fear of light and fear of air.

In the cases of the girl, her advanced tooth decay may have contributed to the onset of rabies. Her father Rentante said he was deeply saddened by his daughter's demise. *"Marami pa sana kaming pangarap so kanya, pero wala na siya ngayon. Nananawagan ako n asana huwag na tayo kumain ng aso (*We had many dreams for her, but now she is gone. We call on the public not to eat dog meat)."

Eight national publications, 4 radios and 2 leading television stations featured the family's story. Wishing his daughter's death will save lives, the father appealed to the nation to stop serving dogs as food.

(Unfortunately it is still happening more and more.)
September 8th 2005 (http://www.latimes.com/news/nationworld/world)

9 Hospitalized after eating rabid dog.

Mayor Efren Pinol of the town of Magpet was cited as saying that nine people who ate a neighbor's dog are being monitored in a hospital isolation ward in the southern Philippines after the canine's owner, farmer Teresita Estanol, 48, died of rabies.

The dog bit Estanol in mid-August, and days later her angry neighbors, apparently unaware that it had rabies, killed the animal and ate it, the mayor said.

Bagbag, Novaliches, Quezon City - December 30, 2005. (Report from Animal Kingdom who interviewed the hospital staff and man's wife)

This alarming case happened in Bagbag, Novaliches, Quezon City on December 30, 2005. A large man and his drinking buddy died because they ate the innards of a slaughtered dog. When he was taken to the hospital, he was spitting all over the place, as verified by the nurses, and in some moments of sanity, had warned his wife not to tell the doctor that he ate dog meat because, as his wife revealed, he was a proud man and had been known to brag that dog meat will not put him down because he believed that the rabies virus die when marinated to a strong vinegar and chilli which are the main ingredients of a local delicacy called *kilawin* (cooked raw in vinegar).

Russia

5 Humans develop trichinellosis in Buryatiya after consuming dog meat.

5 people in the village Novaya Bryan, Nuryatiya Republic have developed trichinellosis after they ate dog meat. One of them is in a severe condition. It was established that of the 13 young people who ate the dog meat, 5 are confirmed to have trichinellosis, and the rest have been hospitalized.

2003

Eating a dog's brain can give you rabies

DAVAO CITY, March 21, 2004 (PNA)

Department of Agriculture livestock chief Dr Rafael Mercado has warned the public about eating the meat of stray and unvaccinated dogs to avoid rabies infection.

He also frowned on the practice of eating a dog's brain or mixing it with other food, as it poses a very high risk of a acquiring the rabies virus.

Wednesday, May 28, 2003 *By Carl Suller*

Political Animal Lobby (PAL) Veterinarian Dr Arturo Pangan Tuesday warned the public about the deadly diseases that may be transmitted through eating dog meat.

Pangan warned that eating dog meat might not only cause rabies. "Eating dog meat may cause anthrax, hepatitis, leptospirosis (through the urine), and internal parasites".

He added that *Brucella spp*., a bacterium that causes abortion in both human and animals, might also be contracted through eating dog meat, especially stray ones.

"However, the most dangerous are the E.Coli 107 virus and the salmonella virus, most common in contaminated meat", he said.

Meanwhile, Dr Robert Umali, regional director of the National Meat Inspection Commission, also stressed that dog meat is inedible because of high risks of catching many diseases that are present in dog meat and not in cattle, poultry and pork.

"Dogs are not considered as food animals and so we are appealing to the public to refrain from selling and eating dog meat", he said.

Moreover, Umali said that since dogs are not considered food animals, they do not go through inspection by the NMIC.

"This makes consumption of dog meat even more dangerous. I hope that the public, especially those who are used to eating dog meat, realize that the implementation of RA 8485 is for the general welfare of the people. This is for your health," Umali appealed.

The NMIC-CAR recently distributed waivers to the vendors in the city to refrain from selling dog meat.

"It is prohibited because it is not safe. Second, it is illegal under the Constitution, and third, because it is a form of cruelty to animals," the officers maintained.

The animal welfare act specifies that torturing, maltreating, and killing/slaughtering of dogs are highly unlawful and offenders should be apprehended and punished accordingly.

The Criminal Investigating and Detection Group (CIDG) has been empowered to raid establishments and apprehend violators of the said law.

On the other hand, the combined forces of PAL, CIDG, the city government and NMIC identified lack of ample information and right education as the biggest hindrances why the law is hardly ever followed.

They also lamented the ineffective sanctions and poor specifications of the RA 8485 that cause offenders to repeatedly ignore the law.

(*Links to this report are found below*.)

http://www.sunstar.com.ph/static/bag/2003/05/28/news/pal.dog.meat.may.be.deadly..html

http://www.dogmeattrade.com/library_articles/deadly_dog_meat.html

2001

Almaty, Kazakhstan (Nando Times 18 May 2001 from the Associated Press)

Eleven Hospitalized after Eating Dog Meat in Kazakhstan

Eleven youngsters were hospitalized after eating kebabs made of dog meat in the former Soviet republic of Kazakhstan, doctors said Thursday. The youngsters, residents of the Pavlodar region in Kazakhstan, were taken to hospital suffering from a parasitical worm after eating dog meat kebabs during a picnic last month, said Yury Kalinin, deputy head doctor of the regional sanitary office. "They ate kebabs. I think they knew they were eating dog meat", Kalinin said. The young men and women were only hospitalized this month as the disease tends to incubate over several weeks, he added.

2000

Kazakhstan (Pro-Med Mail Post April 22, 2000 Report from American Academy on Veterinary Disaster Medicine)

Seventeen people in Ust-Kamenogorsk were infected with trichinellosis after eating dog meat.

