

**The Effect of the Dog Breed Ban on Bite Incidences and the Usage of  
Rabies Post-Exposure Prophylaxis on Fort Riley**

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## Abstract

This study evaluated the impact that the Banned Dog Breed Policy on Fort Riley military installation has had on the number of dog bite-related injuries seen in the emergency room at Irwin Army Community Hospital (IACH) and the amount of rabies post-exposure prophylaxis (PEP) used at any of the medical clinics on Fort Riley. The Policy was implemented on Fort Riley on 01 October 2008, banning American Staffordshire Terriers, Staffordshire Bull Terriers, Pit Bulls, and mixes of these breeds. This study also evaluated the average percentages of dog bite reports received by Veterinary Services by the next duty day per year and overall over a 10-year period. Data used to calculate the incidence rates and percentages were gathered from Public Health Command and Health Information Management. The population statistics were obtained from Residential Communities Initiative, Housing Division. Results show that the breed ban has made no significant difference in the incidence rates of dog bites, with an average incidence of 5.265 per 1,000 persons before the breed ban and 4.255 per 1,000 persons after the breed ban and an alpha of 0.982. There was an increase from 34 before the breed ban to 43 after the breed ban of number of people that initiated PEP. There was no linkage between the unpredictable number of PEP series' initiated and the steadily growing population. There were a total of 701 dog bite reports from 2003-2012, of which 27.25% (191) were not received by Veterinary Services by the next duty day. This is vital to public safety due to the fact that staff at Veterinary Services are responsible for locating and quarantining an animal following a bite incident to minimize the risk of another incident occurring with the same dog, as well as the possibility of rabies exposure to another person from the same dog. Results indicate that the Banned Dog Breed Policy has not had the intended effects and that the rates at which reports are received by Veterinary Services need to increase in order to increase public safety.

## **Chapter 1: Introduction**

This study was conducted at the Fort Riley Department of Public Health in Kansas. This study has three different objectives. The first objective was to study Breed-specific legislation (BSL), the Banned Dog Breed Policy that was implemented on Fort Riley effective 1 October 2008, and the effect it has had on the reduction of dog bite-related injuries seen in the emergency room at the hospital on post. The second objective was to evaluate the usage of rabies post-exposure prophylaxis (PEP) on post in general over a 10-year period and in terms of the Banned Dog Breed Policy. The third objective was to determine the number of dog bite reports that Veterinary Services received and by the next duty day.

BSL has been implemented in various countries and states world-wide, many of which have been repealed on account of not having the intended effect— an increase in public safety by reducing the number of dog bites. The purpose of the BSL portion of this study was to determine if the breed ban has had the intended effect or not, and if not, to eventually cause the policy to be repealed on post. Also provided are the demographics of patients that were involved in a dog bite-related incident.

Rabies is a disease that is almost always 100% fatal, but is also 100% preventable if the correct steps are taken. Post-exposure prophylaxis (PEP) administered shortly after potentially being exposed to rabies is the only preventive measure that can ensure one will not become symptomatic and die; thus, the availability and use of PEP is important. The purpose of the PEP section of this study was to determine the amount of PEP used over a 10-year period in comparison to the increase in population living on post and to determine if the amount of PEP varies before and after the Banned Dog Breed Policy was implemented in 2008.

Fort Riley Veterinary Services is responsible for maintaining the bite report forms, and these forms are received from medical personnel at the hospital on post. It is important for Veterinary Services to receive these reports in a timely manner so proper steps can be taken to prevent the potential spread of rabies. The purpose of this section of the study was to determine how quickly reports were submitted to Veterinary Services. This was done by determining the average percentage of reports that were and were not received by the next

duty day per year over a 10-year period and the average percentage of reports received and not received by next duty day for the whole 10-year period.

## **Chapter 2: Breed-Specific Legislation and its Effect of Fort Riley**

### **Background**

Breed-Specific Legislation (BSL) is defined as “any bill that seeks to ban or place severe restrictions on owners of a particular breed of dog or dogs with certain physical characteristics, regardless of whether or not the dog is a problem in the community” (American Kennel Club, 2009). Many cities, states, and even entire countries have turned to BSL as a means of protecting communities from dangerous animals; however, as time passes, many of these communities have come to realize that BSL does not work, and have repealed these breed-specific policies. Breeds that have been discriminated against amongst several BSL policies include Rottweilers, German Shepherds, American Staffordshire Terriers, Pit Bulls, and/or any mix or cross of these breeds. First and foremost, there is no such breed as the ‘Pit Bull.’ Some of the main breed registries—the American Kennel Club (AKC) and the Westminster Kennel Club (WKC)—do not recognize “Pit Bull” as a breed. The term Pit Bull will be used in this report in reference to American Staffordshire Terriers, Staffordshire Bull Terriers, and mixes of these breeds, which are typically the breeds deemed aggressive for having similar physical characteristics of strength.

The American Staffordshire Terrier, described by Westminster Kennel Club as “a loyal, trustworthy and courageous companion, whose intelligence, strength and agility make him an excellent all-around dog,” is one of two breeds most commonly referred to as Pit Bull (WKC, 2014a). The other breed is the Staffordshire Bull Terrier, which the Westminster Kennel Club describes as “a foremost all-purpose family dog with a steady and dependable nature, outstanding athletic ability in the performance sports of agility and flyball, and the intelligence to be successful in the obedience ring” (WKC, 2014b).

In the past, before Pit Bulls obtained the stigma of being aggressive, they were seen as dogs very similar to the Westminster Kennel Club description. In the early 1900s, Pit Bulls were

well respected and were even used as mascots in the military. Sergeant Stubby was a Pit Bull who served as the mascot for the 102<sup>nd</sup> Infantry Battalion, 26<sup>th</sup> Yankee Division, and even went on to fight in World War I (Wikipedia, 2014). In France, he became aware of his surroundings and learned to warn the soldiers of the presence of gas bombs (Wikipedia, 2014). The military also chose the Pit Bull as the breed of dog to represent dignity and tenacity on the propaganda war posters in WWI (Figure 1). Even Former Presidents Theodore Roosevelt and Woodrow Wilson owned Pit Bulls (Millan, 2014). Although there are many other Pit Bulls used as mascots on television and in movies that can be named, the most recognizable Pit Bull is 'Petey' from the *Little Rascals and Our Gang* television series.

**Figure 1:** Pit Bull on War Poster



(Courtesy of Cesarways.com)

In recent years, media exploitation and banning of Rottweilers and German Shepherds has decreased as the focus has now turned to Pit Bull-like breeds. As mentioned by the Westminster Kennel Club, dogs with physical characteristics similar to the American

Staffordshire Terrier and Staffordshire Bull Terrier are known to have strength, athletic ability, and intelligence. These characteristics make for good, obedient family dogs; however, they also allow for these dogs to be good candidates and targets for dog fighting, as well as the exploitation of their strength and ability to potentially cause more harm to a person or animal if a bite were to occur. Bites and attacks by Pit Bulls are more commonly exploited in the media in comparison to any other breed, specifically due to the aggressive stigma that these breeds have been given. The attention that the media shines on Pit Bulls only perpetuates this negative stigma even further, even though the media is lacking the knowledge and understanding of what these breeds really are: strong, intelligent, and dependable dogs. When Pit Bulls are portrayed negatively by the media, the public is bound to take on this perception of the breeds.

### **Previous Studies**

Many studies have analyzed the effect of breed-specific legislation, or lack thereof. All but one of these studies concluded that BSL does not reduce the number of dog bite-related injuries. In Germany, a study was conducted by Ott, Schalke, Gaertner, and Hackbarth (2008) that consisted of testing 415 dogs belonging to the breeds listed as dangerous by the legislation. Ninety-five percent of these dogs “showed no indication of disturbed aggressive communication or aggressive behavior in inappropriate situations” (Ott et al., 2008). When a control group of 70 golden retrievers was tested using the same methods, 98.57% of the dogs reacted in an appropriate manner. When comparing the two groups of dogs, there was no significant difference to prove the legislation reasonably implemented (Ott et al. 2008).

A prospective study conducted by Klaassen, Buckley, and Esmail (1996) analyzed the percentage of patients seen in the local accident and emergency department with mammalian bites that were caused by dogs before and after the Dangerous Dogs Act 1991 was implemented. Before the Act, dogs were responsible for 73.9% of all mammalian bites and after the Act, 73.1%. In fact, Klaassen et al. discovered that the second most common mammalian bite was caused by humans, and “human bites were as common as those from the most implicated breed of dog” (1996, Abstract). Not only does this study show that there is no



significance in the effect of the Act, but it also shows that humans are responsible for more bites than dogs deemed dangerous by the act.

### **Stereotypes and Misidentification**

One of the main discrepancies in using BSL is the inability of a person, regardless of their career field, to correctly identify the breed of an animal based on visual inspection. Many studies have been conducted to determine the ability of identifying dog breeds based on visual inspection, and the results of these studies deem BSL unjust and a matter of physical profile discrimination against all dogs with similar physical characteristics to Pit Bulls. When a dog is involved in a bite or attack, there is no DNA analysis of the dog to determine the actual breed(s). If the dog resembles the physical appearance of a Pit Bull, it is automatically seen as just another aggressive Pit Bull involved in the ever-so-prevalent Pit Bull attack. If this is the case, how many dogs have been banned and possibly even euthanized just based on their appearance, that don't actually have any DNA of a Pit Bull?

