Section I: Historic Contributions

The Centennial Time Capsule plaque, marking the 100-year anniversary of the Army Veterinary Corps, is displayed outside the US Army Medical Department Museum at Joint Base San Antonio-Ft Sam Houston, Texas.

Photograph: Courtesy of Nolan A. Watson.

Chapter 1

MILITARY VETERINARY SUPPORT BEFORE AND AFTER 1916

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INTRODUCTION

The history of US military veterinary service parallels the development of the veterinary profession and the emergence of the American Army as a profession. The US Army's creation on June 14, 1775, precedes what many consider the official birthdate of the United States of America (the signing of the Declaration of Independence) in July 1776. At the time of the Revolutionary War, veterinary medical roles were limited to "animal nurses" with no formal training.[1(p1)] In 1776, the newly declared United States of America had considerable livestock and animal care needs but no veterinary school.

The world's first veterinary school, the Royal Veterinary School of Lyon, had started in France in 1761, just 15 years prior. However, French horseshoers (farriers) wanted to continue treating lame and sick animals and opposed more veterinary schools. Nonetheless, another royal veterinary school was founded in 1765 in Paris.[2(p36)] England's first veterinary college, the Veterinary College of London, began training students in 1791 and served as the model for future training in America in 1863.[2(p38)] (For more information about the growth of veterinary colleges, especially those educational institutions relevant to the field of veterinary pathology, see Chapter 15, Veterinary Pathology).

VETERINARY SUPPORT OF THE US MILITARY PRIOR TO JUNE 3, 1916

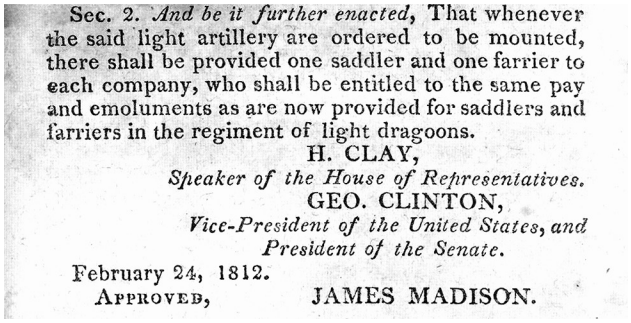
American Revolutionary War to Pre-Civil War

The origin of the Army Veterinary Service can be traced to a letter from General George Washington, dated December 16, 1776, which mentions the inclusion of farriers in the "regiment of horses."[3(p111),4] In 1792, Congress provided for two regiments of dragoons, along with farriers to care for the animals.[1(p1)] More specifically, Congress requested one farrier for each of four troops of dragoons.[1(p1)] The Army, without having a ready pool of trained veterinarians, expected horseshoers and blacksmiths to also perform the work of animal doctors.[2(p118)] The Army's lack of properly educated veterinarians, proper horse management, and veterinary preventive medicine led to high loss rates and the spread of costly epizootics.[2(p124)]

Veterinary medicine in America was largely neglected by both the civilian and military communities up to the Civil War. Still, there are some historic documents such as journals that mention animal care in the US military prior to the Civil War (Figure 1-1) as well as some early records about military farrier contributions. For example, the horse (later, field) artillery, which needed more mobility, had farriers in service during the War of 1812. After this war ended and the Army was once again dispersed, farriers were removed from the military until 1833, when 10 farriers were assigned to a cavalry regiment. Ten more farriers were assigned to another regiment in 1836.[1(p1)]

An 1834 to 1835 Inspector General report with little documentation also referenced the Army "veterinary surgeon," but, at that time, "veterinary surgeon" and "farrier" were most probably interchangeable names for the same profession.[1(p1)] The report questioned the duty competency of these individuals and if they were properly trained.[1(p1)] At that time, although Army regulations required inspectors to watch "veterinarians" do their duties, it is questionable whether the Army actually had any trained active duty veterinarians in service. These regulations could have been referring to farriers or temporarily hired civilian veterinarians whose services were paid as needed out of unit funds.[2(p119)]

During the Mexican War and various Indian War campaigns from 1846 up until 1848, farriers—with no noted improvement in training or competency—were


Sec. 2. *And be it further enacted*, That whenever the said light artillery are ordered to be mounted, there shall be provided one saddler and one farrier to each company, who shall be entitled to the same pay and emoluments as are now provided for saddlers and farriers in the regiment of light dragoons.

H. CLAY,
Speaker of the House of Representatives.
GEO. CLINTON,
Vice-President of the United States, and President of the Senate.

February 24, 1812.
APPROVED, JAMES MADISON.

Figure 1-1. Although veterinary medicine struggled for early recognition, farriers were already recognized as part of the Army, as shown in this detail from *An Act, Establishing Rules and Articles for the Government of the Armies of the United States* (1812), page 79.
Reproduced from Google Books. https://books.google.com/books?id=uns0AQAAMAAJ&printsec=frontcover&dq=An+Act,+Establishing+Rules+and+Articles+for+the+Government+of+the+Armies+of+the+United+States&hl=en&sa=X&ved=0ahUKEwjkvezGrdrWAhVLjlQKHS_eDdYQ6AEIMTAC#v=onepage&q=An%20Act%2C%20Establishing%20Rules%20and%20Articles%20for%20the%20Government%20of%20the%20Armies%20of%20the%20United%20States&f=false. Accessed October 23, 2017.

still considered "veterinary surgeons."[1(p1)] Military units had no set standards for the number of farriers needed to support a designated number of horses. As a result, horses were often overworked and underfed. Showing forethought and an elevation of the profession in general, Congress authorized the hiring of bona fide civilian "veterinary surgeons" for long-term Army service in 1848.[2(p119)]

Congress's action and naming convention mirrored a growing sense of change within the country. Previously, the United States was generally indifferent to the diseases of animals. Before the founding of US veterinary schools, the majority of veterinary care in the United States was based on what people could learn from books. Very few school-trained veterinarians were available, and veterinary quacks were abundant.[2(p132)] Congress made liberal appropriations for veterinary education starting in the 1840s, but the states, in general, misapplied the funds. In other words, it wasn't the federal government that failed to protect the livestock industry of the time (ie, by failing to provide nationwide standards and inspection capabilities), but rather it was the fault of the state governments, as they believed veterinarians impeded the free trade of diseased animals and unwholesome animal products, which would negatively impact their economies.[2(p134)]

As mentioned earlier in this chapter, the US veterinary education system started much later than European systems. In the 1840s, after veterinary medical textbooks became available, veterinary lectures started in medical colleges. Since many physicians at that time also treated animals, it made sense that animal medicine lectures were held at medical colleges. During this time, most of the American public also had little understanding of what an educated veterinarian could do, so a college diploma didn't mean much until the 1870s. Even then, one college-educated veterinarian urged graduates of his school to obtain the doctor of medicine degree, so they would have a better recognized professional standing in the community.[2(p173)]

By the 1860s, some American colleges and universities taught veterinary science, but instruction at these schools was usually not given by a veterinarian, unless the animal doctor had received a veterinary education in Europe. One of the first veterinary lecturers was Robert Jennings Sr, a self-educated veterinarian and successful practitioner, who gave presentations in Philadelphia and later worked toward chartering a veterinary college.[2(139)] Slowly, as more American veterinary students studied in US medical institutions, US courses and lectures evolved into full degrees of veterinary medicine. This evolution in US veterinary medicine soon led to improved US military veterinary services.

George B. McClellan (famously known as the "Commander of the Army of the Potomac" during the Civil War) recognized the benefits and the need for having well-trained veterinarians long before the majority of his senior leaders and military decision makers. In 1856, McClellan was sent to Europe as a captain to study the European armies and observe the Crimean War. He reported that the US Army could benefit by following the veterinary systems he observed at the Berlin and Vienna veterinary schools. McClellan also recommended the Army create a veterinary school as well as a farrier school, clearly separating the schooling and duties of the veterinarian from those of the farrier in his report.[2(p123)]

McClellan further stated that students for the veterinary school should be selected from the best recruits and recommended both the veterinarian and farrier receive extra duty pay. He proposed one veterinary sergeant and one farrier for each cavalry company, and each regimental staff should have a chief veterinarian with the rank of sergeant major or commissioned officer.[5]

Although the Army didn't create a veterinary school as McClellan recommended, (the military didn't have a large standing force or the budget for the desired school), it can be inferred from McClellan's report that he realized veterinarians needed specific skills that farriers could not adequately provide. McClellan's concern for the Army and its horses was also made evident by his invention of a light but sturdy saddle design. Named the "McClellan Saddle," it would be used in various versions by the Army from 1859 to present.[6] (For more information about the evolution of veterinary medicine schooling and the collaboration of human and animal doctors during the emergence of US veterinary medicine, see Chapter 15, Veterinary Pathology.)

Civil War to Spanish-American War

At the start of the Civil War (April 1861), two dragoon, one mounted infantry, and two cavalry regiments were composed of 10 companies for each regiment, with one farrier assigned per company. Federal forces had few university-qualified veterinarians in service and, consequently, experienced a high death rate in horses.[7(p249)]

However, General Orders 16, May 4, 1861, authorized a veterinary sergeant to each battalion in the cavalry regiments, presumably to supervise the farriers and improve the standard of care for horses.[2(p147)] Early in the war, the Army also recognized the need for veterinarians and tried to improve the situation with increasing pay.[1(p2),7(p249)] Cavalry soldiers

with the rank of sergeant earned 17 dollars per month, which was more pay than infantry soldiers received.[2(p147)]

An important change regarding military veterinary medical history occurred when the Enrollment Act of March 3, 1863, was passed**.** From this act, General Orders 73, March 24, 1863, stipulated that each federal cavalry regiment receive a veterinary surgeon with the rank of regimental sergeant major, and pay was set at 75 dollars per month.[8(p3)] Each of the regiments' 12 companies was to have two farriers or blacksmiths.[8(p2)] In addition, after April 29, 1863, the volunteer cavalry regiments were each to have a veterinary surgeon, like the six regular (not raised for the war) cavalry regiments. The number of volunteer regiments has been estimated to be between 232 to 272 regiments, which indicates a larger number of veterinarians served in the Union than previously thought. Another dozen or so veterinarians worked for the Quartermaster in various roles such as inspecting animals[8(p3)] (Figure 1-2).

It is important to note that these veterinary surgeons were not considered commissioned or noncommissioned officers; they were perceived as civilians with the equivalency of sergeant major rank. Therefore, their names usually do not appear on any official military rosters.[8(p3)] General Orders 259, dated August 1, 1863, provided selection and appointment criteria for veterinary surgeons to be assigned to six regular cavalry regiments.[2(p152)] However, no type of skill qualification standard was required:

> Veterinary surgeons of Cavalry under the Act of March 3rd, 1863, will be selected by the Chief of the Cavalry Bureau upon the nomination of the regimental commanders. These nominations will be founded upon the recommendation of the candidate by a regimental board of officers to consist of the three officers present next in rank to the commander of the regiment. The names of the candidates so recommended and nominated to the Chief of the Bureau of Cavalry will be submitted by him to the Secretary of War for appointment. A record of the appointments so made shall be kept in the Adjutant General's office**.**[2(p152)]

Despite improvements, a quartermaster report (QMG Orders 21, 1863) mentioned the waste of horses during the war and the cost to taxpayers.[1(p2),2(p149)] The report blames improper knowledge of horses and mules and their uses, leading to the animals' quick and needless demise**.** At the beginning of the Civil War, the Union and Confederate states had about 3.4 million and 1.7 million horses, respectively.[9] The border states of Missouri and Kentucky had another 800,000 horses.[9] All states combined had approximately 1.1 million mules.[9] The North acquired many horses from the South by seizing them while occupying large areas of territory.[9] As the war continued, severe grain and hay shortages developed. Many horses died of disease (glanders was the most prevalent) or from exhaustion. Also, a considerable number were killed in battle.[9] The general lack of organization and support from senior leadership contributed to the loss of more than 1.2 million horses and mules.[10] Thus, as an estimated 620,000 soldiers died during the Civil War, almost twice as

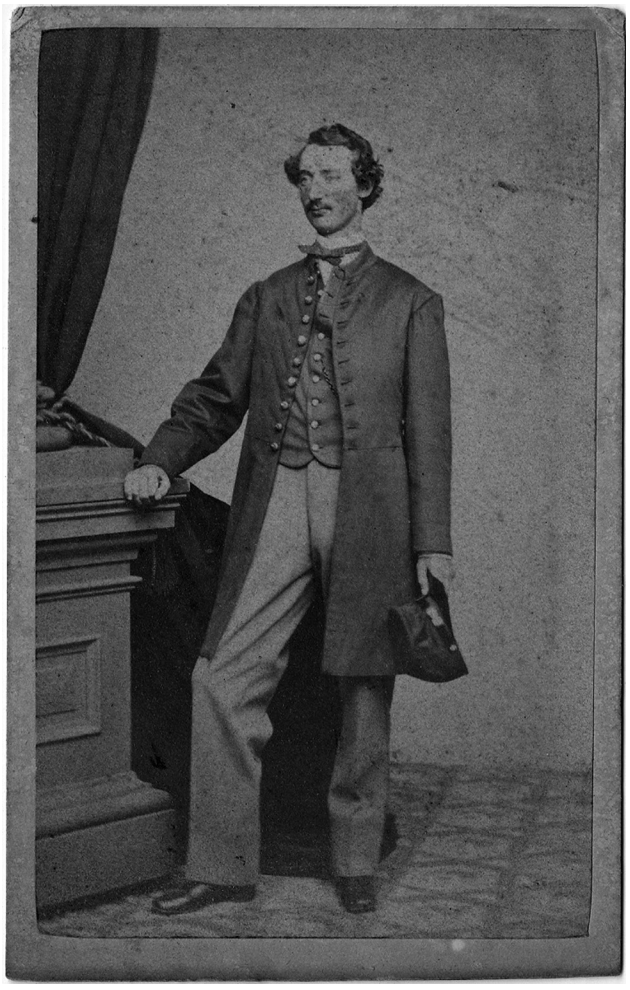


Figure 1-2. "George F. Parry Standing Portrait." George F. Parry (1838–1886), veterinary surgeon for the 7th Pennsylvania Cavalry during the Civil War. Parry graduated from the Boston Veterinary Institute in 1859. His wartime diaries mention some of the problems faced by veterinarians in service at the time, including poor animal nutrition and glanders in horses. Parry is shown in an approximation of a uniform. While veterinarians were not "officially" in the Army at the time and did not have a uniform, Parry did have the Union Kepi (head gear).
Reproduced with permission from the Historical Society of Pennsylvania, Philadelphia, Pennsylvania; George F. Parry Family Volumes [3694] (DAMS #94-3).

many horses and mules were lost.[11] (For more information about equine history and the use of horses in the US military, see Chapter 8, Military Equine Programs.)

In 1863, leading civilian and military veterinarians met in New York City to better organize and improve professional veterinary service, partly because of the costly losses of animals that the Union was experiencing and partly because of the lack of standardized veterinary hiring and medicine practices in the Army. Conference attendees chartered the US Veterinary Medical Association in 1863, which became the American Veterinary Medical Association (AVMA) in 1898.[2(p172)] A product of the time of its formation, the US Veterinary Medical Association's name signifies preservation of the Union while the American Veterinary Medical Association (formed during the Spanish-American War) denotes consolidated patriotism. The AVMA became a strong proponent for military veterinary medicine and the creation of the Army Veterinary Corps, as well as initiated setting standards for the veterinary profession within the United States.

After the Civil War ended, the Army decreased in size but also established four new cavalry regiments in 1866. Each of these regiments was given two veterinary surgeons; the more senior surgeon received $100 per month while the assistant surgeon received $75 per month.[1(p2),2(p155)]

Despite some progress in the profession and recognition within the Army, there were still some contemporary military and governmental setbacks that deterred the growth of veterinary medicine. Although there is no evidence of glanders being a significant problem in America before the Civil War, it became a serious problem during the war and continued for almost a half century afterwards.[2(p164)] At the end of the Civil War, the Army sold glanders-infected horses to civilians, which helped spread the deadly zoonotic disease all over the United States.

When glanders became problematic, there was also active resistance to hiring qualified veterinarians. Trained veterinarians realized that glanders could not be adequately treated and would euthanize infected horses. Nontrained veterinarians would treat infected horses with ineffective methods, which only kept the diseased horses alive longer and spread the disease to others. This difference of opinions regarding glanders treatment methods indicates that, at times, the establishment resisted proper preventive medicine based on limited knowledge and a short-term focus. In the long run, failure to embrace proper preventive care was more costly (personal knowledge, Colonel Timothy H. Stevenson, US Army, Assistant Veterinary Corps Chief, from presentation by Thomas Frezza, formerly of the National Museum of Civil War Medicine, Washington, DC, April 30, 2016).

Similarly, not recognizing the need and importance of hiring qualified veterinarians, in 1868, Congress hired a farmer, not a veterinarian, to treat the Army's horses specifically for lameness by trimming the hooves in a special way.[2(p158)] The farmer received $10,000 for his services.[2(p158)] Per War Department General Orders 84, August 20, 1873, the Quartermaster furnished horse medicines and instruments to the mounted artillery with the intent of these supplies being used by nonveterinarians.[2(p159)] In 1875, another general order directed horse medicines and dressings be issued quarterly to artillery and cavalry company commanders, not qualified veterinarians.[2(p159)]

Although the conditions started improving for Army veterinarians from 1861 to 1879, they were still considered civilian employees for the Army in 1866, which prevented them from receiving allowances and retirement privileges. In addition, Army veterinarians had no authority over enlisted men, even the ones that were supposed to assist them.[2(p166)]

However, when qualified veterinarians were appointed into the Army—such as Samuel G. Going (educated at the Royal Veterinary College in Edinburgh)—they could achieve excellent results. In 1875, shortly after arriving at Benicia Barracks, California, Going recognized and quickly eradicated a serious outbreak of glanders.[2] He drafted a bill to be presented to Congress to show the value of veterinary service and to give Army veterinarians commissioned rank, but the bill didn't materialize, and Going died during the Nez Perce War (1877).[2(pp160-161)]

Many veterinarians were on the front lines of the Army's wars. One of Lieutenant Colonel George A. Custer's 7th Cavalry Regiment veterinary surgeons, Dr John Honsinger, was killed by Sioux Indians on August 4, 1873.[2(p232)] After the Battle of Little Big Horn on June 25, 1876, one of the few, (and only officially accepted) Army survivors, was Comanche, the horse ridden by Captain Myles Keogh, who was killed in the battle. Suffering from at least seven gunshot wounds, Comanche became the most famous recipient of veterinary care in the Army before the world wars; he was saved by the efforts of the veterinary surgeon, Dr Charles A. Stein.[7(pp258-259)] As veterinarians became more proficient and performed successful surgeries (as in Dr Stein's case), they started being recognized more by the US Army, as well as by the US public. For example, on May 31, 1877, General Orders 52 established examinations and a board of officers to nominate veterinary surgeons; unfortunately, the orders didn't spell out what were considered minimum standards for qualification.[2(p159)] Several private US institutions were training veterinarians, but academic content and standards were not consistent. The 1870 national

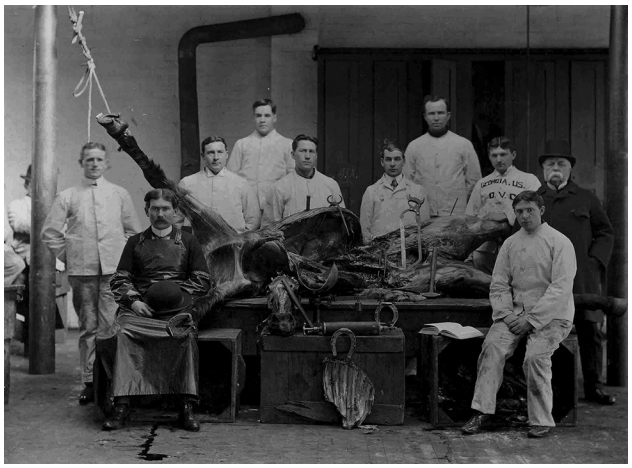


Figure 1-3. An equine anatomy course possibly at the University of Georgia's first version of their School of Veterinary Medicine, circa 1915. Veterinary medicine advanced as several universities in America began instruction in the latter part of the 19th century. Similarly, the requirement for Army veterinarians to be graduates of formal study improved their standing and perceptions of skill in animal care.
Courtesy of the Army Medical Department Center of History and Heritage Archival Collection, Ft Sam Houston, Texas.

census noted that there were 1,166 veterinarians.[12] It also recorded that most of the "practitioners" had no formal education or were educated in other countries[12] (Figure 1-3).

Thus, during this time, many positions were filled with farriers or veterinary quacks who the selecting official liked. The poor medical skills of the charlatan "veterinary surgeons" hindered the process of obtaining genuinely qualified veterinarians. Senior Army officials viewed them and their inadequate animal care as a good reason to oppose giving veterinarians a commissioned rank in the Army.[2(p160)]

An important milestone towards the advancement of US military veterinary service took place with an Act of Congress and subsequent Army General Orders of 1879, specifically War Department General Orders 36, March 27, 1879.[2(p162)] In these orders, the Army finally listed qualifications in the veterinarian hiring process, stipulating that veterinary sergeants were required to be graduates of reputable veterinary colleges.[2(p162)] However, the previously appointed "veterinary surgeons" who were originally blacksmiths, farriers, or self-declared veterinarians were allowed to stay in their positions; it took another 32 years before all positions were filled with veterinary college graduates.[2(p194)]

By 1881, six cavalry regiments were authorized one veterinarian, and four cavalry regiments were authorized two veterinarians.[2(p195)] In addition, the Quartermaster Department had one inspecting veterinary surgeon (for government animal purchases).[2(p195)] These veterinary positions totaled 15; nine positions were filled by veterinary college graduates, four positions were filled by nongraduates, and two positions were authorized but unfilled.[2(p195)]

It took time to leverage the potential usefulness of US veterinarians on the civilian side, too. Even though the US government started recognizing the importance of animal diseases in 1843 (eg, contagious pleuropneumonia and Texas fever in cattle, glanders in horses, and hog cholera in swine), the government did not take action until 1884, when it finally founded the Bureau of Animal Industry, which was to be directed by a veterinarian, under the Department of Agriculture.[2(p135)]

Numerous attempts were made in the 1880s and 1890s to get bills passed in Congress to establish a Veterinary Corps or Service, many supported by the AVMA. For example, General Philip Sheridan (Commanding General of the Army of the United States) wanted to improve veterinary service in the US Army and was working on a proposal for creating a Veterinary Corps in 1887 to 1888, but he died before introducing his bill to Congress.[2(pp221-222)] General Orders 19, February 20, 1889, spelled out the veterinary surgeon's responsibilities to improve veterinary service by giving them a larger role to provide veterinary treatment and practice preventive veterinary medicine, as well as set conditions for providing a veterinary hospital building.[13] All of these roles were strictly equine-related, however, and generally, veterinarians weren't utilized by purchasing boards or consulted about nutrition. MJ Treacy, a veterinarian of the 8th Cavalry, wrote about this subject in 1898, and he was the first recorded to propose that Army veterinarians should perform food inspection. Unfortunately, he died of yellow fever in Cuba July 14, 1899, and his visionary efforts were delayed.[2(pp232-233)]

Spanish-American War to Pre-World War I

At the start of the Spanish American War in 1898, a veterinary sergeant was authorized for each field artillery battery, and 14 veterinary surgeons were authorized for 10 cavalry regiments.[1(p3)] Although the Army veterinary surgeons' skills were generally improved at the beginning of the Spanish-American War, the veterinary services they initially provided were not substantially better overall than what were provided during the Civil War. The potential roles of veterinary services at that time were hindered by actions of the Quartermaster Department, which purchased many horses unfit for military service at twice their market value. These costly purchases resulted in

appalling animal losses that captured the national press' attention.[2(p253)] After the Quartermaster Department's procurement problems, some leaders recognized the need for qualified veterinarians to be involved in the purchase process; however, not everyone agreed. Even as late as 1900, during a senate debate concerning improving Army veterinarian benefits, a senator argued that the cavalry captain of the troop had more experience and ability to determine a horse's condition than young veterinarians coming out of college.[2(p240)]

When veterinarians were finally utilized in greater numbers on purchasing tours in the western United States, the quality of the animals procured greatly improved. Many of the horses staged at Tampa, Florida, for the Spanish-American War were deemed unfit by the veterinarians and were not shipped to the battle sites. Unlike the situation at the end of the Civil War, the Bureau of Animal Industry quarantined the animals at the Tampa camps, preventing the spread of disease to other parts of the United States. Also, the Florida courts banned the horses from being shipped out of the staging camps.[2(p253)] Veterinarians, federal agencies, and states were beginning to understand the importance of herd health and enforcing zoonotic disease control.

Other advances and progress in the United States brought more changes to the Army, many of which affected military veterinarians. The Army Reorganization Act of 1901 provided that all veterinarians in cavalry and artillery regiments received the pay and allowances of a second lieutenant with a salary of $1,500 per year.[2(p342)] The number of these positions was 42.[2(p238)] Although still viewed as civilian employees, Army veterinarians were now given quasi-commissioned officer status[2(p342)] (Figure 1-4). In addition to better pay, Army veterinarians now wore a uniform and were entitled a salute from enlisted personnel.[2(p342)] Even though other Army officers had a better impression of these uniformed veterinarians, Army veterinarians were still handicapped by not falling under the medical department and not having authority, which was only granted by their immediate commanding officer.[2(p341)]

With somewhat of an increase in status, veterinary officers' responsibilities expanded. For example, they now were usually able to oversee the work of their horseshoer and farrier. Veterinarians also were appointed as instructors at the Army training school for farriers and blacksmiths at Ft Riley; one was an assistant instructor in hippology at the Infantry and Cavalry School at Ft Leavenworth.[2(p341)] In garrison, veterinarians assisted with hippology instruction to junior officers. They were also selected to provide age

Figure 1-4. Early veterinarian insignia denoting the branch of assignment, crossed sabers (cavalry) or crossed cannons (artillery), number of the regiment at the peak, and the winged horseshoe. The horseshoe provides not only the symbol and shape of the horse hoof, but also a stylized "V" for veterinarian.
Courtesy of the Army Medical Department Center of History and Heritage Archival Collection, Ft Sam Houston, Texas.

determination and soundness exams for horses being procured by the purchase boards. In the field, they accompanied their commands to care for disabled horses.[2(pp341-342)]

To supplement Army veterinary officers, the Quartermaster's Department continued to hire contract veterinarians as civilians for $100 per month.[2(p248)] There were over 60 civilian veterinarians in the Philippines during the Spanish-American War (1898) and the Philippine-American War (1899 to 1902).[1(p3),2(pp345-346)] These veterinarians had no promotion potential, retirement, or disability benefits.[2(p345)] Beginning in 1904, these veterinarians had to pass an entrance examination before being appointed, and eventually, these veterinarians and those of the mounted services (Cavalry and Artillery) would all be commissioned.[2 (p346)]

As the 20th century approached, the military's veterinary service mission expanded to include food inspection. This new mission was in part connected to the "Progressive Era" of thinking in America. Because of discoveries and the recent acceptance of the germ theory of disease, scientific approaches to problems were recognized more. A congressional act approved in 1884 established the Bureau of Animal Industry (BAI), a new department under the Department of Agriculture, and required a veterinary surgeon to be the department chief. The BAI was to determine the causes of costly livestock diseases such as bovine pleuropneumonia and tuberculosis, establish quarantine procedures for infected animals, develop prevention strategies and cures, and suppress export of diseased animals.

With a thriving agriculture industry, the US wanted to be able to export livestock and meat products. In 1890, another act of Congress required the Secretary

of Agriculture, via the BAI, to inspect meats for exportation and to prevent adulterated foods and beverages from being imported into the United States. A year later, acts were passed to provide for the safe and humane export of cattle to foreign countries and inspection of live cattle, hogs, and carcasses for interstate commerce. However, it was not until 1896 that adequate funds were appropriated for the BAI to properly accomplish all these missions.[14] Although the federal laws' and BAI's focus was to reduce diseased animals and prevent their products from entering the market, at this time, little legislation was written to properly enforce sanitation requirements, grade, condition, and quality of meats.

Just a few years later, at the end of the 19th century, the Spanish-American War's "Embalmed Beef Scandal" played another important part in the establishment of the Army's veterinary food inspection service. Soldiers in Army camps in the southern United States, Cuba, and Puerto Rico alleged their beef rations were preserved with harmful chemicals, rendering the meat unpalatable and making them sick. The US press ran numerous scurrilous stories featuring the claims (Figure 1-5).

President William McKinley appointed a commission, chaired by General Grenville Dodge, to investigate the War Department's conduct during the war with Spain, partially based on various Spanish-American War veterans' allegations, to include embalmed beef used for subsistence. The Dodge Commission Report determined the refrigerated and canned beef was generally wholesome and met the quality standards of the day. The commission found no evidence of chemically tainted beef but indicated that the beef occasionally may not have been optimally stored, issued, and prepared. The commission also noted that, over time, refrigerated beef can have surface mold growth, but with trimming, the meat underneath is still satisfactory.[15] Although these findings may have been scientifically accurate, witnesses seeing the mold-covered refrigerated beef concluded the food was aesthetically unacceptable and unfit for consumption.

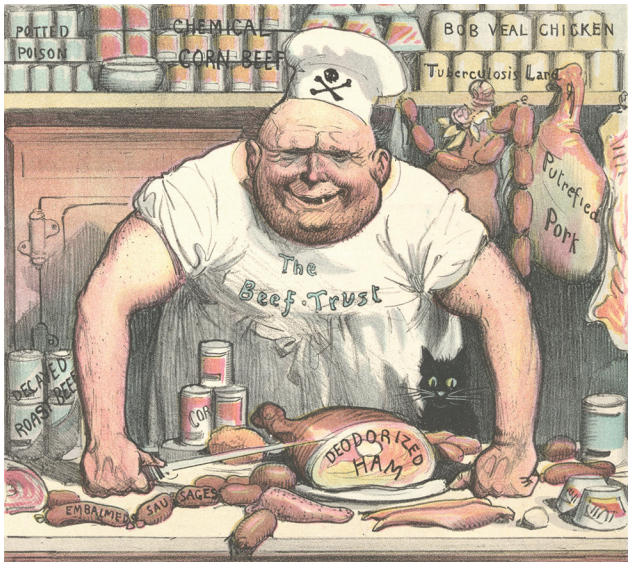


Figure 1-5. Public opinion remained inflamed over the quality of food and its production in the years after the embalmed beef scandal during the Spanish-American War and the subsequent publication of *The Jungle* by Upton Sinclair, as this image of the 1906 cover of *Puck* illustrates.
Reproduced from the Library of Congress. http://hdl.loc.gov/loc.pnp/ppmsca.26067/. Accessed October 23, 2017.

In the early days of military food inspection, Army training was lacking. Subsistence department personnel often relied on the beef suppliers' quality inspectors for contract compliance.[16] In 1901, the Army's food inspection gap was initially filled by hiring a US Department of Agriculture (USDA) veterinarian, who was appointed as meat inspector, Subsistence Department, US Army, to perform receipt meat inspection.[1(p3)] By 1906, the Army had six veterinary food inspectors. Based on War Department orders, veterinarians were to conduct locally procured beef inspections for post commanders.[1(p3)]

In 1906, Upton Sinclair's book *The Jungle* graphically described horrid sanitary conditions in the Chicago meatpacking houses. This novel enraged the public and, along with the Embalmed Beef Scandal's negative press, compelled Congress to pass the Federal Meat Inspection Act of 1906. By 1907, the Federal Meat Inspection Act empowered the BAI to hire over 2,200 inspectors to apply explicit sanitary standards and enforce 100 percent mandatory ante mortem and post-mortem inspections at approximately 700 slaughter and processing establishments.[17] (For more information about the evolution of food inspection in the US military and current evolving missions, see Chapter 9, Food Safety and Defense.)

