



Nepal Earthquake Search Canine Deployment Injury and Illness Report

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Canine deployment survey data expands our knowledge base regarding the nature of illness and injury incurred during varied disaster environments and search conditions. Foreign deployments present some unique challenges with respect to lengthy travel requirements, endemic diseases, and insect vector concerns, advanced veterinary medical facilities, and cultural attitudes towards dogs in general.

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| Information and Data for Canine Teams Deployed to Nepal, Indonesia, April 26, 2015; Lori E. Gordon, DVM, MA-TF1 US&R | |

Introduction

This is the seventh report by the author to document injury and illness incurred by search canines deployed to various disasters around the country and around the world. Prior reports include the Haiti Earthquake (2010), Joplin, MO Tornado (2011), Hurricane Sandy (2012), Moore, OK Tornado (2013), Colorado Floods (2013), and the SR-530 Oso, Washington Landslide (2014).

Whether the disaster is natural or man-made, the weather cold and wet or hot and humid, the elevation mountainous or at sea level, the search areas rubble or mud, the culture familiar or foreign, patterns are emerging from the data. Significance of information relies heavily on numbers, so the more data collected the more credible the findings. The information provides insight into how we can better prepare and care for our canine team members out there in the field.

Brief History

On April 25, 2015 at 11:56 Nepal Standard Time (NST) an earthquake of magnitude 7.8 occurred with an epicenter just east of the district of Lamjung, Nepal. The earthquake triggered an avalanche on Mount Everest, killing at least 19 people. Aftershocks occurred throughout Nepal within 15–20 minute intervals, with one shock reaching a magnitude of 6.7 on 26 April at 12:54:08 NST. The country also had a continued risk of landslides. A major aftershock occurred on 12 May 2015 at 12:51 NST with a moment magnitude (M_w) of 7.3. The epicenter was near the Chinese border between the capital of Kathmandu and Mt. Everest.

The United States Agency for International Development (USAID) deployed personnel to aid in search and rescue operations. The response included 12 FEMA US&R Live Find Certified Canine Search Teams, 6 teams each, from CA-TF2 and VA-TF1.



Executive Summary

Survey response of 100% maximizes validity of data. Having 12 surveys completed by the 2 canine coordinators minimizes errors in reporting objective data information.

Handlers were experienced in task force operations, with team memberships of 7-22 years. Nine of the 12 had deployed with USAID before, and all 12 had prior deployment experience with their US-based teams. Preparedness, safety, and operations are enhanced by these backgrounds.

Canines breed, age, and weight distribution was similar to other deployments. The Labrador Retriever remains the majority breed; ages between 5-8 years and weight distribution of 50-80 pounds are also most common. FEMA cache supplies, materials, and drug dosing are tailored to these parameters.

Air travel was sometimes challenging due to extended flight times. Also, canines were not always allowed in cabin. All possible arrangements were made to break up flights enough to allow for enough breaks. USAID and diplomatic ties aided in getting canines onto flights. Only one canine was reported to have become mildly dehydrated. In general, canines were fed and watered an hour before landing, then brought out during the lay over. Other canines are trained to relieve themselves command, or onto an absorbent pad. The health of the canines was always the priority, and handlers would rather have an accident in the kennel to clean up than an ill canine.

Transport

Issue: vehicles were driven by non-task force members. Comfort levels with canines loose in a vehicle while extended search operations are being conducted may vary. Drivers could potentially open a door and accidentally release the canine, none of which happened due to control measures put into place.

Recommendation: When responding to an area where you may have non task force member drivers, consider taking a collapsible kennel along with search operations.

Physical examinations were performed by a U.S.-based veterinarian both pre-mission and upon return home for all canines. This increases our ability to catch potential problems before they exacerbate. Handlers are well-versed in exam checks and human medical personnel are available to assist in canine care. IST Veterinary Officers have made themselves available to contact should any questions or concerns arise. Deployed veterinarians with other agencies were available to consult and treat injury and illness.

Search operations were conducted primarily in collapsed structures and vehicles. Despite the complexity, canines accorded themselves well, a testament to their vigorous training and FEMA testing standards. Despite heat and humidity, no issues secondary to these conditions were reported (dehydration, heat stress). Aftershocks did not affect canine search operations.

