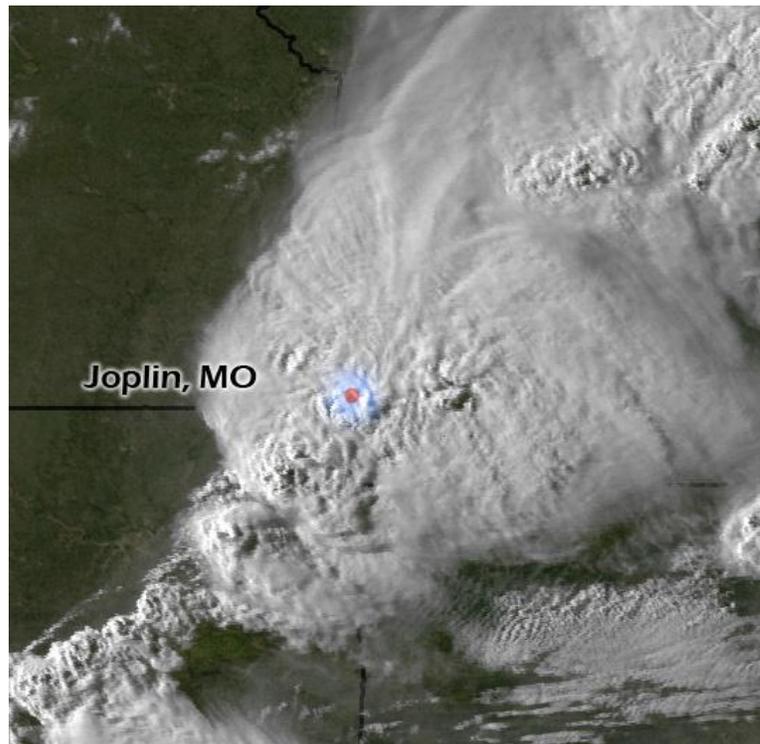


Handler and Canine Deployment Survey

Joplin Missouri Tornado

May 22, 2011



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MA-TF 1 US&R

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Introduction

This survey was conducted in response to medical abnormalities discovered at post-mission veterinary examinations and tests of several canines that deployed to Joplin, Missouri for the tornado response. The original intent was to investigate the underlying cause for the abnormalities and formulate solutions to prevent and/or avoid such occurrences in the future. In addition, these findings would bring to the forefront contamination exposure risks that search canines face, raise awareness of their situation, and highlight the importance of decontamination procedures and physical examinations and testing by licensed veterinarians.

This deployment did not involve any Task Forces deployed under federal sanctioning, however the majority of Canine Search Specialists were affiliated with a federal agency as members of FEMA US&R teams that deployed as state assets for this mission. One of the interesting differences was the majority of survey canines were Human Remains Detection (HRD) certified, including 2 dual-certified live find (LF) and HRD canines.

Information Collection Method

A survey was sent out electronically to handlers that deployed in response to the Joplin, Missouri tornado. Questions included canine signalment (breed, age, gender, weight), billeting, physical examinations performed, work shift information, preventative medicine status, injuries and illnesses incurred, decontamination procedures, briefing details, and post-mission examinations and testing. The information was collected, analyzed, and presented in this report by the author.

Brief History

On Sunday, May 22, 2011, super cell thunderstorms were reported from southeast Kansas to southwest Missouri. An Enhanced Fujita-5 (EF-5) tornado touched down in Joplin, Missouri at 6:41 PM. Winds were measured in excess of 200 miles per hour. The tornado path measured 22.1 miles long and up to 1 mile wide, destroying an area $\frac{3}{4}$ miles wide and 6 miles long through central Joplin.



Summary of Findings

This survey included 13 Canine Search Specialists who deployed as a state asset. Eleven of them were from teams that also are members of the FEMA US&R system. Their experience as handlers ranged from 2 years to 15 years, with an average of 7 years. The majority of handlers 9 of 13, 69%) had between 3 and 8 ½ years experience.

There were 14 Certified Canines for this survey. One handler deployed with 2 canines. The majority breed was Labrador Retriever (6 of 14, 43%) with Belgian Malinois second (3 of 14, 21%). The youngest was 1 year and 10 months old, the oldest 9 years and 9 months old. The majority of canines (11 of 14, 79%) were 5 years to 9.75 years old, with half (7 of 14, 50%) at 5.5-6.6 years of age. The majority (11 of 14, 79%) were altered (6 female spay, 5 male neuter). They weighed in at 45 to 74 pounds, with an average of 60 pounds.

Search capabilities among the 14 canines were 7 HRD (50%), 5 LF (36%), and 2 dual-trained in HRD and LF (14%). The bark alert was most common (8 canines, 57%). One of the 2 dual-trained canine displayed bark alert for both HRD and LF, while the other had separate alerts for each type find (LF bark and HRD sit). Their certifications were from 6 different agencies, with FEMA and IPWDA most common at 4 canines each. Only 1 canine had never deployed before. At least half of them had 1-14 prior missions including FEMA US&R and others.

All Missouri-based handler-canine search pairs were activated the day of the tornado, May 22, 2011, and arrived on site 2.5-8 hours later at 0100-0300 May 23, 2011. Other teams arrived over the next 8 days. Demobilization orders came between May 24 and June 3, with actual departures from 1-18 hours later. Mission duration ranged from 2 days to 7 days, with an average of 3½ days. Staging locations included a church, parking lot of the high school, parking lot of the hospital, and lot outside of the Home Depot.

Briefings that included the locations of medical stations were received by 7 handlers (54%). Additional information about off-site veterinary hospitals was known to 4 handlers (31%). HazMat and safety concerns related to one handler included antifreeze, oil, fuels, pesticides, insecticides, fungicides, and herbicides.

A total of 41 shifts were reported for the 13 handlers and 14 canines. One shift time, not reported, was not included in the data. Most teams worked several shifts, although they varied greatly in length of time. Work shifts ranged from 6 hours to 38 hours, with an average of 12.3 hours. Day shifts numbered 31 (77.5%) and shifts that encompassed day and night hours numbered 9 (22.5%). The most common shift was 0800 - 1700 hours. Half of the shifts (20 of 40, 50%) were between 0700 and 1900 hours.

Rest periods ranged from 15 minute breaks to 2 hours. The 30 minute rest time was most often quoted by the handlers. The marked variation is listed in the main text.

Three handlers with LF canines reported 2 canines had no alerts, the other canine had 2: one victim asleep in a car and the other asleep in a ruined house. Four handlers with HRD canines

reported no finds. One alerted where a body had previously been removed. One handler with a dual-certified canine reported over a dozen full bodies plus pieces. She stopped counting after a while.

All canines were current on heartworm preventative and flea & tick repellants. Two canines had marked tick infestations while deployed, one of which had their flea & tick repellant reapplied during the mission.

Physical examinations were as follows. Pre-Mission canine PE by a licensed veterinarian was reported by 1 handler, which was by coincidence and not purposefully done for this deployment. Pre-Shift PE was performed on 7 canines (50%), 6 of which were performed by the handler. Post-Shift PE was performed on 11 canines (79%), 6 of which were performed by the handler. Demobilization PE was performed on 2 canines (14%), both done by a veterinarian at the BoO. Additional PEs performed during the mission were for 8 canines (57%), 4 of which were due to medical concerns: 2 exams done by the handler, 1 by a team MD, and one by a VT.