After several years of lobbying by the AVMA and Army veterinarians, a congressional act established retirement benefits for military veterinarians in 1910.[2(p350)] Conversely, in 1913, Congress questioned why military veterinarians should be part of Army medical service. The Surgeon General, in discussions with the Secretary of War on June 12, 1913, made a strong case that veterinary service personnel should be formed into a new corps in the Medical Department.[2(p356)] Despite the discussions, veterinary personnel were not included in the Medical Department until 5 years later.

The first reference to establish a veterinary reserve corps was made in February 1916 at the semiannual meeting of the Missouri Valley Veterinary Association.[2 (p474)]

Europe was already embroiled in World War I, and many saw American involvement as imminent. Dr Robert Vans Agnew, a veterinary officer in the 5th Cavalry, Ft Leavenworth, wished to compile a list of those willing to serve in case of war.[2(p474)] At this and later meetings, a list said to contain 700 names was accumulated.[2(p474)] This list was given to the Quartermaster General but was never mentioned again.[2(p474)]

In March 1917, the president of the AVMA, Dr Chas E. Cotton, appointed a special commission on Army veterinary service. At the same time, he issued an appeal to the veterinary profession, "If our country is drawn into this war ... it will be necessary to have a large reserve corps."[2(p503)] He asked all eligible men to volunteer their services and noted a reserve corps would have numerous duties, to include the inspection of meat and feed, care of horses and mules, and the usual veterinary work at hospitals and depots near the battle lines.[2(p503)]

As noted in this chapter thus far, military veterinary medicine—from the Revolutionary War until 1916—progressed as the civilian veterinarian gained stature; however, problems remained. Veterinarians in the cavalry and artillery regiments were paid differently than the veterinarians working for the Quartermaster General. Veterinarians still were not considered Army officers, and standardization of training and authority was lacking. The US Army lagged decades, if not a century, behind some of the European armies in establishing a veterinary corps, which became more apparent in the years before World War I. Many of these problems were rectified by the National Defense Act of 1916.

VETERINARY SUPPORT OF THE US MILITARY JUNE 3, 1916, TO PRESENT

World War I to Pre-World War II

Expansion of the US Veterinary Corps and Veterinary Service

On June 3, 1916, the National Defense Act established the US Army Veterinary Corps and expanded entrance requirements. Veterinarians could now be officially commissioned officers within an Army Corps if they were citizens of the United States, 21 to 27 years of age, and a graduate of a recognized veterinary college who could pass professional and physical examinations. After a proscribed term of service, they could achieve the rank of major.[1(p5)] Although this National Defense Act stated the US Army Veterinary Service was supposed to fall under the Medical Department, veterinary officers were still aligned with artillery and cavalry regiments and the Quartermaster Corps when the United States entered the war on April 6, 1917.[2(p471)] The National Defense Act also provided for the establishment of the Veterinary Section, Officers' Reserve Corps, but, as will be noted later in this section, nothing was done to establish this component until after war was declared.[2(p507)] When the National Defense Act was approved, the Veterinary Corps had no organization above regiments or station sites (camps or depots).

In early 1917, the Surgeon General, Major General William C. Gorgas worked with various military and civilian veterinarians, veterinary college deans, and the AVMA to better organize the American Veterinary Service, which was based on the British Army's Veterinary Service. Later, he established a veterinary advisory board to further develop the organization and plans for the US Veterinary Service. This led to the publication of Special Regulation 70, which spelled out technical and administrative direction to the Veterinary Service until 1921.[1(p7)] Also, General Gorgas established the Veterinary Division in the Surgeon General's office in October 1917.[18(p52)] Since almost all veterinary officers were in combat divisions or Quartermaster Corps remount depots, Gorgas had five senior veterinary officer general inspectors visit and advise the largely young and inexperienced veterinary officers and report back to him on their findings and recommendations.[1(pp8-9)]

The Overman Act of May 18, 1917, allowed President Woodrow Wilson to further expand the Veterinary Corps. At the beginning of World War I, the Veterinary Service was made up of 58 officers; this number rapidly increased as the war progressed.[1(p10)] To meet the demand, many veterinary officers were appointed via the National Defense Act of 1916's Veterinary Section, Officers' Reserve Corps.[1(p11)] Major Gerald E. Griffin, the senior veterinary officer detailed to the Office of The Surgeon General (OTSG), started to organize the Veterinary Reserve during the summer of 1917.[2(p476)] The reserve officers would be commissioned in the rank of second lieutenant, were subject to call to duty only in time of actual or threatened hostilities, were only entitled to pay or allowances when in active service, and would receive no retirement or retired pay.[2(p509)] However, they were entitled to a pension for disability in the line of duty and while in active service.[2(p509)]

Reserve officers were commissioned, quickly brought on to active duty, and given various duties, often with no military experience or training. Some of these officers were sent to France with no supplies, equipment, plans, or regulations.[2(p524)] These officers initially fell under combat or infantry divisions and the Quartermaster during World War I, instead of the Medical Department because there was no Medical

Department plan for veterinarians until January 1918.[2(p479)] During World War I, 74 National Guard and 1,596 Reserve commissioned veterinary officers served on active duty.[1(p11)]

At the time the United States entered the war, the entire meat inspection force of the Army consisted of just three regular Army veterinary officers, three civilian veterinarians, and one retired enlisted man.[19] Under the authority of the Overman Act, the War Department General Orders 130 on October 4, 1917, called for the first use of enlisted men in veterinary service and established regulations for their utilization (one Veterinary Corps officer [VCO] for 16 enlisted soldiers per 400 animals).[1(p12)] Enlisted personnel were authorized as sergeants first class, sergeants, corporals, farriers, horseshoers, saddlers, cooks, privates first class, and privates.[1(p7)] Interestingly, the farriers, horseshoers, saddlers, and cooks were known by their titles and not by a rank recognized today.

To briefly summarize the progression of the Veterinary Corps thus far, legislation established the Corps in the National Army; a larger force formed during World War I and was augmented by conscription, volunteers, and the National Guard. General Orders 130 provided for officers and enlisted men in the proportions that the Surgeon General had recommended, although, as noted earlier in this chapter, no veterinary officers were to serve in rank above the grade of major.[1(p5)]

Later, authorizations were expanded to provide two colonels and six lieutenant colonels.[20(p199)] The peak wartime strength of VCOs was 2,234 on November 20, 1918; the peak strength of veterinary enlisted personnel was over 18,000 men by October 31, 1918.[1(p12)] The size of the US Army in the American Expeditionary Forces (AEF) was approximately 1.2 million soldiers.[21(p630)]

There was also another soldier component in the expanded Army: a very small number of African-American veterinarians received commissions during World War I. Although these veterinarians served in segregated units such as the 92nd and 93rd divisions, their duties remained the same as other Army veterinarians. African-American veterinarians were responsible for maintaining equine health, food inspection, and camp sanitation.

Evolution of Improved US Veterinary Training and Expanded Veterinary Missions

As the US Veterinary Service rapidly expanded, almost all officers and enlisted soldiers lacked military experience and needed individual, as well as unit training. Many had to rely on on-the-job training wherever possible, but this training suffered because of a shortage of trained instructors.

Five Medical Department training facilities and schools opened from the summer of 1917 through February 1918. This formal training included a veterinary laboratory course in Philadelphia, Pennsylvania, and courses from Medical Department schools located at Camp Lee in Virginia, Camp Greenleaf in Georgia, Fort Riley in Kansas, and Meat and Dairy Hygiene and Forage Supply Inspection courses in Chicago, Illinois.[1(p13)] In general, veterinary personnel at the camps were provided training in subject matter areas such as meat and dairy hygiene, veterinary laboratory, and veterinary hospital operations overseas. However, only half of the enlisted soldiers and veterinary officers received any formal training from these schools during World War I.[1(p13)] Lieutenant Colonel Everett Miller, Veterinary Corps, and principal author of the *United States Army Veterinary Service in World War II*, observed that "the most discouraging situation in the beginning wartime expansion of the Army Veterinary Service [in World War I] was its inadequate training."[1(p12)] (More specific information about schools and specific training courses is found in the expanded missions subsections of this chapter.)

In addition to experiencing training problems at the beginning of World War I, the Medical Department had practically no veterinary equipment or supplies, and adequate stocks were not available in the medical supply system until late 1917.[1(pp14-15)] A few specific items, especially veterinary supplies and instruments, were exceptionally difficult to obtain, possibly because of the enormously increased demand; the difficulties involved in predicting what might be needed and in drawing adequate attention to these needs; and the newness of the Veterinary Corps itself.

The Army Medical School supplied veterinary vaccines, and later, a veterinary laboratory, established in Philadelphia, began making some of the drugs needed for animal treatment. In some instances, the Medical Department paid veterinary officers for their instruments when these doctors joined the Veterinary Corps. However, particular difficulty was encountered in providing horse ambulances because the Army had never purchased such an item before.[18(p58)]

Despite training and logistical issues, the Veterinary Corps' missions expanded during World War I. During this time, zoonotic disease prevention and control was added to the list of veterinary services provided to the military. Food inspections were initiated at food establishments, conserving Army stockpiles by surveillance inspections and included nonanimal origin food. The term "Army animals" grew to include not only horses and mules, but also (unofficially) Army dogs, signal pigeons, and laboratory animals.

Zoonotic Disease Protection and Control Mission. The Veterinary Corps started establishing its laboratory service in December 1917.[2(p599)] Three laboratories produced mallein for glanders testing and performed bacteriological and pathological work, as well as dairy and meat product testing.[2(pp599-600)] A laboratory was set up in Philadelphia on January 19, 1918. Laboratory rooms were provided by the University of Pennsylvania, with the Army Medical Department responsible for furnishing supplies. Important work was initiated to include the study of influenza, pneumonia, and strangles (equine distemper). The veterinary officers trained in laboratory work at this facility were invaluable and served to promote the "efficiency of the service."[20(p204)] In 1920, the veterinary laboratory course was transferred to Washington, DC, and eventually served as part of the Army Veterinary School.[1(p14)]

Food Inspection Mission. The National Defense Act (1916) and Special Regulations 70 (1916) charged the Army Veterinary Service with duties involving food supplies of animal origin.[1(p5)] The mission included the inspection of meat-producing animals before and after slaughter, dressed carcasses, and milk herds and dairies. Expertise in this area actually began at the General Supply Depot in Chicago, which was the central purchasing point during the war. A small number of veterinarians had engaged in these inspection duties for years, and their inspections were expanded to other purchasing points and to the field.[1(p15)] In the early months of the war, inspections varied from none at all to other agencies such as the BAI conducting the inspections.

In an effort to improve these unsatisfactory inspection procedures, the Secretary of War directed that meat and dairy inspections would be the responsibility of the Veterinary Corps.[20(p205)] Thus, the Veterinary Service's food inspection mission assured that food supplies of animal origin, purchased by the Army, were wholesome, produced in establishments with acceptable standards of sanitation, and met quality standards. In addition, efforts were made to ensure proper food storage at Army stockpiles to minimize loss.

The Meat and Dairy Hygiene and Forage Inspection Course opened at the General Supply Depot in Chicago in August 1917.[1(p13)] The course originally served to train veterinary officers, but soon enlisted men were accepted as students.[20(p204)] The increased food inspection roles of the Veterinary Service and the essential need for this type of technical training led to the permanent establishment of the school.[20(p204)] The course was designated as the Veterinary School of Meat and Dairy Hygiene and Forage Inspection in 1920.[1(p14)] After reorganization in 1922, the school was renamed the Army Veterinary School, transferred to Washington, DC, and finally integrated into the formation of the Army Medical Center.[1(p14)]

Animal Care Mission. As the Veterinary Corps' animal care mission expanded during World War I, the need for military and specialized veterinary training also increased. The principal training school for commissioned officers was at the veterinary section of the Medical Officer's Training Camp at Camp Greenleaf, Georgia. If suitable, graduates were then assigned to the Veterinary Training School at Camp Lee for inclusion in the overseas veterinary units.[20(p203)] Graduate veterinarians would receive both training in the basic duties of a soldier and specialized training as a future officer.[20(p203)] An enlisted section was also trained at Camp Greenleaf. In addition, the camp received all of the veterinary graduates of the Medical Enlisted Reserve Corps called to active duty.

A training school was also established at the Medical Officers' Training Camp at Fort Riley, Kansas. The veterinary section of the school focused only on training enlisted men for duties related to the Veterinary Service and in specialized skills such as cooking and horseshoeing. Graduates were then assigned to organizations for overseas duty. This school was eventually transferred in September 1918 to the Veterinary Training School at Camp Lee, Virginia.[20(p203)]

The Veterinary Training School at Camp Lee, Virginia, focused on the organization and training of veterinary field hospital units for the American Expeditionary Forces in France.[1(p13)] The Camp Lee school sent almost 6,500 of its students overseas to maintain the veterinary hospitals and to work with other veterinary organizations.[1(p13)] At the outbreak of the war, veterinary hospitals were constructed at some of the older posts having mounted troops, and remount depots were built at each divisional cantonment. The official capacity at three of these depots was 10,000 animals, eight depots of 7,500 animals, and 23 depots of 5,000 animals.[20(p205)] The remount depots were responsible for the reception, processing, and issue of newly purchased animals to the divisions. However, because of an accumulation of horses and the overcrowding of sick animals housed with healthy animals, the efficiency of the Veterinary Service and the management of communicable disease was affected. Thus, the veterinary hospitals at the remount depots became the center of veterinary activities at the camps. The largest depots had veterinary detachments of 12 officers and 150 enlisted men; nine officers, and 100 enlisted men for those of intermediate size; and six officers and 75 enlisted men for the smallest depots.[20(p205)]

In December 1917, the territory of the United States was divided into five zones, with five experienced officers assigned as general inspectors, whose purpose

would be to develop appropriate sanitary standards while increasing the efficiency of veterinary personnel.[20(pp205-206)] Serving as both inspectors and instructors, they identified deficiencies and corrected the defects, providing essential instruction to improve veterinary efficiency. Their work greatly benefited the US animal industry to include the inspection of stockyards and their supply of animals for the public.[20(p206)] This emphasis on veterinary preventive medicine was also used to preserve the health status of animals maintained at remount depots. Preventable conditions and communicable diseases were appreciably decreased by recognizing the need for shelter with proper sanitation and by providing less overcrowding in corrals.[20(p206)]

Progress was also seen on animal transports proceeding overseas. Veterinary personnel cared for the sick, supervised sanitation for the animals on the outward voyage, and cleaned and disinfected the ships upon return. Temporary details using veterinarians and casual officers changed to permanent assignments of one veterinary officer and 25 enlisted men to each transport. Of the 66,071 horses and mules shipped overseas, there were only 660 lost or 1%.[20(p207)]

The Tables of Organization for the Veterinary Service (later renamed the Tables of Organization and Equipment or TO&E) were promulgated around January 1, 1918.[20(p208)] An evacuation unit was authorized for each infantry division. This unit was known as the Mobile Veterinary Section and was allocated one officer and 21 enlisted men. Veterinary personnel for each division totaled 12 officers and 51 enlisted men, with a division veterinarian and division meat inspector assigned.[20(p208)] With some exceptions, the division veterinary personnel were organized, trained, and equipped at the divisional camps and were sent overseas with their unit.[20(p208)]

The authorized veterinary hospital units for field service included a corps mobile veterinary hospital (evacuation) with two officers and 35 enlisted personnel.[20(p209)] There was also an Army mobile veterinary hospital (evacuation) with four officers and 144 enlisted personnel. This hospital had half the equipment of a veterinary hospital and could handle 500 patients.[20(p209)] The base veterinary hospital (stationary) had the same personnel numbers and equipment as the mobile veterinary hospital. Finally, the typical hospital for service in the rear was the veterinary hospital (stationary) with eight officers, 311 enlisted soldiers, and a patient capacity of 1,000[20(p209)] (Figure 1-6).

The first complete veterinary hospital unit arrived in France in April 1918. At this time, the US Army had procured over 60,000 animals. Prior to the new unit's arrival, care was being provided by a squadron of Cavalry assisted by "veterinary advisors."[2(p519)] In June 1918, a complete veterinary hospital, with a capacity for 500 patients, opened.

Figure 1-6. Reproduction brassard with green cross representing veterinarians. The red cross represented noncombatants on the battlefield. The green cross signified veterinary officers who (carrying sidearms, ostensibly to dispatch wounded horses) were not guaranteed unarmed Geneva Convention protection.
Courtesy of the Army Medical Department Center of History and Heritage Archival Collection, Ft Sam Houston, Texas.

All overseas veterinary hospitals were used only for treating mounts. The American Army officially did not have dogs in military service during World War I or any of the preceding wars.[21(p949)] The major reason for equine admissions in the overseas veterinary hospitals was mange, although there were many other causes of equine injury[2(p523)] (Figure 1-7) (Figure 1-8).

Figure 1-7. While there were many equine health issues in Europe during World War I, sarcoptic mange was a widespread (and largely curable) problem. Shown here are horses receiving sulfur gas treatment. US Army Signal Corps photo 17880.
Courtesy of the Army Medical Department Center of History and Heritage Archival Collection, Ft Sam Houston, Texas.

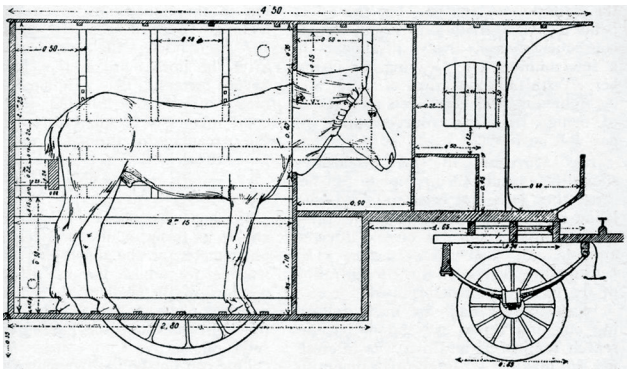


Figure 1-8. In World War I, there were plans for mobile sulfur gas treatments for incapacitated animals or those in remote areas.
Reproduced from Lepinay, Vigel, Chollet. Sulfur gas in the treatment of mange. *Am J Vet Med.* 1918;13(5-6):263. Courtesy of the Army Medical Department Center of History and Heritage Archival Collection, Ft Sam Houston, Texas.

Overview of the US Veterinary Service at the Great War's End

On August 24, 1918, veterinary service in Europe was transferred from the Quartermaster Corps to the Medical Department as spelled out in General Orders 139.[21(p717)] (This transfer had been detailed in Special Regulations 70 in 1917 but was never implemented.) During the Great War, the Veterinary Service had personnel at five components: the Headquarters of the Veterinary Corps; the Veterinary Division in veterinary hospitals and remount depots; the separate schools for the Veterinary Corps, meat inspectors, and farriers; the food inspection branches for military forces; and the Army Veterinary Laboratory Service.[21(pp912-937)]

World War I was a bloody conflict, and the newly formed Veterinary Corps was not immune from losses. An issue of *The Veterinary Bulletin* from February 1920 states that during World War I "104 [veterinary] officers and [veterinary enlisted] men" were "fatal casualties."[22(p1)] Of that number, 94 died as a result of disease.[22(p1)] One of the Veterinary Corps personnel killed in action was Second Lieutenant James C. Cox, who was attached to the ammunition train for the Third Infantry Division.[23(p312)] The "train" or rolling convoy of supplies consisted of motorized trucks and wagons pulled by horses and mules. It made sense for a veterinarian to be on hand for any equine emergencies. During the Meuse-Argonne offensive, the ammunition train came under sustained artillery fire from the enemy, and on October 23, 1918, Cox was killed, and his assistant, seriously wounded[23(p308)] (Figure 1-9).

Several important programs seen during World War I would shape the future work of the Army Veterinary Service. Major George A. Lytle, initially assigned as a subsistence inspector at the Chicago depot, has been referred to as the "father of Army veterinary food inspection."[16(p20)] Having obtained the support of the Surgeon General and the Quartermaster Corps, the Chicago school for meat inspectors was established in June 1917. Lytle supervised and trained an inspection force in meat and dairy products, established the basic principles for today's military food inspection system, and developed the nine classes of food inspection.[16(p20)] At purchasing points alone, the inspection service inspected a total of 1.26 billion pounds of meat and dairy products from 1917 to 1919. Overall, an estimated 11 million pounds of food were condemned,

Figure 1-9. The roads were indeed dangerous for all types of traffic during World War I. Second Lieutenant James C. Cox, Veterinary Corps, was attached to the ammunition train for the Third Infantry Division in order to provide care to animals used for transport. During the Meuse-Argonne offensive, Cox was killed when the ammunition train came under artillery fire. US Army Signal Corps photo.
Reproduced from US Army American Expeditionary Forces 3d Div. *History of the Third Division, United States Army in the World War for the Period December 1, 1917, to January 1, 1919.* Andernach-on-the-Rhine, Cologne, Germany: M. Dumont Schauberg; February 1, 1919: 307.

thus protecting the health of troops and their combat effectiveness.[16(p21)] In 1922, for the first time, the administrative, technical, and professional duties of the Veterinary Service were set out in Army regulations.[16(p23)]

Another key program to evolve and lead to the growth of the Veterinary Corps' food mission was the Civilian Conservation Corps (CCC). Established in 1933, the CCC's expansion prepared the Veterinary Corps for better food inspection programs in later years. Under the Act of Congress entitled "An Act for the relief of unemployment through performance of useful public works, and for other purposes," the CCC was placed under the War Department and became a force of 2.5 million.[16(p23)] Upon activation of the CCC, the USDA was initially responsible for conducting food inspection duties, but the USDA was overwhelmed by the new emergency military role of the CCC. Therefore, the Army Veterinary Service, which previously had only covered military posts and depots, was given responsibility for the CCC's entire inspection service, which doubled the size of the active duty Veterinary Corps.[16(p23)] In addition to more active duty VCOs, over 100 Reserve Corps veterinary officers were utilized.[1(p11)] These officers' overall success eventually led to having the Veterinary Corps conduct the inspections of other foods such as fruits, vegetables, and bread, which, in turn, provided a more experienced and versatile Veterinary Service for early World War II.[16(pp23-24)]

Toward the end of the post-World War I period and perhaps because of the Depression Era programs (eg, Works Progress Administration, Civilian Conservation Corps, and other mobilizations of government jobs), US Army Reserve numbers were increasing. The VCO Reserve Corps numbered 626 on the active list on June 1, 1935. [21(p915)] The number of enlisted personnel was about 600.[21(p938)] Even so, on the eve of World War II in 1939, the number of VCO authorizations in the Regular Army had decreased to 126 VCOs, and the National Guard had roughly 150 VCOs.[1(p10)]

During the drawdown at the close of World War I's hostilities, the Army was able to sell excess horses (100,000 within the United States) at good prices, in part because of the excellent disease control procedures being implemented by the US Army veterinarians.[2(pp562-563)] This was an economic bonus that did not occur after the Civil War and the Spanish American War. After those wars, entire lots of horses had contagious diseases and were either sold, spreading disease all over the country, or were in such bad condition they could not be sold.

In addition to the aforementioned benefits of stricter disease control, the Army Veterinary Corps secured another victory by pushing to have Bulletin No. 33 published on April 19, 1919, to stop public animals belonging to military forces in Europe from being imported to the United States. This blockage was achieved after coordinating with the US Department of Agriculture, which implemented quarantine regulations for privately owned mounts that were returning to the United States. This forethought prevented several diseases such as mange, foot and mouth disease, and glanders from being brought back from Europe in horses that would have been shipped all over the country.[21(p843)] Despite these effective policies, exceptions were made; General John J. Pershing brought his horse back from service in France.[24(p149)]

With the exception of the course of instruction at the Chicago General Supply Depot and the Veterinary Laboratory Course, the end of World War I brought the closure of all of the wartime veterinary training schools.[1(p13)] Then, in 1920, the Medical Field Service School for the field training of Medical Department personnel was established at Carlisle Barracks, Pennsylvania. Veterinary Corps officers first began attending in 1923, and a total of 113 veterinary officers graduated before 1941.[1(p14)]

Training in veterinary units of the Reserve Officers' Training Corps (ROTC) proved to be some of the most important peacetime training. Conducted at four veterinary colleges (Iowa State College, Kansas State College, the Ohio State University, and New York State Veterinary College at Cornell University) between 1920 and 1935, nearly 500 veterinary ROTC graduates were commissioned as second lieutenants.[1(p14)]

After the terrible pandemic of influenza killed millions worldwide (including many US Army veterinarians), training in hygiene was given more consideration and was one of the many concerns studied by veterinary personnel. Similarly, tropical diseases and rabies were scourges that veterinary scientists looked to defeat. One VCO in particular, Raymond A. Kelser, devoted much of his career during the postwar period to discovery and prevention of these diseases.

Kelser had an interesting background, with foundations in science and hard work. Securing a position that allowed him to work through college and night school courses, Kelser became a "messenger" for the Bureau of Animal Industry under the Department of Agriculture at age 17.[25(p201)] The position led to subsequent promotions to secretary and then laboratory assistant. Advancing in his studies as well, Kelser earned his doctorate of veterinary medicine at George Washington University's School of Veterinary Medicine through his continual night school course schedule.[25(p202)]

Kelser joined the Army in 1918 during World War I. He did not see service overseas at that point but would later serve in the Philippines and Panama. For the next 20 years, Kelser performed numerous studies

and made significant observations. In 1928, while in the Philippines, he developed a vaccine for rinderpest in cattle.[25(p207)] His pioneering laboratory work led to a test for detecting botulism in canned foods, the first "killed virus" vaccine that utilized chloroform as an inactivating chemical, important observations in equine encephalomyelitis, and an improved rabies vaccine[25(p207)] (Figure 1-10).

From the Spanish American War to World War I, military veterinary requirements, missions, and official acceptance expanded. During World War I, the importance of food and meat inspection for an Army in the millions became apparent. Similarly, animal care and the important discoveries made by veterinarians in laboratories greatly assisted war efforts. At the close of 1918, the "Great War" was over, but US Army veterinarians were still on duty to support the military through animal care, food inspection, and discoveries in the laboratory. Some veterinarians remained as part of the occupation forces in Europe, ultimately leaving in 1922, while others were sent to administer animal care as part of the Siberian and North Russia Expeditions (1918 to 1920).[26] The Veterinary Corps was now established as an official corps of the Medical Department, and despite the post-World War I drawdown, the Veterinary Corps was poised for service in the next war.

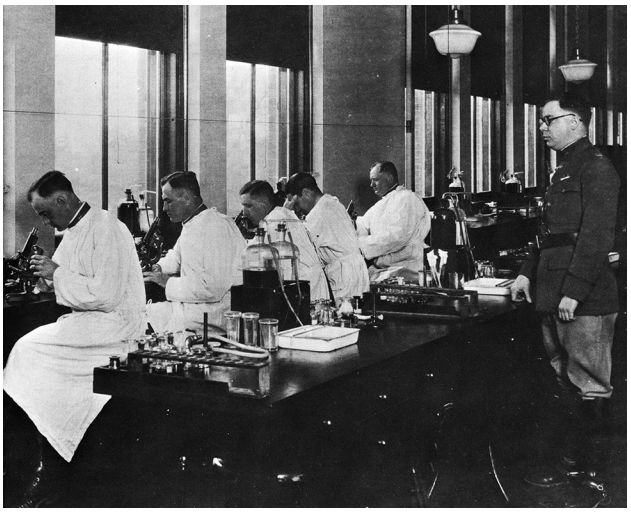


Figure 1-10. Lieutenant Colonel Raymond A. Kelser (standing, on the far right) in the bacteriological laboratory at the US Army Veterinary School, US Army Medical Center, Washington, DC. Courtesy of the Army Medical Department Center of History and Heritage Archival Collection, Ft Sam Houston, Texas.

World War II to Pre-Korean War

Important Changes in US Army Veterinary Service During World War II

Mission Changes. During the World War II to pre-Korean War timeframe, VCOs and enlisted soldiers became more specialized, as veterinary medicine in general expanded. By the time World War II began, the Army Veterinary Service had already defined and tested its missions and responsibilities, which led to a much more orderly expansion to meet World War II wartime requirements than had previously occurred with the onset of World War I.[1(p17)] The Veterinary Corps' missions were essentially the same as they were during World War I—animal health and food inspection—but World War II missions were much more defined. Tasks were spelled out (ie, zoonotic disease control responsibilities, as well as food procurement, safety, and quality responsibilities, throughout the supply chain).[1(pp17-19)]

The Veterinary Corps' missions also underwent a shift in emphasis during World War II; animal health expanded from horses and mules in World War I to horses, mules, pigeons, Army dogs, and laboratory animals during World War II.[1(p22)] As an example, the total equine strength for the Army in Europe during World War I was 191,631; the average equine strength in the US Army during the peak year of 1943 was only 56,287.[1(pp 520,552)] Also, the food inspection mission increased in magnitude as the animal health mission decreased.[1(p23)] In 1944, the food procurement inspections alone peaked at approximately 500+ million pounds.[1(p675)]

In other words, the Army Veterinary Service conducted three main activities during World War II: veterinary animal service, military meat and dairy hygiene service, and veterinary laboratory service and research. The second activity was the most extensive, and together with the third activity, they were the most important veterinary activities performed during World War II. By 1943, the animal mission steadily decreased in volume.[1(p520)] Initially, Army veterinarians were responsible for inspecting meat and dairy products, but later they became more involved in inspecting all subsistence, including fruits and vegetables, as well as other nonanimal-origin foods.[1(pp681-682)] Approximately 20 percent of veterinary personnel were involved with inspecting the Army's subsistence during World War I. During World War II, this increased to about 90 to 95 percent of veterinary personnel; they inspected 142 billion pounds of meat and dairy products from 1940 to 1945[1(p675)] in support of a massive Army with 8 million plus troops.

The veterinary subsistence inspection mission was considered an extension of the Medical Department's troop health programs.[1(p676)] Veterinary personnel

worked closely with the Quartermaster Corps and Transportation Corps to optimize subsistence quality, sanitation, and wholesomeness throughout the procurement, storage, and distribution processes.[1(p676)] In the two world wars, the Army Veterinary Service and the subsistence supply chain minimized unwholesome food, resulting in the "best and healthiest fed" Army of modern times; no foods issued under veterinary supervision caused food-borne disease as a result of the food being unsound, unwholesome, or contaminated at the time of issue.[1(p727)] One wartime survey indicated at least 190 outbreaks involving over 22,000 cases of illness, but the causes were determined to be improper mess hall practices, poor sanitation, or uninspected foods.[1(p726)]

In addition to helping the Medical Department with subsistence inspections, VCOs were often requested by medical officers to participate in many of the epidemiological investigations.[1(p727)] Although no full-time veterinary officers were assigned for pet care, the Veterinary Service also provided limited care to privately owned pets, established immunization programs, and worked with local provost marshals on mitigating stray animals.[1(p668)]

Colonel (later Brigadier General) Raymond Kelser, mentioned previously in this chapter for his veterinary laboratory contributions, advanced to the position of Chief of the Veterinary Corps at the beginning of World War II. Kelser was promoted to help facilitate his management of veterinary support of the exponentially expanding military. He stayed in position until the end of the war and was the second veterinarian recognized with the Distinguished Service Medal (Figure 1-11).