Illness and injury reports involved 3 canines (dehydration, wound, knee ligament injury). The majority of canines had no health issues, and those reported were minor (non-life-threatening) and treated appropriately. The orthopedic injury did place the canine out of service, however search operations were not compromised.

Briefings involving specific canine-related concerns were conducted in addition to general information. This information was provided by the author, representing the USAR Veterinary Group. The scope of disease and insect-vector issues unfamiliar to United States based operations can be extensive in foreign countries. Access to information before conducting operations allows for preventative measures to be set in place. The Nepal information is provided in the appendix for reference.

Decontamination was provided after all shifts for all canines. Canine-specific shampoos and conditioners were used as a response to lessons learned from the Oso, WA landslide deployment. Dishwashing liquid is unsurpassed in breaking up oil-based contamination, but chronic use caused skin drying, loss of protective oils, and scratching that resulted in infected skin.

Cultural considerations involving attitudes towards dogs in general vary around the world. In Haiti, the populace was wary of the search dogs, and handlers were wary of giving their canines water in front of on lookers who did not have enough for themselves. In Nepal, stray dogs needed to be kept at bay, and search dogs required protection from strays with respect to physical contact and potential spread of disease.

Survey Data

Information was collected by a survey sent electronically to each of the two teams' canine coordinators. These personnel compiled the surveys for all 12 deployed handlers (6 per coordinator) and their canines, a 100% response.

Definitions for Reference

Mean = the average; the numbers are added and then divide by the number of numbers

Median = the middle value in the list of numbers

Mode = the value that occurs most often; if no number is repeated, there is no mode

Range = is the difference between the largest and smallest values



Survey Findings

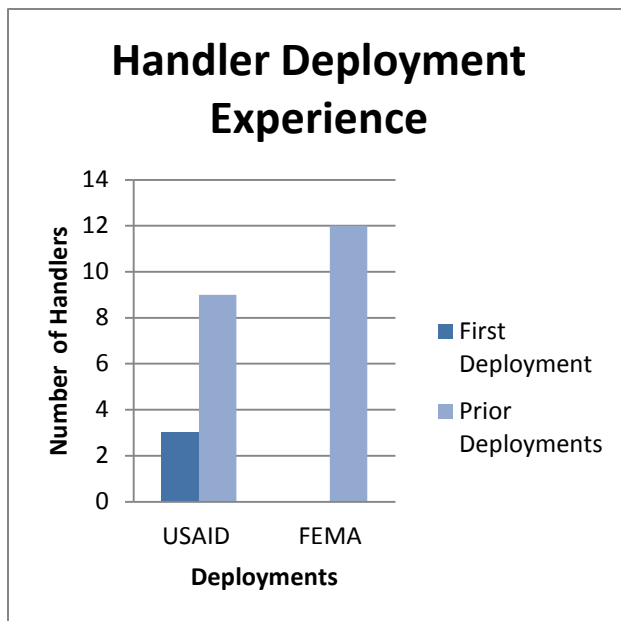
Handler Information

Six members from each of 2 teams (VA-TF 1 and CA-TF 2) were deployed. Task force membership for all 12 handlers ranged from 5 to 22 years.

- VA-TF 1 handlers ranged from 8-22 years, mean 14.2 years.
- CA-TF 2 handlers ranged from 7-15 years, mean 10.7 years

All handlers had at least 1 deployment experience

- This was the first USAID deployment for 3 handlers (25%), while 9 handlers (75%) had prior deployment(s) with this organization.
- All handlers (100%) had prior deployment experience(s) with their home teams.



Canine Information

Twelve Canines were deployed. All are FEMA Live Find Certified.

Age distribution ranges from 3 to 9 years

- VA-TF1 canines ranged 3-9 years; mean 5.5 years
- CA-TF2 canines ranged 5-9 years; mean 7.3 years