Medial parameters were checked at various times. Temperature, heart sounds, and lung sounds were the least checked at 17% - 44% of the time. Pulse, respiration, eyes, ears, mucous membranes, skin, paw pads, stool, urine, and limb joint checks were performed the most at 67% - 100 % of the time.

Prophylactic subcutaneous (SC) fluids were administered to 3 of the 14 canines (21%) due to concerns regarding potential dehydration. Dehydration was not detected for the 2 canines who received SC fluids before and after each shift.

During deployment, 11 canines (79%) incurred illness and or injury. Multiple injury and illness was experienced by 7 of them. Wounding was the most common injury (64%) and dehydration was the most common illness (21%). Details of the problems are in the main text.

Decontamination procedures were performed for 11 of the 14 canines (79%). Most were done after their shift, and all before entering BoO or rest areas. Soap and water were the most common methods used (for 9 of 11 canines, 73%). Nine handlers reported there was a decontamination station set up at one or more locations. The locations were at the search sites and at the BoO.

Post-Mission PEs were acquired by handlers and performed by their primary care veterinarians, for 12 canines (86%). Of these 12 canines, 9 were examined for medical problems. Most (7) were seen within 24 hours of their arrival home. The other 3, examined at 1, 7, and 30 days post deployment, were routine exams and no problems detected.

There were 6 canines with abnormal blood tests. These abnormalities were possibly related to liver and kidney damage, but veterinary medical records could not be obtained for all canines. Of the 4 veterinary medical records that were obtained, 3 of them were incomplete. Fortunately all issues resolved within 2 days to 3 months.

Data Interpretation and Comments

Currently FEMA does not officially deploy HRD canines. In the past they have been deployed for special mission requests (i.e. Columbia Shuttle Explosion). Several federal teams that also deploy as a state asset have also utilized HRD certified canines. As demonstrated in Joplin, HRD canines were utilized extensively. This supports the modular deployment concept, including HRD missions, being examined by the FEMA US&R Program Office. **Recommend continued support for modular HRD canine missions and allowing task forces to include HRD canines in full scale Type I deployments.**

FEMA guidelines recommend 12-hour shifts, for every 20-45 minutes of work, allow for an equal time of rest. This minimizes fatigue and illness, maximizes performance efficiency and safety. Shifts of more than 12 hours increases the likelihood for accidents, injury, and errors. It also decreases the search capabilities of the canines. The same can be said of the human team members. The canine will become non-useful, possibly injured, and the team will lose a great asset. **Recommend stricter adherence to as close to a 12-hour shift as possible to maintain the health and efficiency of search canines.**

Despite being current on HWP, 2 canines were inundated with ticks. Not all flea & tick repellants are alike, and resistance is becoming more common. Options include changing to newer spot-on products, application of products every 3 weeks rather than every 4 weeks, and adding oral preventative medications to the regimen. **Recommend handlers include bringing extra flea & tick preventatives for administration if needed, researching newer products and self-education about safety and overdose concerns, and having the US&R Veterinary Group create a reference for handlers concerning flea & tick preventative options.**

There were almost no Pre-Mission examinations performed. One canine had a pre-existing condition which was exacerbated during the deployment. Temperatures, an important aspect of a Good PE, was rarely included. Handlers were the most common examiners, and conducted brief but thorough exams that stressed the most concerns for canines during a mission. The majority of PEs were Post-Shift, however many things may develop during rest periods and Pre-Shift checks can be just as important. There was some veterinary support during the deployment. **Recommend handlers, if possible, acquire Pre-Mission PE, include Pre-Shift checks as well as Post-Shift, and have a demobilization check with at least one of these PEs by a veterinarian, VT, or MD trained in canine care.**

Prophylactic subcutaneous fluids are being considered more often as aids in decreasing potential dehydration. Currently there is no published scientific data regarding potential benefits and/or contraindications for giving a working canine subcutaneous fluids in an effort to prevent and/or delay the onset of dehydration and other heat-related conditions. Studies are being conducted. **Recommendation is to encourage oral intake of water, reserving the administration of subcutaneous fluids for extreme weather conditions or for medical treatment.**

A majority of handlers did not receive HazMat and safety briefings concerning potential contaminants. It soon became evident to handlers searching in water and at Home Depot that there were multiple contaminants to which their canines were being exposed. Decontamination was performed for most canines, but factoring in 15 - 38 hour shifts and minimal decon or hours between decon procedures were highly suspect as the cause of post-mission liver and kidney problems. Contaminants, including nerve agents, can be absorbed through the paw pads.

Recommend handlers carry or acquire more supplies for decontamination, even just wipes, to perform multiple times during searches among highly contaminated environments, and consider training with and using booties if the search area surface is flat or the booties will not compromise canine footing (building searches) to decrease absorption through paw pads.

Nearly 80% of the canines had medical issues. Wounding was the most common injury, dehydration the most common illness. These are consistent with findings in a report by this same author, on injuries and illnesses incurred by the canines deployed to Haiti. **Recommend training, supplies, and medications reflect the high incidence of these medical issues**

Most of canines were brought for post-mission veterinary checks. Considering the amount of deployment injuries and contaminant exposures, this was a very important step to maintain their health. Some handlers got their canines an exam after hearing the Missouri canines were ill. **Recommend Post-Mission Examinations be mandated and financially supported by the governing agencies when significant injury, illness, and/or contaminant exposure is evident. In addition, communication between Canine Search Specialists from different teams should be maintained for 2-4 weeks after an event in order to disseminate information regarding health issues.**

Abbreviations for Reference

ALT - alanine aminotransferase
BoO - Base of Operations
BUN - Blood Urea Nitrogen
CBC - Complete Blood Count
CRT - Capillary Refill Time
FEMA - Federal Emergency Management Agency
HazMat - Hazardous Materials
HRD - Human Remains Detection
IPWDA - International Police Work Dog Association

LF - Live Find
MD - Medical Doctor
MM - Mucous Membrane
NSAID - Non-steroidal Anti-inflammatory
PE - Physical Examination
PSGAG - Polysulfated Glycosaminoglycan
RMSF - Rocky Mountain Spotted Fever
SC - Subcutaneous
STM - Search Team Manager
US&R - Urban Search and Rescue
VT - Veterinary Technician

Definitions for Reference

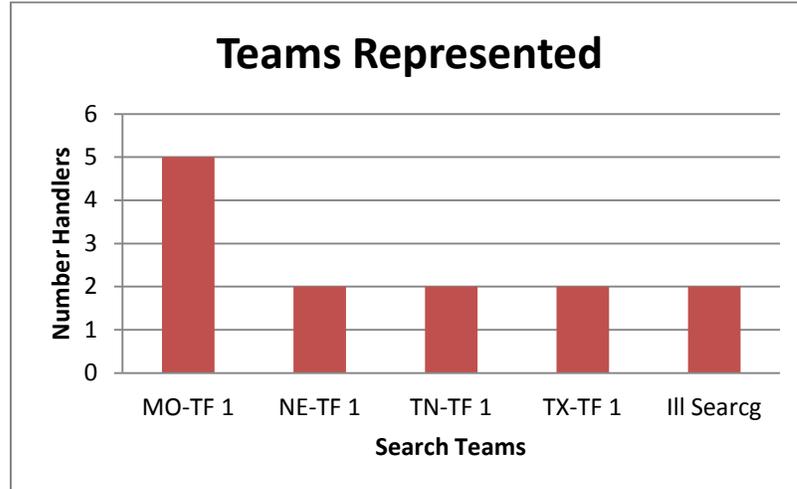
Mean = the average; the numbers are added and then divide by the number of numbers
Median = the middle value in the list of numbers
Mode = the value that occurs most often; if no number is repeated, there is no mode
Range = is the difference between the largest and smallest values

Handler Response Information

Please note that this was not a federal agency deployment, and a complete list of all deployed handlers was not attained. Survey requests were sent to as many as could be acquired, but this report does not reflect all handlers that deployed for this mission.