During World War II, Veterinary Service personnel strength peaked at 2,116 veterinary officers and 6,370 enlisted soldiers, as well as a small group of civilians.[1(p33)] During this time, about 15 percent of the nation's total veterinarians were in the Army.[1(p33)] The VCOs were comprised of Regular Army (not more than 126 at any time during World War II), National Guard, Officer Reserve Corps, and a few retired Regular Army officers brought back to active duty. The Veterinary Corps Reserve was the major source for officers in the active Army Veterinary Service during this expansion.[1(p36)]

Training Changes. Unlike World War I, in which there wasn't time to establish training programs for the newly created Veterinary Corps and needed military veterinary positions were filled by basically placing uniforms on untrained civilian veterinarians with unsatisfactory results, the Army Veterinary Service had time to mature between wars and advance its training programs. Many remaining officers completed various military training courses and worked on postgraduate professional education, in addition to receiving training from the ROTC, reserve officer experiences, and National Guard unit training.[1(p83)]

Also, many existing Regular Army training courses were modified and often shortened to get new recruits special training for needed skills before being sent to duty sites; even after relocation, training still continued, sometimes as on-the-job training.[1(p85)] The Refresher Course in Forage Inspection, Special Graduate Course in Clinical Pathology (later changed to Refresher Laboratory Course), Refresher Officers' Course, and the Meat and Dairy Hygiene Course aided in getting officers up to speed for their missions.[1(pp86-87)]

Figure 1-11. Brigadier General Raymond A. Kelser, eighth chief of the Veterinary Corps (1938–1946). His tenure of leadership was tested by World War II, but he managed the corps during great expansion and worldwide service. Prior to serving as chief, Kelser made significant discoveries in the laboratory. His pioneering lab work led to a test for detecting botulism in canned foods, the first "killed virus" vaccine that utilized chloroform as an inactivating chemical, important observations in equine encephalomyelitis, and an improved rabies vaccine. Courtesy of the Army Medical Department Center of History and Heritage Archival Collection, Ft Sam Houston, Texas.

Despite the time for training programs to advance between wars, after World War I, the Army demobilized, and tactical unit training almost disappeared. At the onset of World War II, just a few veterinary units remained. When the United States entered combat, the need for immediate veterinary support was again great, and the number of veterinary units that had to quickly be trained grew to more than 200.[1(p107)] In many cases, these units' training had to continue overseas as, unlike more tenured veterinary personnel, incoming personnel were only trained in animal origin food inspection. Overseas, however, the Army Veterinary Services inspected all of the Army's foods.[1(p108)] As the war in the Pacific matured, the veterinary animal service units' mission decreased, but the food procurement and surveillance mission increased, requiring large numbers of personnel be locally retrained to support the more diversified overseas food inspection mission[1(p109)] (Figure 1-12).

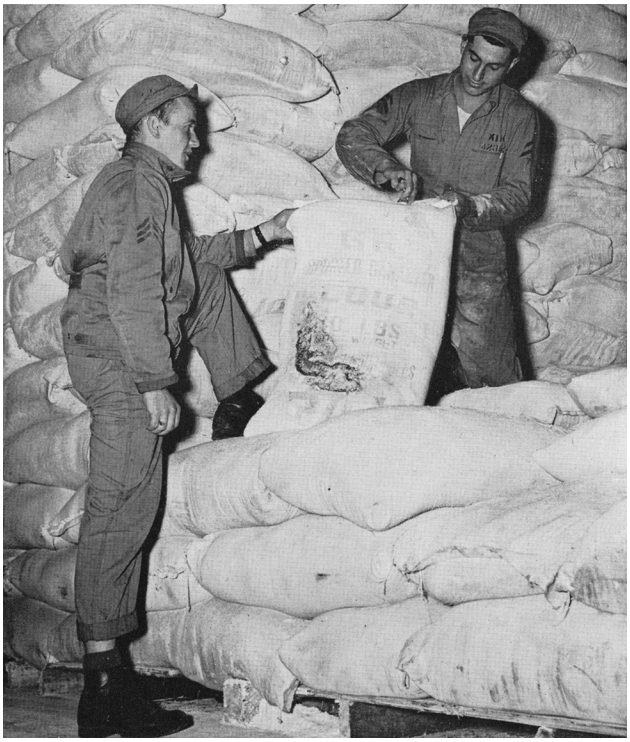


Figure 1-12. Two enlisted members of the US Army Veterinary Services conduct an inspection of subsistence supplies in the European theater of operations during World War II. While World War I may have been the high point for animal transportation care, World War II served as the standard for food inspection on a massive scale.
Reproduced from Miller EB. *United States Army Veterinary Service in World War II.* Washington, DC: Office of The Surgeon General; 1961: 682.

Army veterinarians also provided horse and mule health and care instruction to more than 4,400 Cavalry officers and 1,041 enlisted personnel; to Field Artillery School personnel on almost as an extensive scope; and to almost 1,500 enlisted horseshoers. Army veterinarians provided Army dog and Army signal pigeon health, emergency first aid, and care instruction to more than 4,800 dog handlers, as well as to many of the Signal Corps enlisted pigeoneers personnel.[1(p111)] Army veterinary officers also provided instruction in pack animal care and horseshoeing to Allied-sponsored military forces and to over 2,000 Chinese personnel, including veterinary officers[1(p114)] (Figure 1-13).

Assignment Changes. Veterinary military occupational specialties (MOSs) in 1943 were as follows:

- veterinary officer;
- veterinary officer, large animal;
- veterinary officer, small animal;
- veterinary officer, staff;
- veterinary officer, remount;
- veterinary unit commander;
- meat and dairy products inspector;
- meat products inspector;
- dairy products inspector;
- food chemist; and
- veterinary laboratory officer.[1(p68)]

Figure 1-13. A mule bogged down in mud receives medical care. Veterinary personnel treated government owned animals and animals captured from enemy forces; they also assisted with civilian animal concerns when possible. US Army Signal Corps photo N86439A.
Courtesy of the Army Medical Department Center of History and Heritage Archival Collection, Ft Sam Houston, Texas.

Enlisted MOSs were revised in 1944 and reduced from seven to three to include meat or dairy inspectors, veterinary technician, and veterinary ambulance orderly.[1(p79)]

The World War II War Department TO&E veterinary units numbered 24 initially and grew to 65; at least 550 activated units had veterinary officers and enlisted personnel assigned to them.[1(p206)] Veterinary personnel were assigned to Army Corps and Division headquarters; Infantry, Armored, Airborne, Mountain, and Cavalry divisions; Cavalry brigades and regiments; Field Artillery battalions and regiments; Division Artillery; Medical Department units, including veterinary field units; Quartermaster units; Signal Corps units; Transportation Corps units; and Army Air Force units.[1(pp207-208)]

Veterinary personnel were also assigned to the Chemical Warfare Service (later known as the Chemical Corps) with a diversified mission of operating laboratory animal colonies and conducting scientific research on the effects of chemical and biological agents and weapons and developing protective measures, equipment, and tests for personnel, animals, and foods.[1(pp92-93)]

Significant Impact of Army Veterinarians During World War II

Collective Efforts. The Veterinary Corps attained prominence during World War II in pathology, radiology, epidemiology, and biomedical research. Military veterinary medicine achieved a distinguished record of research firsts to include developing a vaccine for rinderpest; discovering sleeping sickness vectors between animals and people; making advances in laboratory animal medicine through the creation of a disease-free large-scale colony at Walter Reed Army Hospital; demonstrating the value of tetanus toxoid in preventing lockjaw in animals prior to its use for humans; and conducting high-altitude studies. The World War II-generated high-altitude studies also contributed to the definition of aerospace medicine (then centered at Brooks Air Force Base in San Antonio, Texas).[27]

The Army Veterinary School Laboratory personnel perfected and produced equine encephalomyelitis vaccine, improved biologic preparation for typhus vaccine production, and produced Japanese B encephalitis vaccine. In addition, the laboratory staff isolated and identified various types of equine encephalomyelitis infections in man and animals.[1(p391)] The Army Medical Museum (redesignated in 1946 as the Army Institute of Pathology) utilized Army veterinarians, along with an AVMA sponsorship, to build the Registry of Veterinary Pathology and contributed to wartime research on animal disease of military importance, such as equine influenza, equine periodic ophthalmia, and canine leptospirosis.[1(pp430-431)]

Veterinarians also developed a list of sanitarily approved commercial food establishments from which Army contractors could procure subsistence, which was the beginning of the Veterinary Service Approved Sources list that is utilized today. As testimony to the large number of inspections of all types being performed in 1944, about 4,000 commercial food establishments were being regularly inspected every month.[1(p679)] From 1941 to December 1945, the Veterinary Service inspected almost 13.5 billion pounds of meat and dairy products procured, while minimizing perishable subsistence losses.[1(p700)]

Veterinarians and their detachments worked closely with the Quartermaster Corps to provide professional and technical services to at least seven animal purchasing boards, seven remount areas, four remount depots, six dog centers, 18 depots, and 34 market centers to inspect, supply, and care for the armed forces' horses, mules, and dogs, as well as perform subsistence procurement, testing, and surveillance inspections. About 50 VCOs who fell under the control of the Surgeon General's Office were involved with the professional and technical supervision of procurement and processing of remount animals for the Army Remount Service, who fell under the control of the Quartermaster General. Approximately 60,000 animals were procured in the Zone of Interior, with 6,000 procured in Australia, and thousands captured or procured in various theaters such as the China-Burma-India, Mediterranean, and European theaters.[1(p489)]

About 18,000 dogs were brought into the military, with about 10,000 dogs being issued to various K-9 units.[1(pp615-616)] Officially new to the inventory, Army dogs were classified for various types of work, including attack (police), cart, messenger, pack, sentry, scout, sled, trail, and specialty (mine detection, chemical warfare agent detection, and casualty) work.[1(p619)] Dog platoons were made up of various combinations of these responsibilities and were authorized one veterinary sergeant to provide first aid (Figure 1-14).

The new weapon in the Army arsenal, the dog, faced various health challenges, including a food supply that was variable and often questionable. Commercial dog food couldn't maintain an Army dog in good working condition without supplementation; dogs fed raw rabbit meat experienced an outbreak of tapeworms; other dogs were fed meats rejected for human use because of tuberculosis. Subsequently, the Army Veterinary Service initiated the requirement to cook all meats fed to military canines.[1(p621)] Veterinary officers also

conducted trial feeding of the various Type C ration meat components and found them to be acceptable supplements.[1(p621)]

Although no laws or regulatory agency existed concerning health requirements for importing or exporting dogs in the Zone of Interior, the Army Veterinary Service took the initiative and implemented quarantines and other controls to prevent the spread or introduction of diseases from Army dogs in the United States and overseas. Fifteen dog platoons deployed to the overseas theaters; however, because of quarantine restrictions, none of these dogs were sent to Great Britain.[1(p628)] The US Army and Army Air Corps received and utilized about 300 British-trained dogs for use in the country. After the Normandy invasion, US war dogs could be shipped directly from the United States to Europe to support the troops,[1(p631)] but few dogs were allowed to be brought back to the United States from their overseas service sites.[1(p624)]

Figure 1-14. Sergeant William C. Dutton, a veterinary technician, bandages the paw of "Thundeis," a scout dog with the 38th War Dog Platoon, 85th Division, near Villa Di Sassonero, Italy; February 27, 1945. US Army Signal Corps photo 202050-8.
Courtesy of the National Archives and Records Administration.

A local dog procurement program was also more feasible in Hawaii because of the 120-day quarantine on imported dogs implemented there. Modeled after the program in the United States, the Army Veterinary Service in Hawaii conducted physical examinations on over 3,250 dogs, and 344 dogs were successfully trained.[1(pp632-633)]

US Army VCOs also implemented zoonotic disease control regarding dogs and other pets that included import quarantine operations in cooperation with local authorities in the Panama Canal area. There was also a fatal case of human rabies in an Army officer in Guatemala in which a dog was implicated; the animal was quarantined for 2 months in the local Army veterinary hospital and was destroyed but tested negative for rabies. This led to civil action to extend the animal import quarantine period to 6 months.[1(p221)] Furthermore, in January 1945, at a rest camp in Egypt, two recreational riding horses borrowed from the British forces developed rabies. A rabies control program was instituted with the vaccination of 17 personnel, quarantine of the stable area, destruction of stray animals, and reiteration of a year-long order against having animal pets in the camp area.[1(p244)]

In addition to its World War II procurement and disease prevention duties, the Army Veterinary Service was responsible for the overall veterinary care and transport of "Army animals," which by then had grown to include not only military working horses and mules (strength averaged 44,000 during the war years), but also 10,000 dogs, 54,000 signal pigeons, hundreds of livestock and poultry (maintained by the Quartermaster Corps and Army Exchange System food-producing farms or by other departments at rehabilitation and rest centers), all the laboratory animals (eg, mice and rabbits), and captured military animals.

During World War II, the Army Veterinary Service provided over 2 million hospital treatment days for Army horses and mules and implemented evacuation plans in overseas theaters with 72 veterinary detachments, companies, hospitals, and provisional organizations. The Zone of Interior alone had a stall capacity of 2,500 for disabled animals.[1(p563)]

World War II was also the first time aircraft were used to move horses and war dogs in a tactical setting. Over 20,000 mules and horses, about 1,900 Army dogs, several thousand pigeons, and Medical Department research animals were shipped overseas.[1(pp543,615, 649-651)] The Army Veterinary Service played an important role in minimizing animal losses during transport by air, ship, rail, or truck by conducting examinations for condition prior to movement and accompanying animals to monitor their health while en route.[1(p539)] The Veterinary Service also supervised the loading and shipping of these animals at the ports of embarkation.

At least 17 VCOs provided veterinary services to the birds used by Signal Corps pigeon centers and units.[1(p643)] The VCOs' main objectives were to protect the pigeons' health and prevent zoonotic disease transmission from pigeons to other animals and humans.[1(pp644-645)] For deployment overseas, 12 Signal Pigeon companies consisting of three platoons of 1,500 pigeons were activated, with an authorized veterinary detachment consisting of one VCO and one enlisted technician.[1(p649)]

The Veterinary Service also cared for officers' private mounts, troop mascots, and privately owned pets of military personnel, as well as various animals involved with Civil Affairs in liberated and occupied areas, Marine Corps scout dogs, Coast Guard horses and sentry dogs, and livestock on Navy-administered island bases.[1(p519)]

Shortly after the attack on Pearl Harbor on December 7, 1941, Army veterinarians initiated an antibiological warfare program (now called a food defense program) in Hawaii. The program instituted a plan to safeguard fresh milk from deliberate bacterial contamination and extended the program to soft drink beverage plants, ice cream manufacturers, and other commercial food industries throughout the Hawaiian Islands.[1(p433,728-729)]

In 1941, the Army Veterinary Service also established the first of its kind civil affairs assistance program in Iceland. This program received praise from Iceland's prime minister for initiating regulatory controls against diseases affecting the country's animal industry, modernizing its dairy industry, developing hog raising, and conducting research and investigational studies on sheep diseases.[1(p228)] Similar programs were later undertaken by veterinary personnel in developing countries and are now common.

Individual Losses and Gains. Veterinarians in the Philippines were surrounded almost from the beginning of the war because Japan invaded the island soon after attacking Pearl Harbor. Serving in very difficult circumstances, these VCOs were vital to the local procurement and field slaughter of carabao (local water buffalo) for over three months, as food supplies diminished. The veterinarians' skills were also needed to provide medical care during the long imprisonment.

One VCO who served in the Philippines, Captain Clayton H. Mickelsen, received the Distinguished Service Cross for acts of heroism carried out when he was a first lieutenant on the Philippine front lines. The Distinguished Service Cross citation mentions his great achievement in delaying the enemy advance as well as his concern for fellow soldiers:

> For extraordinary heroism in action at Rosario, La Union, Philippine Islands, on December 22, 1941. During a concentrated fire from enemy tanks and infantry at close range against the rear guard of the 26th Cavalry [Philippine Scouts], Lieutenant Mickelsen, with one other officer, with total disregard of his personal safety, remained between the hostile troops and his own force, set fire to a truck placed on a bridge, and remained at the bridge exposed to enemy fire until satisfied that the bridge was in flames. Subsequently, Lieutenant Mickelsen, with the other officer, in a scout car, moved slowly with the rear most elements of the 26th Cavalry, picking up the wounded and collecting and giving orders to stragglers. By his heroic actions, Lieutenant Mickelsen prevented unhindered pursuit by the hostile tanks, saved the lives of a number of wounded, collected many stragglers, and set an inspiring example of courage for the entire regiment.[1(p74-75)]

Sadly, Mickelsen later succumbed to illness as a prisoner of war (Figure 1-15).

Figure 1-15. Captain Clayton H. Mickelsen, Veterinary Corps. Mickelsen earned the Distinguished Service Cross for heroism in the Philippines when he stopped the Japanese advance by destroying a bridge and rescuing fellow soldiers in the process.
Courtesy of Washington State University, College of Veterinary Medicine, Pullman, Washington.

As with previous conflicts, there were other losses of veterinary personnel. A total of 17 VCOs died or were killed during World War II.[1(p75)] Of that number, four VCOs were killed in action.[1(p75)] Some of the

personnel were recognized for their valiant efforts during the war. Five VCOs and approximately 31 veterinary enlisted men were awarded the Combat Medical Badge in the China-Burma-India Theater of Operations.[1(p75)] At least one VCO was awarded the Combat Infantryman Badge.[1(p75)]

Significant Transformations During and After World War II

World War II was significant for the Veterinary Corps in numerous other regards. Early in World War II, VCOs could be found in the ranks of first lieutenant through colonel. The first brigadier general was appointed during World War II, Brigadier General Raymond Kelser, but the authorization was dropped in 1946 after he retired.[1(pp68-69)] Later, The Officer Personnel Act of 1947 restored the grade of brigadier general to the Veterinary Corps.[1(p69)] The first female VCOs, First Lieutenant Thais de Tienne and First Lieutenant Helen M. Robertson, were appointed at the close of World War II[1(pp76-77)] (Figure 1-16). Another change occurred some years after the war. In the summer of 1949, Air Force General Orders 35 established an Air Force medical service and included an Air Force Veterinary Corps.

Figure 1-16. Helen M. Robertson, a veterinarian with the Women's Army Auxiliary Corps. Robertson is shown inspecting beef, but also performed animal care tasks. Thais de Tienne and Robertson were the first female US Army Veterinary Corps officers. US Army photo.
Courtesy of the Army Medical Department Center of History and Heritage Archival Collection, Ft Sam Houston, Texas.

Army Veterinary Service personnel continued working in occupied countries such as Japan after World War II ended. Although the animal health and zoonotic disease control (eg, rabies control) duties were still important parts of their overall mission, the emphasis was on food inspection and enforcing sanitary standards throughout storage and distribution.[28(pp1-3)] Most of the food being consumed by US forces was shipped from the Zone of Interior. Some ice cream was locally procured; eight ice cream plants in Yokohama were inspected, and samples were tested biweekly for standard plate count and coliforms.[28(p6)]

Postwar conditions in Japan were quite dismal—as illustrated by the plight of stray dogs caught without tags after the war ended. For a short time, the US Provost Marshal impounded these strays, and after a period of time passed without the dogs being claimed, he had the dogs donated to Japanese farmers. However, when the complaint of the farmers butchering the dogs for food and using the hides for clothing was verified, this practice was halted, and veterinary personnel were tasked to euthanize these dogs.[28(p3)]

In an effort to rebuild war-torn Japan, various US military actions were taken. Several shipments of milk cows and milk goats were imported to Japan as breeding stock and as a supplement to the Japanese milk supply. Army Veterinary Service personnel inspected these imported animals to prevent foreign animal disease introduction into Japan.

The Eighth Army established military government teams, with one veterinary officer authorized and working with the Public Health section. The teams had a similar role as current agriculture development teams and nation-building activities. The military government teams' duties consisted of animal disease control, veterinary education, and surveillance of the inspections made by the Japanese Veterinary Service. Each team's goal was to build a safe food supply in Japan and establish a self-sufficient Japanese Veterinary Service.[1(pp480-481)]

Veterinary research was also conducted in Japan. Major Kenneth F. Burns was assigned to the Eighth Army to study Japanese B encephalitis (mentioned earlier in this chapter) and proved the causative organism in humans was the same virus causing equine encephalomyelitis. He also developed an effective vaccine for horses.[28(pp9-10)]

As with the close of the previous wars, the US Army proceeded to shrink from its enormous World War II size. However, continual conflicts and the start of the

Cold War increased the need for a worldwide American military presence. For the US Army Veterinary Corps, support missions continued. Although equine care was greatly minimized, canine use in government service was now established, and canine numbers would increase in coming years. Food safety inspection and laboratory work remained essential tasks, as interaction and cooperation with other government agencies saved countless jobs and lives by curtailing various disease outbreaks.

Korean War and the Early Years of the Cold War

Korean War

The United States was once again caught off-guard when the Korean War erupted. The US military presence was still global in nature but was greatly diminished from its peak during World War II. Within 2 weeks of North Korea's invasion of South Korea on June 25, 1950, Veterinary Service units arrived with US and UN forces in Korea, with the 95th Veterinary Food Inspection Detachment (VFID) arriving on July 8, 1950, and the 476th VFID arriving on July 15, 1950.[29(pp1-2)] At the end of 1950, one port veterinarian and four VFIDs were in Korea. The 150th VFID participated in the Inchon landing on September 24, 1950. Two veterinary personnel supervised the loading of 80 tons of fresh frozen turkeys and accompanied the military vanguard for 7 days, moving north over bad roads to ensure the soldiers were fed a turkey in good condition, which was appreciated.[29(pp1-2)]

Similar to the previously mentioned detachments, the 66th VFID was subordinate to the 2d Logistical Command. The Eighth Army had veterinary consultants: the 106th VFID and the 477th VFID.[29(pp2-3)] Although the Army Veterinary Service's mission was to support only the Army, one enlisted inspector was detailed out to the 1st Marine Division upon request, when the division was experiencing large losses of perishable items. Attachment to a larger organization, especially near the ever-changing front lines, and recognition of their inspection mission was often overlooked in the first months of the war. Additionally, refrigeration issues, improper storage, and theft were continual problems.[29(p11-12)]

Veterinary resources were largely shared or transferred between Japan and Korea inside the Far East Command. This arrangement made sense for both proximity and needs; the country of Korea was still recovering from Japanese occupation and didn't yet have dairy or large food production facilities. At the beginning of 1951, there were 13 VFID units within the command, and at the close of the year, 30 VCOs were assigned to the Far East Command.[30(p43)] Throughout the war, veterinary laboratory service for the Far East Command was largely provided by the 406th Medical Laboratory in Tokyo and the 1st Medical Field Laboratory attached to the 121st Evacuation Hospital or by other nearby medical units willing to share resources.[29(p16),30]

Although food inspection was the primary mission, some veterinary units were involved with animal care (Figure 1-17). The 26th Infantry Scout Dog platoon arrived in Korea in June 1951.[31] Initially, the unit had several "journeymen" dog handlers acting as veterinary technicians in the field.[32(p83)] When the dog platoon was attached to the 3d Infantry Division, the port veterinarian for the 21st Transportation Medium Port served as the attending veterinarian.[31] Later, when the dog platoon was transferred to the 24th Infantry Division, the veterinarian performing food inspection for the 548th Quartermaster depot at Chunchon (477th VFID) was to provide medical care for the unit's canines.[31,33(p10)] Of the "journeymen" dog handlers and veterinary technicians (their specialty remained Infantry), Sergeant Robert

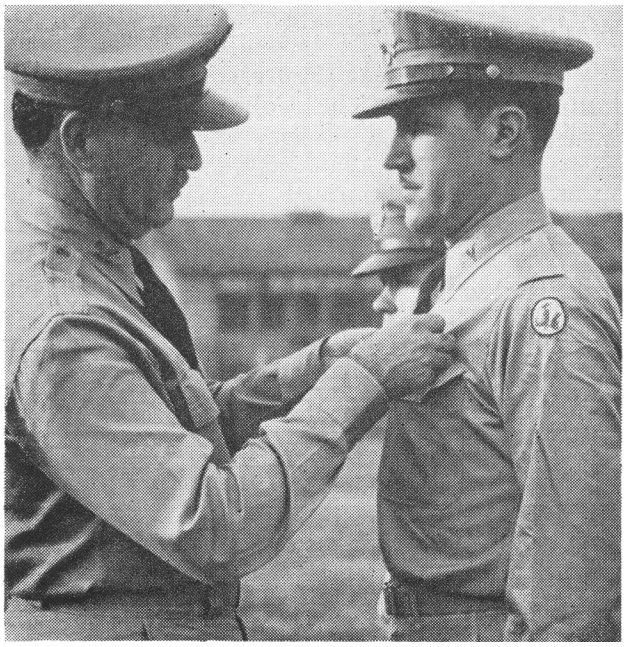


Figure 1-17. Major William L. Abbot receives the Bronze Star for his service in the Korean War. Abbot commanded the 477th Veterinary Food Inspection Detachment and later served as the attending veterinarian for the 26th Infantry Scout Dog Platoon. During his travels in Korea, Abbot's jeep came under fire, with two bullets reaching the windshield. Fortunately, Abbot was unharmed. US Army photo.
Courtesy of the Army Medical Department Center of History and Heritage Archival Collection, Ft Sam Houston, Texas.

Figure 1-18. Sergeant Robert D. Goodwin, "journeyman" (and unofficial) veterinarian technician and dog handler for the 26th Infantry Scout Dog Platoon, receives the Silver Star medal for rescuing fellow soldiers trapped in a minefield while under fire. US Army photo 20-51-4 FEC-53-1397. Courtesy of the National Archives and Records Administration.

Goodwin received the Silver Star award for rescuing two wounded soldiers trapped in a minefield while under enemy fire[32(p83),34] (Figure 1-18).

In June 1952, the 7th Cavalry Regiment of the 1st Cavalry Division trained nine dogs purchased from local Koreans for use as scout and guard dogs.[31] Similar to other dog teams in Korea, nutrition was a continuous and sometimes contentious issue since beef was a premium and hard-to-procure source of protein. The 1st Cavalry Division dogs suffered combat losses—one killed in action, one wounded in action, and one declared missing with its handler—but the dogs had some success before the division redeployed to Japan.[31]

The 26th Infantry Scout Dog platoon received more visibility, with stories appearing in newspapers, and ultimately, the unit received a Meritorious Unit Citation for service in Korea.[32(p160)] In 1952, when one of the unit's dogs was severely wounded by shrapnel (approximately 50 fragments), the dog received care at the 121st Evacuation Hospital and survived to return to the continental United States (CONUS).[29(p15)] While use of the human treatment facility was very much appreciated, the incident identified a need for a separate veterinary medical facility, a request that was approved in late 1953 and was made possible via a veterinary detachment transfer.

The 150th Veterinary Detachment was freed from its duties of food inspection at the massive Enemy Prisoner of War (EPW) holding area at Koje-Do Island south of the Korean Peninsula and was sent to Munsan-Ni north of Seoul. At Munsan-Ni, the unit was attached to the 43rd Surgical Hospital, Mobile Army (8055th MASH). Establishing operations in a Quonset hut with the sign "1st Veterinary Hospital in Korea," the unit provided animal care as well as food inspection for the Munsan-Ni to Ui-Jong-Bu areas.[29(p15)]

The utilization of helicopters for moving wounded canines during the war had been very positive and expanded to include dog transport experiments.[35] At the close of the war, ad hoc "kennels" consisting of frames and chicken wire were mounted on H-13 helicopters. These experimental kennels allowed dogs from scout teams to either be deployed to the reconnaissance area or evacuated if wounded.[32(p137)] The innovation was short-lived, but the idea received consideration for future conflicts (Figure 1-19).

While there were no "official" large US government-owned animals for which US Veterinary Service were responsible during the Korean War, there were captured enemy equines. After a brief inspection at capture, they were transferred to Republic of Korea forces.[31] The animals were largely, and ironically, from

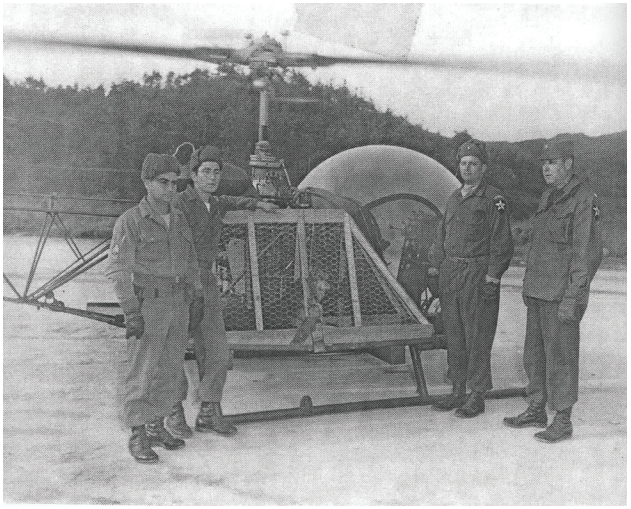


Figure 1-19. H-13 Helicopter with chicken wire kennel pods to transport dogs.
Courtesy of the Army Medical Department Center of History and Heritage Archival Collection, Ft Sam Houston, Texas.

the Chinese Army, which had greatly benefited from American veterinarians and the US supply system during World War II.[1(p352)] One captured mule was brought to the 26th Scout Dog platoon, presumably because of the platoon's veterinary connection.[36]

Public health concerns were also an issue in Korea. In the years after Japanese occupation of the Korean Peninsula and before the outbreak of war (1945–1949), cholera, smallpox, and tuberculosis were frequent problems. Later, during the war (1951), veterinary supplies were quickly transferred from Japan to prevent further expansion of an outbreak of hog cholera and swine erysipelas.[30(p228)] Rabies was a problem for servicemen, civilians, and even South Korea's president.

Veterinarians vaccinated President Syngman Rhee's dog for rabies and treated the dog when it became ill. Several months later, the dog started acting strangely and exhibited signs of rabies. The dog was isolated, died, and tested positive for rabies at the 1st Medical Laboratory. The Eighth Army Surgeon made arrangements to have the entire Rhee household receive the antirabies treatment.

Mascots for units and pets for Army generals serving in Korea fell under the small but varied category of animal care. Dogs, cats, and monkeys were in this group but so were bears. The 187th Regimental Combat Team's Anti-Aircraft Artillery Battery kept a male bear named "Rocky" as a mascot.[37] The bear, outfitted with a special harness, made a few parachute jumps and was wounded when an enemy mortar round hit the 187th Regimental Combat Team's area in Korea in 1953.[37] It is presumed his care and vaccinations were provided by an Army veterinarian. Army veterinarians also vaccinated a bear that was imported to the United States, a gift from South Korea's President Rhee to President Dwight Eisenhower.[29(p16)]

Veterinary efforts and those of the US Army, in general, stabilized as hostilities ceased with the Korean Armistice Agreement on July 27, 1953. The military footprint within the country remained as the uneasy truce held. Veterinary services continued to ensure food safety and provide animal care as designated for the next 50 years. The Veterinary Service now has fewer personnel in Korea, due to the shifting of troops to the wars in Afghanistan and Iraq, but still performs its missions.

The Early Years of the Cold War

Europe. Although the war in Korea was the "hot" embodiment of the Cold War, the American military maintained a global presence after the 1953 ceasefire that impacted various Veterinary Service missions. The massive number of US troops as well as military dependents in Europe provided an urgent need for food inspection. The inspection mission followed troop concentrations and local production facilities. Veterinarians and veterinary technicians served in a variety of European countries and were instrumental in preventing food-related sickness over the course of five decades.

To ensure food safety for the large Army of the Cold War, veterinary personnel were serving roles similar to the USDA and the Food and Drug Administration (FDA) in overseas locations. As an example, the veterinary food inspection specialists in Romania and Yugoslavia performed antemortem and postmortem carcass beef and pork inspections destined for all services (most meats were locally procured). Dairy plants were inspected using the FDA's Pasteurized Milk Ordinance and had to meet equivalent standards.

The US Army Veterinary Detachment, Europe, performed food inspection missions across an extensive geographic area. The countries that inspectors surveyed commercial food plants included Denmark, Norway, Sweden, Finland, Scotland, Iceland, Greenland, The Netherlands, Luxembourg, Belgium, France, Spain, Austria, Yugoslavia, England, Wales, Northern Ireland, Germany, and the Azores.[38] Inspections of local perishable products eliminated the need for expensive air transportation modes to deliver American-produced perishable items to overseas locations with any shelf-life remaining. Since these local inspections involved large contracts, the DoD not only saved millions of dollars in overseas shipping charges, but also reduced the amount of money lost due to US-procured perishable products spoiling during shipments (personal knowledge, Colonel [Retired] Leslie G. Huck, chapter author).

Similar to the mission in Europe, food inspection missions were conducted in Africa from the 1950s to 1970s. Working in locations such as Eritrea and Ethiopia, local sources of food were inspected, and health standards were improved for service members. These new sanitary improvements brought about a pasteurized milk plant that greatly assisted the local economy as well (conversation between Sergeant Major [Retired] Robert Kilburn, US Army Veterinary Service, and Nolan A. Watson, chapter author, May 18, 2015).