TRICHINELLOSIS, DOG MEAT - KAZAKHSTAN
April 22/00
ProMED-mail post
<http://www.promedmail.org>
Source: Source: Interfax-Kazakhstan news agency, Almaty [in Russian] 0600 GMT 18 Apr 2000 [edited]
In East Kazakhstan Region there is an outbreak of trichinellosis (a parasitic infestation transmitted by infected meat). The Regional service of Gossanepidnadzor [state medical and epidemiological supervision] told an Interfax-Kazakhstan agency correspondent that currently there were 17 such cases in Ust-Kamenogorsk (EKR administrative centre), 6 were admitted to hospital. According to experts, the people were infected as a result of eating dog meat. The first patient was admitted in the infectious department No 1 city hospital on 14 Apr 2000. According to the epidemiologists, currently in the village of Krasin (residential area of Ust-Kamenogorsk), preventive measures are being carried out, residents are being examined and those infected are being found. The Vorobiyev and Co. communal enterprise, which is engaged in catching stray dogs, has been instructed to strengthen control over the territory of the village. According to the Gossanepidnadzor service, the last case of trichinellosis was found in the Region in 1998, when a group of students in Zharma District EKR were infected after eating dog meat shashliks.

NMIC WARNS DOG EATERS (*PIA Press Release 2006/09/15*)
Philippine Information Agency report by Danny O. Sagun
Dagupan City (15th September)

"Dog meat" lovers may avoid now their favorite delicacy like kilawen once they learn that dogs carry many diseases that prove fatal to humans.

Meat Control Officer Cherrie Ann Javier of the National Meat Inspection Service (NMIC) regional office based in Urdaneta City said that because of such danger, Republic Act 8485, the animal welfare act classifies dogs as "companion animals", not as food animals like cattle and pigs.

She said that "dog meat" easily decomposes and cannot stand the heat. The term meat actually does not apply since dogs are not meant for human consumption, she noted.

Rabies is one of the deadly diseases that pets like dogs and cats carry prompting concerned authorities to finally ban the eating of such "meat". [However, this ban is worthless since the Government refuses to enforce it.]

Some people in the barangays seem indifferent. Dog meat is more preferred during drinking bouts, it was observed.

Javier, who guested at the weekly Pantongtongan Tayo radio program of the Philippine Information Agency over Radyo ng Bayan-DZMQ last Tuesday, stressed the importance of buying fresh meat in the market for health reasons.

The quality of the meat deteriorates when the temperature requirement is not met, she noted. Poorly-maintained public markets which usually have swarms of flies all over the place greatly affect the quality of the meat, she added.

She also dispelled the usual belief that frozen foods are not as fresh as that of the newly slaughtered animal.

http://www.pia.gov.ph/default.asp?m=12&fi=p060915.htm&no=39

Notes:
Congress in the Philippines passed law in 2007 banning the trading in dog meat and promoting the elimination of rabies through mandatory dog immunization.
President Gloria Macapagal Arroyo signed the law, the "Anti-Rabies Act of 2007" and allocated P100 million to implement it.

Republic Act 8845, passed in 1998 bans the trading in dog meat, but its implementation has been selective as most provinces in the north of the country hide behind "tradition" to justify eating dogs.

In Baguio alone, residents continue to consume about 200 dogs a day.

China ***Reference Veterinary Parasitology Volume 132, Issues 1-2, 5 September 2005, Pages 167-171Trichinellosis – Proceedings of the 11th International Conference on Trichinellosis***

Outbreaks of human trichinellosis caused by consumption of dog meat in China.

Department of Parasitology, Henan Medical University, Zhengzhou 450052, China.

Dog meat has become an important source of Trichinella infection for humans in China. The first documented outbreak of human trichinellosis resulting from the consumption of dog meat occurred in China in 1974. Until 1999, the outbreaks with this source of infection occurred mostly in Northeast China (81 cases in five outbreaks in Jilin and two in Liaoning), Beijing (six cases) and Henan provinces (two cases). The epidemiological surveys were performed in nine Provinces or Autonomous Regions in China among 19,662 dogs samples. Dogs trichinellosis prevalence ranged from 7% in Henan to 39.5% in Heilongjiang, with an overall prevalence of 21.1%. based on random amplified polymorphic DNA fingerprint (RAPD), some dog isolates of Heilonjiang and Jilin provinces were recently identified As Trichinella native, suggesting that this parasite is widely distributed among dogs in Northeast China. Since the Trichinella larvae in dog meat is resistant to freezing, Caution should be paid to the consumption of dog meat even if it had been frozen.

6.

CONCLUSION

Sirius has great concern that dog meat is now available for export world-wide. In view of the large numbers of Asians living in the West, this concern, is justified.

As can be seen from this report, the handling, processing and consumption of dog meat products poses a great risk to human health world-wide. Given that there are large numbers of people from countries associated with dog meat processing living in Western countries, this is a global concern that every nation should address.

While some countries have laws in place to stop the slaughter of dogs for human consumption, these laws are not adequately policed by the governments concerned and the full extent of the use of dog meat in countries, not traditionally associated with dog meat food production, is unknown. However, both dog meat food production and the contraction of diseases from dog meat is rising in many countries. Besides risks to local communities, in terms of the large number of diseases described in this report, there also is a risk of new diseases developing and spreading, similar to bird flu, for instance, or something new. Given the enormous number of dogs used as

companion or work animals worldwide the risk to human health globally from those who have made a practice of consuming their meat is of serious concern. An outbreak initiated by dog meat processing and/or consumption is potentially disastrous, and could threaten world economies.

We therefore request the urgent intervention of the World Health Organisation and the Food and Agriculture Organisation of the United Nations to have dogs classified as 'Not for Human Consumption'.

7. Acknowledgements:

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8.

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