Weight distribution

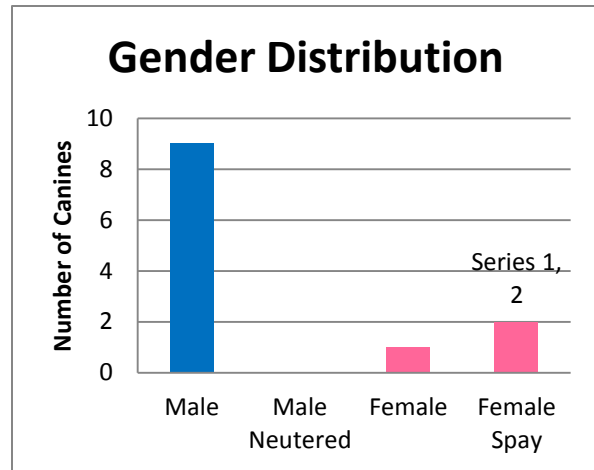
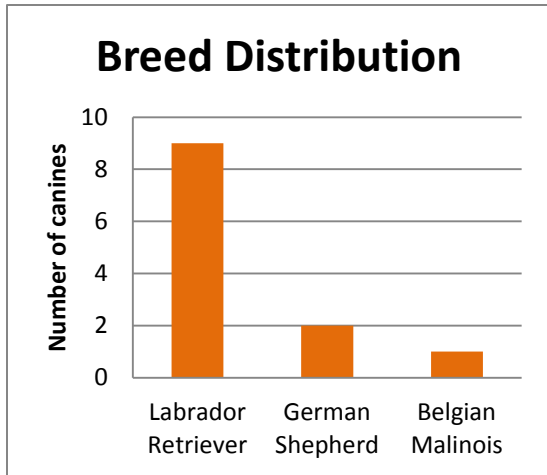
- All canines ranged from 50 to 80 pounds (22.7-36.4 kg)
- Mean of 68 pounds (31 kg)

Breed distribution

- 9 Labrador Retrievers (75%)
- 2 German Shepherds (17%)
- 1 Belgian Malinois (8%)

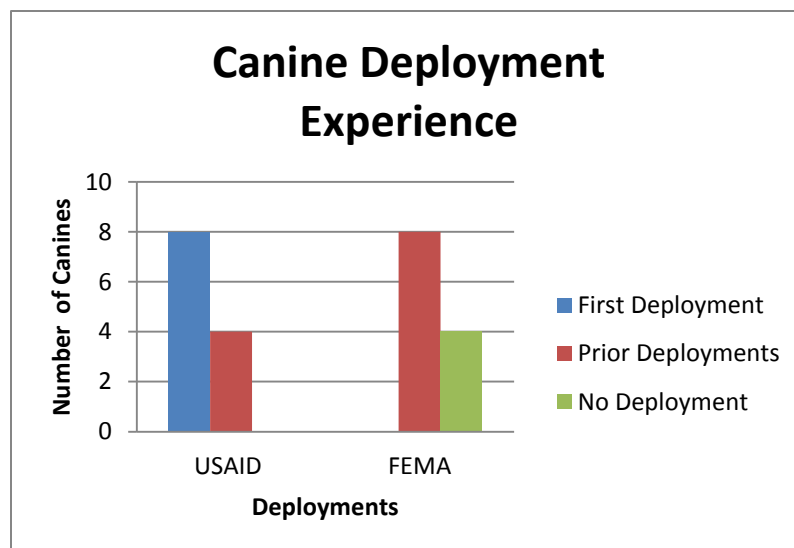
Gender distribution

- 9 Male
- 2 Female spay
- 1 Female



This was the first USAID deployment for 8 canines (67%), 4 from each team, while 4 canines (33%) had prior deployment(s) with USAID (2 from each team).

Eight canines (67%) had deployed with their FEMA task force in the past (all 6 from VA-TF 1 and 2 from CA-TF 2), while 4 canines (33%) had not (from CA-TF 2).



Deployment Mission Travel

Each team departed within 1 day of each other (April 25 and 26), arriving on the same date (April 27, 2015). Both teams demobilized 2 days after the last day of search operations (May 15), arriving home 1 calendar day later for one team, 2 days for the other (May 16 and 17, respectively). Total deployment was 22 days for all team members.

Flight Travel Issues

Extended flights and varying international policies presented some challenges.

The VA-TF 1 canines were crated in the C-17 aircraft at the handlers' feet with limited food and water on the flight to Nepal. One canine became mildly dehydrated and remained so for the first 24 hours upon arrival. The canine was still able to work and function well. Flights home were broken up enough to be able to break them enough to keep them hydrated.