One study conducted by Voith et al. (2013) consisted of 986 participants from 30 locations throughout the US and 20 dogs of various breed mixes. The majority of these participants were or had been in an animal- or veterinary-related field of work. These participants were each shown a one-minute video of each of the 20 dogs, giving a well-rounded, full-bodied and full-face visual of each dog. The participants were asked to identify which breed(s) he or she thought to be the predominant breed(s) in each dog. For 14 of the 20 dogs, less than 50% of the participants were able to visually identify the breeds that matched DNA analysis. Of these dogs, two had been visually identified as a Labrador Retriever (39.9% of respondents) and a German Shepherd (61.2% of respondents), but their DNA analysis proved they both had 25% of American Staffordshire Terrier DNA in their genes. Another dog had been visually identified as Pit Bull by 39.5% of respondents and American Staffordshire Terrier by 12.1% of respondents, for a total of 51.6% of respondents. The mixed breeds of this specific dog proved to be 25% Chow Chow, 25% French Bulldog, and 12.5% each of Clumber Spaniel, Dalmatian, Gordon Setter, and Great Dane.

The conclusion of this study demonstrates that even people in animal- and veterinary-related fields were not capable of accurately identifying the breeds of a dog based on appearance only. This fact alone should make BSL void in all aspects unless policy municipalities approve a DNA analysis on each dog they seek to ban. Breed-Specific Legislation has no evidence of reducing the risk of dog bites or attacks, and dogs cannot be correctly identified based on appearance, and yet every military base in the US has a policy against certain “aggressive” breeds. Eventually, the military and all other policy municipalities will have to re-evaluate their situation and implement a Dangerous Animal policy to maintain control of animals with history of aggression in order to actually have an impact on public safety and public health.

### **Fort Riley**

In an attempt to increase public safety and public health, the military decided to implement a Banned Dog Breed Policy. The purpose of this policy was to reduce the number of dog bites, which would simultaneously reduce the risk of potential rabies exposures; however, previous studies have shown that breed-specific legislation does not effectively reduce the incidence of dog bites.

In 2008, Fort Riley implemented the Banned Dog Breed Policy: Fort Riley Regulation 40-18, Pet Control and Disease Prevention (2008). The outline of the Banned Dog Breed Policy follows:

1. Effective 1 October 2008, Pit Bulls, American/Staffordshire Terriers, and crosses of these breeds will no longer be allowed on Fort Riley. This policy applies to Soldiers, Family members and civilians who own a Pit Bull, American/Staffordshire Terrier, or a cross of this breed of dog. Any Pit Bull, American/Staffordshire Terrier, and crosses currently residing in on-post housing and registered with the Fort Riley Veterinary Clinic before 1 October 2008 will be allowed to remain in on-post housing. However, no newly acquired Pit Bulls, American/Staffordshire Terriers, or a cross of these dog breeds will be allowed.

2. This breed of dog has been bred for the purpose of aggression and may pose a danger to Soldiers, Families and visitors to Fort Riley. The Pit Bull, American/Staffordshire Terrier, or a cross of this breed has a genetic propensity which may lead to unprovoked aggression or attacks. This policy has taken into account the fact that Soldiers and Families become very attached to their pets; however, it also takes into account the fact that the safety of everyone on the installation is the primary concern.

### **Purpose**

The first objective was to evaluate the literature as well as other sources to determine the results of previous studies on breed-specific legislation. The second objective was to collect data from Irwin Army Community Hospital's (IACH) medical record database and determine the incidence of dog-bite related ER visits for a two-year period before and two-year period after the Banned Dog Breed Policy was implemented. The third objective was to identify the characteristics of patients that make them more prone to dog bites than others.

### **Methods**

The data used to determine the difference in risk of dog bites was collected from Health Information Management at IACH on Fort Riley. The time period selected for this study included all cases related to dog bite-related injuries in which the patient sought medical attention in the emergency room at IACH between 01 January 2004 and 31 December 2013. These cases consisted of all encounters that included the diagnostic code of ICD-9, E906.0, and V01.5, or any chief complaint containing the text "dog" within the selected time period. The variables that were studied included the number of cases of dog bite-related injuries, age at the time of attack, gender, patient category, and Family Member Prefix.

The time periods that were analyzed were October 2005 through September 2007 and October 2009 through September 2011. These time periods allow for a one year buffer before and after the 01 October 2008 policy implementation date to rule out potential bias in data.

Incidence was calculated as follows:

$$\frac{\text{\# of cases of dog bite-related doctor visits in the population during a specified time period}}{\text{\# of persons who are at risk of getting bitten by a dog during this time period}} \times 1,000$$

When comparing incidences rates before and after the policy was implemented in 2008, the significant difference was calculated using a chi-square test within Excel. The formula for the chi-square test used was =chisq.test(x,y), where x represents the first column of data and y represents the second column of data.

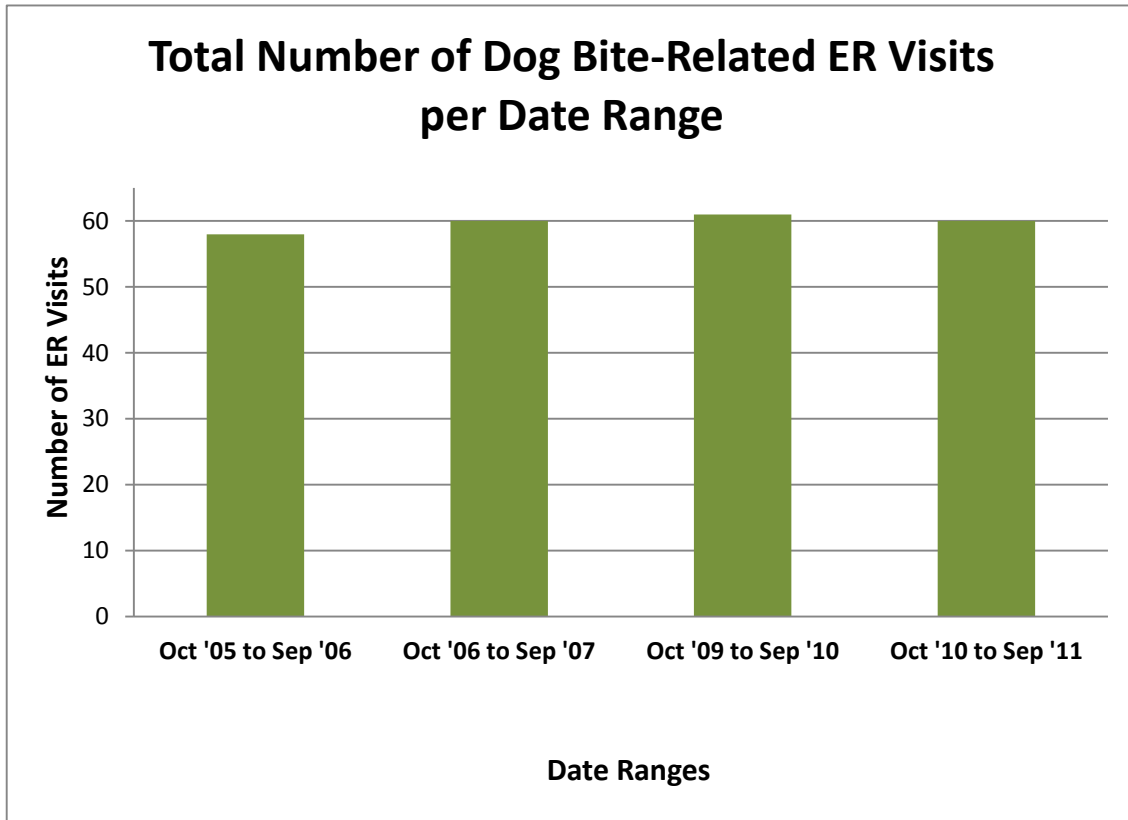
The number of cases was obtained from data collected through Health Information Management at IACH. The population data was obtained from the Residential Communities Initiative, Housing Division on Fort Riley. The total number of troops and family members combined living on post was calculated using a multiplier of 2.7.