Although the first mission in post-World War II Europe for veterinarians was food safety, veterinary treatment facilities (VTFs) were established for government-owned animals and, later, for the pets of military service members and their families. Unlike previous conflicts, the American Army did not dismantle after the Korean ceasefire, and as the military continued to build, it became the chosen profession for many more people. These volunteers were augmented

by millions of drafted servicemen. The larger force and the unprecedented "Baby Boom" changed the US Army's global outlook about medical care needs for humans and animals. An increasing number of military families needed medical care, and privately owned animals and military working dogs (MWDs) were growing in numbers as well. European animal quarantine requirements and veterinary treatment, in general—coupled with the continuous movement of service families—kept the US Veterinary Service busy.

In Europe, veterinarians also monitored the procurement of dogs for the military. A European Command Dog Training Center was established in 1950 at Lenggries, Germany. (See Chapter 3, Military Working Dog Procurement, Veterinary Care, and Behavioral Services, for more information about the evolution of military canine procurement, training, and healthcare at home and abroad.) The unit would later change its name to the US Army Dog Training Detachment, Europe, and was directly supported by the 51st Medical Detachment (Veterinary Animal Hospital).

The 51st would remain in Europe and go through some name changes and moves in the coming decades; it was later designated as the 51st Medical Detachment (Veterinary Medicine). In 2008, the detachment left its station on Pulaski Barracks in Kaiserslauten, Germany.[39] A veterinary activity remained in place, however, and was renamed Dog Center Europe.[39] (Dog Center Europe served as the first stop for in-depth [Role 3] treatment and evaluation for seriously wounded MWDs evacuated from Operation Enduring Freedom [renamed Operation Freedom's Sentinel in 2014] and Operation Iraqi Freedom; further discussion of these operations is found in subsequent sections of this chapter.)

Early comprehensive food testing and other diagnostic and laboratory support for veterinary activities in Europe was provided through the US Army Europe Medical Laboratory located at Landstuhl, Germany.[40] The laboratory was established in 1954 and had a veterinary element, the Department of Veterinary Medicine, staffed by personnel assigned to the 10th and 4th medical laboratories.[40] The work load was considerable: in the mid-1960s, the laboratories performed approximately 60,000 separate food analysis determinations per year.[41]

Stateside research and laboratory work also continued and took into consideration the possibility of a nuclear battlefield. Veterinary testing increased understanding of safety and treatment for the new threat. Similarly, biological and new chemical agents were also examined. Building upon efforts during World War II, specifically the veterinary pathology registry organized in 1944 at the Army Medical Museum (renamed the Armed Forces Institute of Pathology, 1948–2011), Army veterinarians were able to expand and document laboratory work, seeking to improve human health through experimentation, observation of zoonotic diseases, and other research.[42] In the early days of space travel, veterinary pathologists were also tasked with observing the health of animal test subjects and the correlation of human physiology. By 1961, the Veterinary Pathology Division at the Armed Forces Institute of Pathology had three branches: (1) General Veterinary Pathology, (2) Animal Care, and (3) Surgery and X-ray.[42]

Stateside Successes and Struggles. These ongoing studies had positive results. In 1952, Major (later Colonel) William S. Gochenour, Jr, Veterinary Corps, demonstrated that "Ft Bragg Fever," thought to be caused by a virus, was actually due to infection with a *Leptospira* bacterium.[43] An internationally known veterinary scientist, Gochenour had served previously during World War II and was held in captivity by the Japanese in the Philippines until his liberation in 1945.[44] Clayton Mickelsen (previously mentioned Distinguished Service Cross recipient) and Gochenour served together in the 26th Cavalry Philippine Scouts[45] (Figure 1-20).

Figure 1-20. Colonel William S. Gochenour, Jr, (right) at retirement in 1971 wearing an abbreviated version of his uniform. Gochenour spent numerous years performing research as veterinary scientist at the Walter Reed Institute of Research. Previously he served in World War II and was held in captivity by the Japanese. During the war he earned the Combat Infantryman Badge. Later, during the establishment of the Vietnamese National Institute of Bacteriology in Saigon (1967–1968), Gochenour donated 120 bound volumes and 775 scientific journals from his personal library to the facility. Courtesy of the Walter Reed Institute of Research Archives, Washington, DC.

Despite successes and the growing peacetime force, there was some opposition to retaining the military Veterinary Corps. Charles Erwin Wilson, Secretary of Defense (1953–1957), sought to rein in military spending after the Korean War. In his efforts, he decided that veterinarians of the Army and Air Force needed to leave the military or find nonveterinary-related positions.[46] Wilson reasoned that contracted animal care was more efficient, echoing statements that he had made publicly that there were more veterinarians in the military than animals.[47] His analysis totally disregarded the Veterinary Corps' food safety and inspection missions and laboratory work.

As part of his plan to cut the Veterinary Corps, Wilson wrote a memorandum on May 15, 1956, barring the commissioning and enlisting of veterinary personnel. However, because the Veterinary Corps was established by Congress in 1916, Congress alone had power to disestablish the Corps, and despite his testimony before Congress, this legislative body rescinded Wilson's order.[47] Unfortunately, the elimination of veterinary services would again be revisited after the Vietnam War (Figure 1-21).

In 1946, the Medical Field Service School at Carlisle Barracks, Pennsylvania, closed for its upcoming move to Ft Sam Houston, Texas. After closing and moving, the school was renamed the "Army Medical Department Schools," operating under the then-named Brooke Army Medical Center, but this school was not to last.[48(p2)] On January 15, 1947, Brooke Army Medical Center General Orders 3 reorganized the school components and consolidated them back into the newly incorporated "Medical Field Service School."[48(p2)] Included in the school was the Department of Veterinary Service, which had the early responsibilities of not only instruction, but also oversight for a veterinary and pharmacy Reserve Officers Training Corps summer camp in the early 1950s.[48(p41)] In the 1950s, departmental courses were comprised of, but were not limited to, the following subject matter: food inspection, veterinary laboratory service, veterinary service with military animals, veterinary preventive medicine, and veterinary public health.


Military Veterinarians Ordered To Find New Jobs or Quit Forces

Wilson Sets July 1 As Deadline for Closeup Plan

Figure 1-21. *European Stars and Stripes* newspaper from May 22, 1956. The headline describes the problem faced by military veterinarians when Secretary of Defense Charles Erwin Wilson issued a memorandum barring the commissioning and enlisting of veterinary personnel and also sought to replace veterinarians in uniform with contract veterinarians. Courtesy of the Army Medical Department Center of History and Heritage Archival Collection, Ft Sam Houston, Texas.

Even before the Medical Field Service School move, Ft Sam Houston had several Veterinary Service connections. Serving as the headquarters of the Army's Southern Department for operations along the US and Mexico border (1912–1918), Remount Station #2 (now located on the grounds of Dodd Army Airfield) was used as a depot to provide equine care support for cavalry and other troops.[49] Similar operations would continue as post operations expanded during World War I. One horse began his Army career in 1912 at Ft Sam Houston, and "Pat" remained at the post, ultimately passing away at age 45 in 1953.[50] The post also maintained an aviary as part of the World War II Signal Corps pigeon breeding program. (For more information about the uses of various government-owned working animals throughout US military history, see Chapter 2, Military Working Dog History; Chapter 6, Human-Animal Bond Programs; Chapter 7, Marine Mammal Program; and Chapter 8, Military Equine Programs.)

As the Medical Field Service School became more ingrained at Ft Sam Houston, there were other changes. On January 14, 1955, dedications took place in Building 2792. Several halls were memorialized in memory of great leaders and pioneers in different fields of Army medicine. The eastern bay of the building was dedicated to Brigadier General Raymond A. Kelser, US Army Veterinary Corps, who passed away in 1952.[51] Later, in 1972, when the two current Army Medical Department (AMEDD) Center and School (C&S) buildings were dedicated (Aabel Hall, Building 2840, for Colonel Bernard Aabel, US Army Medical Service Corps; and Willis Hall, Building 2841, for Major General John M. Willis, US Army Medical Corps), the eastern plaza of Willis Hall was designated as Kelser Plaza (Figure 1-22). The total campus of the AMEDDC&S is now referred to as the AMEDDC&S, Health Readiness Center of Excellence (HRCoE).

Elsewhere, other Army veterinary training was also undergoing changes. There was not an official Meat and Dairy Hygiene School for Army veterinarians until after World War II. During the war, the Chicago Quartermaster Depot maintained the facility, allowing veterinarians to provide instruction and courses. In 1952, War Department General Orders 80 moved control of the activity from the Quartermaster General to the Surgeon General and changed the name of the facility to the "Army Medical Service Meat and Dairy Hygiene School."

Figure 1-22. Photograph of current (2017) plaque for Kelser Plaza at the Army Medical Department Center and School, Health Readiness Center of Excellence, Joint Base-San Antonio, Ft Sam Houston, Texas.
Courtesy of Nolan A. Watson, chapter author.

Vietnam War

Establishing a US Veterinary Presence

Early Army efforts in Vietnam began with the Military Assistance Advisory Group, later to be called the Military Assistance Advisory Group Vietnam. Up until 1965 (when American involvement increased), the United States only sent advisors and support personnel, considered as "noncombat" troops. In an effort to bolster the capabilities of the Army of the Republic of Vietnam (ARVN) (Figure 1-23), the Military Assistance Group Vietnam worked towards enhancing the ARVN MWD program already in place (canine numbers increased from 56 to over 1,000 MWDs).[24(p1)] The ARVN Veterinary Corps didn't have any graduate veterinarians, and the MWDs were experiencing extensive medical problems.[24(p22)]

The first US Veterinary Corps officer to serve in Vietnam, First Lieutenant Roger N. Wiggins, arrived in early 1962.[24(p3)] His mission was to help establish a veterinary care system for the ARVN MWD program.[24(p23)] Although this was a huge task for a first lieutenant with less than a year of service, his plan was quickly implemented, with only a few modifications as the war progressed.[24(p4)]

Since the ARVN Veterinary Service was poorly equipped and poorly trained, and only one college in South Vietnam offered a 4-year Bachelor of Science degree called Veterinary Engineer, US Army VCO advisors had to start from the beginning to build the ARVN Veterinary Service. They provided on-the-job training to the ARVN Veterinary Engineer warrant officers, developed a 6-week course for ARVN enlisted veterinary technicians, and set up policies and procedures for medical supply channels, records and reports, dog rations, parasite control, immunizations, kennel sanitation, and evacuation.[24(p23)] ARVN veterinary personnel also were sent to the United States to attend the basic food inspection course. As the need (and the war) expanded, more US Army veterinary personnel, including numbered units, were brought in to provide veterinary care for the expanding ARVN MWD program.[24(p25)]

In 1967, to rectify the shortage of graduate Vietnamese veterinarians in the military and civilian community, Veterinary Corps advisors arranged to train Vietnamese students at the veterinary school in Thailand with the US Agency for International Development funding.[24(pp36-38)] Unfortunately, the first group of students didn't start training in Thailand until 1970,[24(p38)] but 50 students were trained in Thailand and returned to Vietnam by 1974.[24(p38)]

A major problem with the ARVN MWDs was malnutrition, as it was hard to build an acceptable ration from local sources. Dog food that contained enough protein to maintain the dogs' health cost more than the AVRN handlers' ration and wasn't approved by the ARVN leadership.[24(p14)] When the supplementation

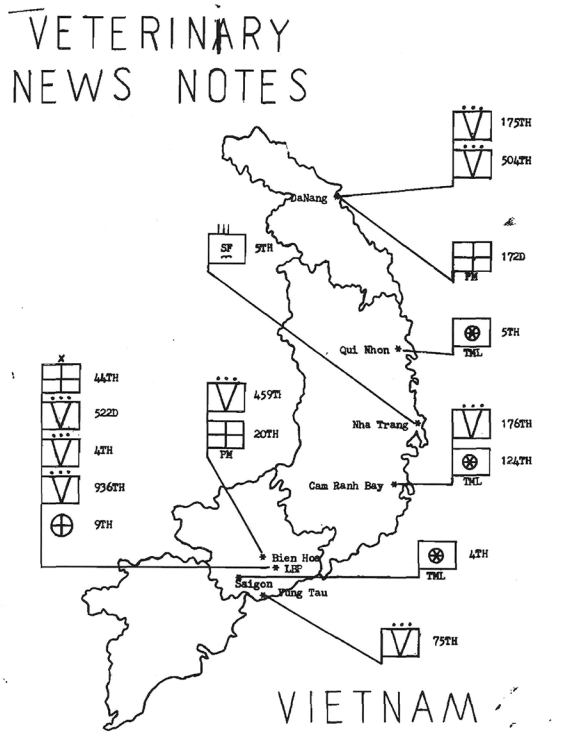


Figure 1-23. Map of veterinary units (circa 1967–1968) in Vietnam.
Courtesy of the Army Medical Department Center of History and Heritage Archival Collection, Ft Sam Houston, Texas.

ration finally arrived, the handler and his family often ate a portion of the dog food, and the MWD still ended up being malnourished.[24(p14)] The appearance and nutritional health of the dogs began to improve in 1966, when an Army VCO went through the Military Assistance Program to obtain US-produced dog food.[24(p15)]

Another major problem with the ARVN MWDs was heat exhaustion, especially when dogs purchased from CONUS were initially brought into Vietnam. Eventually, several factors limited MWD heat casualties: helping animals acclimate, limiting MWD training hours and work, and educating handlers on heat exhaustion dangers.[24(p31)]

Several diseases also were crippling the ARVN MWD program including distemper and leptospirosis. US Veterinary Corps advisors were able to bring distemper under control by exceeding the original recommended doses of serum and vaccine usually given to canines with distemper.[24(p30)] The advisors suspected rat infestations throughout the MWD compounds, including the food storage areas, were causing the leptospirosis problem and concluded the dogs were suffering from strains of *Leptospira* resistant to most existing vaccines. The MWDs were finally successfully treated using high doses of penicillin.

US Veterinary Corps personnel were also involved in many ARVN civic action (CA) activities with very limited long-term success, to include working in dog clinics, human clinics, animal husbandry programs (for swine, poultry, and cattle), and rabies control programs.[24(pp41-44)] One of the more successful US Veterinary Corps efforts was the establishment of the ARVN food inspection program; at first, the ARVN personnel were trained in the United States and later established the Vietnamese Army's food inspection program, patterning it after the US Army Veterinary Corps program, which included origin and surveillance inspections and laboratory testing.[24(p45)] In 1966, US veterinary personnel established a 3-month food inspection course to train future ARVN enlisted personnel in Vietnam.[24(pp45-46)] Eventually, locally trained ARVN program personnel became even more self-sufficient, not only developing combat rations for their own ARVN soldiers, but also inspecting these rations using their own food inspectors.[24(p46)]

The road to this self-efficiency was a bit bumpy. Many of these first Military Assistance Advisory Group Vietnam advisors reported having diarrhea. First Lieutenant Wiggins, who earlier had helped establish the ARVN MWD program, was asked to develop a food inspection program for the ARVN.[24(p88)] Wiggins recommended more VCOs be brought in to assist with the new task, and more VCOs and enlisted personnel were sent to Vietnam, starting in May 1962.[24(p88)]

Concerned about the deteriorating political climate in Vietnam in 1962, President John F. Kennedy decided to increase the numbers of US personnel from 3,000 to over 11,000. The larger numbers of troops did not ease the cases of diarrhea; cases of hepatitis also increased.[24(p88)] The causes for these problems were not mysterious: large amounts of perishable foods were spoiling during the shipment from the United States to Vietnam, and locally procured food was suspected of causing food-borne illness. A food inspection program was needed to improve the safety and wholesomeness of locally procured food, as well as the food arriving from the United States. The first veterinary food inspector in Vietnam, First Lieutenant Gerald D. Kugel arrived in May 1962 and was soon followed by more Army and Air Force Veterinary Service personnel. They would have the unenviable task of developing and implementing the food inspection program in Vietnam, including an approved local food source directory.

Many problems needed to be addressed, including substandard warehousing and storage facilities at the port and a shortage of refrigeration and freezer space. Staggering food losses occurred until late 1967, when ships arrived with food in self-refrigerated Sea-Land vans that could continue refrigerating the items during transport to the various bases in Vietnam.[24(p93)] Since ships took 45 to 50 days to reach Vietnam from the United States, Veterinary Service personnel were deeply involved with local procurement inspections of foods, to include dairy, ice, bread, fresh fruits and vegetables, and eggs; each egg had to be candled to check for potential defects[24(p94)] (Figure 1-24).

Filled milk plants had to be established and inspected as Vietnam had practically no dairy industry. Filled milk, or milk reconstituted from skim milk powder with vegetable fat (coconut oil), was often used in the Pacific and was of high quality, wholesome, and greatly appreciated by service members (electronic personal communication from Colonel [Retired] William Kerr, US Army Veterinary Corps, to Colonel Leslie G. Huck, chapter author, January 18, 2015). Ice plants had to be closely inspected to monitor proper chlorination and sanitation to prevent numerous diseases.[52] Sanitation was so bad in the local bakeries that none was on the approved list; instead, inspectors were kept at the bakeries on a full-time basis.

One study on bacterial flora from fresh fruits and vegetables received showed 30 percent of the samples were positive for *Shigella*, so veterinary personnel provided chlorination instructions and focused inspection efforts on mess halls to ensure produce was washed, chlorinated, and rinsed in three separate tanks.[24(p100)] Surveillance food inspection was always in demand to mitigate losses due to dispersed Class I operations:

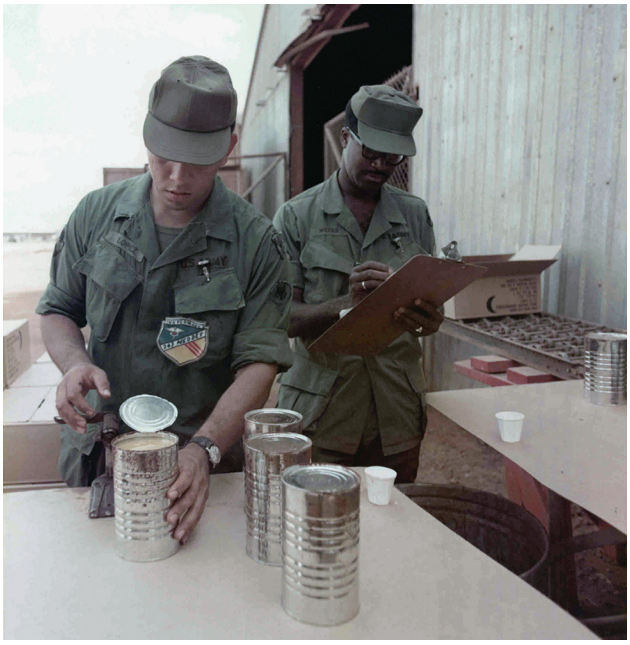


Figure 1-24. Specialist 4 Ronald G. Lopez and Staff Sergeant John R. Weeks, both of the 245th Medical Detachment (Veterinary Services), inspect a shipment of orange juice at Long Binh, Vietnam, December 1968. US Army Signal Corps photo 54132.
Courtesy of the Army Medical Department Center of History and Heritage Archival Collection, Ft Sam Houston, Texas.

poor storage facilities, heat, humidity, limited refrigeration capabilities, rodent problems, insect infestations, and excess food supplies in storage. The 9th Medical Laboratory arrived in Vietnam in May 1966. The unit's arrival helped support the field inspectors' decisions.[24(p105)] Through constant monitoring and inspection, food-borne illness was never reported as a significant problem, despite all of the other problems encountered with the food (electronic personal communication from Colonel [Retired] William Kerr, US Army Veterinary Corps, to Colonel Leslie G. Huck, chapter author, January 18, 2015).

Initiating a Veterinary Animal Care System

In 1965, military police brought in the first US military dogs to support American forces. By November 1965, the 180 sentry dogs in country were spread out at 10 locations.[24(p117)] Marines also brought in sentry dogs. The first scout dog platoon arrived July 14, 1966, and by the end of 1966, the total number of dogs rose to 673.[24(p117)] Since dog food and fixed kennels were not readily available locally, veterinary personnel were kept busy trying to mitigate these supply system problems.

The veterinary care system, patterned after the human medical care system, started at the primary level with the Military Occupational Specialty 91T (now 68T Animal Care Specialists) organic to each scout and sentry dog platoon at the dispensary level; the veterinary hospital level provided long-term care.[24(p117)] The improved care also included an evacuation system for each level.[24(p117)] Because of the wide dispersion of dog platoons and the increased number of dogs (1,200 dogs by 1967), veterinary food inspection (JA and JB) detachments had to pick up the dispensary level care. (JA and JB refer to TO&E listings. JA units are small or expansion Veterinary Service teams. JB units are larger Veterinary Service teams.) Military Occupational Specialty 91R (today's 68R Veterinary Food Inspection Specialists) were cross-trained by VCOs to provide animal care. The JA and JB teams' TO&Es were eventually changed to include veterinary medicine sets and 91T personnel.[24(p118)] Later when the numbers of military dogs in Vietnam grew, the organization of veterinary units altered and small animal dispensaries (IE units) and small animal hospitals (ID units) increased.[24(pp118-119)]

By January 1966, the veterinary units in Vietnam included the 4th Medical Detachment (Veterinary Service, VS), 75th Medical Detachment (JA), 68th Medical Detachment (JA), and the 936th Medical Detachment (ID).[24(pp119-120)] Initially, veterinary hospital care fell to the 936th Medical Detachment Infantry Division, which maintained a small animal hospital located at Tan Son Nhut in early 1966[24(p120)] (Figure 1-25). The 504th Veterinary small animal dispensary arrived in Vietnam in October 1966.[24(p121)] Adequate veterinary assets were now able to focus on improving preventive medicine and kennel facilities.

The initial evacuation system for working dogs in Vietnam did not include helicopters, and Air Force plane evacuation procedures were not very dependable. In 1969, helicopter evacuation became available for dogs and handlers, and an evacuation policy was established for dogs requiring more than 7 days of treatment; however, no dogs were medically evacuated outside of Vietnam.[24(p123)]

Complaints concerning dog food being shipped to Vietnam go back to 1959. Because of rancidity, mold, and insect infestation, large quantities had to be condemned, which led to the development of a special stress diet developed by Hill's Packing Company. Mitigating other problems such as shelf life, the "diet" included preventatives for heartworms and hookworms.[24(p125)] Since the dog force build-up was rapid, many kennels were initially constructed without veterinary consultation, which led to an increased

incidence of hookworms and sanitation problems. In addition to using the new dog food for MWDs, veterinary personnel worked closely with kennel staff to improve MWD kennel conditions.[24(p127)]

The US military looked at improving dog capabilities and expanding their mission (eg, to include mine and booby-trap dogs, drug detection dogs, and explosive detection dogs). For German shepherds, the military started to research genetic improvements to reduce inherited problems such as hip dysplasia and improve intelligence and trainability. Three VCOs, a geneticist, 27 enlisted personnel, and two clerks worked on these traits in the Biosensor Research Program starting in fiscal year 1969.[24(p129)] After 8 years, they succeeded in reducing hip dysplasia from 50 percent to 18.7 percent, while improving intelligence and trainability.[24(p133)] Termed the "Super Dog" Program, the project was supposed to switch from research to production, but since the war was over by the time of the results, the entire program was eventually halted.[24(pp128,133)] (See Chapter 3, Military Working Dog Procurement, Veterinary Care, and Behavioral Services, for more information about historic and current canine research and training programs.)

Figure 1-25. (Left to right) Specialist 4 Richard S. Shanks, dog handler, holds down his injured scout dog "Gunn" as Captain Rodney F. Taylor, Veterinary Corps, and Captain William T. Watson, Veterinary Corps, administer treatment. Image taken at the 936th Veterinary Detachment's "War Dog Hospital" at Tan San Nhut Air Base, November 30, 1968. US Army Signal Corps photo 54174.
Courtesy of the Army Medical Department Center of History and Heritage Archival Collection, Ft Sam Houston, Texas.

Supporting Special Forces and Laboratories

In the early 1960s, as the Army began officially recognizing Special Forces units, veterinary support was also considered for these units. In Vietnam, some of the first VCOs serving in Special Forces had the mission of food inspection. Isolated from supply systems, local livestock was often the food source for these soldiers and their teams. VCOs also assisted the Special Forces teams by controlling animal diseases and improving livestock and crop production in local areas. These tasks were efforts to help villages and the imbedded teams become self-sufficient. Veterinary personnel performed animal care in support of other missions such as animal transport to include elephants. The Special Forces veterinary personnel would also assist in aspects of medical CA programs (Figures 1-26 and 1-27).

3. SPECIAL FORCES ASSIGNMENTS:

It is anticipated that several VC officers and veterinary enlisted men may be required for duty with "Special Forces." The field duty in such assignments may be in Latin America or Southeast Asia.

Those accepted for such assignments will receive special training and will become "jump qualified."

These assignments should be most interesting and highly challenging and should be filled by volunteers. All volunteers should be able to qualify physically under the provisions of AR 40-501. Those interested in these assignments, and who would be willing to volunteer for same, may inform this office by personal letter.

Figure 1-26. "These assignments should be most interesting . . . ." An early notice seeking Army veterinarians for Special Forces from the April 1963 *Army Veterinary Corps Memorandum* (newsletter).
Courtesy of the Army Medical Department Center of History and Heritage Archival Collection, Ft Sam Houston, Texas.

Figure 1-27. A Special Forces veterinarian providing instruction for the 97th Civil Affairs Group, Okinawa. Special Forces veterinarians were involved in a variety of tasks in Vietnam, including one instance of elephant transport.
Courtesy of the Army Medical Department Center of History and Heritage Archival Collection, Ft Sam Houston, Texas.

Laboratory support for the veterinary personnel and their operations was essential, and similar to the other activities, it took time to coalesce. Testing for diseases and food nutrition or studying other occurrences, military personnel performed the laboratory work at larger facilities until the veterinary detachments and their substations were solidified and properly equipped. The Veterinary Division of the 9th Medical Laboratory started providing comprehensive veterinary laboratory service in Saigon on August 1, 1966. When the 9th was inactivated and left Vietnam, the 406th Medical Laboratory in Japan assumed its duties.

The South East Asia Treaty Organization Medical Laboratory in Bangkok, Thailand, was another source for comprehensive research. Items encountered in the field were also collected. Some of the histopathology specimens were sent to the Armed Forces Institute of Pathology in Washington, DC, for further study.[24(p127)]

Another major veterinary laboratory was located in Vietnam. VCOs worked closely with the US Agency for International Development to control livestock diseases and develop a vaccine production facility in Vietnam (Figures 1-28 and 1-29). Vaccine production was achieved through the establishment of the Vietnamese National Institute of Bacteriology, which had to be created virtually from scratch. US Army veterinary personnel worked together with the South Vietnamese to maintain production, research, and testing. The first objectives were to build laboratory infrastructure in Vietnam, which required improved administration, facilities, equipment, supplies, testing capability, vaccine and bacterin production, and training programs for Vietnamese personnel to eventually run the programs. Through hard work, these VCOs were instrumental in producing vaccines for hog cholera, Newcastle disease, fowl pox, and rinderpest, as well as several bacterins.[24(pp167-168)]

Studying and Preventing Zoonotic Disease

Combining the previously mentioned Special Forces' capability and the need to study and collect samples from Vietnam, veterinary personnel served on the field epidemiology survey teams (FEST) from the Walter Reed Army Institute of Research (WRAIR).[24(p140)] These teams, which were attached to the 5th Special Forces Group in Vietnam, were Special Forces-qualified in order to ensure their personnel's abilities to work autonomously within the country.

Figure 1-28. The Vietnamese National Institute of Bacteriology, exterior view. Formed in cooperation with the US Agency for International Development, the institute performed research and produced vaccines for livestock diseases within Vietnam. Daily operations were overseen by Army Veterinary Corps officers.
Courtesy of the Army Medical Department Center of History and Heritage Archival Collection, Ft Sam Houston, Texas.

Figure 1-29. Graphic for the Vietnamese National Institute of Bacteriology and US Agency for International Development.
Courtesy of the Army Medical Department Center of History and Heritage Archival Collection, Ft Sam Houston, Texas.

Figure 1-30. Major James A. Ferguson, Veterinary Corps, inspects a Vietnamese villager's cow. Ferguson served as a member of the Walter Reed Army Institute of Research's field epidemiology survey teams in Vietnam in 1967 to 1968. These teams were attached to the 5th Special Forces Group in Vietnam. The personnel were Special Forces-qualified in order ensure their ability to work autonomously within the country. US Army photo. Courtesy of the Army Medical Department Center of History and Heritage Archival Collection, Ft Sam Houston, Texas.

Originally, the mission of FEST was to collect and study diseases found in Vietnam that were affecting US troops. In late 1966, FEST was expanded to include veterinary and laboratory officers, not just Special Forces personnel.

Zoonotic diseases were of primary importance of study and collection by the veterinary contingent. Additionally, the added veterinary presence allowed for animal health surveys that were not tied to one region. Although successful in gathering information and samples, the FEST program was disestablished in October of 1968 (Figure 1-30).

In addition to Veterinary Services personnel in laboratories, preventive medicine units, and Special Forces, there were six types of TO&E veterinary units assigned in Vietnam. The 522nd Medical Detachment located in Long Binh was the TO&E units' command and control unit. Subordinate units included three JB teams (4th Medical Detachment responsible for III and IV Corps, the 176th Medical Detachment supporting II Corps, and the 175th Medical Detachment supporting I Corps); two JB (reduced) units in II and III Corps; one JA team in III Corps; and one ID Veterinary hospital at Long Binh, and several IE small animal dispensary units in III and II Corps (electronic personal communication from Colonel [Retired] William Kerr, US Army Veterinary Corps, to Colonel Leslie G. Huck, chapter author, January 18, 2015).

Transmissible Canine Pancytopenia. During the summer of 1967, Army veterinarians in Vietnam began noticing fevers of unknown origin in their MWDs. One year later, these veterinarians realized they were dealing with an epidemic; of the 1,200 US MWDs in the region, 89 had died.[24(p139)] In addition, the MWDs that had served in Vietnam and then were sent back to Okinawa were becoming ill and several died. Epistaxis was usually the first clinical sign, with death usually occurring a few days afterward. Some other symptoms noticed included weight loss, anemia, leukopenia, thrombocytopenia, edema, lethargy, dyspnea, and anorexia.[24(p139)]

US veterinarians instituted a quarantine (Vietnam and Okinawa MWDs were not allowed to be shipped to other countries).[24(pp140,144)] After consulting with the WRAIR and 406th Medical Laboratory in Japan, they tested MWD blood samples for known viral and bacterial agents, including known rickettsial diseases—all were negative.[24(p140)] Despite the results, the Army veterinarians suspected the illness was caused by a rickettsial organism and was being spread to the MWDs by ticks. In addition to the quarantine of suspect MWDs, veterinarians implemented a strict tick-control program and euthanasia of clinical cases. In 1969, several Army veterinarians at the WRAIR found the tick-borne culprit, *Ehrlichia canis*, which had been identified earlier in other parts of the world but wasn't known to cause hemorrhagic disease.[24(p143)] The disease, canine ehrlichiosis or tropical canine pancytopenia (TCP), was thought to have been brought into Vietnam when US forces bought tracker dogs from the British military in Malaysia.[24(pp143-144)] Researchers at the WRAIR worked out the pathogenesis, diagnostic test, and treatment, and demonstrated tetracycline was effective to prevent and treat the disease.[24(p145)]

By 1970, the high MWD losses to TCP were mitigated. However, the US and ARVN estimated losing 300 and 100 MWDs, respectively, to this disease before bringing it under control.[24(pp144-145)] In addition to TCP, Army veterinarians kept busy treating more common illnesses and nonbattle-related injuries. In fact, though there were some combat injuries, the majority of animal treatment cases were not related to actual combat[24(p415)] (Figure 1-31).