The CA-TF 2 canines were aired at every stop while in route in the C-17 aircraft. The stops were at U.S. airbases. However for the return flight the canines were not allowed in cabin. USAID made special arrangements to remove them in Thailand. The canines then traveled the remaining two legs of the return flight in the cabin. Handlers fed and watered their canines about 1 hour before landing, and then took them out during the layover. In Japan the canines were not allowed on the tarmac, so they were brought into a rest room. One canine that urinates on command did so onto an absorbent pad and 2 other canines did as well to mark their scent on top of that.



Operations Transportation & Billeting

Base of Operations was maintained at Phora Dubar Kathmandu, Nepal. Sleeping quarters were in tents, with an occasional hotel. All canines were crated in sleeping quarters.



Transportation to operations sites was via SUVs and buses. Typically the drivers would stay in the vehicle while waiting for task force members complete assignments. Keeping canines in a climate controlled environment was a priority while not in use. However, the canines were not in kennels. Concerns that drivers might open a door and accidentally release the canine were mitigated by control measures put into place.

Physical Exams Performed

A veterinarian performed pre-mission examinations on all of the canines (100%). Handlers performed pre, intra, and post-shift examinations on their canines. A veterinarian performed post-mission examinations on all of the canines (100%).

Search Operations

One team began search operations the same day of arrival, the others began the next day, for a total of 17 and 16 days respectively. Each shift was 12 hours, but specific search operations varied from that maximum time to brief specific missions throughout the deployment. Handlers did the majority of shifts with their canine partners, in addition to working some shifts and/or missions without them.

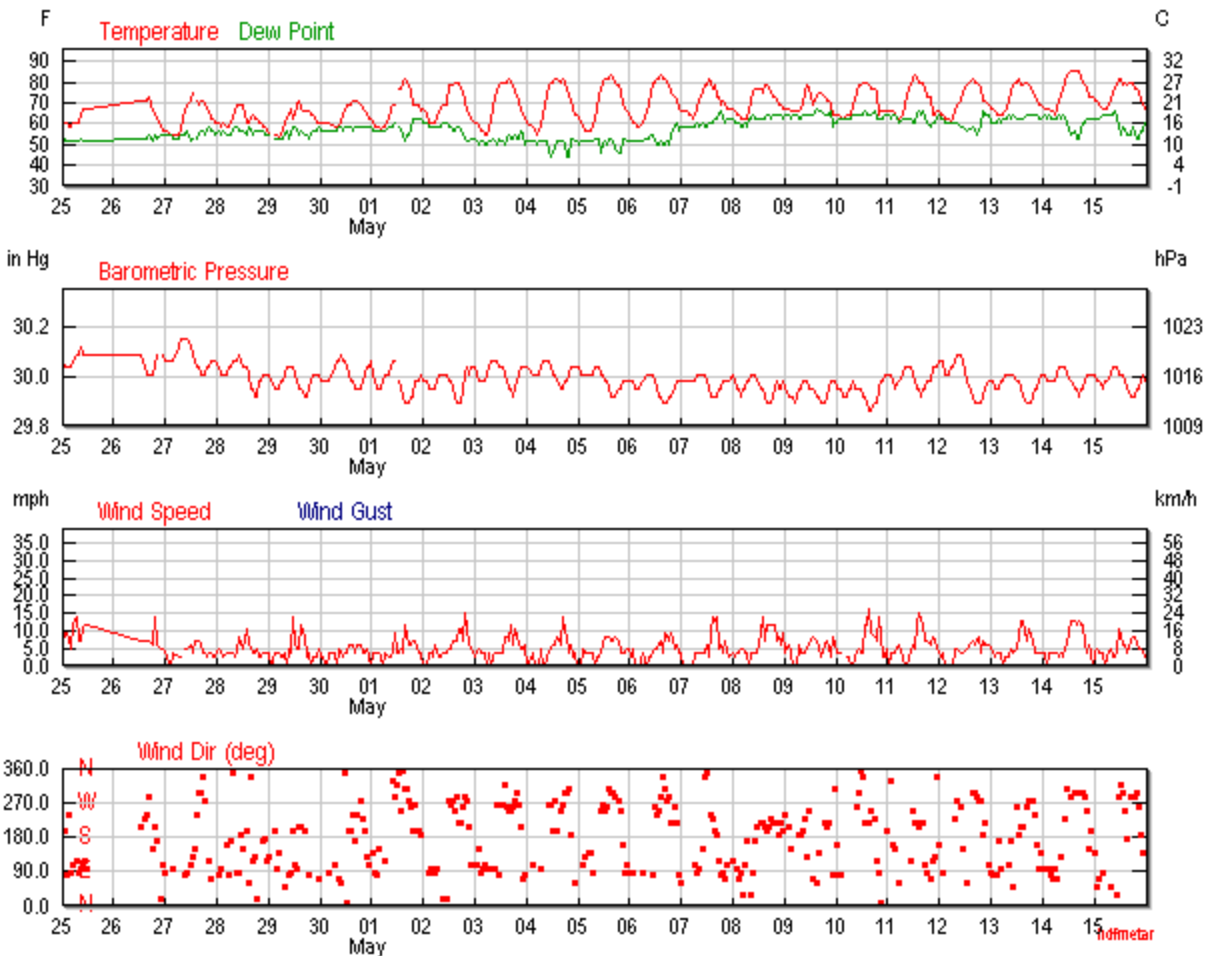
Many handlers are multi-disciplined and function in other assignments when canine activities are not needed. Other duties included Search Team Manager, Communications, Site Surveys, Construction /Relief Efforts, Medical Specialist, Technical Information Specialist, Technical Search, and Rescue Specialist.