## **Results**

### **The Effect of the Banned Dog Breed Policy on Fort Riley**

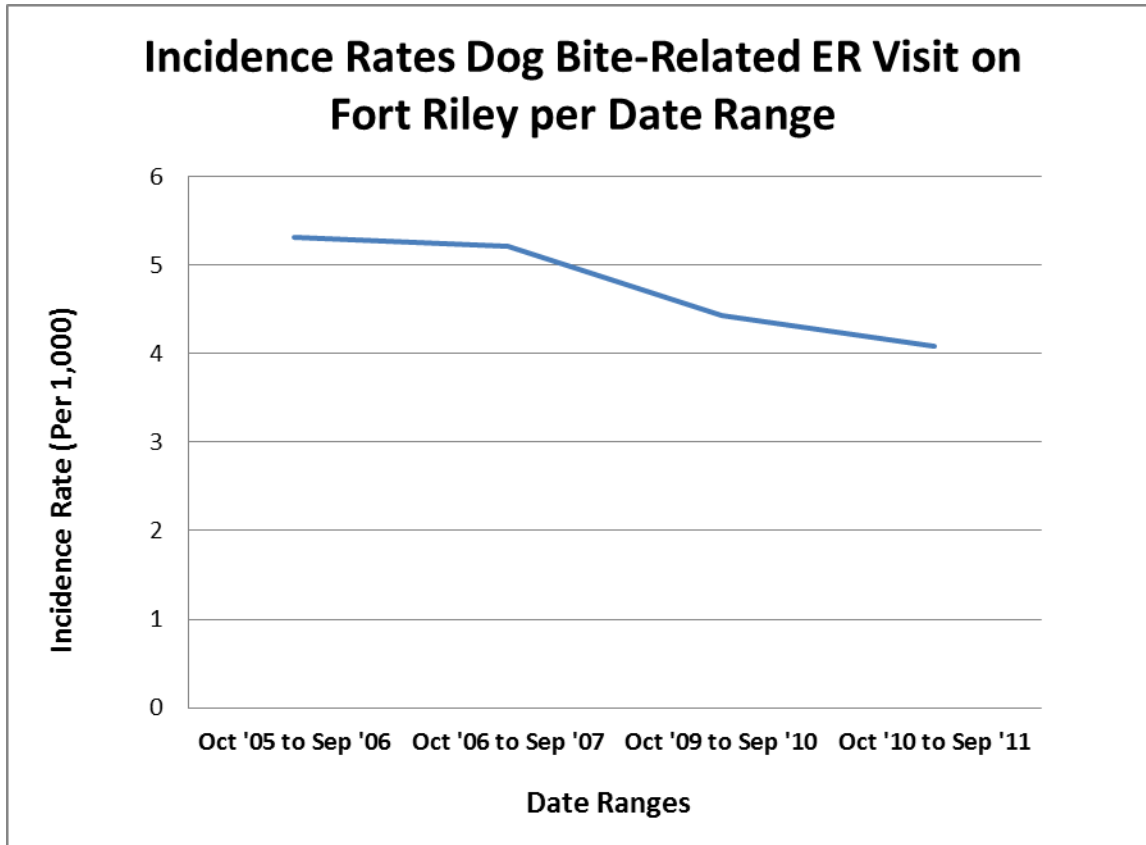
For the time period October 2005 to September 2007, there were 58 dog bite-related ER visits, October 2006 through September 2007 there were 60 dog bite-related ER visits, October 2009 to September 2010 there were 61 dog bite-related ER visits, and October 2010 to September 2011 there were 60 dog bite-related ER visits (Figure 2).

**Figure 2:** Number of Dog Bite-Related ER Visits at Irwin Army Community Hospital on Fort Riley, Before Breed Ban (October 2005-September 2007) and After Breed Ban (October 2009-September 2011).



The incidence of dog bite-related emergency room visits at IACH before the Banned Dog Breed Policy during the time periods October 2005 to September 2006 and October 2006 to September 2007 was 5.32 and 5.21 per 1,000 persons, respectively. The incidence rate after the policy during the time periods October 2009 to September 2010 and October 2010 to September 2011 was 4.43 and 4.08 per 1,000 persons, respectively (Figure 3).

**Figure 3:** Incidence Rates (per 1,000 persons) of Dog Bite-Related Injuries Seen at Irwin Army Community Hospital Emergency Room on Fort Riley Before the Breed Ban (October 2005-September 2007) and After the Breed Ban (October 2009-September 2011).



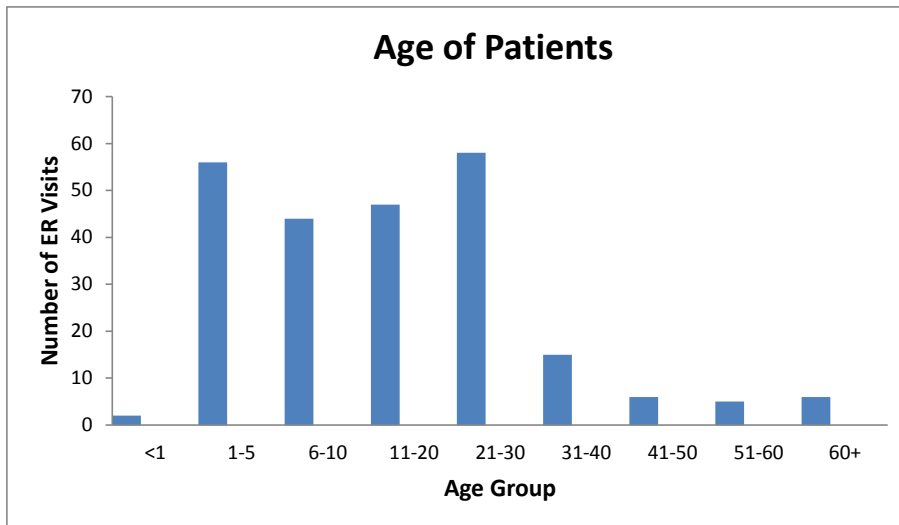
### Demographics

From October 2005 to September 2007 and October 2009 to September 2011, there were more males to seek medical attention at the IACH ER for dog bite-related injuries than females (Table 1). According to Gilchrist et al. (2008), adult males are more likely to be involved in a dog bite incident than adult females. The predominant age range affected was ages 1 year through 30 years (Table 1). There were 44 or more patients in each of the age groups from 1 through 40 years, and there were 15 or less patients in each of the age groups <1 year and 41 years and older. Dog bite-related injuries are most common in the United States in children between the ages of 5 and 9 (CDC, Home & Recreational Safety: Dog Bites, 2014).

**Table 1:** Age and Sex of Patients Seen in the Irwin Army Community Hospital Emergency Room on Fort Riley for Dog Bite-Related Injuries, October 2005-September 2007 and October 2009-September 2011.

Demographic	Number	Percentage
<b>Age Category (in Years)</b>		
<1	2	0.84
1-5	56	23.43
6-10	44	18.41
11-20	47	19.67
21-30	58	24.27
31-40	15	6.28
41-50	6	2.51
51-60	5	2.09
61+	6	2.51
<b>Sex</b>		
Male	128	53.56
Female	111	46.44

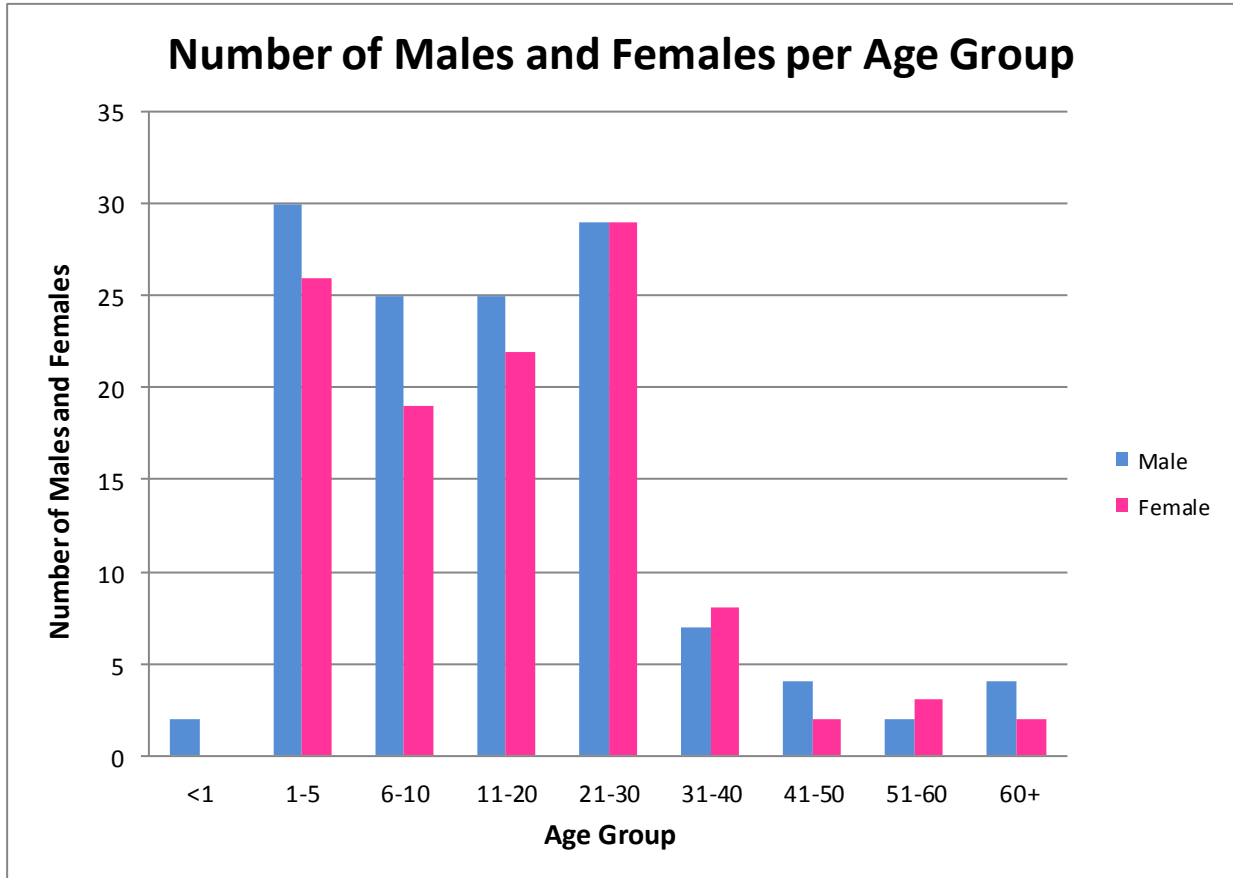
**Figure 4:** Number of Dog Bite-Related ER Visits at Fort Riley Irwin Army Community Hospital by Age Group, October 2005-September 2007 and October 2009-September 2011.