As the Vietnam War drawdown began, troop numbers including veterinary units decreased; however, the numbers of MWDs being supported did not decrease. By May 1970, the Army and Air Force had approximately 1,600 MWDs in Vietnam.[24(p149)] Initially, DoD policy did not allow these dogs to be brought back

to the United States because the TCP epidemiology was still being researched.[24(p149)] However, after public outcry and congressional involvement, healthy dogs could be returned after screening. Army veterinarians ran 21-day quarantine programs to exclude suspect MWDs,[24(p150)] and 191, deemed healthy, returned to the United States by the end of 1972. Of the remaining dogs, some were euthanized or died, but the majority (971) were transferred to the ARVN.[24(p151)] (For more information about the service and care of canines during the Vietnam War, see Chapter 2, Military Working Dog History; information about more current MWD procurement and disposition policies can be found in Chapter 3, Military Working Dog Procurement, Veterinary Care, and Behavioral Services.)

Common Diseases. Some of the more common zoonotic diseases in Vietnam were brucellosis, anthrax, salmonellosis, shigellosis, cysticercosis, meliodosis, leptospirosis, and rabies.[24(p155)] Military veterinarians were involved in controlling leptospirosis, both in humans and MWDs, first, through their food inspection duties and animal care and, later, via their laboratory capabilities. For example, in 1962, one airman died of leptospirosis, and 16 others became ill.[24(p155)] Since inspectors suspected that a local bread source's cooling racks were being contaminated by rats (rodents transmit leptospirosis), the military stopped buying from local sources. Rats were also suspected of contaminating MWD food supplies.[24(p156)] After the 9th Medical Laboratory started testing in August 1967, the laboratory found 42 human cases of leptospirosis within 5 months.[24(p156)]

Rabies, a widespread problem in Vietnam both before and after American military involvement, was briefly brought under control. While US forces were in the country, the disease was somewhat corralled, especially in light of the number of servicemen involved and considering the disease is endemic in Vietnam. Outbreaks and sources were studied early on. Although animal mascots boosted the troops' morale, they were considered a constant rabies threat. Through testing, VCOs determined rabies was not a problem in wildlife; the disease was primarily found in stray dogs.[24(p158)] Over 25 percent of positive cases were in pups less than 16 weeks old; they were usually asymptomatic when they died.[24(p158)]

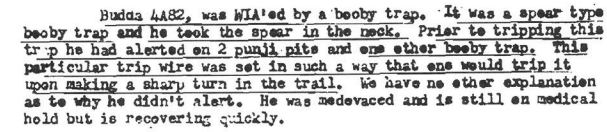

Budda 4A82, was WIA'ed by a booby trap. It was a spear type booby trap and he took the spear in the neck. Prior to tripping this trap he had alerted on 2 punji pits and one other booby trap. This particular trip wire was set in such a way that one would trip it upon making a sharp turn in the trail. We have no other explanation as to why he didn't alert. He was medevaced and is still on medical hold but is recovering quickly.

Figure 1-31. While most of the health problems faced by military working dogs in Vietnam were related to malnutrition, heat, and disease, combat injuries were also seen by Veterinary Corps officers. Information found in the January 1969 report of scout dog operations, 39th Infantry Scout Dog Platoon, 173rd Airborne Brigade.
Courtesy of the Army Medical Department Center of History and Heritage Archival Collection, Ft Sam Houston, Texas.

In the beginning, however, rabies testing and confirmation processes had logistical issues (eg, when the laboratories servicing the veterinarians were unable to communicate or transfer samples). Lieutenant Colonel Thomas G. Murnane, VC (later Brigadier General and Chief of the Veterinary Corps, 1976–1980), added rabies testing capability to the 9th Medical Laboratory in 1966.[24(p159)] His arrival as an onsite VCO resolved some of the communication issues between laboratories that were testing for rabies. During that year, 64 out of 296 animal heads tested positive for rabies.[24(p159)]

After a later exposure incident involving a dog mascot and a large number of Marines, rabies control received command emphasis to include mascot registration and vaccination and stray animal control. Rabies suspect animals were quarantined, and the collection and evaluation of statistics for the disease were strictly maintained. Despite the major achievements made by US Army veterinary units, five Americans died from rabies (two military and three contractor employees) in Vietnam.[24(p165)] (For more comprehensive information about rabies and other military zoonotic disease control concerns for service members and civilians, see Chapters 11, 12, and 13 in this textbook's Section 4, Preventive Medicine and Public Health Services.)

Conducting Civic Action

Veterinary personnel expanded their mission in Vietnam to include what was later called "nation-building" or "stability operations." One area with potential to build positive partner capacity with was the project to help the Vietnamese produce adequate amounts of animal protein, which was in short supply. Livestock production was hampered by disease: almost half of the swine died of hog cholera (Figure 1-32); death rates in chickens often approached 100% due to Newcastle disease, fowl pox, and fowl cholera; and cattle and buffalo were stricken with serious diseases such as rinderpest, anthrax, and foot and mouth disease (FMD).[24(p167)] Additionally, most of these animals suffered from parasites and malnutrition.[24(p167)]

In July 1966, for the first time in Vietnam, US veterinary personnel supported a large-scale CA program. Working with the 1st Infantry Division, the veterinary personnel assisted a resettled local population in fortified villages by deworming pigs and vaccinating

Figure 1-32. The 4th Medical Detachment (Veterinary Services) civic action team members treat pigs in the Vietnamese village of Co Vap. US Army photo.
Courtesy of the Army Medical Department Center of History and Heritage Archival Collection, Ft Sam Houston, Texas.

them using a Saigon-produced hog cholera product. They also developed an edible garbage feeding program,[24(p170)] provided antibiotic treatment to treat secondary infections of cattle and buffalo stricken with FMD, and helped construct livestock pens.[24(p170)]

In March 1967, veterinary personnel were attached to the 4th Infantry Division to assist with this division's CA programs. Veterinary unit-level CA projects, which saved some livestock and had a positive effect on the Vietnamese people, included animal vaccinations, treatments, and surgeries. One enlisted Veterinary Service soldier actually lived in a village in order to help the residents construct a church, hog pens, wells, and toilets.[24(p174)] The medical and dental units developed CA programs known as Medical Civil Action Program or MEDCAP and Dental Civil Action Program or DENCAP; later, veterinary units formalized CA programs known as the Veterinary Civil Action Program (VETCAP), which included a purebred swine import program, mobile vaccination teams, and a veterinary training program for Vietnamese students in Thailand.[24(p176)]

Remembering Veterinary Service Losses in Vietnam

During the Vietnam War, the US Army Veterinary Service lost two soldiers, who seemingly had a lot in common. On December 20, 1968, Specialist 4 Douglas O. Duke (animal care specialist) was driving a jeep with VCO Captain Jack P. Blake in the Binh Duong Province. Their jeep hit an enemy mine or similar device, with the resultant explosion killing both soldiers.[53] Both men served with the 4th Medical Detachment (VS). Captain Blake was from Beaumont, Texas, and a graduate of Texas A&M University (class of 1966). Specialist Duke was from Oklahoma, a graduate of Oklahoma State University, and had also lived in Texas. Blake and Duke were also very close in age (24 and 23 years of age, respectively) (Duke was 8 days from turning 24)[54] (Figure 1-33).

Figure 1-33. On December 20, 1968, Specialist 4 Douglas O. Duke, animal care specialist, was driving a jeep with Veterinary Corps officer Captain Jack P. Blake in the Binh Duong Province. Their jeep hit an enemy mine or similar device, and the resultant explosion killed both soldiers. They served with the 4th Medical Detachment (Veterinary Services). (The image was not taken during the time of the incident.) Blake is behind the steering wheel; Duke is the passenger seated diagonal from Blake.
Courtesy of the Army Medical Department Center of History and Heritage Archival Collection, Ft Sam Houston, Texas.

Ensuing Problems After the Vietnam War

Mirroring the withdrawal of forces in Vietnam, veterinary services were proportionally reduced. Food inspection, laboratory testing, and animal care in Vietnam diminished as the American military presence departed. Despite the exit from Vietnam, laboratory services and research continued in Thailand and Japan. The Veterinary Corps also continued to safeguard the military by providing food inspections, assist civil authorities curb animal disease epidemics, and conduct continuous laboratory and research elsewhere. Despite these actions, there were again governmental calls to eliminate veterinary services for the military.

Veterinary Service Scrutiny. During the 1970s, a series of studies and reviews targeted the US Army Veterinary Corps, ranging from total elimination,

merging with other corps, and large personnel cuts. In 1970, a US Government Accountability Office (GAO) Report to Congress indicated a need to reassess the food inspection roles of the various federal organizations, including the DoD.[55(p6)] The report noted that there was considerable federal inspection overlap on many foods, which caused dissatisfaction in the food industry. The report also included the viewpoint that various federal food inspection organizations could be streamlined to be more effective and less costly.[55(pp6-7),56]

After the 1970 GAO report was released, the US Army's veterinary missions were scrutinized almost yearly, and the fate of the US Army Veterinary Corps and how the US Army Veterinary Service should operate hung in the balance for a decade:

- In 1971, a Senate bill was drafted with the following goals: to conduct a review and use its results to more practically meet the military's medical needs, while reducing military medical personnel in administrative and research roles. The bill further proposed medical personnel should be used only in their specialty in a clinical role. DoD officials included the Army Veterinary Corps in this review. The review concluded that food inspection didn't necessarily have to be performed by licensed veterinarians; they could potentially be replaced by trained sanitarians and food technologists with lower salaries.
- In 1972, a Department of the Army (DA) study was conducted to examine all the Veterinary Corps' functions and determine which corps' authorizations could be filled with civilian veterinarians or nonveterinary military personnel. That same year, the DA established a team to analyze the entire Veterinary Corps with the objective of providing veterinary service at the lowest cost to the DoD.
- In 1974, the GAO investigated military veterinary activities, again looking for ways to reduce military veterinarians to the minimum number necessary to accomplish their responsibilities. The GAO found Veterinary Service (includes enlisted personnel) was providing cost-effective, essential duties that could not be outsourced more economically. That same year, the Army Audit Agency examined the Veterinary Corps (includes VCOs only), per the request of the Secretary of Defense.
- Also in 1974, the Office of the Secretary of Defense (OSD) requested the GAO audit both the Army and Air Force Veterinary Corps to look for possible ways to reduce VCO numbers (eg, by replacing VCOs with nonveterinarian personnel in various food inspection activities, with civilian veterinarians for privately owned pet care, and with contractors for government-owned animals in the United States). However, rebuttals by the Army Surgeon General and a Deputy Assistant Secretary of Defense involved with supply and services stopped this audit.
- The Army Surgeon General (Health Affairs) submitted budget guidance for fiscal year 1975 that reduced US-based VCO end strength by 29% over a 2-year period. It took the efforts of the Army Chief of Staff to convince the DoD not to reduce the current VCO end-strength numbers.
- There was also a study to determine if it were feasible to combine the Army Medical Service Corps with the Veterinary Corps. The DA tasked the OTSG to study the feasibility of combining the Army Medical Service Corps and the Veterinary Corps. The intent was to reduce total authorizations, but the 1976 study results convinced the DA to keep them separate.[55(pp44-45)]

In 1977, private veterinarians complained to the OTSG about low-cost vaccinations being provided by the Army Veterinary Service, which should not be permitted because this Army provision was punishing the civilian veterinarians. When the complaints reached the attention of congressmen on the House Appropriations Committee (HAC), the OTSG responded that the Army Veterinary Service was only implementing a preventive medicine program on a reimbursable basis, and this program was endorsed by the AVMA.[55(pp63-66)]

The "Boston Massacre." The aforementioned studies and legislative action from the 1970s shaped the structure of current US military veterinary services. There were a series of events that took place prior to the 1977 vaccination complaint, however, which revolved around the Veterinary Corps meat procurement inspections in Boston. Meat procurement brought about further studies and inquiries that would greatly impact other changes in the Veterinary Corps. In 1974, a Florida meat packer had two lots of boneless beef rejected by Army Veterinary Service personnel. He thought his product better met the specifications than a competitor's product processed in Boston that was being accepted.

In 1975, the disgruntled meat packer met with his senator, who was on the Senate Subcommittee for Federal Spending Practices, Efficiency, and Open Government. Samples of ground and diced beef from

the Boston packing company, which passed Army Veterinary Service origin inspection and in the military supply chain, were collected and inspected; however, the diced beef was found to be nonconforming and did not meet specification. This led to further inspections and finding more nonconforming beef products from additional packing companies. An audit of six military supply points showed that over half of the beef samples were nonconforming. Also, pork loins from a packing company were found to be grossly nonconforming.

A veterinary technical team from the Academy of Health Sciences went to the Boston beef packer to overview the packing and inspection process and found major problems with the meat processing company and the military veterinary inspectors. For example, the inspectors were not familiar with the specifications, were not well trained, and were poorly supervised. The Defense Investigative Service found that other vendors in the United States, in addition to the Boston packing companies, also had major problems.

Several military inspectors were found to be taking various types of bribes to accept nonconforming products. Several of the meat packer companies' owners and managers pled guilty or were convicted of bribery, fraud, and conspiracy to upgrade meat. In September 1975, an experienced VCO and noncommissioned officer were sent to Boston, a training program was implemented, and soon conforming product was being produced. However, by then, the Army Veterinary Service had received negative media attention, which quickly led to other major changes.

A US GAO team found the inspection system did not insure meat being procured for the DoD would meet requirements. At about the same time, Air Force Veterinary personnel were investigated by the Office of Special Investigations in Ireland for accepting unauthorized gratuities and allowing similar nonconforming meat products to be distributed in Europe.[55(p55)] Although eventually resolved, the problems caused by the actions of these few inspectors damaged the reputation of the Veterinary Service.

Other changes added to the turmoil of Army restructuring in the post-Vietnam era. Responsibility for the US Army Veterinary School was transferred from the OTSG to the Academy of Health Sciences in February of 1973.[57] With this change, the school was moved to Ft Sam Houston from Ft Sheridan, Illinois. In November 1974, the functions of the AMEDD Veterinary School were transferred from Ft Sheridan to Ft Sam Houston.[58] This action also closed the US Army Meat and Dairy Hygiene School in Chicago in 1975.[58]

P**roposed Congressional Phase-Out of the Veterinary Corps.** Based on the meat investigation, the HAC asked the DoD for more information. Committee members wanted to know why the meat inspection could not be done by the USDA, at least in CONUS. Some of their questions included the following: Why does it take military officers—ie, can't civilians do this job? Why does the DoD have to be involved in food inspection, and what are the DoD inspection costs for 1977 to 1978?

The HAC also wanted change. A Special Investigation of Veterinary Food Inspection Activities report by the US Army lnspector General & Auditor General, dated January 10, 1977, summarized that little had been done since the Boston incident to correct the military's food inspection problems.[55(p74)] The lingering shadow of these systemic failures not only led to the handing over of CONUS in-plant responsibilities to the USDA, but also would lead to renewed threats to cut the Veterinary Corps completely and, eventually, to reduced military specifications and cuts in military veterinary personnel.[55(p74)]

Starting in 1977, the HAC and OSD debated several options: reduce or civilianize VCOs or eliminate the Veterinary Corps entirely, perhaps by using a phase-out process. After reviewing numerous studies and investigations, the HAC recommended origin meat inspections in the US be transferred from the Army and Air Force veterinary services to the USDA. Thus, in August 1977, the responsibility for CONUS in-plant inspection of meat and food products, conducted by Army and Air Force veterinary personnel, was transferred to the US Department of Agriculture and US Department of Commerce. During the planning and transfer stages, the military veterinary services continued to provide those food inspection services to the DoD, and although HAC had recommended the transfer be finished by 1978, it was not officially completed until September 30, 1979.[59]

In 1978, the HAC wanted to further reduce and eventually phase out the Veterinary Corps; however, the Senate contested the language of the HAC's proposed appropriations bill for fiscal year 1979. The HAC recommended a cut of 520 enlisted and 100 veterinarian positions and almost 9 million dollars in funding from the Army and Air Force. The Senate Armed Services Committee recommended much lower personnel and funding cuts. A Joint Committee finally agreed on cutting Army VCOs by 20 authorizations.

The aforementioned budget and personnel discrepancies generated another audit of the Army and Air Force Veterinary Corps in 1978. After evaluating the two corps, the Defense Audit Service identified that the US Veterinary Corps could be consolidated under an executive agency, which would increase the time

VCOs utilized their professional skills and minimize their administrative time, so the numbers of VCOs could be decreased.

During the writing of the Fiscal Year 1979 Program Decision Memorandum, the OSD also wanted to eliminate the Veterinary Corps. The DA contested this option from the OSD, and the Secretary of Defense finally agreed not to phase out the Veterinary Corps but would be willing to restrict the Health Professions Scholarship Program (HPSP) to physicians. Veterinarians would no longer receive military pay for attending military-approved universities to earn their veterinary degrees.

In October 1978, OSD contracted with MAXIMUS, a consulting firm, to further study options for the Veterinary Corps. The five recommendations of this study were as follows: (1) reduce the size of the Veterinary Corps; (2) replace 30 percent of VCOs with other specialties; (3) stop HPSP scholarships for veterinarians (as stipulated by the Secretary of Defense); (4) stop the $100-per-month special pay; and (5) make a Tri-Service approach to veterinary services.

A copy of the MAXIMUS report was sent to the HAC in early 1979 with the additional comment that a majority of research VCOs could be civilianized with a cost savings. The HAC released their report in September 1979, which stipulated the following six actions: (1) the Air Force Veterinary Corps was to be disestablished by March 31, 1980; (2) the Army would be the executive agent for all DoD veterinary functions; (3) VCOs would be reduced by 10 percent; (4) another 30 percent of VCOs would be replaced with other less-costly personnel; (5) HPSP would be stopped for VCOs; and (6) special pay would be stopped.[55(pp144-145)]

The House and OSD supported the MAXIMUS findings, but the Senate deferred. In September 1979, the Veterinary Corps received the support of Senator Strom Thurmond. In his letter to Senator Warren G. Magnuson, Thurmond stated, "It is difficult to understand why the Secretary of Defense has renewed such an ill-advised proposal, overriding the strong objections of the Surgeons General of the military departments."[55(p163)] In December 1979, a House and Senate Joint conference finally decided to reduce military veterinary services by almost $4 million and realign military veterinary structure as proposed by the House (ie, the Army was to be the DoD Executive Agent).[60]

Consolidation. The Fiscal Year 1980 DoD Appropriation Bill became law December 1979, which directed the disestablishment of the Air Force Veterinary Service not later than March 31, 1980. At that time, the Army would become the executive agent for all DoD veterinary functions.[61] Also, using many of the MAXIMUS' and HAC's earlier recommendations, 10 percent of VCO were eliminated, and 30 percent of VCOs were to be substituted; furthermore, there was to be a civilianization of research VCO positions and a phase-out of the HPSP program for veterinarians. The process was to be completed in fiscal year 1985.

In April 1981, the Army Surgeon General informed the OSD that their civilianization hiring attempts to replace VCOs in Research and Development (R&D) positions had failed and recommended to restore the 102 VCO positions that were to be civilianized back to the Army inventory. In May 1981, a HAC report acknowledged the difficulties in civilianization and did not note the perceived cost savings. The report recommended restoring these positions back to the Army and Air Force VCO end-strengths. The House Armed Services Committee's report essentially recommended the same as the HAC.

The Army's Surgeon General, Veterinary Corps chiefs and staff, AVMA, various agencies supported by veterinary services, and individuals who contacted key legislative officials in Congress worked extremely hard to save the Army Veterinary Corps from multiple attempts to eliminate the military Veterinary Corps. Through compromise, only the Air Force Veterinary Corps was disestablished. In addition, there was a strong push to remove VCOs from all food inspection duties and civilianize R&D VCO positions. However, while the Army had to give up some VCO positions relating to food inspection, the Army was able to establish a veterinary warrant officer program, retain VCOs in the food inspection field, and keep VCOs in R&D positions.[55(pp170-172)]

Highlighting the Positives

Congressional directives specifically stipulated that the Air Force Veterinary Service be disestablished not later than March 31, 1980, and that the Army became the Executive Agency for all DoD veterinary functions, April 1, 1980.[61] The Army started its veterinary warrant officer program in 1981. Despite these successes, the road to securing branch existence was arduous. With the backdrop of possible elimination of military veterinary services in the 1970s, positive deeds were sometimes minimized or forgotten, and missteps were sometimes magnified.

Venezuelan Equine Encephalitis. Previously found only in Colombia and Ecuador, a Venezuelan equine encephalitis (VEE) epizootic spread north through Central America and reached southern Texas in June 1971. Army Veterinary Corps personnel were involved in studies and human vaccine development for VEE and eastern equine encephalitis decades before this epizootic reached Texas. Although the experimental

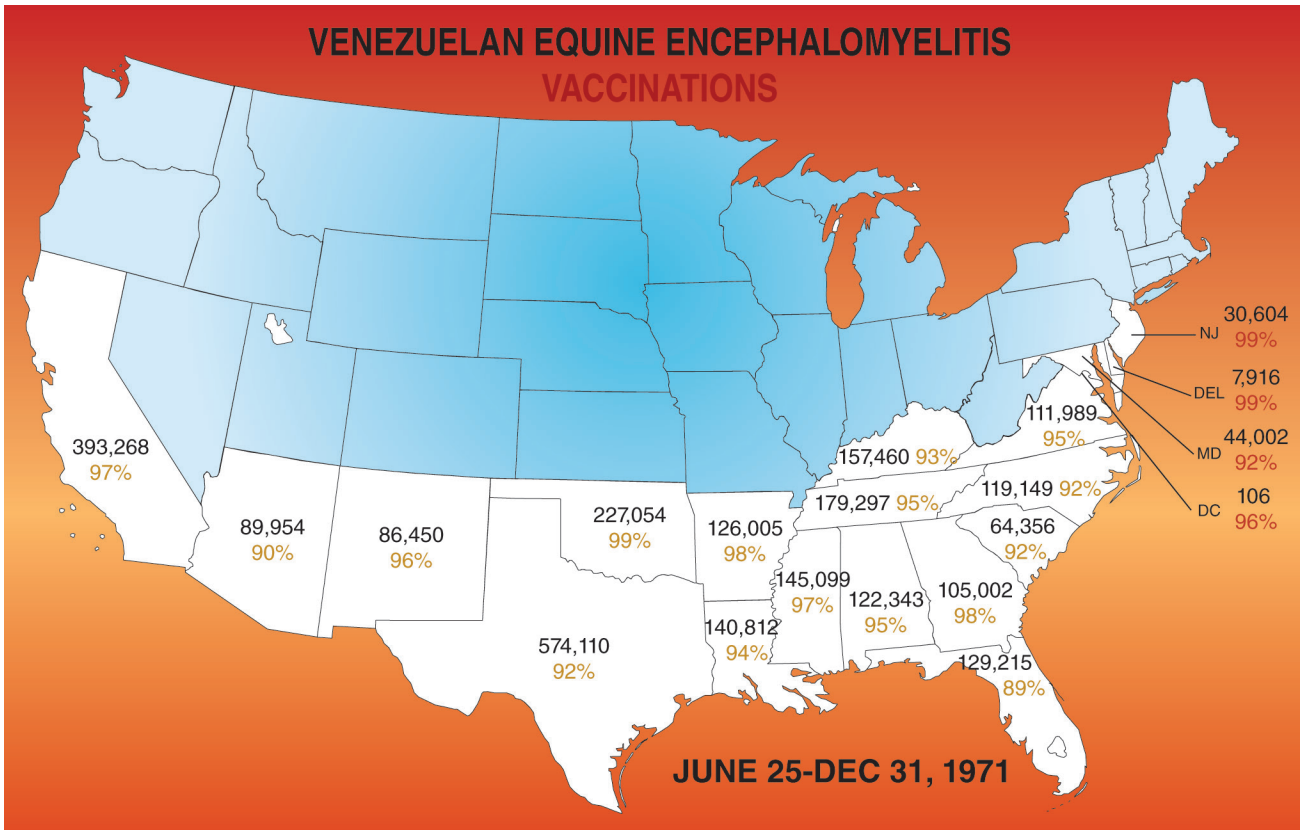


Figure 1-34. Threatened by equine encephalitis strains, which were migrating from Central and South America in the late 1960s and early 1970s, a massive (and successful) vaccination program was enacted. In 4 months starting July 1971, almost 3 million horses were vaccinated in 19 states in America.
Courtesy of the Army Medical Department Center of History and Heritage Archival Collection, Ft Sam Houston, Texas.

human vaccine they developed was for laboratory personnel working with the virus, the human vaccine proved to be effective in equines.

The US Army provided the vaccine, and VCOs provided technical assistance for emergency vaccination of horses during a VEE outbreak in Colombia in 1957, followed by Guatemala and El Salvador in 1969. Through 1970, almost 2 million doses of VEE vaccine were provided to five Central American countries and Mexico. In 4 months starting July 1971, almost 3 million horses were vaccinated in 19 states in America, which, along with other preventive measures such as aerial insecticide spraying, contained the outbreak to southern Texas. No VEE cases originating in the United States were reported by 1972[62] (Figure 1-34).

Newcastle Eradication Campaign. Late in 1971, exotic Newcastle disease was diagnosed in California's poultry. California regulatory officials soon were overwhelmed and ran out of money fighting what eventually turned out to be one of the most extensive animal disease eradication campaigns in history. The USDA realized this could jeopardize the US' $6 billion poultry industry, and in March 1972 requested military assistance. Initially, 20 Army and 20 Air Force veterinarians were requested. Eventually, over 400 Army, Air Force, Navy, and Marine officer and enlisted personnel participated in the operation that grew to a task force numbering 1,300. The outbreak was declared a national emergency; southern counties in California and western counties in Arizona were put under quarantine. About 12 million infected and exposed birds, valued at 56 million dollars, were destroyed. In addition, the task force implemented an extensive vaccination program for birds in the quarantine area. Military assistance ended on September 30, 1972.[55(p13)]

Standardizing Veterinary Pay

In the years after World War II, the DoD was having problems recruiting VCOs, which led Congress to pass Public Law 83-84 in 1953, entitling VCOs to

special pay ($100 per month). Years later, this action would be revoked. With the Vietnam War concluding and Congress contemplating an all-volunteer Army in 1972, increasing special pay and constructive credits were again brought up as a way to maintain VCO end-strength with no draft, or decline in ROTC numbers, or cuts in scholarships; however, none of these incentives became law until years later. Those entering active duty on or after June 30, 1975, were no longer receiving the $100 per month special pay; thus, the first-year VCO retention rate dropped to 8 percent in 1975.

Public Law 95-114 in 1977 reinstated the VCO special pay beginning on October 1, 1977.[63] There were other changes as well. Effective October 1, 1999, based on the National Defense Authorization Act for Fiscal Year 2000, VCOs would receive board certification pay at the same rate as psychologists and nonphysician health care providers (the scale increased from $1,000 to $5,000 dollars, depending on the number of years of service).[64] Incentive pay, retention bonus pay, and an increase in board certification pay were incorporated and became effective on October 1, 2009; board certification pay was set at $6,000 per year regardless of years of service. However, since VCOs did not get the chance to apply for the extra payments until the summer of 2010, once the payments started, back pay from the original effective date was required to catch up.

Shifting Personnel Changes

After World War II there was only one female veterinarian, Doreen H. Lewis, who served in both an enlisted and then commissioned capacity from 1947 to 1948.[65] After Lewis's service, there was a considerable absence of women veterinarians in the Army; the next female commissioned veterinarian was Jean E. Hooks (later Sessions), who was commissioned in 1970[66] (Figure 1-35). By 1975, there were eight commissioned female veterinarians on active duty and in the reserves.[67] Female VCO numbers in 1983 totaled 29, with another four females serving as veterinary warrant officers.[68] However, by 2014, the number of active duty female VCOs represented over half of the force, with 285 female officers serving in the Veterinary Corps (electronic personal communication from Colonel Noreen Murphy, Assistant Corps Chief, Veterinary Corps, to Nolan A. Watson, chapter author, January 9, 2014).

As noted earlier in this chapter, one of the results of the Army becoming the Executive Agency for DoD Veterinary Service was the development of a veterinary warrant officer program. Initially, the program consisted of senior NCOs, trained in food inspection, who would then transition to warrant status after further training and selection.[69] The concept was approved by Congress in September 1980, and in 1981, the Army began training warrant officers in the field of food inspection.[69] Initially, there were 10 candidates for the Military Food Inspection Technician Program who graduated in November of 1981. The program met its goals of producing 53 warrant officers within 2 years.[68]

Figure 1-35. Staged image of Captain Joanne Marie Rick, Veterinary Corps, at the Ft Sam Houston stables, 1972. Rick was one of the early female veterinarians joining the Army in the early 1970s. Jean E. Hooks (later Sessions) was the first female commissioned Army veterinarian since 1948 and was commissioned in 1970. US Army photo 41-133-6145-2/AK-72. Courtesy of the Army Medical Department Center of History and Heritage Archival Collection, Ft Sam Houston, Texas.

Despite its establishment, the warrant officer food inspection program was soon in danger. Many of its personnel were almost eliminated because of an Army-wide reduction of warrant officers. To avoid this mishap, the Chief of the Veterinary Corps at the time, Brigadier General Robert R. Jorgensen was able to intervene directly to the Army Vice-Chief of Staff and relay the vital importance of the food inspection mission (electronic personal communication from Brigadier General [Retired] Robert Jorgensen, former Chief, US Army Veterinary Corps, to Nolan A. Watson, chapter author, June 2, 2013). Jorgensen's message was successful. In 2015, there were 67 warrant officers serving in veterinary services (electronic personal communication from Colonel Kathleen Miller, Veterinary Corps Personnel Proponent Officer, to Nolan A. Watson, chapter author, February 19, 2015).

Pre-Persian Gulf War

In the early 1980s, as the aftereffects of post-Vietnam Army reorganization subsided or were reinforced by positive doctrinal changes, the Army was bolstered with budgetary increases, which led to better troop morale and overall effectiveness. These improvements were part of a strategic plan for victory in the Cold War. Soldiers entering the Army during this time would be well-poised for continuous challenges during the next three decades. For the Army Veterinary Service, not only were there more changes on the horizon, but also continuing emphases on health concerns, humanitarian actions, and global VETCAP support. Food inspection evolved from examining preparation facilities for sanitation to food safety, in which causes for preventing food-borne illnesses were more closely studied (electronic personal communication from Brigadier General [Retired] Michael Cates, former Chief, US Army Veterinary Corps, to Nolan A. Watson, chapter author, May 13, 2013). Usage of military working dogs also expanded.

During this time, the Veterinary Service also faced numerous challenges. The new standard Army ration, the Meal Ready to Eat (MRE) had gone through research and just as it was being fielded, problems with packaging and concerns for the food surfaced. To manage the issue, then-Brigadier General Robert R. Jorgensen supervised the Veterinary Corps and answered concerns at the OTSG, while former Veterinary Corps Chief Brigadier General (Retired) Frank A. Ramsey was brought out of retirement to examine the problem at storage and distribution areas. Concerns were abated, and the MRE was fielded without further incident.[70]

Operation Urgent Fury

On October 25, 1983, combined US forces with Caribbean contingents deployed to the small island country of Grenada. The troops were sent in response to Grenada's leader, Maurice Bishop, being deposed and murdered while the threat of Cuban Communist forces increased on the island. Despite some setbacks, the operation was successful and provided numerous examples for improved procedures and cooperation between military branches and services for future operations.