There were 13 canine handlers that were asked to complete a survey about their response to the Joplin, MO Tornado. All 13 responded.

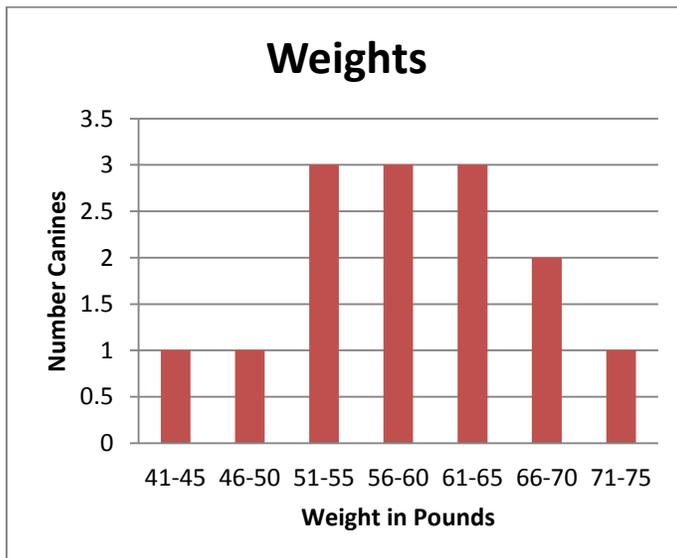
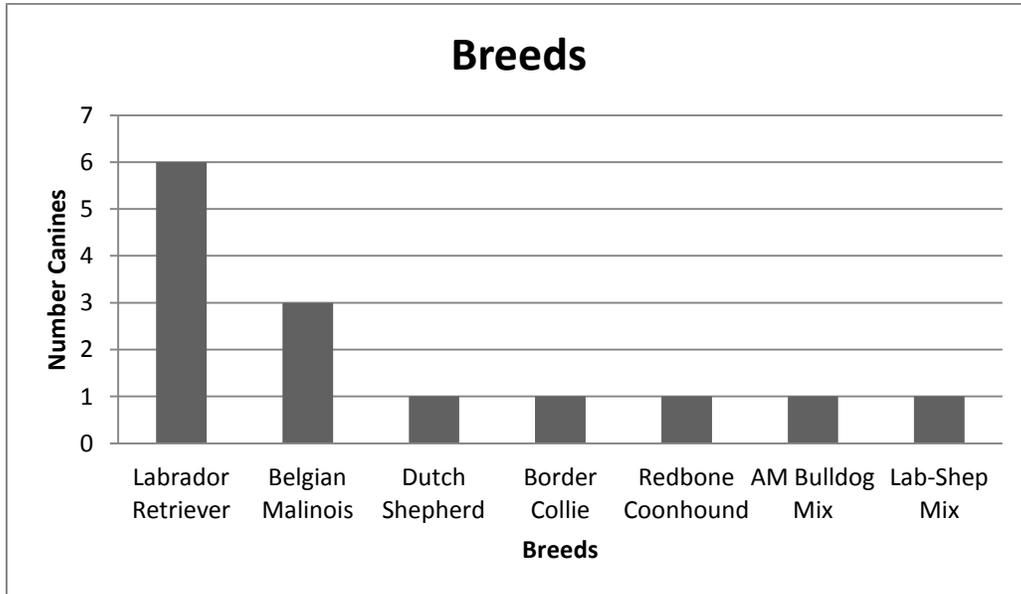
- One handler deployed with 2 canines
- 5 teams are represented: 5 from MO-TF 1
2 each from NE-TF 1, TN-TF 1, TX-TF 1
2 from Illinois Search Dogs
(currently Illinois Search Dogs of McLean County EMA)
- Handlers' service time with their deployed teams ranged from 2 years to 15 years
(Mean = 7 years 1 month, Median = 7 years 8 months, Mode = 3 years)



Canine Information

There were 14 search canines deployed for the Joplin, MO Tornado with the 13 handlers, one handler took 2 canines.

- Their breeds are 6 Labrador Retrievers (43%), 3 Belgian Malinois (21%), 1 each Dutch Shepherd, Border Collie, Redbone Coonhound, American Bulldog Mix, Labrador-Shepherd Mix (7% each)
- Their weight ranged between 45 pounds (20 kilograms) and 74 pounds (34 kilograms)

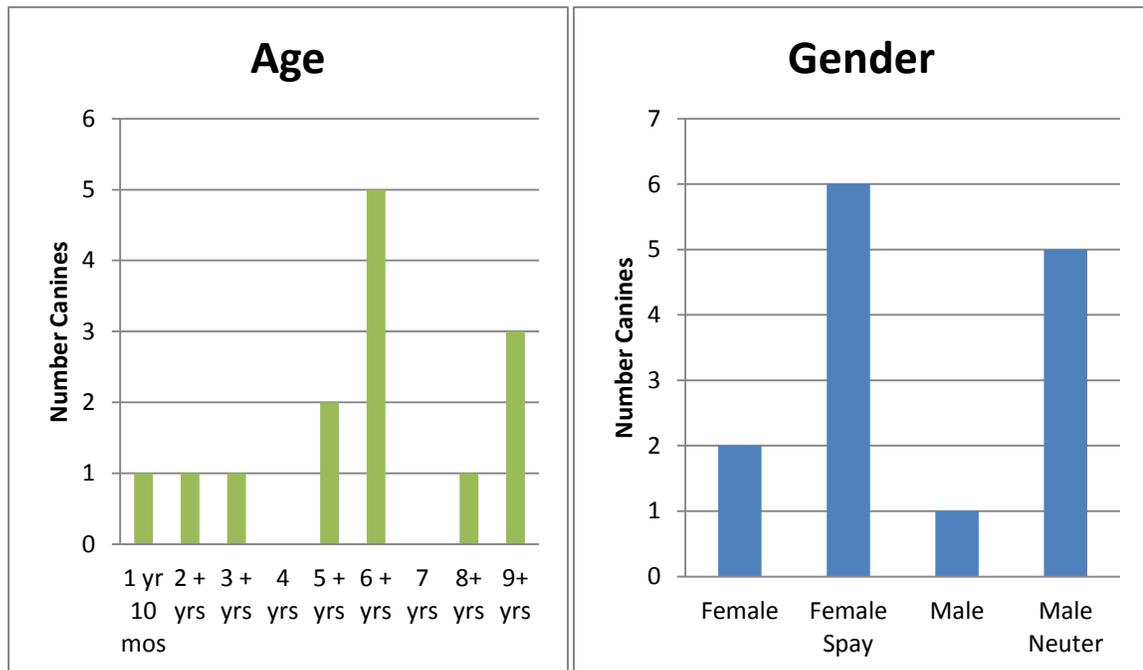


Mean = 59.5 pounds (27 kg)
 Median = 60 pounds (27 kg)
 Modes = 60 and 62 pounds (27 kg)