More males were seen in the ER for dog bite-related injuries than females for age groups <1 through 20 years. For age group 21-30, the number of males and females seen in the ER for dog bite-related injuries were the same. The remainder of the age groups alternated between the two genders each year (Figure 5).

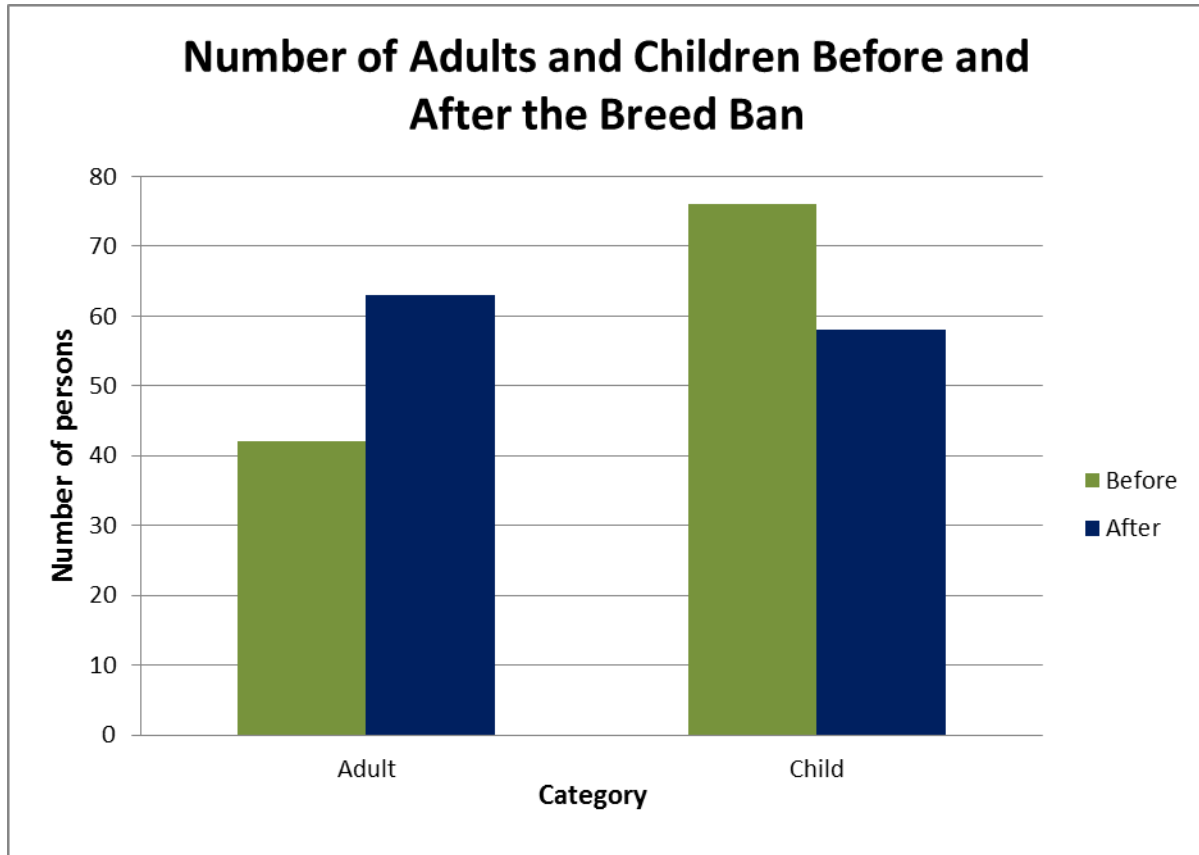


**Figure 5:** Number of Males and Females in Each Age Group Seen at Irwin Army Community Hospital Emergency Room for Dog Bite-Related Injuries, October 2005-September 2007 and October 2009-September 2011.



To determine if the breed ban had a different effect on children versus adults, Figure 6 was created. A child was considered someone under the age of 17; an adult was considered someone 17 years of age and older. The number of adults seen in the ER for dog bite-related injuries increased from 42 before the breed ban to 63 after the breed ban. Conversely, the number of children seen in the ER for dog bite-related injuries decreased from 76 before the breed ban to 58 after the breed ban. Overall, there were 118 ER visits before the breed ban and 121 ER visits after the breed ban. Although the overall numbers from before and after the breed ban were very close, the breed ban seems to have affected children and adults differently. Children were less likely to be seen in the ER for dog bite-related incidences than adults after the breed ban.

**Figure 6:** Number of Adults and Children Seen in the Irwin Army Community Hospital Emergency Room for Dog Bite-Related Injuries Before (October 2005-September 2007) and After (October 2009-September 2011) the Breed Ban.



Patient Category is a letter and number sequence given to each category of service member status and pay grade. For instance, A11 represents United States Army Active Duty Enlisted and Officer service members. Each patient is also given a Family Member Prefix (FMP) which indicates the relation to the service member. For instance, 20 is the service members themselves, 01 is the service member's first child, 02 is the service member's second child, etc.

According to Patient Category, the majority of patients to visit the ER for dog bite-related injuries were categorized as A41, which is US Army Active Duty Family Member. There were 175 patients categorized as A41, 73.22% of all patients in this study (Table 2). The next largest group was the patient category A11, which is US Army Active Duty Enlisted or Officer service member. There were 41 patients under this category, or 17.15% of all patients in this

study (Table 2). The other eight patient FMPs that appeared in this study were of small significance and are listed in Table 2.

The Family Member Prefix gives more insight to the relation between the patient and the service member. Prefixes 1-7 in this study represent the sequential order of child to the service member. For instance, 01 is the first-born child, 02 is the second-born child, and 07 is the seventh-born child of the service member. Of the 239 patients to be seen in the IACH ER for dog bite-related injuries, 143 (59.83%) were categorized as FMP 1 through 7. Prefix 20 represents the service member him or herself, of which 52 of the 239 patients (21.76%) were in this category. FMP 30 and 31 represent the first and second wives of service members, which accounted for 17.57% of all patients. The other two patients were under prefix 98, which represent civilians brought to IACH for an emergency, which accounts for only 0.84% of all patients (Table 2).

**Table 2:** Military Demographic Characteristics of Patients Seen in the Irwin Army Community Hospital Emergency Room for Dog Bite-Related Injuries

Demographic	Description	Number	Percentage
<b>Patient Category</b>			
A11	USA AD Enlisted or Officer*	41	17.15
A31	USA Retired LOS **	8	3.35
A32	USA Retired PDRL***	1	0.42
A41	USA Family Member AD	175	73.22
A43	USA Family Member Retired	8	3.35
A47	USA Family Member Deceased Retired	1	0.42
A48	USA Un-remarried Former Spouse	1	0.42
F41	USAF Family Member AD****	2	0.84
K93	Medicare-Civilian Emergency	1	0.42
K94	Medicaid-Civilian Emergency	1	0.42
<b>Family Member Prefix</b>			
01	First-born child	68	28.45
02	Second-born child	40	16.74
03	Third-born child	23	9.62
04	Fourth-born child	8	3.35
05	Fifth-born child	2	0.84
07	Seventh-born child	2	0.84
20	Service Member	52	21.76
30	Spouse or Former Spouse of Service Member	38	15.90
31	Second subsequent spouse	4	1.67
98	Civilian Emergency	2	0.84

\*=USA refers to United States Army; AD refers to active duty

\*\*=LOS refers to Length of Service

\*\*\*= PDRL refers to Permanent Disability Retired List

\*\*\*\*= USAF refers to United States Air Force

## Discussion

The years leading up to the implementation of the Banned Dog Breed Policy in October 2008 had a total number of bite-related injuries seen at the IACH ER of 58 and 60, respectively, and the years after the policy had a total number of 61 and 60, respectively. These results negate the purpose of the Banned Dog Breed Policy on Fort Riley—to reduce the number of dog bites. Although there was a slight increase in total numbers, the incidence rates actually decrease after the breed ban due to the growing population living on Fort Riley. The population of military members and their family members increased from approximately 10,893 in 2005 to 14,689 in 2011. With incidence rates of 5.32 and 5.21 per 1,000 persons prior to the policy and 4.43 and 4.08 per 1,000 persons after the policy, there is a slight decrease in incidence. With a chi-square test performed, alpha equals 0.982, which is greater than 0.05; thus, there is no significant difference between the incidence rates before and after the policy. These results suggest that the Banned Dog Breed Policy is not effective.