Search Conditions and Hazards

Environmental conditions reported by Weather Underground for April 27 – May 15, 2015 were as follows:

- Daily high temperatures ranging from 74-87°F with a mean of 83°F
- Daily low temperatures ranging from 52-68°F with a mean of 56°F
- Daily high humidity ranging from 82-100% with a mean of 94%
- Daily low humidity ranging from 25-61% with a mean of 41%
- Visibility ranged from 2-7 miles with a mean of 4.5 miles
- Winds ranged from 2-29 mph, gusts up to 20 mph, with a mean of 8 mph
- Thunderstorms and rain reported for 10 of the 20 days, however less than 0.5 inches precipitation was recorded.



Katmandu, Nepal April 25-May 15, 2015

Search operation sites were predominantly collapsed structures and vehicle searches. The sites were described as complex; however the canines were prepared and had no problems negotiating the rubble. Wires within the rubble were confirmed dead by tech search via hot stick.



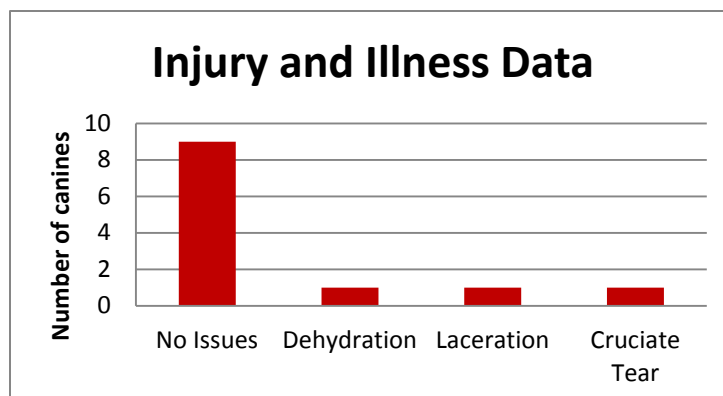
After shocks occurred, but were not perceived as affecting the canines.

There were roaming dogs and local dog packs that were territorial and some appeared to have mange. They were kept at bay by the managers and other team members assisted with securing the areas.

Injury and Illness

Nine of the 12 canines (75%) did not incur any illness or injury. The 3 health issues reported were minor and treated appropriately.

- One canine became dehydrated. The condition did not interfere with search capability and resolved with oral hydration within 24 hours.
- Subcutaneous fluids (500 ml) were administered as a precaution to (presumably) prevent dehydration in another canine one time.
- One canine damaged a knee ligament (tore their cranial cruciate ligament): checked by the MTM, an American veterinarian present, and a Nepalese veterinarian. The canine was rested for the remainder of the deployment and given a non-steroidal anti-inflammatory, and received surgery upon return to the US, currently recovering.
- One canine had a 1” laceration above the pad of the right hind leg. The wound was opened, explored for foreign material (none found), cleaned, closed with sutures, and bandaged Team Rubicon in country. The canine continued to work with no problems, and the wound checked and bandaged daily. Once home, at suture removal there was a slight discharge which was cleaned and the area healed without incident.