Photo courtesy MO-TF 1
 L. Ballard & Max
 E. Chamberlain & Katy

- Canines ranged in age from 1 year 10 months to 9 years 9 months old
- Their genders were 1 male, 5 male neuter, 2 female, and 6 female spay



Mean = 7 years 1 month
 Median = 6 years, Mode = 6 years

- All deployed canines had certifications from 1 or more agencies. Specific areas of certification included LF, HRD, land, water, disaster, and cadaver forensic. One canine's dual certification agency was not identified in the survey.
 - 🐾 Federal Emergency Management Agency Type I (FEMA) - 4 canines
 - 🐾 National Association for Search and Rescue (NASAR) - 2 canines
 - 🐾 North American Police Work Dog Association (NAPWDA) - 1 canine
 - 🐾 International Police Work Dog Association (IPWDA) - 4 canines
 - 🐾 Emergency Management Agency of Tennessee (EMAT) - 2 canines
 - 🐾 Search and Rescue Dogs of the United States (SARDUS) - 1 canine
- This was the first deployment for one canine. One handler, with the team for 15 years, reported 0 US&R deployments but did not specify the number of other missions they had performed. The other 12 canines had from 1 to >100 prior search missions.
 - 🐾 7 Canines had 1-14 prior mission
 - 🐾 4 Canines had 23-dozens of missions
 - 🐾 1 canine had more than 100 missions



Photo Courtesy MO-TF 1
 A. Brown & Molly

- Search capabilities were as follows:
 - 🐕 7 canines (50%) in Human Remains Detection (HRD)
 - 🐕 5 canines (36%) for Live Find (LF)
 - 🐕 2 canines (14%) were certified in both LF and HRD
- All live find alerting was via bark, HRD alerts included bark, sit, and down. Survey canine alerts were as follows:
 - 🐕 Bark for 9 canines (64%) including dual-trained canines
 - 🐕 Down for 3 canines (21%)
 - 🐕 Sit for 2 canines (14%)
 - 🐕 One dual-trained canine gave bark alert for LF and sit for HRD
 - 🐕 One dual-trained canine gave bark alert for both type finds

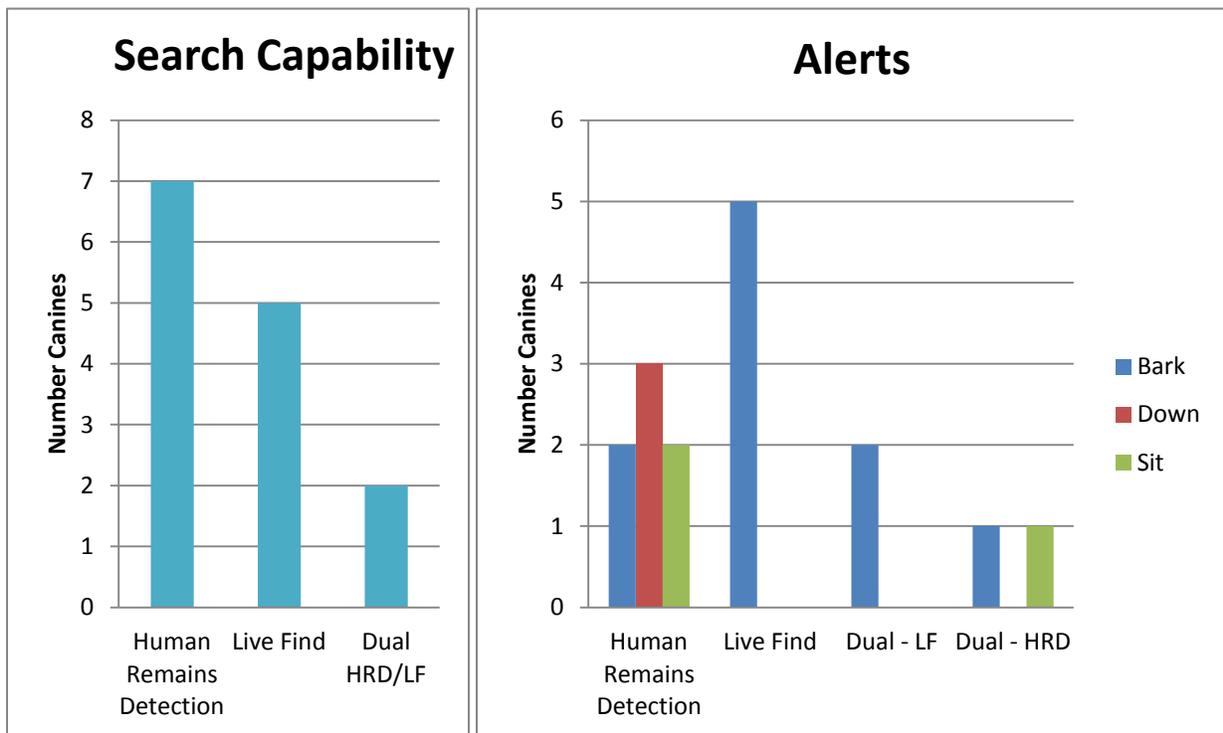


Photo Courtesy NE-TF 1
Stryker
R. Comegys Handler

Deployment Information

Mobilization

Handlers were given activation orders between May 22, 2011 and May 29, 2011. Handler-canine team arrivals on site was between 2.5 hours and 2 days (times not specified for 4 teams), from May 22 to May 30, 2011.

All Missouri based handlers received activation orders on May 22, between 1800 (40 minutes prior to the tornado touchdown in Joplin) and 2030 hours. The handler-canine teams arrived 2.5 to 8 hours later on site between 0100 and 0300 May 23, 2011.