The age span that is predominately involved in these dog bite situations are those from ages 1 to 30, with the highest number of bites occurring in children ages 1 through 5, with 56 occurrences, and ages 21 through 30, with 58 occurrences. Although the proportion of patient gender is very close, there is still a slightly higher occurrence in males than in females, with 53.56% and 46.44% incidence rates, respectively.

Patient Category informs us that the majority of patients seen in the ER for dog bite-related injuries are US Army Active Duty service members and their family members, accounting for 90.38% of all patients in this study. Retired service members and their family members account for 7.53% of all patients. Service members and their family are allowed to use any military installation hospital, and two family members of United States Air Force Active Duty went to IACH ER for dog bite-related injuries, accounting for 0.84% of all patients.

Almost 60% of all patients in this study were children of the service member, and approximately 38% of all patients were the military service members themselves (21.76%) or their spouse (15.90%). These numbers are very informative to public health surveyors and professionals working in the area because it provides a good understanding of the certain demographics of the population that need to be educated. Children are more likely to be

involved in a dog bite-related incident, but according to IACH's medical records, adults are not far behind. This provides proof that all age groups need to be educated on how to approach, understand, and behave around dogs to reduce the risk of being in a situation where one could get bitten by a dog. Because bite report forms were incomplete, it was not possible to determine the breeds responsible for the bites or the relationship of the dog to the patient.

## **Chapter 3: Rabies and the Usage of PEP on Fort Riley**

### **Background**

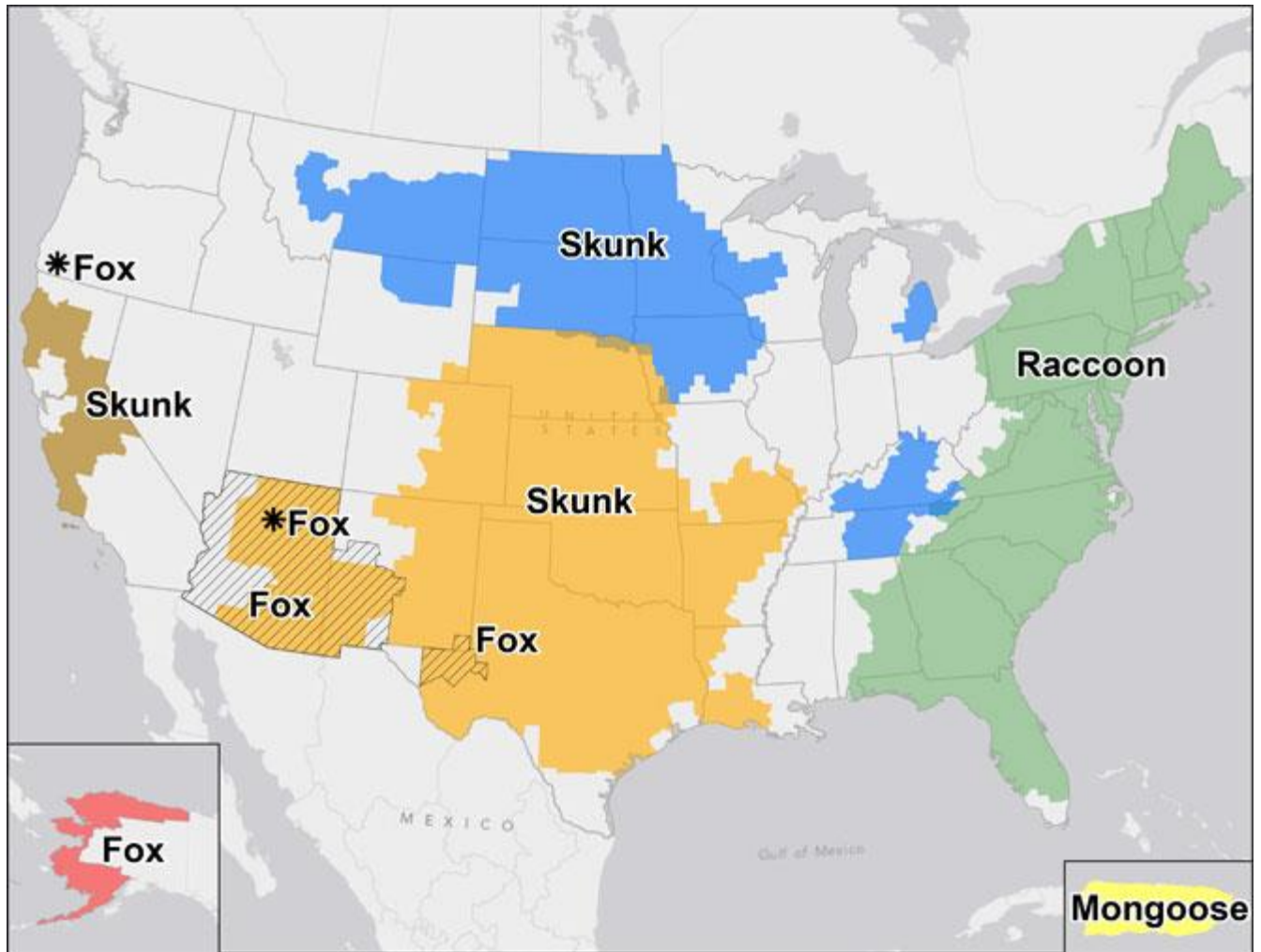
One concern in public health is the control of rabies. Rabies is a widely known virus and is one of the main reasons public health professionals warn people to stay away from unfamiliar animals. Rabies is a zoonotic disease—a disease that can be transmitted from animals to humans—which is caused by a lyssavirus (World Health Organization [WHO], 2014a). The virus is transmitted through a “deep bite or scratch by an infected animal,” and it can also be transmitted with direct contact of saliva from an infected animal and open wounds or mucosa of humans (WHO, 2014b, Transmission section, para. 1). The most common route of infection in humans is through the bite of an animal.

There are two forms of the disease: furious and paralytic. The furious form of rabies results in signs of “hyperactivity, excited behaviour, hydrophobia and sometimes aerophobia. After a few days, death occurs by cardio-respiratory arrest” (WHO, 2014c, Symptoms section, para. 3). The paralytic form of the disease occurs in about 30% of human cases, and is a much more gradual process (WHO, 2014c). Over time, the person will become paralyzed, go into a coma, and eventually die (WHO, 2014c).

According to the World Health Organization, each year, more than 15 million people receive post-exposure prophylaxis throughout the world (2014d). More than 95% of human rabies fatalities occur in Asia and Africa (WHO, 2014d). In these two countries and many other developing countries, the reservoir for rabies that is the most imminent threat to humans is the overpopulated dogs. Many efforts have been made to vaccinate these dogs to prevent tens of thousands of deaths per year. According to WHO, about 40% of bite victims are children under

the age of 15 (2014d). In the continental United States, terrestrial rabies uses wildlife as reservoirs, to include raccoon, skunk, and fox (Centers for Disease Control and Prevention, 2014) (Figure 7). Also, indigenous bats with rabies are found in all US states except Hawaii (WHO, 2014d). The virus cannot live outside of its host. The virus must be transmitted directly among animals.

**Figure 7:** Terrestrial Rabies Reservoirs in the United States, 2012.



Courtesy of: Centers for Disease Control and Prevention

## **Prevention**

Rabies is a preventable disease via preventive measures known as post-exposure prophylaxis (PEP). According to the WHO (2014e), post-exposure prophylaxis consists of:

- Local treatment of the wound, initiated as soon as possible after exposures
- A course of potent and effective rabies vaccine that meets WHO recommendations
- The administration of rabies immunoglobulin, if indicated

These steps are key, if taken soon after exposure, are key in preventing the “onset of symptoms and death” (WHO, 2014e, PEP section, para. 2).

With the advancement of medicine such as PEP as described above, the chance of survival from exposure to rabies has gone from nearly 0% to nearly 100%. However, this survivability rate is only applicable when medical attention is sought and the proper steps are taken to prevent symptoms and death shortly after exposure.

The cost of PEP varies; however, it is always expensive. According to the CDC (2011), the cost of the typical PEP treatment costs at least \$1,000.

## **Purpose**

The first objective was to collect data from Irwin Army Community Hospital’s (IACH) medical record database to evaluate how many prescriptions of PEP have been initiated between 2004 and 2013, per calendar year. The second objective was to determine the impact that the Banned Dog Breed Policy may have had on the amount of PEP used.