Briefings

Canine-specific hazards, diseases, and other concerns were presented at briefings. These included weather, aftershocks, Hemorrhagic Fever, Giardia, Leishmania, Leptospirosis, Plague, Rabies, Blood Flukes, Chagas' Disease, diarrhea, mange, distemper, and disease-carrying insects including fleas, ticks, and sandflies.

Decontamination

Decontamination was performed after each shift and when they were walked outside the BoO. The method involved shampoo temperate water and towel or air dried for one team, oatmeal shampoo and tail & mane conditioner with purified room temperature water and microfiber towel drying for the other team.

Cultural Considerations

Local Nepalese advised that to keep stray dogs away one must pretend to throw something at them. It was vital information and worked very well according to handlers. Team members were told to bring a long handle tool when out in search operations to help provide canine security. Team members were a vital resource in keeping the safety and security of the canines.

Handler Comments

This deployment was a great experience in every way for the dogs. Addition of collapsible kennels for vehicle transport recommended (see transportation comments)



References

1. <http://www.wunderground.com/>
2. https://en.wikipedia.org/wiki/April_2015_Nepal_earthquake
3. Gordon, Lori E., SR-530 Slide Oso, Washington – Canine Illness and Injury Report, April 2014
4. Gordon, Lori E., Haiti Earthquake, Handler and canine Deployment Survey; January 2010

Photo Credits

1. Teresa MacPherson
2. LA County Fire and Rescue
3. VA-TF 1 Urban Search and Rescue
4. USAID

All photos are subject to copyright, and their origin is available upon request from the author.

Appendix: Information and Data for Canine Teams Deployed to Nepal, Indonesia April 26, 2015

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Weather

The forecast for Nepal is the same for the next 10 days

- High 84-85°F (29°C)
- Low 73-75°F (23-24°C)
- Thunderstorms 80% for 9 of 10 days
- Winds 4-8 mph (6-13 km)
- Humidity 80-95%
- UV index – extreme

Data from the Haiti earthquake deployment, a similar weather environment w/r to heat, revealed **dehydration** to be the most common medical condition among the search canines. Humidity may alter conditions, however it is good for maintaining mucous membrane moistness within the nasal and oral cavities and therefore scenting is not compromised.

Preferably, hydration is maintained through drinking water. DO NOT LET THE CANINES DRINK FROM ANY UNKNOWN WATER SOURCE OR PUDDLES. Numerous disease-causing organisms potentially exist in pools of water. Some handlers have become accustomed to giving their canine subcutaneous fluids. These may be in short supply, and will not be enough to maintain hydration in this environment. Encouraging oral rehydration is important. In Oso, WA we put a scoop of canned dog food in the water and they drank it readily.

Fairfax, VA temperatures have been hovering in the 60-70°F (15-21°C) range, so those canines have some **acclimation** to achieve. Los Angeles, CA has been 70-85°F (21-29°C). Body temperature has been shown as an important factor in limiting performance during search in hot climes. Thought it takes up to 20 days to fully acclimatize to a new environment, demonstrable lower strain on the canines may be seen within 4-5 days.

Dogs that have light-colored noses, inner ears, and eyelids can incur sun burn in a high UV index environment. Sunscreen with UVA and UVB protection can be applied to the ears and nose (not the eyelids!). Though many will lick it off their nose, some may be absorbed and provide a level of protection. Take advantage of shade not only for the light-pigmented hairless areas of a canine, but also to decrease the heat absorption by the black-haired canines.

Preventative Medicine

Several of the diseases endemic to Nepal are transmitted by ticks, fleas, and flies. Flea and tick preventative products that act as repellants will discourage being bitten. Other products that are taken orally are effective only after the insect bites the dog. Heartworm preventative products should also be up to date.

Insect repellants: Advantix and Vectra are 2 of the better products. They can be applied even if a dog is on the oral preventative. There are no approved products to prevent flies from biting however we have had very good success keeping the black flies off using Skin-so-Soft (Avon) on the wolves at our wolf educational center.

DEET products should not be used on canines. They are toxic and will cause drooling, loss of appetite, gait abnormalities, vomiting, and seizures!