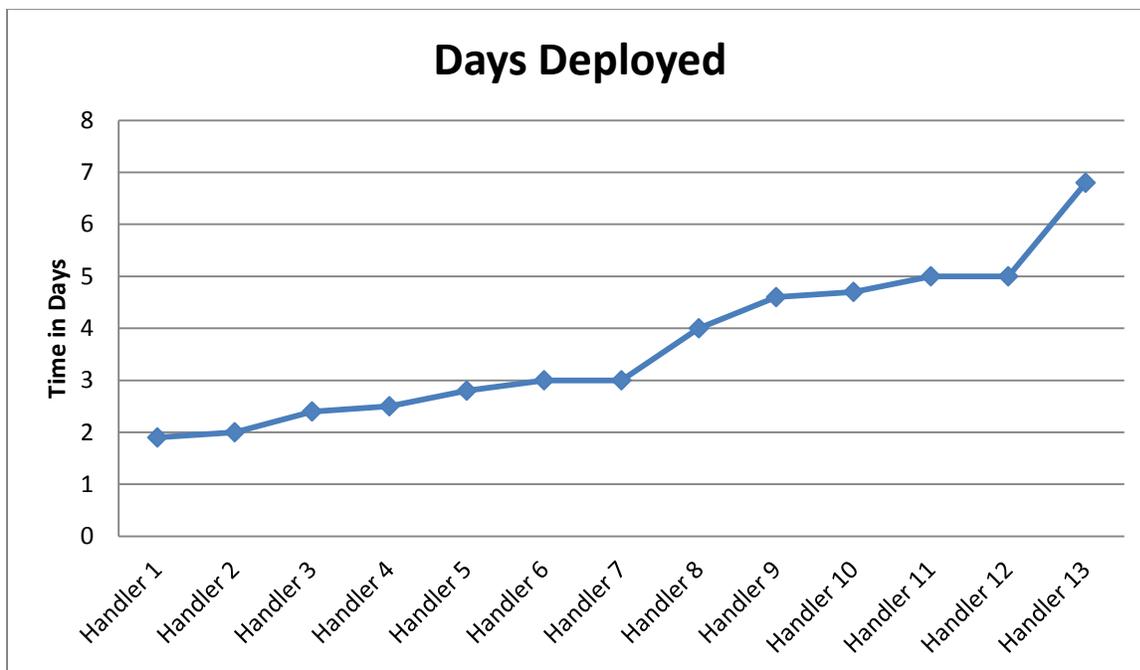
Base of Operations (BoO, Staging)

Twelve of the 13 handlers (92%) reported the presence of a BoO. The locations varied, including a church, a hospital, a high school, Joplin HS, Home Depot, across from a hospital, and across from a high school.

Demobilization and Duration of Deployment

Handlers were given demobilization orders between May 24, 2011 and June 3, 2011. Their actual departure times were from 1 to 18 hours later.

The duration of their deployment from activation to departure from site ranged from 1 day 21 hours to 6 days 20 hours. Their arrival time at home base is unknown.



- Mean = 3 days 14 hours
- Median = 3 days

Briefings

Medical Stations

The handlers reported the presence of medical stations set up at the BoO, a high school parking lot, and across from a hospital. A veterinarian and VT were known to be at the station(s) by 6 of the handlers.

- 7 handlers (54%) recalled being briefed on the location of a medical station
- 3 handlers did not recall receiving this information
- 3 handlers were unsure



Canine Medical Station
Photo Courtesy NE-TF 1

Briefing about an off-site veterinary hospital was known to 4 of the handlers. One of them was briefed on the information by their Search Team Manager (STM), the others could not recall who gave them the information.

HazMat and Safety

Two handlers reported receiving significant information from the STM or HazMat personnel regarding hazards. Included were antifreeze, oil, fuels, paints, pesticides, insecticides, fungicides, herbicides, and other lawn chemicals. The tar was added when canines began stepping in it. Most handlers realized there were contaminant hazards on their own, and instituted decontamination whenever they could.

Work

Work shifts ranged from 6 hours to 38 hours. One handler's report of two 4-hour shifts per day was counted as one 8-hour shift per day. Although counted as one continuous shift, some handlers reported there were no formal shifts, just a continuous blitz of searches when their work periods exceeded 16 hours.

- Mean = 12.3 hours
- Median = 11 hours
- Mode = 8 hours

Handlers reported working their canines from 1 to 4 shifts. In total, 41 shifts were reported. *However, the length of shifts varied so greatly that the relevance of this is unclear.*

- 1 canine worked 1 shift (16 hours long)
- 4 canines worked 2 shifts (one of those shifts was 38 hours long)
- 4 canines worked 3 shifts
- 5 canines worked 4 shifts

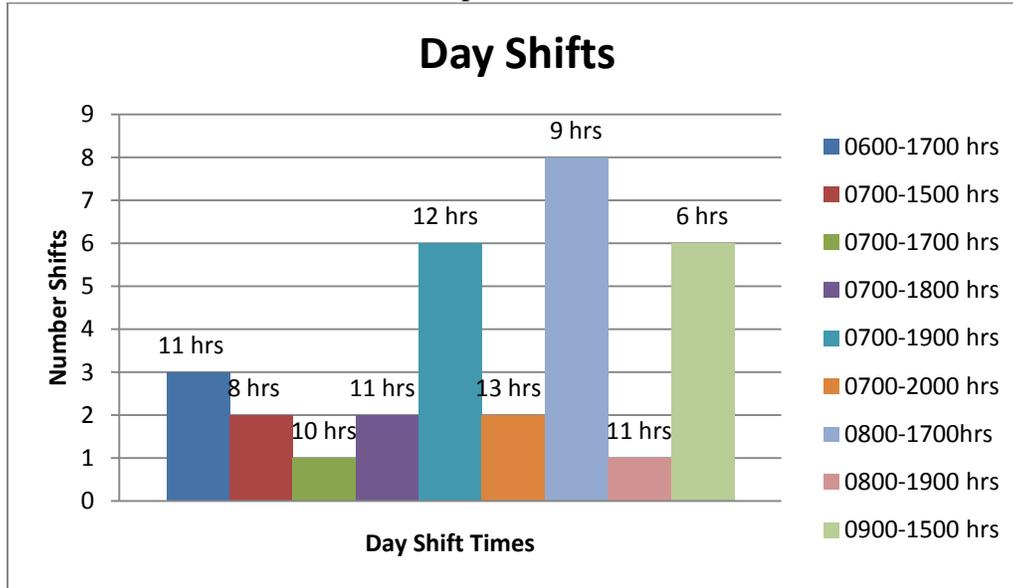
Shifts were conducted during daylight, evening, and some were a combination of both day and night. The majority of shifts were during the day beginning at 0600-0800 hours and ending from 1500-2000 hours.

A total of 41 shifts were reported: 31 day shifts, 9 day/ night shifts, 1 shift time not reported and was not included in the data.

Day Shift Times (31 shifts, 77.5%)

- 3 shifts 0600 - 1700 hours
- 2 shifts 0700 - 1800 hours
- 8 shifts 0800 - 1700 hours
- 2 shifts 0700 - 1500 hours
- 6 shifts 0700 - 1900 hours
- 1 shift 0800 - 1900 hours
- 1 shift 0700 - 1700 hours
- 2 shifts 0700 - 2000 hours
- 6 shifts 0900 - 1500 hours

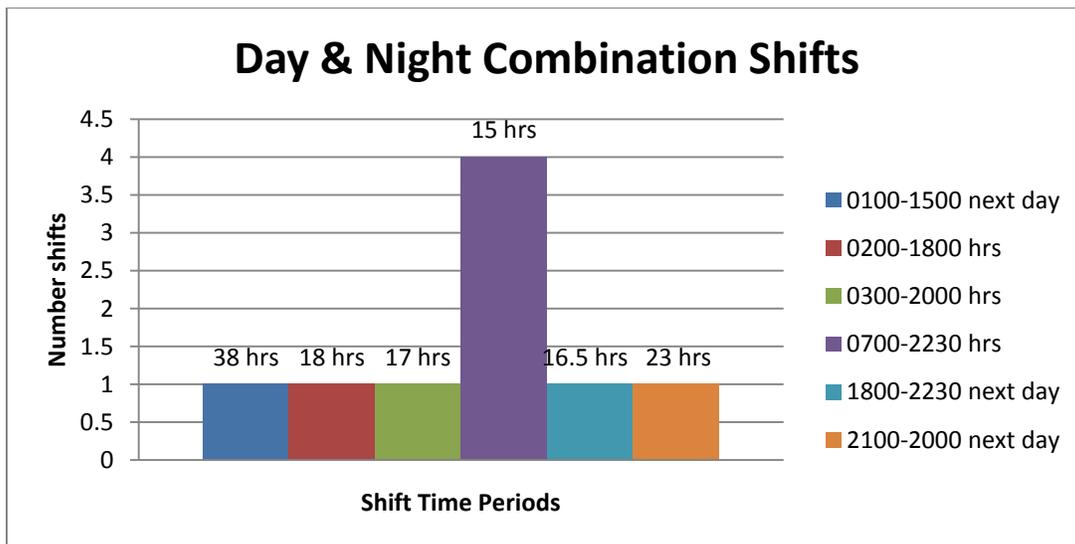
Day shifts ranged from 6 hours to 13 hours. These hours do not reflect additional time spent on physical examinations and decontamination procedures.