## **Methods**

The data used to determine the difference in incidence rates of dog bites was collected from Health Information Management at IACH on Fort Riley. The time period selected for this study was 01 January 2004 to 31 December 2013. The original set of data included every PEP vaccination administered to patients at any of the clinics on Fort Riley. These vaccinations are not necessarily all dog bite-related. The animal involved in the incident that led to the



administration of PEP was not available for this study. Although patients may have received several vaccinations, not all vaccinations were taken into account for this study. Any vaccination listed for the same patient that had a vaccination date of more than 30 days from the initial vaccination date was considered another PEP series initiation (two separate potential rabies exposures), which consisted of a booster. A vaccination of the same patient within 30 days of the initial vaccination was considered the same series of vaccinations.

## **Results**

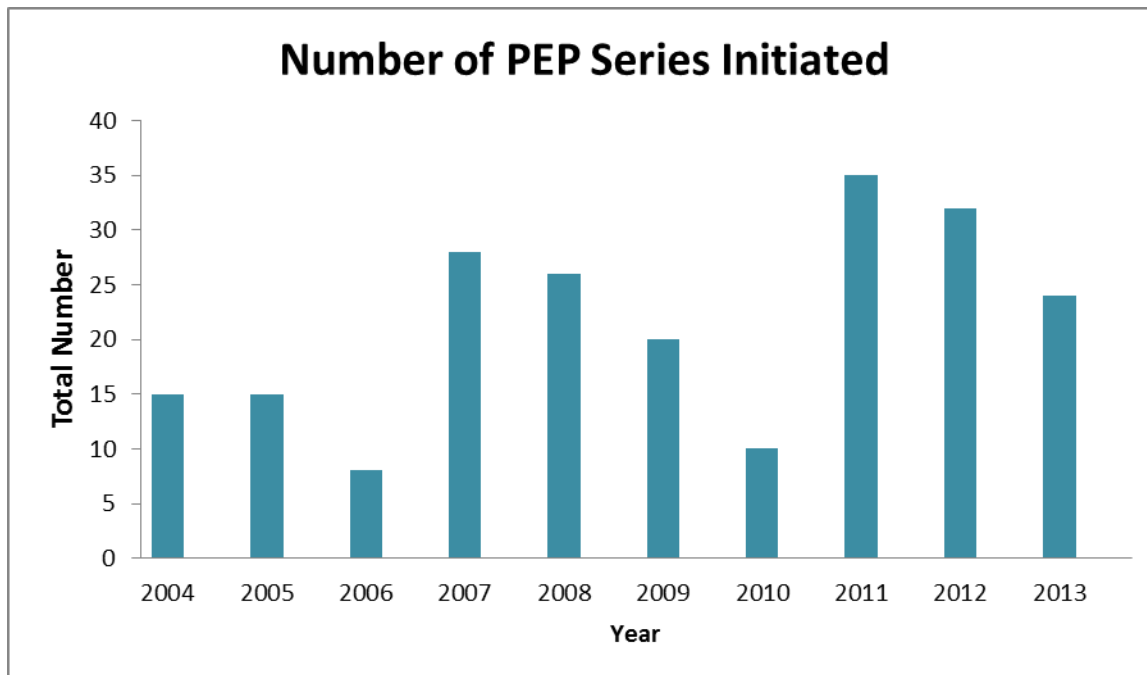
### **General PEP Usage**

From 01 January 2004 to 31 December 2013, a total of 213 PEP vaccination series was initiated at all of the medical clinics on Fort Riley combined. The number of PEP initiated from 2004-2006 was lower than the number of PEP initiated from 2007-2013 (with the exception of year 2010), with 15 in 2004, 15 in 2006, and 8 in 2007 (Table 3, Figure 8). The years with the highest number of PEP initiated were in 2011 and 2012, with 35 in 2011 and 32 in 2012 (Table 3, Figure 8).

**Table 3:** Number of PEP Series Initiated per Year and Percentage of Total Number of PEP Series Initiated per Year on Fort Riley, 2004-2013.

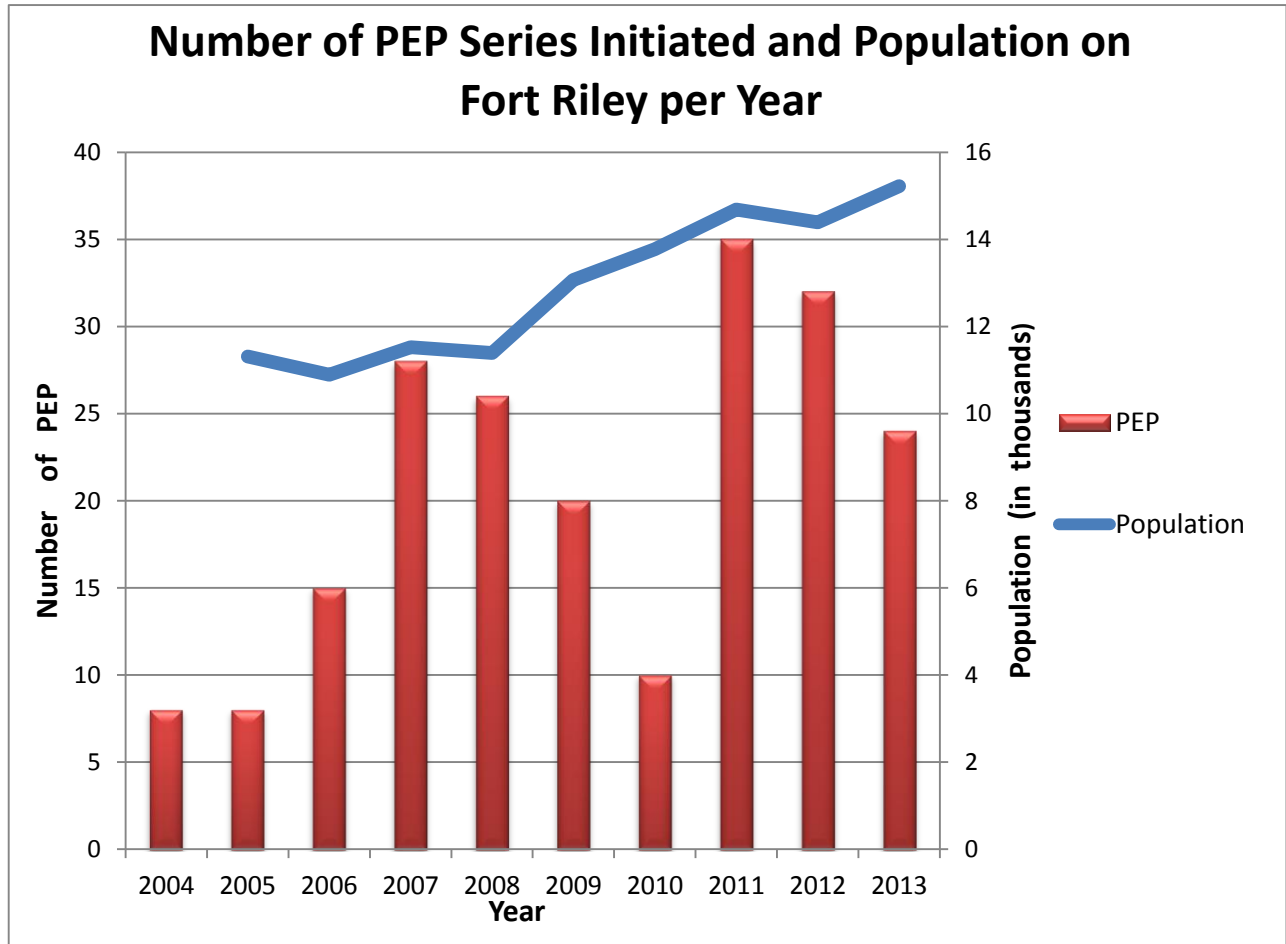
Year	Number	Percentage
2004	15	7.04
2005	15	7.04
2006	8	3.76
2007	28	13.15
2008	26	12.21
2009	20	9.39
2010	10	4.69
2011	35	16.43
2012	32	15.02
2013	24	11.27
<b>Grand Total</b>	<b>213</b>	<b>100.00</b>

**Figure 8:** Number of PEP Series Initiated per Calendar Year, 2004-2013.



When PEP was compared to the population living on post, there was no apparent trend. The increase in PEP was very unpredictable, whereas the population steadily increased from 2005 to 2013 (Figure 9).