Decontamination

Conditions may be such that enough potable water is not readily available to allow for complete decontamination operations on the canines. If there is some, use it on the higher contamination areas of the body: paw pads, legs, and under the abdomen/chest. Baby wipes or similar product can then be used over the rest of the body, especially the face, head, ears and neck.

Decontamination operations are also a great time to be looking over the canine for any **wounds**, including scrapes, lacerations, abrasions, and punctures. These must be vigilantly monitored for infection and kept inaccessible to insects.

Endemic Diseases that can affect Canines

Crimean-Congo Hemorrhagic Fever – a virus transmitted by the bite of ticks

- Signs: fever
- Diagnosis: ELISA, antigen detection, reverse transcriptase polymerase chain reaction (RT-PCR) assay, virus isolation by cell culture, serum neutralization
- Treatment: symptomatic and supportive

Giardia – a protozoa transmitted by the ingestion of contaminated feces/water

- Signs: diarrhea, may be soft, frothy, greasy, malodorous, excessive mucus, maybe blood
- Diagnosis: fecal smear, ELISA
- Treatment: Metronidazole 30-60 mg/kg once daily for 5-7 days or 10-25 mg/kg PO BID x 8 days

Leishmaniasis – a protozoan transmitted in the bite of sandflies

- Signs: weight loss, polyuria, polydipsia, depression, vomiting, diarrhea, melena, cough, epistaxis, sneezing, fever, icterus, polyarthritis, uveitis, conjunctivitis
- Diagnosis: serologic testing, organisms in lymph nodes, skin lesions
- Treatment: symptomatic and supportive; meglumine antimonite 100 mg/kg IV, SC once daily for 3-4 weeks; or sodium stibogluconate 30-50 mg/kg IV SC once daily for 3-4 weeks

Leptospirosis – a bacterial organism transmitted in urine, often contaminating water

- Prevention: vaccine available; does not cover all serovars that exist
- Signs: anorexia, lethargy, fever, dehydration; may progress to vomiting, reluctance to move, back pain, polyuria, polydipsia, icterus, hemorrhage, hypovolemic shock, uveitis
- Diagnosis: microscopic agglutination test (MAT), polymerase chain reaction (PCR)
- Treatment: Doxycycline 5 mg/kg PO BID x 14 days or Ampicillin 20 mg/kg IV q 6 hrs (reduce dose if azotemic) or Penicillin G 25,000-40,000 U/kg IM, SC BID for 14 days

Plague – fleas are the vectors for this bacterial disease (*Yersinia pestis*)

- Signs: fever, lymphadenopathy
- Diagnosis: microscopic and bacteriologic examination of lymph node aspirates and blood
- Treatment: Streptomycin 10 mg/kg IM BID-QID and tetracycline 10-22 mg/kg PO TID in combination

Rabies – a virus transmitted in the saliva of infected animals causing encephalitis

- Prevention: vaccination
- Signs: altered behavior, aggressiveness, progressive paralysis, death
- Diagnosis: history, signs, immunofluorescence for antigen in fresh tissue; monoclonal antibodies
- Treatment: none
- Protocol for vaccinated canines bitten by potentially rabid animal: revaccinate immediately; quarantine/observation for 90 days

Schistosomiasis (Blood Flukes) – water snails are intermediate hosts that release fluke eggs into water; flukes live in blood vessels of final host and migrate to the intestinal and/or urinary system.

- Signs: diarrhea (which may be blood-tinged), vomiting, anorexia, weight loss, lethargy, and polyuria/polydipsia.
- Diagnosis: identify eggs in feces
- Treatment: praziquantel?

Trypanosomiasis (Chagas' Disease) – caused by a protozoan that is transmitted by Tsetse flies

- Signs: lymphadenopathy, myocarditis
- Diagnosis: organism demonstration in blood, culture, serology, PCR
- Treatment: Benzimidazole 5 mg/kg PO q 24h for 2 mos is the drug of choice; Nitrofurantoin 2-7 mg/kg PO q 6h 3-5 mos; Diminazene aceturate, quinapyramine sulfate, and suramin also reported treatments; treat heart failure and arrhythmias as needed

In addition there are many stray dogs and monkeys free-roaming with **mange** (skin disease caused by mites), **diarrhea**, and **distemper** (viral neurologic disease). **Bite wounds** are a major concern if any of the search canines are attacked.