Mean 9.6 hours, Median 9 hours, Mode 9 hours

Shifts that encompassed Day and Night Hours (9 shifts, 22.5%)

- 1 shift 0100 - 1500 next day (38 hours)
- 4 shifts 0700 - 2230 (15 hours)
- 1 shift 0200 - 1800 (18 hours)
- 1 shift 1800 - 2230 next day (16.5 hours)
- 1 shift 0300 - 2000 (17 hours)
- 1 shift 2100 - 2000 next day (23 hours)



Work-Rest Cycles

Rest periods were reported by 12 of the 13 handlers for 13 of the 14 canines. One handler was unsure and could not recall specific information. Rest periods ranged from 15 minutes to 2 hours. Due to the wide variation, handler comments are listed below.

- 15 min breaks first 38 hr shift; two 1 hour breaks next 12 hr shift
- 15-30 min rests while en route to next search location
- 15-30 min rests with 30-60 minute searches
- 15-30 min rest per 45 minutes of search
- 20 min rests with 20 minute searches
- 30 min rests for 1 hour searches; 10 min searches with 30 min rests
- 30-40 min plus rest during travel during 12 hour shifts each day
- 30-60 min rests every 1-4 hours
- 30 min to 2 hour rests between searches lasting 1-5 hours
- 45 min rests (but this varied) per 1-2 hours of search
- 1-2 hrs rest AM, 30-60 min PM, 1-2 hours next day at noon
- 2 hrs rest (weather hazard) midway in 18 hr shift, other brief rests
- Unsure, cannot recall

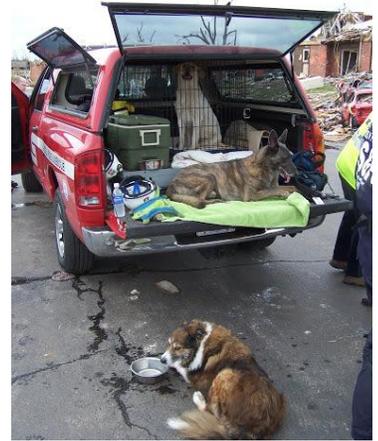


Photo Courtesy NE-TF 1
Moses, Stryker, Talyn

Search Finds for 10 of 14 Canines

Live Finds

- 🐕 Three handlers with LF canines reported canines had no alerts
- 🐕 One handler reported 2 alerts: one victim asleep in car, the other asleep in a ruined house

HR Finds

- 🐕 Four handlers with HRD canines reported no finds
- 🐕 One handler's canine alerted where a body had previously been removed
- 🐕 One handler's canine alerted in water but when a second HRD canine did not indicate, the handler called it clear. When a body surfaced the next day the search was deemed 'missed by the canine', but the handler was quick to point out it was actually 'missed by handler'
- 🐕 One handler with a dual-certified canine reported over a dozen deceased bodies plus pieces. She stopped counting after a while.



Physical Examinations (PE)

Pre-Mission

- 1 canine (7%) had a PE by veterinarian just prior to the deployment
- 11 canines (79%) had no Pre-Mission Physical Examination by a licensed veterinarian.
- 2 handlers did not respond or did not recall.

Pre-Shift

Seven canines (50%) had a Pre-Shift PE and 7 canines (50%) did not.

- 6 of the canines had the exams performed by their handler
- 1 canine had an exam performed by a veterinarian and veterinary technician (VT)

Post-Shift

Eleven canines (79%) had a Post-Shift PE and 3 (21%) did not.

- 6 of the canines had their exams performed by their handler
- 4 of the canines had their exams performed by the handler, a veterinarian, and/or a VT
- 1 of the canines had their exam performed by a veterinarian and/or VT

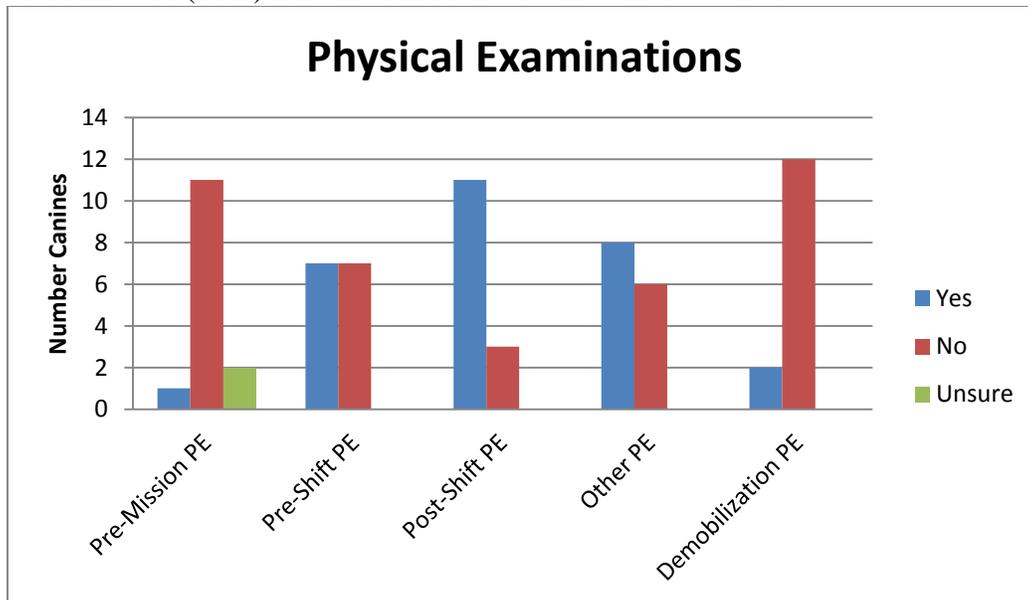
Other PE

Eight canines (57%) received physical examinations at times other than previously stated. For 4 of the canines this was for a medical concern, for the other 4 it was not.

- 4 of the canines had their exams performed by their handler
- 2 of the canines had their exams performed by a veterinarian and/or a VT
- 1 of the canines had their exam performed by a team MD
- 1 Handler did not specify who performed the exam

Demobilization

Two canines (14%) received a demobilization PE. This was performed by a veterinarian at the BoO. Twelve canines (86%) did not receive a Demobilization Exam.