Initial operational planning minimized medical assets and postponed support and involvement with combat units. In addition to ship-borne medical support and elements of the 307th Medical Battalion, a collection of medical support units from the 44th Medical Brigade was gathered for deployment and built around the 5th Surgical Hospital and designated Medical Task Force 5 (MTF 5).[71] As part of MTF 5, personnel of the 248th Medical Detachment (VS) arrived in Grenada on November 2, 1983, after spending a few days in a staging area on the island of Barbados.[72(p1)] (The two initial soldiers who came from the 248th were Major Thomas J. Callahan, VCO, and Sergeant Steve Lancaster, a veterinary technician and food inspector.[72(p1)])

During their deployment to Barbados and Grenada, 248th Medical Detachment (VS) personnel treated military working dogs afflicted with gastroenteritis and lacerations.[72(p1)] A food safety mission of inspecting newly arrived "C" rations was also performed without incident. Another food inspection task, however, was more significant. Elements of the 248th were tasked by XVIII Airborne Corps' G-5 (CA) to inspect captured Cuban military rations that were to be distributed to local Grenadians in need.[72(p2)] Fortunately, the team was able to eliminate 90 percent of the material that was found to be hazardous and prevented countless food-borne illness cases.[72(p2)]

Rabies was once again a threat to US forces, as the disease is endemic in Grenada, found largely among the mongoose population on the island. Recognizing the threat, the 248th team worked with the Grenadian Ministry of Agriculture to develop a rabies vaccination program,[72(p2)] but one critical element was missing: the rabies vaccine. The 248th team contacted the US Office of Foreign Assistance and was able to procure $2,000 in order to purchase enough of the vaccine to implement a vaccination program.[72(p2)]

On November 18, 1983, the 36th Medical Clearing Company assumed the medical mission from MTF 5, as MTF 5 began redeployment to Ft Bragg.[73] The deployed

portion of the 248th remained in Grenada under the 36th. By mid-December, all American forces, except a training element, departed the island.

Years later, in 1996, during the veterinary-specific Operation Green Cross, the 73d Medical Detachment (Veterinary Service) under the command of Major John L. Poppe (later Brigadier General Poppe, 25th Veterinary Corps Chief, 2011–2015), and augmented by Major (later Colonel) Neal E. Woollen (Veterinary Corps), re-established the Grenadian Ministry of Health's rabies diagnostic laboratory. With an improved capability, the laboratory confirmed the first case of rabies on the island since 1977 and initiated a tuberculosis and brucellosis control program for the Ministry of Agriculture's large animal population (electronic personal communication from Brigadier General John L. Poppe, Chief, US Army Veterinary Corps, to Nolan A. Watson, chapter author, March 4, 2015).

Hormone Testing of Beef

In the late 1980s to early 1990s, US Army veterinary personnel initiated testing for illegal hormones in beef being offered for procurement in Europe, possibly based on the European Commission (EC) plan to ban US beef imports into EC countries because of legal hormone use in cattle in the United States. The EC ban became effective for imported beef on January 1, 1989, and applied to US beef in which hormones were used as a growth promoter. The ban didn't apply to foods for US troops, which were covered under the Status of Forces Agreement or to commissary foods, which had received such protection by precedent.

During the same time that the EC was banning US beef imports, new Defense Supply Region-Europe contracts for beef procurement in Europe prohibited the use of illegal hormones in EC cattle procured for US forces. The 7th Medical Command (MEDCOM) began a survey in May 1988 to determine if illegal hormones were present in European beef procured for US forces. A small percentage of urine samples collected were found to be positive.[74]

The 7th MEDCOM program involved cattle urine testing and monitoring based on the USDA program used in the United States. Urine samples were taken in slaughter houses where US beef was procured in Europe. Approximately 25 samples per month were analyzed by Dr G Maghuin-Rogister of the veterinary faculty, University of Liege, Brussels, Belgium. Of 210 samples tested through December 1988, only six were positive, three in Germany and three in Belgium.[75] Issues concerning European beef would resurface in the mid-1990s, with bovine spongiform encephalopathy (BSE) receiving greater media attention.

Bovine Spongiform Encephalopathy (BSE)

A developing issue, beginning in the 1980s (prior to the Persian Gulf War) and continuing into the following decades, was the protection of military service members and their dependents from BSE, commonly known as "mad cow disease." This public health problem took a while to unfold as geographic regions of concern faced the disease threat at different points in time. Several of the Veterinary Service disciplines were cooperatively involved in the study of this public health issue, including animal health professionals, food safety inspectors, and laboratory specialists.

In 1986, the first case of BSE was reported in dairy cattle in the United Kingdom (UK).[76(p1)] BSE is a fatal, chronic degenerative disease affecting the central nervous system of cattle and has also been called mad cow disease because of the neurologic symptoms.[76(p1)] The disease was thought to be nonzoonotic and isolated within the region. However, in the following years, BSE spread to other countries, and in 1989, the USDA banned the importation of beef and cattle from countries with confirmed cases of BSE.[76(p3)] This action was taken in order to protect the American livestock industry, but not public health, as a zoonotic link was not yet known.[77(pp61-62)]

Ten years after the first reporting of BSE, a new variant of a human disease, Creuztfeldt-Jakob Disease (CJD), appeared.[76(p1)] CJD is a rare, degenerative, fatal brain disorder, with 90% of patients dying within one year.[76(p1)] The variant form of CJD (vCJD) differed from the classic CJD in that a younger population developed signs of disease (average age of 29 years versus 60 years, respectively) with a longer time period from development of clinical signs to death (average of 13 months versus 4–6 months, respectively);[76(p1)] as the illness progresses, mental deterioration becomes pronounced and involuntary muscle movements, blindness, weakness of the extremities, and coma may occur.[76(p1)] BSE and the vCJD are classified in the transmissible spongiform encephalopathy group of diseases.[76(p1)]

As information from the CJD report was released in March 1996, the European Union imposed a worldwide ban on beef exports from Britain.[76(p2)] In March 1996, the DoD Veterinary Service Activity (DODVSA) recommended cessation of the purchase and sale of beef from BSE-endemic areas based upon a potential relationship between BSE, CJD, and the consumption of BSE-infected beef.[76(p3)] At this time, this cessation only applied to beef purchased from the UK. Beef from other European countries would continue to be purchased for AAFES operations and Moral, Welfare, and Recreation

(MWR) activities.[76(p3)] Beef for commissary use and military dining facilities was obtained from the United States.

The issue of beef procurement and its possible contamination with BSE continued to percolate within Europe. In 1998, the USDA enacted further prohibitions, placing bans on the importation of ruminant meat (primarily cattle, sheep, goats, and deer) and ruminant meat products and by-products from Europe into the United States.[78(p6)] The new ban encompassed all of Europe—versus just the UK—and caused some new complications.

Although DODVSA enforced the ban, there was a delay due to miscommunication with the USDA.[78(pp6-7)] Other mixed messages also caused difficulties. On July14, 1999, the European Union lifted the worldwide ban on British beef exports to be in effect by August 1, 1999.[76(p3)] During the time of contrary regulations, AAFES was buying beef from Italian and German sources for their concession operations in Europe.[78(p6)] Italy and Germany were still deemed free of BSE and considered "safe" sources for procurement.[78(p6)]

Scientific papers released on December 21, 1999, in the *Proceedings of the National Academy of Science* established a probable link between BSE and vCJD. A few months later in March 2000, based upon this evidence and in response to the emergence of BSE in additional European countries, and changes in US import laws (Title 9, US Code of Federal Regulations, 9CFR94.18), the Army Surgeon General (under the advisement of DODVSA) banned the procurement of all ruminant meat and meat products of European origin.[79(p3)] This action caused a considerable amount of anxiety among AAFES concessionaires, and because it was an immediate ban, there was an immediate cancellation of contracts and lost revenue.[78(p6)] The ban not only affected AAFES, but also affected other MWR activities throughout Europe that were still purchasing local beef.[78(p6)]

Despite protestations that German and Italian meat products were safe for consumption, the ban continued. Within 1 week to 10 days, AAFES had hamburgers flown in from the United States; AAFES concessionaires were up and running again, serving more than just chicken and fish.[78(p6)] Complaints continued until 9 months later when Italy and Germany were both diagnosed with BSE in their cattle population, and the DODVSA-recommended ban proved to be timely.[78(p6)]

Although bans were in place limiting the consumption and transference of possible infected beef, there was also a considerable effort in trying to advise consumers of potential risk.[80(p3)] The US Army Center for Health Promotion and Preventive Medicine-Europe (CHPPM) engaged in an information awareness program that was designed to lessen the concerns of service members and their dependents.[80(p3-4)] While stopping procurement from sources in the UK in 1996 and the rest of Europe in 2000 was achievable, there was no ban on American personnel consuming ruminant meats and meat products in European restaurants. The decision to consume these items from local and host nation food service facilities was an individual's choice.[81]

There were additional complications as well. Because of concerns that blood from an individual with vCJD may be infectious to another individual, the FDA, DoD, and other blood collection agencies implemented blood donor deferral policies.[80(p5)] The most restrictive policy, that of the American Red Cross, deferred anyone who had accumulated 6 months of time in Europe from 1980 to present.[82] This requirement limits a significant portion of blood donors because it is estimated that, during the period of 1980 to 1996, approximately 4.5 million service members and their families served in Europe and may have consumed beef from the UK.[80(p2)]

While the disease remains a danger to animal and human health, risk mediation procedures have been implemented. The USDA has conducted risk assessments sufficient to identify the historical and existing BSE risk factors and has developed a list of regions classified by their controlled risk for BSE. As of the final editing of this chapter (2017), the ban on procurement of all ruminant meat and meat products of European origin is still in force.

Operation Just Cause (Panama 1989–1990)

Background for Invasion. As tensions between the United States and the Noriega-run government in Panama escalated, armed confrontations between the countries became more frequent and violent. While the country's dictator, General Manuel Noriega, crushed political opposition in Panama and was under federal indictments for drug trafficking, his Panamanian Defense Forces (PDF) ran amuck. Events coalesced on December 16, 1989, when Noriega declared Panama to be in a "state of war" with the United States.

After the declaration, a PDF roadblock turned deadly when Robert Paz, a Marine Corps lieutenant, was killed. A Navy lieutenant and his wife witnessed the event and were detained, assaulted, and threatened by the PDF. These events were the immediate precursors for the American military intervention in Panama, Operation Just Cause.

In the years prior to the conflict, veterinary personnel frequently worked within Panama and surrounding countries (telephone conversation with Colonel

[Retired] Paul Schmidt, US Army Veterinary Corps, and Nolan A. Watson, chapter author, July 29, 2014). The veterinary assets within Panama at that time were the 216th Medical Detachment (VS) and Veterinary Service for USA MEDDAC-Panama, which operated two VTFs and maintained a laboratory and personnel for food inspection. With a large military population and geographic area to support, veterinary services were in great demand for a variety of tasks.

Supporting US Army South, the 216th Medical Detachment (VS) was subordinate to the 193rd Infantry Brigade and was assigned to the 142nd Medical Battalion. The unit based at Ft Clayton would also provide support to the 3rd Battalion of the 7th Special Forces Group (electronic personal communication from Colonel [Retired] John Taber, US Army Veterinary Corps, to Nolan A. Watson, chapter author, July 23, 2014). The 216th provided both animal treatment and food inspection duties and participated in missions that spanned several countries.

Veterinary Service for USA MEDDAC-Panama was headquartered in the Gorgas Army Community Hospital. In Panama, Veterinary Service's laboratory facilities were primarily concerned with food safety, so food inspectors were distributed at various installations. Additionally, there were two VTFs subordinate to Veterinary Service for USA MEDDAC-Panama: (1) the Mindi VTF, on the Atlantic side of the country near Ft Davis; and (2) the Corozal VTF, on the Pacific side of the country (telephone conversation with Colonel [Retired] Paul Schmidt, US Army Veterinary Corps, and Nolan A. Watson, chapter author, July 29, 2014). Both VTFs focused on animal care and military working dog health.

The larger VTF at Corozal provided animal care for MWDs and animals owned by military service members and government employees, including Panama Canal Commission workers and embassy personnel. Because of the number of clients, the facility operated with a high volume and was staffed with three military personnel, two US civil service veterinarians, one nonappropriated-fund veterinarian, and approximately 12 local national employees (telephone conversation with Colonel [Retired] Paul Schmidt, US Army Veterinary Corps, and Nolan A. Watson, chapter author, July 29, 2014).

One reason for the large size was that newly relocated animals to Panama needed to be quarantined for 40 days. Also, the VTF routinely supported MWDs from Howard Air Force Base and Rodman Naval Base. During the 1989 through 1990 timeframe, the Air Force deployed 18 MWD teams to Panama in 90-day increments to provide additional security. One of the deployed MWDs expired from heat stroke in November 1989. The dog was one of several brought from CONUS amid bomb scares in Panama. The MWD had been transported from New Jersey and was unable to acclimate in the short transit time from winter in CONUS to the tropical climate of Panama (telephone conversation with Colonel [Retired] Paul Schmidt, US Army Veterinary Corps, and Nolan A. Watson, chapter author, July 29, 2014). Prior to combat operations, the 549th Military Police Company, a local unit, would sometimes assist with the care of the animals at the facility. This unit had kennels on both the Pacific (Ft Clayton) and Atlantic (Ft Davis) sides of Panama and had a close relationship with the MWD care providers.

Food Safety, Preoperations. In addition to the deteriorating political climate in Panama, service personnel and their dependents were also affected by problems in the food supply chain. While food inspections and examinations are not unusual veterinary-provided services, local food procurement for the American military installations within the country came under even closer scrutiny during 1989 to 1990 for political and food safety concerns.

For example, because of connections to Noriega, the Blue Star Milk Company (Estrella Azul) was suspended from supplying local commissaries with milk and juice products in early December 1989.[83(p128)] To overcome this deficit, a first, and then second, shipment of milk (totaling 135,000 pounds) was airlifted to Panama from CONUS on December 7, 1989.[83(p128)] From then on, two shipments were received each week and were then distributed among 58 locations within the country.

Monitoring of commissary operations revealed thawing problems during transport and led to the elimination of highly perishable items such as ice cream.[83(p128)] Adding to the strain in the days before the invasion, AAFES shoppette privileges were granted to employees of the Panama Canal Commission, presumably to provide these employees safer shopping areas.[83(p149)]

Operational Support from Veterinary Service. Invasion operations began in the early hours of December 19, 1989. Veterinary personnel were not part of the invasion force but were drawn from previously mentioned assets already in the country. USA MEDDAC-Panama was placed under the control of the 44th Medical Brigade as medical personnel provided treatment and support during the operation[84] (telephone conversation with Colonel [Retired] Paul Schmidt, US Army Veterinary Corps, and Nolan A. Watson, chapter author, July 29, 2014).

On December 20, 1989, elements of the 988th Military Police Company (deployed from Ft Benning, Georgia) moved to secure a PDF kennel facility at

Curundu, Panama. A brief firefight ensued, which ended with the capture of PDF soldiers. After the exchange, veterinary personnel from the 216th Medical Detachment (VS) and Corozal VTF were sent to the area to treat the surviving animals and the badly injured PDF MWDs wounded in the shootout. The staff also disposed of the remains of many other PDF MWDs that were shot within their kennels by incinerating the dead animals (electronic personal communication from Colonel [Retired] John Taber, US Army Veterinary Corps, to Nolan A. Watson, chapter author, July 23, 2014). The surviving PDF MWDs (approximately 25) were moved to the Corozal VTF to receive treatment and allow for recovery time until they were returned to the post-Noriega Panamanian Army.

As the operation progressed, other animal care missions surfaced. The 216th Medical Detachment (VS) euthanized a horse wounded during the assault on the Cerro Tigre PDF logistics base. The unit would also treat horses at the Military School of Equitation in Panama City, provide animal care at the Balboa Refugee Center, and continuously support the animals of the 3rd Battalion, 7th Special Forces Group (electronic personal communication from Colonel [Retired] John Taber, US Army Veterinary Corps, to Nolan A. Watson, chapter author, July 23, 2014).

Food inspection missions in support of the operation emerged from both ordinary and unusual circumstances. Inspection of items possibly damaged from lack of power or a transport delay based on wartime contingencies were to be expected. Less common were the inspections of food extracted from Noriega's personal bunker at Ft Amador or the inspection of confiscated Christmas propaganda packages for Noriega's troops. Working at the request of the 82nd Airborne Division, the food items were inspected by the 216th Medical Detachment (VS), pro-Noriega items were removed, and the packages were then distributed as a humanitarian gesture to local residents in need (electronic personal communication from Colonel [Retired] John Taber, US Army Veterinary Corps, to Nolan A. Watson, chapter author, July 23, 2014).

After the invasion transitioned from Operation Just Cause to Operation Promote Liberty, US Army Veterinary Service activities continued food inspection and animal care support within Panama and Central and South America. These VETCAP missions included vaccinations of pets for rabies and deworming of livestock. Paul Schmidt, then a captain with the Corozal VTF, served on a mission to Coiba Island (where Noriega exiled many of his political prisoners) to vaccinate the freed prisoners' animals for rabies and evaluate their livestock (telephone conversation with Colonel [Retired] Paul Schmidt, US Army Veterinary Corps, and Nolan A. Watson, chapter author, July 29, 2015). During these VETCAP missions, John Taber, then a captain and commander of the 216th Medical Detachment (VS), observed that local children were hesitant to bring in their pets for vaccination until the children were permitted to mark their animals with a colorful cattle-marking pen (electronic personal communication from Colonel [Retired] John Taber, US Army Veterinary Corps, to Nolan A. Watson, chapter author, July 23, 2014).

Veterinary Corps Chief

The Officer Personnel Act of 1947 raised the rank of Chief of the Army Veterinary Corps to Brigadier General; however, in 1990, because of Army structural changes, the Chief of the Veterinary Corps would no longer hold the grade or rank of 07 or Brigadier General. Despite this change, the abundant challenges of near-continuous military involvement from 1990 to 2004 were met by the 06s or colonels who served in the capacity of Veterinary Corps Chief: Colonel Clifford I. Johnson (1991–1995), Colonel Paul L. Barrows (1995–1999), and Colonel John S. Fournier (1999–2004). In 2002, bills were introduced to bring back the star to the Veterinary Corps, and in 2004, Congress restored the rank of Brigadier General to the Veterinary Corps Chief position.

Persian Gulf War

Hastened Troop Deployment and Veterinary Support

Less than a year after Operation Just Cause in Panama, the US military would be tested again. Iraqi military forces under the direction of Saddam Hussein invaded Kuwait in August of 1990, and a coalition of countries quickly formed to stop Iraqi aggression before it reached the Kingdom of Saudi Arabia (KSA) and then to free Kuwait. The initial phase of planning and gathering forces while maintaining security for the KSA was named Operation Desert Shield. Collectively, Operation Desert Shield (1990) and Operation Desert Storm (1991) are called the Persian Gulf War.

US forces began rapidly deploying to Southwest Asia (SWA) in August 1990, the fastest buildup of the AMEDD up to that time. Over 23,000 AMEDD personnel (55% were Reserve Component) (over 18,000 were enlisted soldiers) deployed to SWA.[85(pp3-4)] Veterinary personnel were on the ground in the KSA within a few weeks of the start of the operation (two enlisted food inspectors of the 248th Veterinary Service Detachment), along with preventive medicine and forward surgical teams.[85(p4)]

Army Veterinary personnel quickly went to work, ensuring local food being procured was safe, as well as inspecting all the operational rations. Veterinary personnel played a key role in minimizing food-borne illness rates for more than half a million military personnel; no documented food-borne illness cases were reported from the consumption of any type of operational ration during the entire operation.[85(p5)] Veterinary personnel also inspected the food at enemy prisoner of war camps and ensured safe food and water for Kuwaiti citizens after the ground war ended in Kuwait.[85(p5)]

Approximately 50 VCOs, both active component and reserve component, and 113 Veterinary Service enlisted personnel were deployed to the Persian Gulf War area of operations.[86(pp70-71)] Additionally, reserve component veterinarians backfilled positions in CONUS and Europe. Seventeen separate veterinary TO&E units, both active and reserve, contributed personnel to the Persian Gulf War.[86(pp73-74)] (As a reference point, in 1991 there were 445 active VCOs serving worldwide.[87])

Organization and Units. Unlike the gradual build-up during the Vietnam War, US forces moved quickly, assembling a large force for the Persian Gulf War. Medical and, more specifically, veterinary assets were initially largely marshaled out of Europe (Germany) and sent to the KSA. The 483rd Medical Detachment (VS) (based at Augsburg) of the 7th MEDCOM was notified of deployment to the Persian Gulf War on August 12, 1990.[88(p1)] Serving as an ALO 1 (Authorized Level of Organization) JB team, the unit would soon be augmented with other units and personnel.[88(p1)] This included the 100th Medical Detachment (VS) and the 168th Medical Detachment (VS) both serving as JA teams.[88(p1)]

Additional personnel and equipment added to the 483rd from 7th MEDCOM units included the following veterinary detachments: 72nd, 110th, 167th, 24th, 655th, 769th, and Veterinary Detachment Europe.[88(p1)] Additional personnel and resources came from the 196th Hospital, 2nd General Hospital, and 10th Medical Laboratory.[88(p1)] The 248th Veterinary Detachment, which had arrived in the KSA as a part of the 44th Medical Brigade, was also assigned to the 483rd. The 73rd Medical Detachment (JA) from Ft Lewis arrived in September and was attached to the 483rd for operational control.

While the 483rd had numerous personnel, there were issues of command and control, with the 483rd answering to both the theater veterinarian and the 44th Medical Brigade.[88(p3)] Changes occurred in December as veterinary operations were transferred from XVIII Airborne Corps control to VII Corps.[86(p72)] The 483rd was transferred to a provisional medical group and the command and control of the 320th Medical Detachment Veterinary Headquarters (EAC, Echelon Above Corps), an Army Reserve unit.[88(p3)]

Other reserve component veterinary units in theater included both veterinary services detachments (the 356th, 358th, 422nd, and 423rd) and VCO detachments for small animal care (the 449th and the 888th).[86(p71)] VCOs also served in Preventive Medicine, CA, and Special Forces units and at medical headquarters.

Because the American military had never been stationed in the KSA, other than as an advisory capacity, there were no approved sources for food supplies in the Persian Gulf countries. Thus, initial sanitary inspections had to be conducted in five countries to create a list of approved sources for host nation contractors to procure food supplies. Over the first 4 months, the Veterinary Service worked with approximately 300 food vendors in these five countries.[86(p72)] Quality assurance inspections of CONUS origin subsistence, as well as local food sources involved in the host nation feeding program, were a major area of mission accomplishment (Figures 1-36 and 1-37). The Veterinary Service approved 286 local sources in the area of operations, to include bakery, dairy, shell egg, meat processing, and catering establishments, thereby contributing to very low rates of food-borne or water-borne disease in military personnel (personal knowledge, Colonel [Retired] Leslie G. Huck, chapter author).

Significant Animal Care Needs. Veterinary Service personnel cared for approximately 120 MWDs in theater and provided much needed support for starving dairy cattle and horses in Kuwait City that had suffered

Figure 1-36. Held together by tape, stacks of canned food await inspection during Operation Desert Storm. Courtesy of the Army Medical Department Center of History and Heritage Archival Collection, Ft Sam Houston, Texas.

Figure 1-37. Photograph taken pending inspection of a local poultry processing facility in Saudi Arabia during the Persian Gulf War.
Courtesy of the Army Medical Department Center of History and Heritage Archival Collection, Ft Sam Houston, Texas.

under the Iraqi invasion.[89(p1)] In addition, veterinary personnel including a Special Forces veterinarian rescued and treated starving, dehydrated, and mistreated animals that remained in the Kuwait Zoo.[89(p4),90] Few of the zoo animals survived, however, and the 483rd Medical Detachment veterinary personnel provided much of the removal of animal remains and general cleanup of the zoo.[88(p20)]

Veterinary clinical activities included examinations and treatment of all MWDs in the theater. They also were responsible for policies related to injuries involving indigenous animals due to military action. In the lead-up to the Persian Gulf War's Operation Desert Storm's tactical activities, four locally owned animals (three camels and a horse) were injured by American forces in a training exercise.[86(p73)] The animals were treated without incident.

Consultation regarding zoonotic diseases such as rabies and the establishment of US Army Central (ARCENT) and US Central Command (CENTCOM) policies regarding animals also fell under the Veterinary Service's umbrella. The 423rd Veterinary Laboratory augmentation team located at Eskan Village, Riyadh, KSA, tested numerous samples and also sent animal heads for rabies testing to the veterinary medical laboratory in Germany.[86(p73)] (See Chapter 12, Rabies and Continued Military Concerns for more information about animal policies during deployments and military rabies control programs.)

There was significant veterinary involvement in the development of biological and chemical agent prevention and treatment modalities, as well as in the provision of training for military personnel in biological and chemical defense procedures. A veterinary toxicologist was the commander-in-chief's US CENTCOM advisor on chemical defense. Veterinarians served as commanders and deputy commanders of institutes and directors of research programs responsible for vaccine and drug development and chemical and biological defense medical research programs to protect the soldiers. Veterinary specialists in laboratory animal medicine, pathology, physiology, pharmacology, microbiology, and toxicology served as primary investigators and conducted research support for a broad array of biomedical research in support of the Persian Gulf War.

A veterinarian also was assigned with the Multinational Peacekeeping Force, and the CENTCOM veterinarian and one 68R (food inspector) were assigned in Kuwait. Navy Forces Central Command requested veterinary support, and a staff study determined a nine-person TDA veterinary unit was required for the current CENTCOM missions. Staff actions progressed to accomplish this requirement, and as the US military presence continues in SWA, Veterinary Service remains an important military medical asset.

Veterinary Operations Highlights. From the period January 17, 1991, (the Persian Gulf War's Operation Desert Storm and air-war phase begins) to February 1, 1991, Veterinary Corps assets increased dramatically. The 888th Medical Detachment (VS) (JA) arrived in theater with five additional personnel, and the 356th Medical Detachment (VS) (JB) arrived about 1 week later with 26 additional personnel.[89(p1)] Both of these units were deployed with no modified table of equipment supplies (eg, vehicles and tents), which required considerable improvisation with respect to mission accomplishment.[89(p1)] Three reserve component VCOs and ten 91R food inspection specialists from Health Services Command arrived in theater in mid-January as individual augmentees, and all were assigned to the 483rd Medical Detachment (VS) (JB).[89(p1)] The overall strength for veterinary support increased to 95 assigned personnel.[89(p1)] In addition to surveillance of operational rations, initial and routine sanitary inspections continued to ensure the wholesomeness of Class A rations for over 365 establishments. The care of MWDs also continued for the approximately 120 government-owned canines in theater.[89(p1)]

The 422nd Medical Detachment (VS) (JB) and the 888th Medical Detachment supported the host nation warehouses in the King Khalid Military City area in the KSA, and the other units remained in the Dammam and Al Khobar area.[89(p1)] Veterinary personnel also provided support at temporary duty locations in Jeddah (KSA), the United Arab Emirates, and Oman, mainly in support of Air Force and Navy installations.[89(pp1-2)]

Here, they discovered large amounts of nonapproved and disapproved food sources being procured. In fact, disapproved shell eggs (poultry eggs in their shells as opposed to dried or powdered eggs) caused the most severe food-borne illness outbreaks, and host nation caterers resulted in the second highest number of cases.[89(p2)] Later on, veterinary personnel located on airbases learned that many of the Air Force environmental health officers had redeployed early with their hospitals; therefore, surveillance of food was none to minimal.[89(p2)] The result was large warehouses of rations that were outdated and needed extensions of shelf-life or condemnation and destruction.[89(p2)]

Difficulties Encountered and the Solutions. Issues were encountered when providing support for enemy prisoner of war (EPW) camps. In addition to the poor field sanitation habits of the EPWs, disinfectants, food preparation surfaces that could be disinfected, and sanitary food-handling utensils were lacking. These problems required extensive coordination with Saudi government officials, Coalition Forces, and US Army preventive medicine and military police personnel.[89(p2)] The quality and quantity of rations being fed to EPWs were also significant sources of debate for two main reasons: (1) the amount of unacceptable cultural foods (ie, large portions of NATO rations contained pork, which Muslim EPWs could not eat), and (2) political concerns (ie, the "equalness" of rations being fed to Coalition Forces and EPWs).[89(p2)]

In addition, transportation issues increased during the Persian Gulf War. The problem of deployment of two modified table of equipment units without organic vehicles was never resolved. Contracting civilian cars was a partial solution, but the decreased mobility of these units was a definite constraint in planning their missions.[89(p2)] If the Persian Gulf War had lasted longer, additional teams that needed to move north following the food supplies would have resulted in failed missions, due to the lack of tactical vehicles, tents, and generators.[89(p2)]

One of the most difficult problems was that of unit morale. Once the Persian Gulf War combat objectives were achieved and redeployment began, units were supposed to follow President George H. W. Bush's announced policy of First In-First Out or FIFO for their return home.[89(p3)] However, ARCENT MEDCOM would not authorize the transfer of equipment from the 422nd Medical Detachment, thus allowing them to redeploy first.[89(p2)] Therefore, this detachment continued to support the mission at the King Khalid Military City area until the majority of the VII Corps troops were redeployed, at which time the detachment troops would be released.[89(p2)] The 483rd was to serve as a stay-behind unit to provide ongoing veterinary support.[89(p2)]

In addition to the equipment transfer complication, the Health Care Operations, the OTSG, and Total Army Personnel Command failed to quickly establish a rotation and replacement policy and rotate replacements in for soldiers already in the war zone for 7 months.[89(p4)] With neither US ARCENT nor MEDCOM embracing the First In-First Out redeployment plan and the apparent indecision by both the Health Care Operations and Total Army Personnel Command, serious morale problems resulted for the veterinary unit designated to remain behind. The result was discipline problems, in addition to health and mental health issues.[89(p4)]

Once the redeployment phase began, support to temporary duty locations became very difficult. Travel by C-130, Eastern Star Flights (from the countries of Qatar, the United Arab Emirates, and Oman) and Western Star Flights (from the KSA cities of Tabuk, Taif, and Jeddah), began to be cancelled and not fly on a daily basis.[89(p3)] The eventual concern was that no flights would travel to these areas, and expensive ticketing for temporary duty personnel to conduct sanitary inspections would be required. Air Force C-12 flights were used temporarily to fill in the gaps; however, as those planes and pilots belonged to the US Military Training Mission, this air transportation support could be cancelled at any time.[89(p3)]

Airport access and travel in more rural areas also caused several unforeseen issues. A set of TDY orders and a US Forces identification card had been enough to gain access and travel anywhere in the United Arab Emirates, the KSA, Bahrain, Oman, Kuwait, and Qatar.[89(p3)] However, when non-English speaking host nation military personnel began guarding those sites, these personnel demanded passports, visas, and access badges.[89(p3)] The command realized that in the future, VCOs and noncommissioned officers (Staff Sergeant E-6 and above) might be necessary to conduct the extensive civilian sanitary inspections for the veterinary service mission in Third World host nations.[89(pp3-4)]

The 483rd Medical Detachment (Veterinary Service) (JB). For the 483rd Medical Detachment (VS) (JB), the period encompassing the Persian Gulf War from January to April 1991 saw rapid changes in both the mission and the living conditions. Even if the THREATCON level was ALPHA, BRAVO, or CHARLIE, (the first three incremental threat conditions, ALPHA being the least critical), all of their routine duties had to be performed under THREATCON DELTA (threat condition critical, the highest of the four threat conditions). Veterinary personnel carried weapons and live ammunition; chemical, biological, radiological, nuclear, and explosives protection masks; personal arms systems for ground troops' vests; and Kevlar helmets.[88(p14)] In addition, co-drivers were required in

each vehicle.[88(p14)] The almost nightly SCUD (a type of long-range surface-to-surface guided air missile) alerts exhausted the soldiers, and a good portion of each night was spent in MOPP 4 (the highest level toxic environment protective gear) and operating M8 alarms (automatic field alarm systems developed for detecting chemical agents present in the surrounding air).[88(p14)]

With the possibility that the supply system might stop, every site was required to stockpile a 10 days' supply of MREs and bottled water in living areas.[88(p14)] An increase in the THREATCON level and the number of guard positions had unit personnel pulling 12-hour guard shifts almost every other day, thus leaving little available time to perform their mission.[88(p14)] Conducting commercial sanitary inspections had to be severely reduced because of terrorist threats and the closure of many small establishments as the owners fled the country. Although VCOs performing inspections wore civilian clothes, they were still required to carry a weapon and protective gear wherever they traveled.[88(p14)]