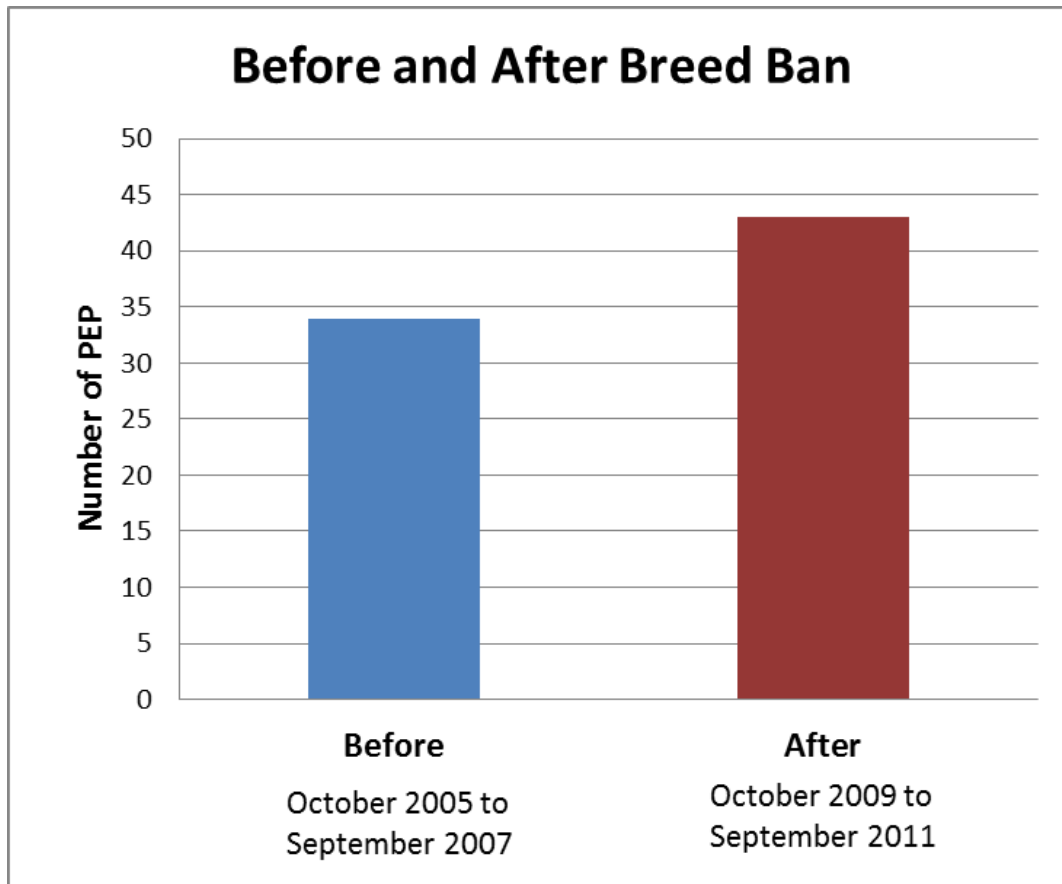
**Figure 9:** Number of PEP Series Initiated versus Population (in thousands) Living on Fort Riley per Year, 2004-2013.



**The Effect of the Banned Dog Breed Policy on PEP Usage**

As with the study on the effect of the Banned Dog Breed Policy, the following date ranges were used: October 2005 to September 2007 (before the policy) and October 2009 to September 2011 (after the policy). Before the breed ban went into effect there were 34 patients that initiated PEP series in the two-year period; after the breed ban, there were 43 patients that initiated PEP series (Figure 10).

**Figure 10:** Number of PEP Series Initiated Before and After Breed Ban Implementation on Fort Riley, October 2005-September 2007 and October 2009-September 2011.



### Discussion

It is important to evaluate the difference in PEP usage before and after the breed ban to determine if the breed ban has been effective in reducing the number of potential rabies exposures on post, and thus, the usage of PEP. As mentioned previously, PEP is very costly; thus, minimizing its use would be beneficial for the military and medical care insurance costs. At the rate of \$1,000 per treatment series, that equates to approximately \$24,000 spent in 2013 just on rabies prevention on Fort Riley.

The usage of post-exposure prophylaxis was limited until 2007, when there was an increase from 15 patients in 2006 to 28 patients in 2007. The years following 2007 were much higher than the previous years in this study, 2004-2006, with the exception of year 2010. The reason for this increase in PEP usage is unknown. The intent of the Banned Dog Breed Policy

was to reduce the number of “aggressive dogs” living on post, thus reducing the number of dog bites to occur and reduce the risk of potential rabies exposures. With an increase of PEP usage from before to after the policy was implemented, there is evidence that there were actually more people to receive PEP once this safety and health measure was put in effect.

## **Chapter 4: Total Dog Bite Reports and Number of Reports Received**

### **Background**

It is very important for Veterinary Services to receive all dog bite report forms as soon as possible so that if there is a potential rabid or aggressive dog or animal running loose, the assigned personnel can attempt to locate and quarantine the animal. A dog bite report does not necessarily indicate that an injury was incurred that required medical attention. The report forms are transferred from the three medical clinics on post to Veterinary Services.

### **Purpose**

The first objective was to evaluate the average percentage of reports that were received by the next duty day after the initial dog bite report per year, 2003-2012. The second objective was to evaluate the overall average percentage of reports received the next duty day over the ten-year time period, 2003-2012.

### **Methods**

The data used to determine the percentage of reports received by Veterinary Services from Fort Riley medical clinics by the following duty day was obtained from Public Health Command. The date range provided by this data was 01 January 2003 to 31 December 2012. The following calculations were made: total number of reports per year, percentage of reports not received by next duty day per year, and the overall percentage of reports not received by next duty day for the entire 10-year period. The data only provided information on whether or

not the reports were received by next duty day; if they were not received by next duty day, the data did not specify when the reports were ultimately received by Veterinary Services.

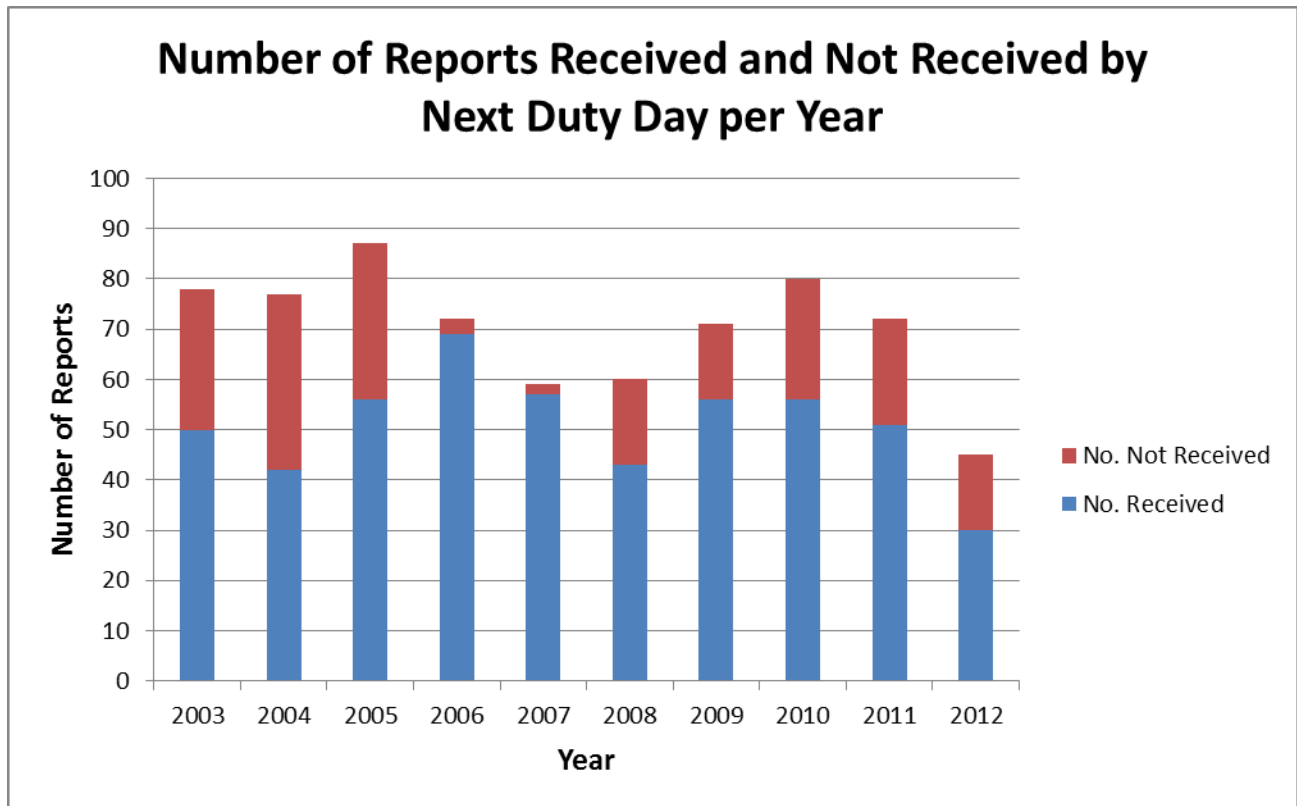
## Results

The total number of dog bite reports initiated on Fort Riley at any of the medical clinics from January 2003 to December 2012 was 701. The total report numbers are provided by year, along with the number and percentage of reports that were not received by the next duty day by Veterinary Services. The years with the lowest total number of reports were in 2007, 2008 and 2012, with 59, 60, and 45 reports of dog bites, respectively. The average percent of reports received by next duty day for all ten years was 72.75%, with 27.25% not being received by next duty day. Although more reports were received than not received, there were 701 total reports throughout the ten year time period; thus, there were 191 reports not received by next duty day, and 191 cases that could lead to another person being bitten by the same animal.