Examination Parameters

The examinations performed by veterinarians included temperature, pulse, respiration, heart and lung sounds, eyes, ears, mucous membrane (MM) color, MM capillary refill time (CRT), MM hydration, skin, and paw pads.

Examinations performed by handlers, MD, and VT had medical parameters checked for the following percentages of the time:

	<u>Pre-shift PEs</u>	<u>Post-Shift PEs</u>	<u>Other PEs</u>
Temperature	17%		
Pulse, Respiration	67%	44%	25%
Heart, lung sounds	33%	89%	100%
Eyes and Ears	100%	44%	25%
MM color, CRT	83%	100%	25%
MM hydration	83%	90%	100%
Skin, paw pads	100%	78%	100%
Other: stool/urine/lame	67%	100%	100%
		67%	75%

Preventative Programs

All 14 deployed canines were on heartworm preventative medication and flea & tick repellent products. Two of the canines experienced a significant tick infestation, one of whom had their repellent product reapplied during the deployment. The infestations were bad enough to warrant follow-up veterinary care.

Subcutaneous Fluids

Prophylactic subcutaneous fluids were administered to 3 of the 14 canines (21%). The reason they were given to 2 of the canines was to prevent dehydration, and they received the treatments both before and after their shifts. The third canine received them because dehydration was a concern, and this canine did suffer from dehydration during the deployment.

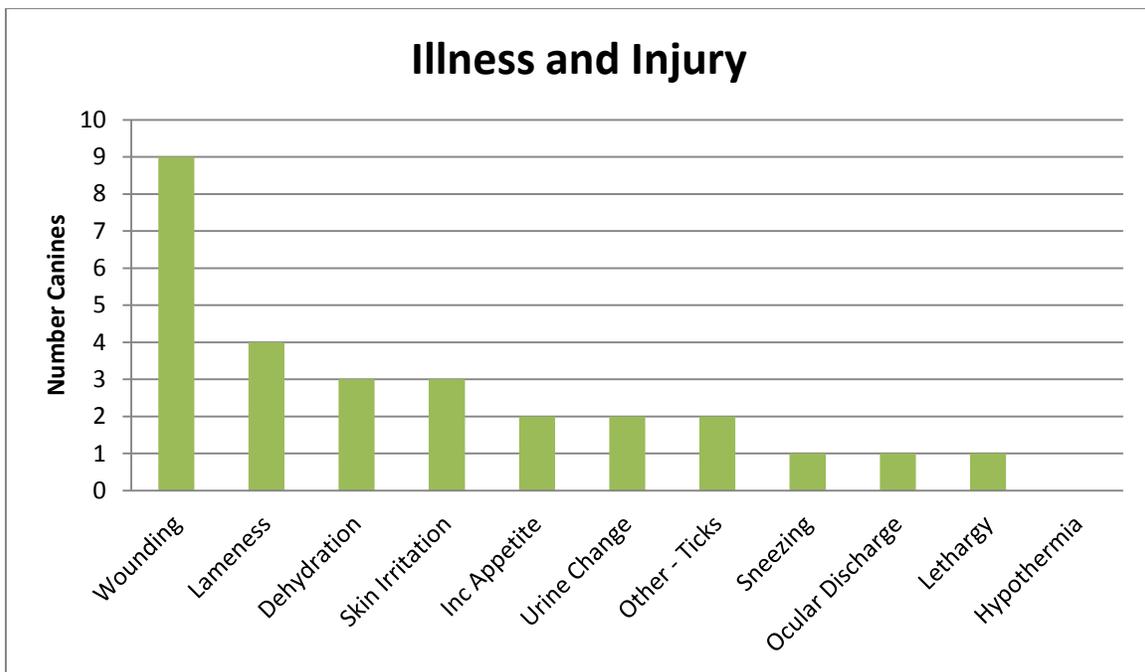


Photo Courtesy NE-TF 1
SC Fluids for Search Canine

Deployment Injury and Illness

Injury and or illness was incurred by 11 of the 14 canines (79%). Seven of these canines experienced multiple problems during the deployment.

Wounding	9 canines - 64%	Other - ticks	2 canines - 14%
Lameness	4 canines - 29%	Sneezing	1 canine - 7%
Dehydration	3 canines - 21%	Ocular discharge	1 canine - 7%
Skin irritation	3 canines - 21%	Lethargy	1 canine - 7%
Increased appetite	2 canines - 14%	Hypothermia	1 canine - 7%
Urination change	2 canines - 14%		



Injury and Illness Accounts

Canine A experienced increased appetite, decreased and dark yellow urine, dehydration and wounding. The appetite demand was treated by giving small amounts of food frequently throughout the deployment. The urine, consistent with signs of dehydration, was monitored. Dehydration was treated by increasing water intake. A small paw pad laceration from stepping on glass was cleansed and bandaged. An antibiotic was prescribed.

Canine B experienced hypothermia, which was treated by providing warmth via body heat.

Canine C experienced ocular discharge, decreased urination, dehydration, skin irritation/infection, and wounding. The eyes were cleaned with a damp cloth. The urine, decreased and dark yellow, is consistent with signs of dehydration. There were lacerations and cuts on the paw pads. These began oozing on the second day of deployment and were treated at home by the primary care veterinarian.

Canine D experienced wounding that consisted of multiple minor scratches and scrapes to the body, mainly limbs and abdomen. These were irrigated and observed until healed.

Canine E experienced lethargy, dehydration, wounding, and lameness. The wound, not specified, was bandaged. The lameness was treated with Rimadyl®, a NSAID. It is unknown if the wound was a cause of the lameness.

Canine F experienced skin irritation and wounding. The skin became irritated from having tar shaved off the forelegs. Treatment for a puncture on a limb was not specified.

Canine G experienced sneezing, wounding, and lameness. Treatment for the sneezing included being given water and rest. An antibacterial/anti-itch salve from a veterinarian was applied to the paw pad wound. The lameness was treated with medications - Deramaxx®, a non-steroidal anti-inflammatory (NSAID) drug and Adequan® a polysulfated glycosaminoglycan (PSGAG).

Canine H experienced increased appetite, tick infestation, wounding, and lameness. Flea & tick repellent was applied for the ticks. A paw pad laceration was cleaned and a boot used for protection. A veterinarian also prescribed antibiotics. This wound was also the cause of the lameness.

Canine I experienced skin irritation, tick infestation, and wounding. The skin irritation was due to paw pads exposure to gasoline which was washed off with soap and water provided by firefighters. Cut paw pads were bandaged each day by a veterinarian or VT.

Canine J experienced wounding, a torn paw pad. This was irrigated and closed with surgical skin glue.

Canine K experienced lameness and joint soreness. This canine had been diagnosed with a tick-borne illness prior to the deployment and was being treated with antibiotics. The handler reported there was no lameness at time of deployment, and no other clinical signs (fever, lethargy, anorexia, joint pain, lameness). There was no Pre-Mission PE by a veterinarian.