A unit decontamination site was selected southwest of Dhahran, and intensive nuclear, biological, and chemical training was conducted to ensure each soldier could survive in such an environment. After one of the initial SCUD attacks, all unit personnel were directed to start PB (pyridostigmine bromide) tablets as an antinerve agent, and everyone was given a total of two anthrax immunizations against a possible biological threat.[88(p14)] The vaccine caused considerable swelling, erythema, and pruritus that lasted up to 7 days in about 20 percent of the soldiers.[88(p14)]

Because adequate quantities of the anthrax vaccine were not available, the normal time period between injections was increased to more than 1 month for the majority of soldiers.[88(p14)] In addition, everyone had a blister pack of ten 750 mg ciprofloxacin tablets as prophylaxis in the event of a potential biological threat.[88(p14)] Upon notification or suspicion that biological agents were being used, they were to take one tablet every 12 hours.[88(p14)] This antibiotic was also excellent for the treatment of resistant strains of salmonella and shigella, and, thus, quickly became the drug of choice for bacterial infections.[88(p14)] An inadequate number of CANA (Convulsive Antidote, Nerve Agent) auto injectors of valium, 19 for 45 people, were issued to the unit.[88(p14)] Because of the shortage of injectors overall, the unit dispensed what it had to the forward-based teams with the Marines and in Kuwait.[88(pp14-15)]

At the beginning of Operation Desert Storm, the 483rd had a rapidly reducing mission except in the MARCENT (US Marine Corps Forces Central Command) area of operations.[88(p15)] The majority of rations were being delivered directly from the port to forward bases in anticipation of the onset of the ground war. In fact, during the initial buildup, rations were not a priority shipment and were replaced instead by equipment and weapons.[88(p15)] The 888th Medical Detachment (VS) (JA), a Veterinary Reserve unit from Lexington, Kentucky, arrived on January 20, 1991, in the middle of a SCUD attack at Al Khobar Towers, KSA.[88(p15)] Another Veterinary Reserve unit, the 356th Medical Detachment (VS) (JB) from the Bronx, arrived on January 26, 1991.[88(p15)] Both of these units arrived without equipment or vehicles. As a result of the reduced mission and a gross overload of personnel, the 888th was moved to King Khalid Military City to support the 422nd Medical Detachment (VS).[88(p15)]

Upon retrograde in the middle of March, units and subsistence moved back to Dhahran, and the workload then increased drastically. Units were supposed to turn in their excess operational rations into the unit they drew them from; however, that policy didn't last long as the units who were to accept the rations were also getting ready to redeploy.[88(p16)] The theater-wide excess of MREs and B-rations could not be consumed by the units in place. In addition, there was confusion as to the ownership since the Saudi government had paid for all operational rations entering the theater.[88(p16)] This question, plus a lack of guidance on the disposition of returning rations and an inadequate number of personnel to complete the inspections, led to great difficulty in performing the mission. Eventually, the excess MREs were permitted to be used for humanitarian aid and were flown by a C-5 to Turkey and air-dropped to feed starving Kurdish refugees.[88(p16)] Additional rations were flown to Kuwait and southern Iraq, also to support refugees.[88(p16)]

The two EPW camps south of Forward Operating Base Bastogne became partially operational in early February 1991.[88(p17)] At the time of the initial visit by veterinary personnel, there were only nine EPWs present; by early March, the EPW population was approximately 20,000; the American population was 4,000.[88(p17)]

For these camps, the veterinary food inspection expertise was vital in bridging the gap between US food service and preventive medicine personnel. Preventive medicine service members were occupied full-time with waste, water, and pest control issues, and food service staff were responsible only for food produced for US personnel, not for EPWs. The EPWs themselves prepared their food, but lacked the proper training and understanding of food service sanitation. Thus, Veterinary Service personnel provided guidance to the camp military police, camp surgeon, and actual EPW cooks. Still, numerous problems ensued.[88(pp17-18)]

With no hot water, a central hot water system had to be installed to allow the EPWs to heat their operational rations.[88(p18)] For food preferences, NATO rations were

desired, and then Saudi canned products, and finally MREs (listed in order of EPW preference).[88(pp18-19)] Because adequate dry and refrigerated food storage facilities were lacking, the semi-perishable rations were stacked directly on the ground and in the sunlight. Perishable products were stacked haphazardly in refrigerated units with commingling of different meats, fresh fruit, and vegetables.[88(p18)]

The food preparation equipment and utensils also were inadequate; for example, EPW cooks were using entrenching tools to cut meat on pieces of cardboard placed on the ground, and nails and knives were used to open cans.[88(p18)] There was also an inadequate supply of potable water. Initially, the camp tried to install a central-piped water supply, but it never functioned properly.[88(p18)] The camp also brought in 250-gallon onionskin bladders of potable water, but the water bladders didn't have hoses to properly dispense the water.[88(p18)] EPWs would instead dip 5-gallon cans and buckets into the water bladder to obtain water.[88(p18)] In order to prevent disease from contamination, the water was hyper-chlorinated to 10 parts per million.[88(p18)]

There was also a lack of proper waste collection facilities to include dumpsters and grease pits, no sanitizing compounds or cleaning supplies, and no clean clothing for the EPW cooks.[88(p18)] All these issues were tackled by the veterinary personnel, and most were resolved by obtaining the proper equipment and supplies and providing the appropriate training in food sanitation.[88(p19)]

Post-Persian Gulf War to Present

When the Persian Gulf War ended quickly, millions of pounds of food packaged for the war were stranded en route, and the Army Veterinary Service was faced with the inspection of these rations during the summer of 1991. These items included MREs (packaged field rations); T-rations (ready-to-cook meals in a tray); unitized B-rations (100-meal modules of canned goods); MOREs (off-the-shelf purchases); bulk B-rations (semi-perishable dry goods); and bread, cereal, and sundries. All required inspection.[91]

Food items that passed inspection were then distributed to more than 30 nations, all 50 states, Puerto Rico, American Samoa, and the Mariana Islands.[91] The Second Harvest network of food banks, as the largest distributor in the United States, received about 120 million pounds of food.[91] The rations were sent out to the network's food banks, which would then distribute them to approximately 43,000 charitable organizations to include soup kitchens, day-care centers, and homeless shelters.[91]

The Army Veterinary Service inspected about 4,500 containers of food between the summer of 1991 and March 1992, with each shipping container about the size of an 18-wheeler truck and holding about 40,000 pounds of food.[91] Shelf-life was the main concern; not bringing in any pests that required quarantine of the product was another.

Returning rations arrived in various ports, with the largest operation at Oakland, California. After being inspected at the port, the vans would receive a condition code ranging from "good for a 6-month shelf life" to "condemned."[91] The containers of rations were then moved to government agencies, hospitals, schools, disaster relief services, homeless shelters, or food banks; about 1,500 containers were directed to relief projects in Latin America.[91] In addition, some of the food was used to assist victims of disasters, including floods in Texas and fires in California.[91] Even more rations were sent to Eastern Europe, Africa, and Asia, but the Army did retain some of the containers of MREs for its use.[91] Historically, the US had not performed a retrograde operation of any size since World War II; in Vietnam, most items were left behind.[91]

The talents of Veterinary Service personnel were readily demonstrated during the crisis in SWA. Broadly trained, innovative, and experienced military veterinary personnel were able to quickly adapt from the supposed European battlefield to one in the desert. Despite initial organizational challenges and expansive working distances, Army veterinary personnel inspected approximately 700,000,000 pounds of food.[86(p72)]

Operation Provide Comfort, 1991 to 1996

Although the Persian Gulf War's Operation Desert Storm tactically concluded very quickly, with 5 weeks of aerial bombardment, followed by roughly 100 hours of punishing ground attack, there were lingering effects. Saddam Hussein and his forces made several attacks on the Kurdish people who had opposed him during the war. Hundreds of Kurds sought refuge in the mountains of northern Iraq along the border with Turkey. By April 16, 1991, US forces were assisting the Kurds and trying to prevent massive starvation in what became known as Operation Provide Comfort.[92]

The coalition effort was a multinational military and civilian force that merged into an international relief effort, and US Army medical personnel were involved from the beginning. Operation Provide Comfort provided aid to a Kurdish refugee population that was estimated between 360,000 to 760,000 civilians.[93(p32)] Having fled their homes to escape Iraqi aggression, the

refugees were trying to survive in the mountain cliffs, enduring harsh weather and a critical lack of potable water, food, shelter, and medical care.[93(p32)]

Elements throughout 7th Medical Command were deployed to numerous locations in Turkey and Iraq to aid in preserving the lives of Kurdish refugees and assist in relocating the people.[93(p31)] A vast food inspection effort by the Veterinary Service resulted in the delivery of more than 30 million pounds of subsistence for the operation.[94] A nine-person team from the 99th Medical Detachment (VS) was deployed from Europe to the region to oversee the veterinary mission, and they were assisted by inspectors from the 34th Medical Detachment based at Incirlik, Turkey.[95(p162)]

Veterinary Service personnel stationed in Turkey (the 34th Medical Detachment, [VS]) led by then-Major John L. Poppe) continued to support northern Iraq refugee relief operations in the coming months and provided animal health support and food protection support for the Combined Task Force compound in Zahku, Iraq. The 34th was part of Joint Task Force Proven Force, of the Combined Task Force for Operation Provide Comfort (electronic personal communication from Brigadier General John L. Poppe, Chief, US Army Veterinary Corps, to Nolan A. Watson, chapter author, March 4, 2015). At the time, it was considered the largest humanitarian relief effort ever undertaken.[93(p35)]

Operations Restore Hope and Continue Hope, 1992 to 1994

Facing famine and civil war, the people of Somalia were in dire peril. Desperately needed food supplies were withheld from the starving populace by feuding Somali warlords. United Nations Peace Keepers participating in UNOSOM I (United Nations Operation in Somalia) were similarly deterred and often brutally attacked. In order to provide assistance, President George H.W. Bush ordered US troops to support humanitarian relief efforts and quell the violence. Hence, Operation Restore Hope began on December 8, 1992, and lasted until most American troops were withdrawn by March 25, 1994, ending the follow-on mission, Operation Continue Hope.[96]

Veterinary Service operations from January 2, 1993, to March 22, 1994, in Somalia for Operations Restore Hope and Continue Hope included support food inspection, MWD care, and zoonotic disease control.[97(p2)] During that timeframe, personnel from the 248th Veterinary Service Support Squad and 73rd Medical Detachment (VS) provided this vital mission support with the personnel strength of one VCO and nine enlisted in January 1993, which decreased to one VCO and one enlisted soldier after January 1994.[97(p3)]

These personnel provided inspection of MREs, operational rations, fresh fruits, and vegetables.[97(p4)] Military sanitary inspections were performed, and commercial sanitary inspections were conducted in both Kenya and Somalia.[97(p4)] The monthly food inspection workload varied from as low as approximately 0.25 million to a high of 3.5 million pounds per month.[97(p5)] Retrograde food inspections were conducted on semiperishable subsistence for a total of 293 MILVANs (military-owned demountable containers) equaling 2,542,662 pounds that included MREs, rations, shelf-stable bread and rolls, cereal, and ultra-high temperature processing or UHT milk[97(p9)] (Figure 1-38). Veterinary Service personnel also provided preventive and emergency health care to four MWDs and consultation on zoonotic disease threats.[97(p4)]

Lessons learned for the food inspection mission included the need for coordination with the United Nations on approved food sources for dining facilities and concessions, identifying subsistence as early as possible for retrograde movement and proper disposition, and recognizing that mobility may be limited in visiting food sources and Class I points (food, ration, and water supplies).[97(p10)] For the animal care mission, the need to coordinate MWD health care support and evacuation was noted, as well as screening MWDs prior to deployment.[97(p16)] Other issues noted were the limited expertise available for Third World livestock and the importance for support of an official mascot program, if current general orders allowed mascots.[97(p16)]

In addition to the aforementioned, another important lesson learned was that the level of hostile threat limited the performance of the food inspection mission and the ability to provide support for the MWD, local animal

Figure 1-38. Subsistence supplies are unloaded and await inspection in Somalia during Operation Restore Hope. Courtesy of the Army Medical Department Center of History and Heritage Archival Collection, Ft Sam Houston, Texas.

missions, and higher headquarters. Overall, the other branches of the military and the United Nations needed to be educated on the potential roles for Veterinary Service.[97(p28)] In fact, when questions arose concerning local food procurement, the Army Surgeon General sent then-Chief of the Veterinary Corps Colonel Clifford I. Johnson to assess the situation first-hand and make recommendations to the Commanding General in Somalia. After viewing local sanitation and food facilities, Colonel Johnson recommended that food not be procured locally for consumption by troops in Somalia. When the colonel was leaving Somalia, the military aircraft he was traveling in came under attack by hostile gunfire (electronic personal communication from Colonel [Retired] Clifford Johnson, former Chief, US Army Veterinary Corps, to Nolan A. Watson, chapter author, March 22, 2013).

Veterinary Command, Activation and Inactivation, 1994 to 2011

The Veterinary Command (VETCOM) was created in 1994 as part of the larger US Army Medical Command (MEDCOM) establishment (Figure 1-39). The MEDCOM organizational changes were made to consolidate the management and oversight of medical treatment facilities and replaced the Health Services Command or HSC, which had been established in April 1973. VETCOM had Veterinary Service Support Areas (VSSAs) that mirrored Health and Dental Service Support Areas for the rest of MEDCOM, which were known as HSSAs and DSSAs, respectively.

Figure 1-39. Distinctive unit insignia for US Army Veterinary Command, created in 1994. The insignia drew from symbols and imagery originally used by the Chicago-based Army Medical Service Meat and Dairy Hygiene School.
Courtesy of the Army Medical Department Center of History and Heritage Archival Collection, Ft Sam Houston, Texas.

VSSAs differed in that they also supported Navy and Air Force activities, because the Army maintained Executive Agency status for Veterinary Service. Local veterinary activities, which were a part of Medical Department Activities (MEDDACs) at the time, were reorganized into 20 veterinary districts under the VSSAs. In 1996, the HSSAs were renamed Regional Medical Commands or RMCs, and the VSSAs were renamed Regional Veterinary Commands or RVCs.[98] Regional Veterinary Commands were subordinate commands under VETCOM and were established to align with the larger Regional Medical Commands. Also, the DoD Veterinary Food Analysis and Diagnostic Laboratory at Ft Sam Houston and the DoD Military Working Dog Center at Lackland Air Force Base, San Antonio, Texas, were directorates under VETCOM (written communication, Colonel Leslie G. Huck, chapter author, March 2015).

On July 22, 2011, VETCOM was inactivated. The former command combined with the US Army Center for Health Promotion and Preventive Medicine or CHPPM to create the new US Army Public Health Command or USAPHC. These changes were short-lived as MEDCOM again reorganized in 2014, and its reorganization is still ongoing (personal knowledge, Colonel [Retired] Leslie G. Huck, chapter author).

Operation Uphold Democracy, Haiti, 1994 to 1995

Initially begun in 1994 to reinstate Jean-Bertrand Aristide as the properly elected President of Haiti, Operation Uphold Democracy altered to provide humanitarian assistance and order. Veterinary and preventive medicine services were urgently needed in a country that struggled with numerous health issues. The US-led multinational forces' veterinarian coordinated efforts with the Haitian Ministry of Agriculture and provided technical advice to the Ministry of Agriculture and Ministry of Health.[99(pp21,24)] The multinational forces' veterinarian also played a vital role in controlling illnesses associated with food by coordinating with other veterinarian assets in theater to inspect local sources of meats and water from the Haitian economy.[99(p24)]

As a part of the larger US military Operation Uphold Democracy, the veterinary-specific Operation MAD DOG was a humanitarian CA project with the goal

Figure 1-40. Rabies poster for distribution during Operation Uphold Democracy in Haiti, 1994 to 1995.
Roughly translated as, "If you see/had contact with a rabid dog from 10 to 17 January 1995, you should find an American/Marine for treatment."
Courtesy of the Army Medical Department Center of History and Heritage Archival Collection, Ft Sam Houston, Texas.

of protecting civilians and United Nations soldiers in Haiti by immunizing dogs and cats against rabies (Figure 1-40). Rabies is endemic in Haiti and numerous other Caribbean countries, and every year several deaths are attributed to the disease.[100(p17)]

In July and August 1995, teams of Haitian and American veterinarians and technicians executed Operation MAD DOG.[100(p17)] Operation MAD DOG achieved a measure of success because of the mutual cooperation of numerous governmental, nongovernmental, private volunteer, military, and nonmilitary organizations that participated in the operation. Army veterinarians—working closely with the Christian Veterinary Mission, the Pan American Health Organization, and the revitalized Haitian Ministry of Agriculture and Ministry of Health—conceived a plan to conduct a massive rabies vaccination campaign using donated vaccine.[100(p17)] The 94th Medical Detachment (VS) from Ft Sam Houston contributed the majority of the veterinary staff for US forces.[100(p17)] Additional medical units and the 248th Medical Detachment (VS) also assisted in the operation.

Divided into two phases, the operation resulted in a grand total of 47,768 animals being immunized against rabies.[100(p19)] The Haitian public responded enthusiastically to the program, so much so that crowd control was a constant problem, as the spectacle of Haitian veterinary agents and American soldiers vaccinating dogs and cats was a source of entertainment for the local people.[100(pp19-20)]

Other issues encountered included the heat, the language barrier, traffic conditions, and the unpredictability of the animals. From the perspective of the military forces involved, this operation was an invaluable training experience in a real-world setting and provided the veterinary units an opportunity to train in tasks related to deployment, humanitarian assistance, convoy procedures, and animal disease suppression.[100(p20)]

The Kingdom of Saudi Arabia

Other Veterinary Service missions would serve as precursors for larger operations. The 46th Medical Detachment (VS) was forward deployed from Ft Stewart, Georgia, to SWA near Dhahran, KSA, on July 4, 1996, under the command of then-Major Leslie G. Huck. The unit was deployed to assume the garrison support veterinary services mission in SWA. About 10 days prior to their arrival, on June 25, 1996, the Khobar Towers area (quarters for non-Saudi Arabian military personnel) was bombed (personal knowledge, Colonel [Retired] Leslie G. Huck, chapter author).

Not long after arrival, Major Huck, along with finance and other out-processing personnel, visited various sites in KSA to prepare military dependent family members for a noncombatant evacuation operation (NEO). Colloquially known within the 46th as "Operation Noah's Ark," this NEO began with veterinary personnel administering necessary vaccines to pets. The health certificates also needed for privately owned animal travel were given to their owners after the travel health checks and vaccinations were finished (personal knowledge, Colonel [Retired] Leslie G. Huck, chapter author).

Pets were evacuated separately from military dependent family members; over 100 dogs and cats were transported to Riyadh and flown via an Air Force

C141 to Charleston, South Carolina. To make sure pets were properly cared for before and during their flight to Charleston, two VCOs (Captain [later Colonel] Thomas E. Honadel and Major [later Colonel] Robert L. Vogelsang, III) and two 91Ts (now 68Ts) were sent from CONUS to Riyadh to accompany the pets. Other veterinary personnel were awaiting the arrival of the pets in Charleston; these personnel set up temporary living quarters and cared for the pets until all animals were reunited with their owners (personal knowledge, Colonel [Retired] Leslie G. Huck, chapter author). Operation Noah's Ark, which proved successful, paved the way for similar Veterinary Service NEO endeavors that are mentioned later in this chapter.

Food Safety, Food Security, and Food Defense

As a follow-on mission in the KSA, the 46th Medical Detachment increased its food surveillance activities and a new terminology arose: food defense. Although protecting food from intentional attack already took place to some extent after Pearl Harbor was attacked during World War II, it was not part of the veterinary service mission in the 1980s and would alter during the 1990s (personal knowledge, Colonel [Retired] Leslie G. Huck, chapter author).

As a part of post-Khobar bombing assessments for security in 1997, an Air Force public health officer was conducting water vulnerability assessments and shared his findings with Major Huck, who added food to the items to be studied. The 46th personnel started conducting Food and Water Risk Assessments (FWRAs) to determine vulnerability at US facilities in Bahrain, the KSA, and Kuwait and shared the findings with installation command teams, so mitigation measures could be instituted to prevent possible intentional attacks on the food and water supplies. At that time, these measures were called "food security," which was later changed to "food defense"(personal knowledge, Colonel [Retired] Leslie G. Huck, chapter author).

After the American Embassy bombings occurred in 1998 in Africa, force protection measures increased throughout the United States European Command. Veterinary services personnel started conducting FWRAs at many US facilities in Europe. Faced with continuous threats to military and dependent personnel, the concept of using FWRAs spread throughout Veterinary Services. After the attacks of September 11, 2001, the Veterinary Corps Chief, Colonel John S. Fournier, wanted to formalize the inspection process and gathered a team consisting of Thomas J. McNeil, Chief Warrant Officer 3 Robert D. Ralyea, Lieutenant Colonel Robert D. Weir, and then-Lieutenant Colonel Leslie G. Huck to write the first edition of the *US Army Center for Health Promotion and Preventive Medicine Technical Guide 188, US Army Food and Water Vulnerability Assessment* (personal knowledge, Colonel [Retired] Leslie G. Huck, chapter author). Food defense remains an integral and formal part of the US Army Veterinary Service's food protection mission for the DoD.

Bosnia: Operation Joint Endeavor, Operation Joint Guard, and Operation Joint Forge, 1995 to 2004

In order to provide stability in the former Yugoslavia and to enact provisions of the Dayton Peace Plan, America and other European countries (Figure 1-41) provided military resources known as the Implementation Force (IFOR) to end ethnic clashes. The early phase of the deployment of US military in support of IFOR was known as Operation Joint Endeavor and began in December 1995.[101(p1)] With over 20,000 American soldiers deployed into the Bosnian Theater, medical and veterinary support was understandably needed.

After extensive predeployment training, personnel from the 72nd Medical Detachment (VS) arrived in the former Yugoslavia as part of the 30th Medical Brigade's medical support for Task Force Eagle on December 27, 1995.[101(p3)] The unit performed food safety missions and provided care for MWDs within Hungary, Croatia, and Bosnia-Herzegovina.[101(p2-3)]

Figure 1-41. Swiss dog handler Corporal Hans Loetscher (left) comforts his patrol dog "Kirro" as Specialist Thomas D. Lombardi, veterinary technician, checks its vital signs. US Army photo published in *The Talon*, November 8, 1996, page 9.
Reproduced from http://www.dtic.mil/bosnia/talon/tal19961108.pdf. Accessed October 23, 2017.

Figure 1-42. Warrant Officer Roman I. Chyla, a food inspection technician, conducts an inspection of a Bosnian bakery. US Army photo published in *The Talon*, March 14, 1997, page 4.
Reproduced from http://www.dtic.mil/bosnia/talon/tal19970314.pdf. Accessed October 23, 2017.

For example, local bakeries were often examined by the 72nd as baked goods were often a staple food source for IFOR or Stabilization Force (SFOR) troops[102] (Figure 1-42). Larger food production facilities, those owned by corporations, were excluded in favor of small, local-based producers. This action was enacted in hopes of gaining goodwill with the local populace.[101(p7)] Trichinosis in locally procured pork products presented a problem as there were outbreaks in the country that affected hundreds of Bosnians.[103] The problem did not affect American pork consumption, however, and veterinary inspectors ensured that locally purchased pigs used in morale building cookouts were fit for consumption.[101(p7)]

The 72nd provided treatment for MWDs and public health monitoring of stray animals that were pervasive in the country. Although mascots were officially not permitted, soldiers eagerly sought pets. The numbers of stray dogs increased alarmingly around troop concentrations, and the Veterinary Detachment, in an effort to provide better public health, had the unpopular task of euthanizing many of the animals. MWDs in the area were also faced with a tick-borne disease, babesiosis. Once diagnosed by Captain (later Lieutenant Colonel) Martin M. LaGodna, the 72nd's executive officer, and after receiving medication (Imidocarb) provided by a local veterinarian, the MWDs recovered, and veterinary personnel were ready for future cases of the rickettsial disease. Despite the many veterinary medical issues and challenges encountered during IFOR, there were no MWD casualties, nor did it ever become necessary to medically evacuate an MWD to Dog Center Europe, Germany, for Level III definitive medical care.[101(p9)]

There were rumors that foot and mouth disease (FMD) or biological weapon storage were used to the advantage of Bosnian Serb forces.[101(p12)] These incidents were quickly dispelled by military veterinarians. On August 14, 1996, the German *Bundeswehr* (Army) veterinarians hosted an IFOR veterinary FMD summit in Trogir, Croatia. Major (later Colonel) Robert E. Walters, the 72nd commander, and then-Captain LaGodna attended as the US Army IFOR representatives.[101(p13)] With Major Walters taking the lead, the group put together an IFOR FMD contingency plan in the event of an FMD outbreak in Bosnia-Herzegovina or Croatia.[101(p13)] On October 16, 1996, after a week of transition, Major Walters and Captain LaGodna redeployed from the former Yugoslavia and were the last members to leave of the original Veterinary Detachment.[101(p14)] They were replaced by the incoming 72nd Commander, Major (later Lieutenant Colonel) Daniel E. Holland and his Executive Officer, Captain (later Colonel) Robin K. King.[101(p14)]

American and the partnering countries' involvement in Bosnia changed in December 1996 when the tasks of IFOR were transitioned to the SFOR.[104(p33)] SFOR took active steps to prevent and arrest war criminals within Bosnia. American forces were reduced to approximately 5,000 troops, and the operation was renamed Operation Joint Guard,[104(p33)] which was followed by Operation Joint Forge on June 20, 1998.[104(p37)] Operation Joint Forge resulted in a further decline in US troop numbers and the units that were formerly drawn from USAEUR. Replacement troops were sought from the National Guard and the Army's Reserve component.[104(p37)]

US forces continued to dwindle in the area as there was a shift to operations in Kosovo and, then, Afghanistan and Iraq. For the most part, American involvement ended in Bosnia when European forces took command of the mission, altering SFOR to European Force or EUFOR in 2004.[104(p37)] As activities in Bosnia stabilized, there were other portions of the former Yugoslavia that were in need of assistance.

Kosovo: Operation Joint Guardian, 1999 to Present

Moving into the area of Kosovo within the former country of Yugoslavia in June of 1999, NATO and American forces worked to maintain peace and end thousands of attacks and murders related to ethnic divisions.[105(p5)] This group was known as Kosovo Protection Forces (KFOR), with the American portion termed Operation Joint Guardian.[105(pp5,17)] Task Force Medical Falcon, based at Camp Bondsteel, Kosovo, had a critical mission to save lives and provide medical support to US military personnel, Kosovar soldiers, and local national Kosovars.[106] The Task Force Medical Falcon was supported by many of 30th Medical Brigade's units, including the 100th Veterinary Detachment.[106]

The mission of the 100th was to provide food safety, veterinary public health, level II+ veterinary medical care to government-owned animals, and limited civil military operations in Kosovo, the Former Yugoslavia Republic of Macedonia (FYROM), Greece, and Bulgaria.[107] Military communities supported included Camp Bondsteel, Kosovo; Camp Monteith, Kosovo; and Camp Able Sentry, the FYROM.[107] Civil military operations included inspection of humanitarian rations for World Health Organization's World Food Program and VETCAPs.[107] The food safety mission involved prime vendor surveillance inspection of Class I facilities (subsistence), conducting 11 commercial sanitary food plant inspections in Kosovo, the FYROM, and Greece; managing the hazardous food recall program; and supplementing preventive medicine missions when necessary.[107]

For veterinary public health, the 100th provided consultation to the military treatment facility commander, clinicians, Task Force Falcon (TFF) staff, and nongovernment organizations on zoonotic diseases; developed mascot and stray animal policies; and served as a member of Rabies Advisory Board.[107] The Level II+ veterinary medical care involved support for approximately 50 government-owned animals, with outpatient services, minor surgery, and stabilization for evacuation.[107] Major surgical stabilization, which would require the use of the hospital operating room, laboratory, radiology, and pharmacy support, was limited because of in-house facilities.[107]

For civil military operations, the VETCAP missions were directed by TFF and provided limited assistance to local populations in the form of veterinary care. In later years (eg, 2009) tasks were received from the command element, which was the 40th Infantry Division for that year (written communication from Major Laura K. Lester, Centers for Disease Control [CDC] Epidemic Intelligence Service Officer, Arkansas Department of Health, US Army Veterinary Corps, January 11, 2015). The primary focus of VETCAPs was to improve the level of public health via examination, vaccination, and deworming of animals. Animal husbandry training was also provided. The teams would also assist in diagnosis of animal disease outbreaks or endemic animal diseases, provide recommendations on control measures, and train local public health and agriculture officials.[107]

Beginning in 2010 and concluding in 2015, the KFOR Strategic Health Engagement partnership with the European Union and the Kosovo Food and Veterinary Agency worked with US Army personnel to eliminate rabies in Kosovo.[108] This task was undertaken first through the dispersal of oral rabies vaccine at Camp Bondsteel and then further distribution at strategic locations and bait sites.[108] Vaccines were aerially distributed with vaccines put into food material and dropped, as well as delivered by NATO and KFOR military compounds.[108] The overall mission in Kosovo, although diminished in numbers, continues at the time of this 2017 chapter writing.

Operation Enduring Freedom and Operation Iraqi Freedom

On the morning of September 11, 2001, Al Qaeda terrorists working under the direction of Osama Bin Laden conducted suicide attacks utilizing hijacked aircrafts that were crashed into the World Trade Center buildings in New York and the Pentagon. An additional plane attack on Washington, DC, was prevented by the passengers of United Airlines Flight 93; all passengers aboard the United Airlines plane perished during this foiled Al Qaeda mission. The immediate consequence of the multiple attacks was a deployment of US forces into Afghanistan.

The Army Veterinary Service supported the war against terrorism during Operation Enduring Freedom in several regions to include Afghanistan (Figure 1-43), the Philippines, and Africa. The Veterinary Service has also performed crucial duties during Operation Iraqi Freedom and its closing piece, Operation New Dawn. Despite the long years of conflict, the Army Veterinary Service—encompassing active duty and reserve veterinarians, warrant officers, enlisted

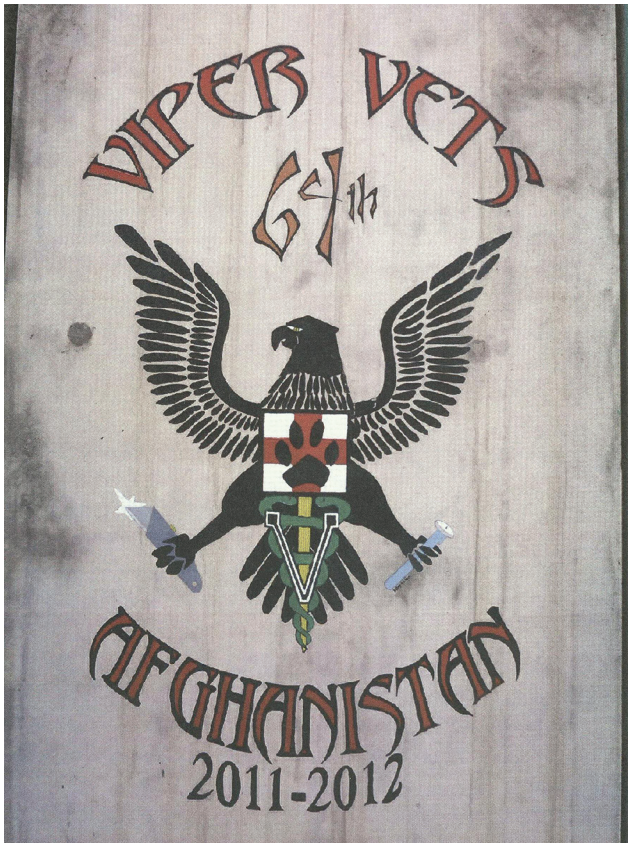


Figure 1-43. "T-Wall" signage for the 64th Veterinary Detachment. The signage was located on the exterior concrete wall of the Craig Joint Theater Hospital in Bagram, Afghanistan. The center crest on the eagle demonstrates medicine and military working dog care; the box cutter and test tube show the importance of opening samples and testing of food items. Courtesy of Nolan A. Watson, chapter author.

soldiers, and civilians—continues to serve in SWA and Africa providing world-class veterinary medical and food inspection support to US and coalition forces.[109]

Operation Enduring Freedom. The first VCO to deploy in support of Operation Enduring Freedom was Lieutenant Colonel Paul Dakin, who teamed with Special Forces in 2001. Although veterinary personnel served as part of Special Forces teams or with CA detachments, one of the first veterinary units deployed in support of the military efforts against terrorism (later named Operation Enduring Freedom) was the 248th Medical Detachment (VS).[110(p19)] Eight members of the unit arrived at an Uzbekistan staging area on December 3, 2001.[110(p19)] Three personnel from the unit established veterinary services operations at Kandahar Air Field in February 2002.[110(p19)] Portions of the unit redeployed in May 2002, leaving three personnel in Uzbekistan until July 2002.[110(p19)] Of special note is that the team leader from the 248th (Major, later Colonel, David Fletcher) was the first VCO in Afghanistan in 2002 when US forces were seizing Bagram Airfield to render aid to an MWD.