**Table 4:** Total Number of Reports, Number of Reports Not Received by Next Duty Day, and Average Percentage of Reports Not Received by Next Duty Day by Fort Riley Veterinary Services per Year and Overall, 2003-2012.

Year	Total Number of Reports	Number of Reports Not Received	Average Percent of Reports Not Received
2003	78	28	35.89
2004	77	35	45.45
2005	87	31	35.63
2006	72	3	4.17
2007	59	2	3.39
2008	60	17	28.33
2009	71	15	21.13
2010	80	24	30.00
2011	72	21	29.17
2012	45	15	33.33
<b>Total</b>	<b>701</b>	<b>191</b>	<b>27.25</b>

**Figure 11:** Total Number of Reports, Number of Reports Received and Not Received by Next Duty Day by Fort Riley Veterinary Services per Year, 2003-2012.



### Discussion

The years with the highest percentages of reports received by next duty day were 2006 and 2007, with 95.8% and 96.6% of reports received, respectively. This could be attributed to personnel or management at IACH during these two years that were more dedicated to making sure reports were turned in to Veterinary Services by next duty day compared to the personnel in the other years in this study. It is important that if a report of a dog bite is brought to the attention of Veterinary Services or Public Health personnel, it should be a priority for any and all personnel involved to get these reports turned in to Veterinary Services as quickly as possible so the animal involved can be quarantined to rule out potential rabies risk.

## **Chapter 5: Conclusions**

### **Study Limitations**

As is common, there were many limitations to this study. The statistics provided regarding population included troop strength, percent currently living on post, and the common multiplier of 2.7 to determine total number of people living on post. To calculate this number, troop strength was multiplied by the 2.7 multiplier to give the total number of soldiers stationed at Fort Riley and their beneficiaries. This number was then multiplied by the percent of troops currently living on post to give the approximate number of soldiers and family members living on post. This is not a 100% accurate number.

Another limitation in this study stems from the original intent of this study. The original goal of this study was to collect data from the Bite Report Forms that are turned in to Veterinary Services and analyze the demographic characteristics of the dogs involved in the bite incidents, such as breed, gender, age, status on vaccinations, status on spay/neuter, and the relationship of the dog with the person affected. Due to poor record keeping and a time requirement of three years to hold on to documents, the reports that were available for collection and review were of no worth. Entire years of reports were missing and those that were present did not have many of the fields filled out.

### **Recommendations**

One of the recommendations for maintaining records at Veterinary Services is to assign a specific position in the workplace to maintaining and logging these records, and locking them in a designated location to minimize shuffling or moving of binders with reports. The unknown placement and organization of these reports, and medical records in general, is a missed opportunity on analysis of specific data that could have been monumental in the very controversial Breed Ban argument world-wide. With this study providing statistical analysis and results that the breed ban has had no significant impact on the incidence of dog bite-related injuries on Fort Riley, it is also recommended that Fort Riley rescind its Banned Dog Breed Policy.



## **Education**

In the recent years, an annual educational event—Rabies Day—has been open to certain departments on Fort Riley such as law enforcement personnel. Opening up this even to the public could increase awareness of rabies and ways to avoid potentially being exposed to rabies. When an opportunity becomes available to educate soldiers and their families, the military should take advantage of the opportunity. For instance, the voluntary pre-deployment meetings are typically attended by a large number of people. Also, the Job Fairs that are hosted on post interest many people. Both of these events are good examples of ways to get educational materials out to the public. For an event such as Rabies Day, open the event to the public and provide activities that interest the public and get their attention. For example, there is an interactive computer game geared towards children that teaches them how to approach, understand, and behave around dogs called Blue Dog. Such a game could entice a larger audience, while entertaining the children and teaching them virtual lessons. It is also important to educate parents about rabies and the deadly effects it can have.

## **Chapter 6: Field Experience**

### **Background**

The Field Experience to fulfill requirements for the Master of Public Health Program at Kansas State University was completed with rotations within the seven sections of the Department of Public Health on Fort Riley. Colonel Paul Benne was the preceptor for the entirety of the rotations, with the assistance of Ms. Kris Bourland, of the Fort Riley Department of Public Health.

Rotations were spent in the seven sections of the Fort Riley Department of Public Health: Environmental Health, Industrial Hygiene, Occupational Health, Army Hearing Program, Army Public Health Nursing, Army Wellness Center, and Veterinary Services. The amount of time spent with each section was determined by the mentor from each section, depending on the amount of time he or she saw fit to understand and learn the responsibilities and duties of that section. A total of 240 hours were spent with the Department of Public Health.

## Rotations

During the time spent with the Environmental Health (EH) section, the following major areas were covered: Food Service Sanitation and Inspections, Water Quality and Surveillance, Disease Vector Surveillance, Hospital Waste Management, and Child Development Center Sanitation and Inspections. Such inspections included the inspection of the United Service Organizations Inc. (USO), School-Age Service, and a barber shop, Farrelly Pharmacy, and the Flint Hills Job Corp. in Manhattan, Kansas. Other activities and observations performed with the EH section included the collection of water samples from the water wells throughout the installation as well as water samples from the Morale, Welfare and Recreation (MWR) facilities on post. This section also included the basics of genus identification of mosquitoes and ticks found in the Fort Riley area.

In the Industrial Hygiene section, a number of topics in the industrial hygiene career field were discussed for better understanding of what the field entails. Areas of emphasis included various hazards encountered in the workplace and the pieces of monitoring and measuring equipment used in the field. Potential hazardous aspects that were monitored included air sampling, radiation, ergonomics, indoor air quality, noise, and ventilation. An example of the observations include the analysis of work-related pain in several workers at Fort Riley (ergonomics), where an employee was having back pain from sitting at a computer desk for long periods of time. A new ergonomic chair was provided to the employee to eliminate future back pain. Another example included the assessment of ventilation in a surgical suite.

In the Occupational Health (OH) section, routine requirements of medical surveillance/screening prescribed by identifying known health risks associated with specific jobs, processes, and exposures were discussed. The operations of these requirements include hearing tests, spirometry (lung-function) tests, vision screening, immunizations, physicals (part I/II), deployment/redeployment physicals, tuberculosis screening, in-processing, and pregnancy surveillance. This section also introduced the following OH Programs: medical surveillance examinations and screening, reproductive hazards, blood-borne pathogens, hearing conservation and readiness, vision conservation and readiness, injury prevention and control, work-related immunizations, worksite evaluations, personal protective equipment, Office of

Workers' Compensation Programs/Federal Employees' Compensation Act, Employee Health and Wellness, and occupational illness and injury prevention and mitigation.

The Army Hearing Program section discussed occupational and other hearing hazards and ways in which medical surveillance and screening and workplace surveys can assist in preventing hearing loss. An audiologist reviewed the program, with emphasis on the five main sections, which include Hearing Readiness, Hearing Conservation, Clinical Hearing Services, Operational Hearing Services, and Education. There was an interactive experience, which entailed an inspection of the earplugs in use by soldiers at a long-distance shooting range. This inspection included the correction of the type of earplugs used for each soldier as an individual and the assurance and/or correction of proper earplug position.

Army Public Health Nursing introduced a number of topics in order to increase knowledge of and exposure to regulations and standard operating procedures related to working with the active duty population and the beneficiary regarding health and wellness, prevention and the communicable diseases. Three inspections were required for this section, which included the inspection of Child Development Centers (CDC), including record review, classroom walk-through, review of special needs binder, and documentation of findings. This section also included the introduction to the preventable disease surveillance and prevention process. Three reports were independently documented in the Disease Reporting System internet (DRSi). A major objective in this rotation was the attendance of meetings with community partners to increase communication skills with external partners and the community. Three meetings were attended with the following community partners: Nurse-Family Partnership, Maternal Child Health, and Geary County Perinatal Coalition – Delivering Change.

The Army Wellness Center (AWC) rotation discussed the mission and core programs of the Army Wellness Centers and their role in improving the health of Active Duty Soldiers, Retirees, Family Members, and DA Civilians. The programs and opportunities that the AWC offers include AWC organization, health assessment review, physical fitness exercise testing, healthy nutrition metabolic testing, stress management, tobacco education, and behavior change.

Veterinary Services rotation introduced many topics within its section to increase knowledge of and exposure to Public Health policy, routine inspections and assessments, and areas of military concern to community safety and health. Two areas were covered: Food Sanitation and Inspections and Animal Preventive Medicine. The following roles are the responsibility of Veterinary Services within Food Sanitation and Inspections: Food Safety Codes, Laws, and Regulations; inspection of food products on receipt and in storage; determination if storage conditions are within regulation; evaluation of packaging, packing and marking requirements; and identification of unsanitary conditions in food storage facilities. An interactive experience took place that included observing the Public Health Veterinarian inspect the Commissary where the expiration dates of products, temperature of storage rooms and containers, and the cleanliness of the building as a whole were all checked. The following roles are the responsibility of Veterinary Services within Animal Preventive Medicine: orientation to Animal Preventive Medicine, identification of zoonotic diseases of concern, evaluation of animals for potentially zoonotic disease, treatment/management of disease in the animal population, veterinary involvement in bite cases, and Child Development Center animal inspections.

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