Photo Courtesy NE-TF 1
Search K9 Stryker



Decontamination

Nine handlers reported there was a decontamination station set up at one or more locations. The locations were at the search sites and at the BoO. Eleven of the 14 canines (79%) were decontaminated at one or more times during the deployment:

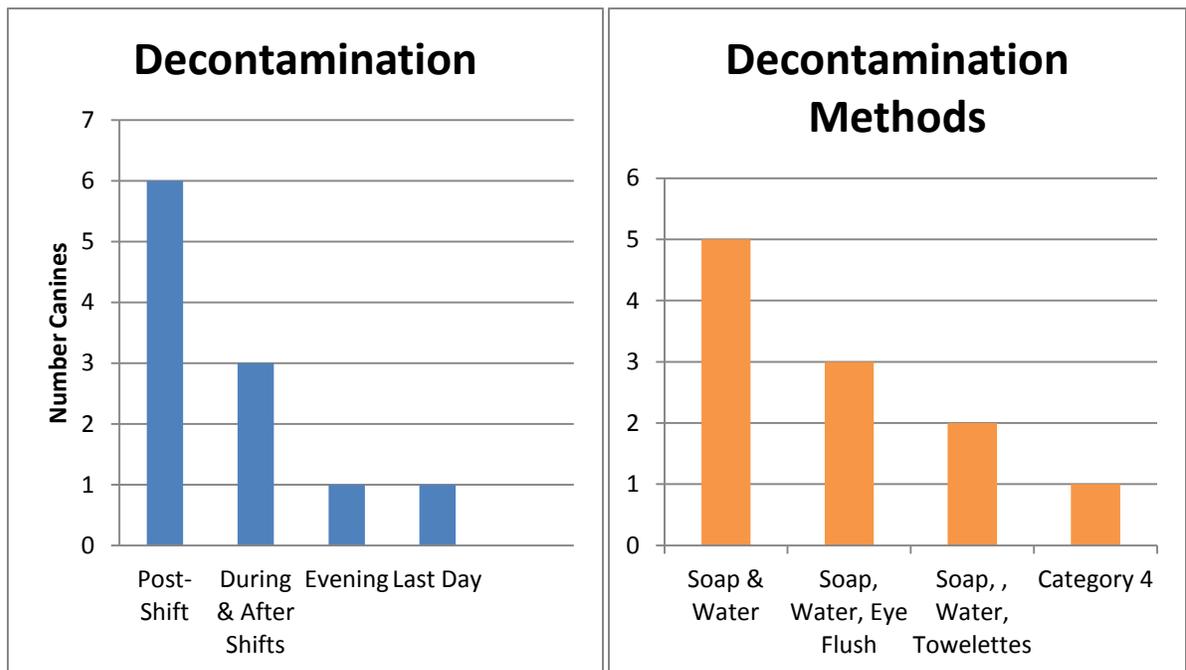
- 6 canines after each shift
- 3 canines during and after shifts
- 1 canine at night, before dinner
- 1 canine on the afternoon of the last day (deployed for 2 days)

Decontamination procedures included:

- 5 canines had soap and water
- 3 canines had soap, water, and eyes flushed
- 2 canines had water only
- 1 canine had soap, water, and moist towelettes



Photo Courtesy NE-TF 1
Handler R Habeger decons Search K9 Talyn



Post-Mission Examinations and Medical Issues

Post-Mission Veterinary Examinations

Twelve of the canines (86%) received a Post-Mission PE. All of them were performed by their primary care veterinarian.

- 8 canines within 24 hours of arriving home
- 1 canine within 3 days
- 2 canines within 7 days
- 1 canine within 30 days

Nine of the 12 canines (75%) examined by a veterinarian at home after the deployment were being examined for medical problems.

- 7 canines within 24 hours of arriving home
- 1 canine within 3 days
- 1 canine within 7 days

One handler reported their team getting follow-up veterinary examinations after hearing that the Missouri canines were ill.

The other 3 of the 12 (25%) had routine exams at days 1, 7, and 30 post-deployment. No medical problems were detected.

Alphabetical labels correspond to the same canine in the deployment injury and illness section.



Photo Courtesy NE-TF 1 - Home Depot Aisle

Canine A was examined within 24 hours of arriving home. A complete blood count (CBC) and biochemical profile blood tests revealed elevations in creatinine and blood urea nitrogen (BUN), measures of renal function. Blood test repeated 7 days later revealed BUN levels at high normal but the creatinine had increased. No urinalyses were obtained to determine renal concentrating ability. The handler reported that with rest and regular food and water the canine was clinically back to normal within 2 days.

Canine B was examined within 24 hours of arriving home. A CBC and biochemical profile blood tests revealed mild decreases in red blood cell count and hematocrit. Test were repeated 5 days later, revealing an elevated BUN, however 2 days later the tests were within normal limits. No other follow-up information was reported.

Canine C was examined within 24 hours of arriving home. All 4 paw pads were abraded and tender. A CBC and biochemical profile blood tests revealed mild elevations in cholesterol and amylase, and mild decrease in phosphorus. Test were repeated 5 days later and all was within normal limits. The handler reported that all 4 paw pads sloughed, and were healed in 8 weeks.

Canine E was examined within 24 hours of arriving home. Diarrhea, polyuria, polydipsia, and polypnea were noted. Several abrasions covered the distal limbs and back, and the right stifle (knee) was tender and swollen. Rimadyl® was administered for the knee, but discontinued after blood test results were received. The knee pain resolved with cage rest. A CBC and biochemical profile blood tests revealed significant elevations in liver enzymes indicative of liver damage. Prescription L/D diet and Denosyl® were prescribed for the liver. The canine was referred to a veterinary medical teaching hospital 3 days later. Physical parameters were normal. There was some tar still present on the top of the paws from the last search. Blood drawn for CBC and chemical profile revealed liver enzymes were still elevated, and the ALT was higher than before (3 days prior). Urinalysis revealed mild increased bilirubin and trace protein. Thoracic and abdominal radiographs, and abdominal ultrasound were normal. The special diet was discontinued. Omega-3 fatty acids, Vitamin E, and Denamarin® were prescribed. Blood tests were repeated and the abnormalities resolved within 3 months.

Canine F was examined within 24 hours of arriving home. Blood tests were performed. The handler reported there were slightly elevated levels on the blood panel indicative of exposure to chemicals. The handler reported that within two weeks blood levels were back to normal. Veterinary records could not be obtained.

Canine G was examined within 7 days of arriving home. The exam was for a routine check, but blood tests revealed abnormalities that may be consistent with chemical exposure, namely organophosphate. The handler reported everything was normal at follow-up checks within 2 weeks of the first visit. Veterinary records could not be obtained.

Canine H was examined within 24 hours of arriving home. There was massive infestation of ticks. They were removed by picking them off and use of a tick collar. The veterinarian prescribed doxycycline. Veterinary records could not be obtained.

Canine I was examined within 24 hours of arriving home. The canine had a massive infestation of ticks, estimated at more than 100. Blood tests were performed to check for tick-borne diseases. Veterinary records could not be obtained.

Canine K was examined within 3 days of arriving home for joint soreness, especially a shoulder. This canine had been diagnosed with Rocky Mountain Spotted Fever (RMSF) prior to deployment and was being treated with antibiotics. There were no abnormalities prior to deployment. The veterinarian suspected the deployment may have exacerbated the disease. The issue took 3 months to resolve. Veterinary records could not be obtained.



Photo Courtesy MO-TF 1



Photo Courtesy MO-T 1
Handler A. Brown and Molly give victim comfort

To all the handlers who responded to the survey, provided photographs, and stuck with me through all the delays in getting this report finished, thank you!