Another unit, the 994th Medical Detachment (VS), US Army Reserve (USAR), was also deployed early in the conflict and followed the 248th. The 994th was a subordinate unit of the 807th Medical Brigade, and assisted the 248th in Uzbekistan and relieved the 248th in Kandahar.[110(pp2,8)] Detachment 1 of the unit arrived in theater on November 29, 2001, and Detachment 2 arrived on February 9, 2002.[110(p4)] With a larger capability (25 soldiers), the 994th maintained veterinary service for Afghanistan, Qatar, Kuwait, Oman, Bahrain, Djibouti, and Kyrgyzstan.[110(pp6-7)]

TDY missions to many other surrounding countries were also part of the 994th's mission. Its personnel provided MWD support and DoD food safety missions for Operations Anaconda, Mountain Lion, and Condor in Afghanistan and elsewhere in the SWA Theater.[110(p8)] The unit was also tasked by the Coalition Forces Land Component Command Surgeon to lead an epidemiological investigation of a British outbreak of a meningitis-like illness in May 2002.[110(p9)] Additionally, the 994th conducted a serological survey of leishmaniosis in a large group of Afghan mine detection dogs in Kabul during June 2002.[110(p9)] When the 994th redeployed in 2002, the 109th Medical Detachment (VS), USAR, assumed the outgoing unit's roles and responsibilities.[110(pp13, 22)]

Operation Iraqi Freedom. After numerous stalled attempts to allow United Nations weapons inspectors into Iraq, Iraqi leader Saddam Hussein's support for terrorism, and fearing another attack on Americans utilizing weapons of mass destruction, a coalition of US-led forces invaded Iraq on March 20, 2003. The new military phase in the continuing war against terrorism was named Operation Iraqi Freedom. Initial stages of the operation saw mechanized and armored forces break through and advance quickly into the country.

The 248th Medical Detachment (VS) was originally assigned to the 62nd Medical Brigade from Ft Lewis, Washington, and aligned with the 4th Infantry Division to take the northern land route through Turkey into northern Iraq. Turkey denied access for the planned northern route, and US forces were diverted to Kuwait. The 248th was part of this new movement and reassigned to the 30th Medical Brigade under V Corps. The unit was located at Camp Virginia and conducted veterinary missions in Kuwait and southern Iraq (personal electronic communication from Brigadier General John L. Poppe, Chief, US Army Veterinary Corps, to Nolan A. Watson, chapter author, March 4, 2015).

Displaced from the northern Iraq mission, the 248th assumed the animal health and food protection mission from the 109th Medical Detachment (VS) in Kuwait and

southern Iraq. After arriving in Kuwait and being reassigned, it was originally planned for the 248th to split the veterinary mission in Iraq, with the 248th responsible for veterinary services in northern Iraq and the 72d Medical Detachment (VS) (organic to the 30th Medical Brigade) having responsibility for southern Iraq. The day before the 30th Medical Brigade and 72d pushed north into Iraq, the 248th received redeployment orders. The 109th (USAR) had been in the CENTCOM Theater an extended time and were being extended further. To relieve the 109th, the 248th assumed their mission to give them relief in place. The 248th was redeployed in June 2003 (personal electronic communication from Brigadier General John L. Poppe, to Nolan A. Watson, US Army Medical Department, chapter author, March 4, 2015).

Many veterinary units for the invasion force (V Corps) were subordinate to the 30th Medical Brigade and the 93rd Medical Battalion (Dental Service).[111] The 93rd Medical Battalion was organized to provide command and control to subordinate units with functions other than dental tasks.[111] Included under the 93rd were the following units: the 21st Medical Detachment (VS), 43rd Medical Detachment (VS) (Operational Control [OPCON]), 72nd Medical Detachment (VS), and 218th Medical Detachment (VS) (Attached).[111]

Continued Support and Global Concerns

The operational tempo and length of veterinary support against terrorism would see multiple deployments of veterinary units and personnel over the years to both Iraq and Afghanistan. Additionally, other areas such as Djibouti, other countries in Africa, CENTCOM sites, and the Philippines were frequent duty stations for Army Veterinary Service members. As previously mentioned, veterinary personnel were also assigned to Special Forces units, CA units, and Agribusiness Development teams. Other veterinary detachments and medical detachments (VS) not previously mentioned that were deployed in support of Operation Enduring Freedom and Operation Iraqi Freedom include the 51st, 64th, 463rd, 438th, and 463rd. Reserve Component units included the 109th, 358th, 422nd, 445th, 719th, 949th, and 993rd (personal electronic communication from Colonel Tami Zalewski, FORSCOM Chief, Medical Operations and Command Veterinarian, to Colonel Leslie G. Huck, chapter author, November 6, 2014).

There have been both military and humanitarian benefits of veterinary personnel's work. One example of the benefit of food inspection support by the Army Veterinary Service has been the inspection and approval of locally owned bottled water plants in Afghanistan. The resulting savings have been more than 38 million dollars per year and the elimination of over 4,000 water-hauling truck trips from supply routes, thus decreasing drivers' hazard to improvised explosive devices.[112(p5)] These water plants are now part of the approved source audit program, protecting deployed service members and contributing to overall food safety.[112(p5)] Veterinary Service personnel, working directly with the governments of Afghanistan and Iraq, have also assisted in the development and improvement of food safety programs for those nations.[109,112(p5)]

Figure 1-44. Lieutenant Colonel Neil Ahle, Multinational Division-Baghdad veterinary officer, gives a lamb a dose of wormer at a veterinary operation in Al-Taraq, Iraq. The operation, conducted by Ahle and soldiers of Company C, 4th Battalion, 31st Infantry Regiment, 2nd Brigade Combat Team, 10th Mountain Division (Light Infantry), treated about 100 animals for worms and provided vaccinations and vitamin injections for the livestock that forms a critical part of the local economy.
Reproduced from the Defense Video and Imagery Distribution System. https://www.dvidshub.net/image/34693/yusufiyah-animals-benefit-visit#.VJRMC1KDA. Accessed October 23, 2017.

Supplying veterinary care to the hundreds of working dogs supporting operations has been another major function of the Army Veterinary Service. Another invaluable Veterinary Service mission more readily visible in recent years is animal care for host nation countries, usually referred to as CA or humanitarian assistance missions. During these deployments, veterinary personnel provide clinical and preventive veterinary care to livestock (Figure 1-44) and other animals of the native people of countries such as Afghanistan, Iraq, Nicaragua, Africa, and the Philippines[112(p5)] (Figure 1-45). The military not only improves the health of the animals, but also directly impacts the quality of life for the families and often the economies of these countries.[112(p5)] The Veterinary Service has also served as coordinators and facilitators for nongovernmental and private volunteer organizations.

Figure 1-45. A sedated lion at the Baghdad Zoo has blood drawn March 24, 2010, by Iraqi zoo workers as Major Matt Takara, commander of the 51st Medical Detachment Veterinary Medicine, 248th Medical Detachment Veterinary Services, observes the procedure. Takara was part of a US forces team organized by 1st Armored Division, US Division-Center, continuing a relationship started early in the Iraq campaign. Reproduced from the Defense Video and Imagery Distribution System. http://www.dvidshub.net/image/263914/iraqi-us-veterinarians-partner-help-baghdad-zoo-animals#.VK_4yclMGos. Accessed October 23, 2017.

A significant accomplishment was seen in Afghanistan during the emergence of H5N1 Highly Pathogenic Avian Influenza (HPAI) and concerns over its possible role in precipitating a pandemic; the first H5N1 outbreak in Afghanistan occurred in March 2006.[113(p41)] The US Naval Medical Research Unit No. 3 (NAMRU-3) deployed one of its Army veterinarians with a mobile polymerase chain reaction or PCR laboratory, which was able to diagnose the cause of the outbreak as H5 avian influenza.[113(p41)] However, government systems were not in place to respond, resulting in a delay of over a week while the outbreak continued to spread.[113(p41)]

Several thousand birds in the infected villages had to be culled, impacting livelihoods and also confidence in the Afghan government. The virus spread to more than six provinces in Afghanistan.[113(p41)] Over the next year, NAMRU-3 worked with the Ministry of Agriculture, Irrigation, and Livestock to establish a permanent PCR laboratory in the Central Veterinary Diagnostic and Research Laboratory in Kabul.[113(p42)] From observation and data collection, the laboratory diagnosed a H5N1 reintroduction into Afghanistan in February 2007.[113(p42)] This time, the Afghan government responded immediately once the positive results were obtained, and the H5N1 outbreaks were limited to three provinces, and only a few hundred birds had to be culled.[113(p42)] Thus, the country had achieved both a laboratory capacity and an improved responsiveness for future outbreaks through the efforts of NAMRU-3.[113(p42)]

Some other interesting observations in the Iraq and Afghanistan theaters have been documented since 2010. US installations in both Iraq and Afghanistan have authorized the opening of small restaurants, coffee shops, grocery stores, and convenience stores on the installations. The garrison command's purpose was to endorse local vendors as a means of economic stimulation for the community and to generate goodwill in the local area.[114(p1)] However, the local food establishments had problems such as the sale of unapproved food sources.[114(p1)]

Unfortunately, these sources lacked traceability; thus, if a food-borne illness were to develop, the military would be unable to work with the local government to pull the food from the market.[114(p1)] In addition, the food defense and transportation methods of the food producer were unknown; such breaches in food defense are a real threat to the military's subsistence.[114(p1)] Also, the medical screening of food vendor employees was uncertain.[114(p1)] These vendors may have received a certificate of health through a local physician; however, the quality of screening was unknown.[114(p1)] The recommendations, to decrease at least the risk of some food-borne illnesses, were to limit the products to be sold to hot tea, hot coffee, and unfilled pastries and breads.[114(p3)]

Concerning livestock and veterinary programs for Iraq in 2010, the reviews were mixed. Although there were 11,000 veterinarians in the country, most were not doing veterinary work and had little or no technical skills.[115(p11)] With 16 veterinary schools in the country, and 400 graduates per year, a surplus of veterinarians existed, yet the services they provided were minimal.[115(p11)] The Iraqi Veterinary Syndicate, similar to the American Veterinary Medical Association, was

present; there were also several national associations that were operating then to include the Iraqi Red Meats Association for cattle and sheep producers and the Iraqi Poultry Producers Association.[115(pp10-11)]

Most interestingly, developing national animal health plans was no longer considered a priority for the postwar government of Iraq.[115(p11)] Before the war, the country of Iraq had large farms and was equipped with modernized capability. However, since then that capability has greatly diminished. Though many tractors have been introduced, fuel has been a problem and is expensive.[115(p17)] Iraq needs a long-range plan that focuses on water supply, electricity, and land reclamation (one similar to the United States' reclamation plan in 1936–1944 during the Dust Bowl).[115(p17)] With the right agricultural approach, the country could have very productive areas.[115(p17)]

Finally, the threat of rabies appeared again, this time in Afghanistan in 2011. While service personnel were warned of the dangers of feral dogs within the country and many had been treated after coming into contact with the animals, one US soldier was bitten and later died from the disease.[116] The tragic death would cause increased efforts by veterinary services to educate commanders and local nationals on the dangers of stray animals and their contact with humans (Figure 1-46). (See also Chapter 12 of this textbook for more information about military veterinary efforts to educate commanders, service members, and local nationals about rabies control.)

Forward Operating Base Salerno, Afghanistan. On June 1, 2012, personnel from the 72nd Veterinary Detachment experienced an attack first-hand while stationed on Forward Operating Base Salerno in Afghanistan.[117(p1)] During lunchtime in the dining facility, insurgents detonated a vehicle-borne improvised explosive device at a nearby gate, with the shock wave causing the roof of the dining facility to collapse on those inside.[117(p1)] Veterinary personnel were inside the facility, and although they sustained minor physical injuries, they assisted others to get to safety. As they left the dining facility, they were then met by small-arms fire by insurgents wearing suicide vests; the insurgents breached the base perimeter after the initial blast.[117(p1)]

While running for cover, they assisted and treated other injured personnel. They also pulled a contract worker from a mound of rubble and administered first aid.[117(p1)] Allowing others to seek cover, one of the veterinary personnel provided suppressive fire against two of the insurgents.[117(p2)] An attacker positioned under a Humvee eventually blew himself up, ending the assault.[117(p2)] Numerous insurgents were killed during this attack, along with one US soldier and a civilian contractor.[118] Recognized for their actions during the attack were the following soldiers: Sergeant Sandra M. Castle (later Staff Sergeant) and Sergeant (later Staff Sergeant) Robert W. Blackmore III received the Army Commendation Medal with "V" (Valor) device, and Sergeant (later Staff Sergeant) Raffique Khan and Captain (now Major) Bethany A. Everett received the Bronze Star Medal with "V" device.[119,120]

Another veterinary unit serving in Afghanistan, the 64th MDVSS, had the task of conducting FWRAs, including one for a high-profile Independence Day celebration at the US Embassy in Kabul. Initially, the 64th enforced and supervised food defense and sanitation standards for events that involved the US ambassador, State Department employees, US and Afghan military dignitaries, and 1,200 Afghan citizens. On July 17, 2014, a Transition of Authority ceremony was held on Bagram Air Field, transferring the mission from the 64th MDVSS to the 72nd MDVSS.[121]

Figure 1-46. A US Army Public Health Command-produced rabies poster that relays to local nationals the dangers of not reporting unsafe contact with animals. This poster is printed in Dari, one of the predominate languages in Afghanistan. Reproduced from https://usaphcapps.amedd.army.mil/HIOShoppingCart/viewItem.aspx?id=442 and https://usaphcapps.amedd.army.mil/HIOShoppingCart/viewItem.aspx?id=510. Accessed October 23, 2017.

Role in Nation-Building. Stability and reconstruction operations in failed or failing states, like Afghanistan, are crucial to US security interests.[122(p71)] Military veterinarians have been planning and conducting animal and public health activities in support of stability operations since World War II.[123] In Afghanistan, agriculture accounts for 45 percent of the gross domestic product and serves as the main source of income for the Afghan economy; over 80 percent of the population is involved in farming, herding, or both.[124] However, the decades of war, drought, and security challenges have devastated the country's agricultural sector, and revitalization is critical to building confidence in the government and stabilizing the country.[122(p71-79)] Early engagement by veterinary teams stimulates agricultural productivity, improves animal and human health, and contributes to stabilization operations.[122(p71)] As noted before in this chapter, Army Veterinary Service personnel are frequently engaged in these operations as members of Special Operations Forces, CA units, and civil-military operations task forces.[122(pp76-77)] They work closely with the host state's military counterparts and government ministries and agencies.[122(pp76-77)]

Coalition Joint Civil-Military Operations Task Force-Kabul VCOs have worked with several of the Afghan ministries to include the Ministries of Agriculture and Animal Husbandry, Higher Education, Public Health, and Defense.[122(p77)] VCOs have coordinated with international and nongovernmental organizations on a variety of projects to improve the health of both the animal and human populations.[122(p77)] The programs included reinvigoration of the Afghan Ministry of Agriculture and Animal Husbandry's veterinary infrastructure; rebuilding the national veterinary diagnostic laboratory and the national vaccine laboratory; and working with nongovernmental organizations to build veterinary clinics to improve access and serve as veterinary training facilities.[122(pp77-78)] Other projects included rebuilding greenhouses and national animal and crop production research facilities; rebuilding the national poultry industry infrastructure; and providing supplies to regional veterinary clinics to service local populations.[122(p78)] Improvement in the state's agricultural sector hopefully can reduce the possibility of a humanitarian crisis or continuance of insurgency.[122(pp71,79)]

Veterinary personnel also frequently conduct domestic animal vaccination programs to reduce the prevalence of disease in support of host state governments. These VETCAPS, conducted in areas such as Afghanistan, Iraq, and the Horn of Africa region, have improved animal health and provided training to local livestock producers, veterinarians, and veterinary technicians.[122(p78)] Interestingly, when combined with medical and dental services in villages, often it was the veterinarian who had the most patients and the longest lines; the families cannot survive without their livestock.[122(p78)] The early deployment of veterinary assets can improve self-sufficiency for the local population, and the promotion and initiation of sustainable agricultural programs leads to overall host nation economic and social growth.[122(p79)] (Chapter 17, Veterinary Support in the Irregular Warfare Environment, highlights many other veterinary nation-building activities.)

Although significant work has been completed during global nation-building missions, there have been losses. Lieutenant Colonel Daniel E. Holland, US Army veterinarian, was killed on May 18, 2006, while serving on a CA mission in Iraq. Holland was serving with the 352nd Civil Affairs Command at the time. Holland, three other soldiers, and a civilian interpreter died when an improvised explosive device detonated near their Humvee during combat operations in Baghdad. The Lieutenant Colonel Daniel Holland Leadership Award and Lieutenant Colonel Daniel E. Holland MWD Hospital at Joint Base San Antonio-Lackland preserve his name and honor his service.

Joint Task Force Katrina, 2005. When Hurricane Katrina devastated New Orleans and much of the surrounding Gulf Coast area in the latter part of August 2005, state and federal agencies mobilized and provided assistance. The Department of Defense response was organized as Joint Task Force Katrina, and this task force was able to greatly assist and stabilize the region through logistical, medical, and organizational assistance. Because of concerns for animal care, public health, and food-related issues, the Army Veterinary Service was included in the task force.

The veterinarian serving on the task force commander's staff was Colonel Timothy K. Adams (future Brigadier General and 24th Veterinary Corps Chief, 2008–2011); the task force commander was Lieutenant General Russell Honore. After initial planning and coordination, the 248th Medical Detachment (VS) under the command of Lieutenant Colonel (later Colonel) Tami Zalewski was deployed to Louisiana as a part of the joint task force.[125] The unit would arrive with 20 members on September 27, 2005.[125] The 248th soon divided, with half of the team going to Belle Chasse Naval Air Station in New Orleans to inspect dining facilities and Class I storage locations.[125] The inspection mission would encompass more than 700,000 pounds of rations and 275,000 pounds of water.[125]

The second section of the team was stationed at Gonzales, Louisiana, where it coordinated the evacuation of all animals held at the area to other locations.[125] The animals had been staged at the 4-H Expo Center by the Humane Society and volunteers. The team at

Gonzales registered and prepared more than 1,500 animals for shipment and examined and treated over 1,100 animals.[125] Because of the team's efforts, the evacuation mission ended earlier than expected, on October 10, 2005.[125]

Camp Shelby, Mississippi, served as the forward command post for the joint task force. Because of its proximity to the affected area and infrastructure, Camp Shelby was also the staging area for numerous units and smaller task forces. The camp had thousands of personnel moving through it and received countless shipments of rations and food relief items of many types. These items included donated food from the California Growers' Association, donations from food-producing corporations, MREs from overseas storage areas or rerouted from Defense Logistics Agency depots, items from Federal Emergency Management Agency vendors, and donated German military rations.[126(p4)] All rations needed to be inspected after arrival at the installation.

Inspections of items at Camp Shelby were performed by Mobilization Center Shelby (VS). The Mobilization Center Shelby VS team consisted of four personnel with one officer, two 91R NCOs, and one contract civilian.[126(p5)] In addition to the food safety mission at the camp, additional inspection of items and facilities expanded to other parts of Mississippi affected by the hurricane and flooding.[126(pp5-6)]

Keesler Air Force Base located on the gulf at Biloxi, Mississippi, received veterinary support from several activities. In order to enact the privately owned animal NEO from the base, the Gulf Coast District Veterinary Command at Ft Rucker (Maxwell Air Force Base section) coordinated with Ft Benning's Veterinary Service branch and the Redstone Arsenal section to provide transportation, medical support, and emergency shelter.[127(p1)] Gathering the animals in convoy, the 101 animals were then treated and sorted in a triage method.[127(p2)]

As the region stabilized and floodwaters subsided, veterinary liaisons focused on long-term recovery and public health. Veterinary activities were generally successful during the operation of the joint task force, with positive interaction and coordination between the USDA, the US Public Health Service, the Humane Society, and state governments.[125]

Operation Tomodachi, Triple disaster in Japan 2011. On Friday, March 11, 2011, the largest in a series of earthquakes struck Japan near the city of Sendai. During the first event and the early hours of recovery, Japan District Veterinary Command (JDVC) located at Camp Zama and led by Lieutenant Colonel (later Colonel) Margery Hanfelt and First Sergeant Bradley Reynolds, shifted to emergency operations. Power outages and potential structural damage posed immediate food safety concerns. JDVC food inspectors called, drove, or walked (as needed, sometimes for miles) to reach all affected facility managers and to conduct refrigeration failure procedures and note potential physical damage impact to food safety.[128(p20)]

Within 24 hours of the earthquake, after initial food and animal facility assessments at Camp Zama and other American military installations at Yokosuka and Misawa were conducted, Veterinary Service branches started preparing command channel messages at their installations. The messages were for food safety during power outages and to provide continued refrigeration failure support to government food facilities.[128(p20)]

MWD kennels, stray facilities, and MWR kennels were contacted to determine physical status and address any animal injury and care issues. An increased food surveillance laboratory testing program was initiated because of increased food sanitation-related concerns. The Misawa Veterinary Service Branch and its VTF in the northern part of the island of Honshu at Misawa Air Force Base lost power, heat, and telecommunications.[128(p20)] Its personnel struggled to continue operations and remain warm for the next couple of weeks.[128(p20)]

As the tremors and aftershocks from the large earthquake decreased in magnitude but continued, another threat appeared. The earthquake had caused a vast tsunami along the east coast of Japan, which was particularly damaging to the Sendai area. Personnel from the Yokosuka Veterinary Service Branch (animal care, JDVC food inspectors, and a Navy Food Management Team noncommissioned officer) stationed on Yokosuka Naval Base had to withdraw for a short time because of fears of the tsunami, which crested 6 feet near Yokosuka versus the height of 30 feet near Sendai, approximately 100 miles to the north.[128(p20)] Breaking through a lowered coastline due to the earthquake, the waters crushed countless walls and buildings and damaged the Fukushima Daiichi nuclear power plant.

To aid in recovery efforts, search and rescue dogs from the United States, United Kingdom, and Australia needed veterinary support to be imported.[128(p20)] The strict animal import requirements of the Japanese government were met largely through the JDVC's efforts. Once in Japan, the dogs required veterinary support while completing their search and rescue missions (Figure 1-47).

The tsunami also directly and indirectly impacted Japanese commercial food plants normally audited by the JDVC.[128(p22)] Still reeling from earthquake concerns, JDVC's immediate post-tsunami actions included

Figure 1-47. Misawa, Japan (March 13, 2011). Staff Sergeant Travis Lausier, right, and Specialist Jason Hayes, both assigned to the Japan District Veterinary Command, Misawa Branch, draw blood from "Lago" while his handler, Tim Dinges, comforts him. Dinges and Lago are with Virginia Task Force 1 of the Fairfax County Fire and Rescue Department and arrived at Misawa Air Base to take part in search and rescue efforts in Sendai, Japan.
Reproduced from the Defense Video and Imagery Distribution System. http://www.dvidshub.net/image/376868/us-navy-provides-tsunami-relief#.VJRaX1KDA. Accessed October 23, 2017.

communicating with these plants and determining their physical damage, power supply, proximity to affected areas, and state of operations.

The start of the new work week on Monday, March 14, brought more challenges when the containment building for nuclear reactor Unit #3 at the Fukushima power plant exploded.[128(p21)] JDVC identified a concern in providing support to MWDs that might need preventative radiologic protection through the administration of potassium iodine or KI tablets.[128(p21)] JDVC addressed the US Forces Japan (USFJ) surgeon and worked through the US Army Public Health Command (VS) with the Department of Defense Military Working Dog Veterinary Service to determine a dosage and dosing scheme, then coordinated with the US Army Medical Department Activity, Japan, Commander to obtain the tablets and finalize the plan, in case tablets were needed.[128(p21)] Dosage and methods of dispersal were quickly discovered and relayed but not administered.[128(p21)]

VTFs at Camp Zama, Yokosuka, Yokota, and Misawa began seeing increased visitation by military dependents—steadily, then very dramatically. Dependents and DoD civilians had concerns for their safety and were voluntarily leaving after receiving health certifications for their pets. The increasing stream of people often nearly overwhelmed the staff of the VTFs. This was particularly true when official notification allowed for voluntary evacuation for dependents and their pets, and "Operation Pacific Passage" began on March 22nd.[128(p21)] This operation would involve the examination and certification of health for over 2,700 privately owned animals.[128(p21)]

Although the VTFs were faced with completing countless pet certifications and vaccinations, they succeeded through dedication and shifting personnel.[128(p21)] Supplemental personnel were primarily available food inspectors from the Yokosuka and the Camp Zama VS branches.[128(p21)] There were also volunteers standing in line, MWD handlers, and a newly arrived JDVC Animal Health Technician destined for the Sasebo VTF who had not in-processed yet.[128(pp21-22)] A surgeon in the Misawa VTF line, also wishing to help, was given a stethoscope and a crash course on animal physical exam basics and was put to work in an exam room.[128(p22)]

Although plans had previously been made for a NEO from Korea in the event of the outbreak of hostilities on the Korean Peninsula, Operation Pacific Passage from Japan served as the first real test, even though there were no hostilities. The number of spouses, dependents, nonlocal civilian employees, and their animals presented a formidable hurdle for the US military during the Japan NEO.

As military personnel and family members decided what course of action to take, a town hall meeting was called at Camp Zama. USFJ and garrison command leadership fielded questions and concerns. One issue that came up was the care of personally owned animals. Noting the extreme concern, USFJ Commander, Major General Michael T. Harrison agreed (along with fellow service commanders in Japan) that personally owned animals could be a part of the voluntary departure.[128(p23)]

This command action would ease many military personnel and dependents' minds, but also significantly increase the workload for VTFs and their staffs. Though most of the dependents and civilians opted to stay in Japan, a fair number decided to leave. Volunteers helped to bridge the gap for animal care in the manner of feeding and walking. Also, some government exchanges provided complimentary water and pet carriers. Navy personnel also assisted in movement of the pets to Narita airport near Tokyo.[128(p23)] Navy Seabees even constructed a very large pet carrier for a bull mastiff.

After 4 to 8 weeks, many of the dependents returned to Japan. Operation Pacific Homecoming, the reverse of Operation Pacific Passage, went smoothly.[128(p24)] The ease of the transition in connection to the movement of personally owned animals was largely due to JDVC's interactions with the Government of Japan. The JDVC

was able to maintain the documentation and field a variety of questions that satisfied the Government of Japan's requirements.[128(p24)]

Approximately 2 weeks after the March 11th earthquake, concerns of food procurement continued to surface. Radiologic contamination was the most notable concern, but of equal importance were refrigeration and other storage and transportation issues related to the earthquake and its aftermath.[128(p24)] Veterinary food inspection teams, previously assisting in the animal care mission, "re-tooled" to their original function (food safety) and began another phase of recovery.[128(p24)] Although the food safety inspection was a task previously assigned, it expanded greatly because of the new challenges developed by the unfolding disasters.[128(p24)]

JDVC developed and initiated a novel program for radiological surveillance. Supplemented with additional radiation meters received from the AMEDDC&S, US Army Veterinary Command, and the US Army Public Health Command, the program provided daily radiological surveillance monitoring of up to 68 different animal and food related facilities and conveyances on 14 different installations for all service branches within USFJ, with over 7,000 readings by July 2011.[128(p22)] The monitoring provided command and public assurances of no health threat to the installation level food supply from radiation.

JDVC worked with the Government of Japan to receive all testing results and with Defense Logistics Agency and the Defense Commissary Agency colleagues regarding normally exempted product origins. JDVC's food inspectors also began surveying at the installation level.[128(p22)] The result was the immediate response to USFJ and up the JDVC chain of command to provide assurances that the contaminated products had not reached USFJ installations.[128(p22)]

VETERINARY SERVICE'S RECENT AND SIGNIFICANT MILITARY AND PUBLIC CONTRIBUTIONS

A Broad Review of Current Veterinary Service's Military Missions and Research Efforts

The US Army veterinary clinical medicine officers provide veterinary care for contract working dogs, marine mammals, horses and mules, beneficiaries' pets, live tissue training animals, and laboratory animals during regular animal care missions, as well as livestock care during stability operations and irregular missions. Veterinary comparative medicine officers, laboratory animal medicine officers, veterinary pathologists, and enlisted soldiers (animal care specialists) are vital to research and development (R&D). Examples of their contributions include depleted uranium (DU) studies. (Soldiers hit by "friendly fire" have depleted uranium fragments in their bodies that cannot be safely removed; veterinary pathologists have studied laboratory animals' tissues after DU exposure to better understand the damage DU does to affected humans.[129]) (More information about DU and other studies can be found in Chapter 16, Veterinary Biomedical Science.)

Veterinary officers are also critical in researching defense strategies against chemical, biological, and nuclear attacks. Related to the Cold War, a Soviet biological weapons scientist defected to the United States and admitted Soviet offensive biological weapons programs involved weaponized anthrax and small pox. This scientist was interviewed by a team, including a VCO, Colonel (Retired) Gerald Parker, who also commanded the US Army Medical Research Institute of Infectious Diseases (USAMRIID), the military's largest infectious disease research facility.[130] (Several other VCOs were selected to command USAMRIID: Colonel David Huxsoll, Colonel David Franz, and Colonel Skvorack.)

The public has traditionally associated the military veterinarian with the mounted forces and most recently with food inspection. Few people realize that approximately 24 percent of the 526 Army veterinarians on active duty are engaged in research and development (R&D) for the military. There are 125 VCOs with AOCs 64C, 64D, and 64E assigned to R&D work (personal electronic communication from Colonel Kathleen Miller, Human Resource Command, to Colonel Leslie G. Huck, chapter author, July 17, 2014).

Recent public health threats have helped US Army veterinary personnel gain recognition, however. *The Hot Zone*, a well-known novel, highlights US military research efforts and features the individuals who used biosafety level 4 (BSL4) "space suits" to depopulate a colony of research monkeys in a civilian facility close to Washington, DC. At the time, these individuals thought the monkeys were infected with an Ebola virus that could infect humans.[131] (Another section of this chapter tells a more complete story of the military veterinarian's connection with the Ebola virus and subsequent disease research.) Ft Detrick also became a more-recognized name after it assisted the CDC with anthrax testing of suspect samples during anthrax mailing threats.[132] Veterinarians within the Biological Defense Research Program at MRMC also have been directly involved in the development of medical countermeasures against threat toxins such

as ricin. As noted earlier in this chapter, VCOs have served in lead roles in the development of a new vaccine for VEE and also Staphylococcal Enterotoxin B or SEB at the WRAIR.

Veterinary officers are assigned not only to the laboratories of the US Army Medical Research and Materiel Command (MRMC), which was formerly the US Army Medical Research and Development Command and the Materiel Development & Readiness Command, but also to several Navy locations to including Headquarters, Research & Development (Bureau of Medicine & Surgery or BUMED), Naval Medical Research Unit (NAMRU) 3 in Cairo, NAMRU in Peru, Navy Regional Medical Center (NMRC) at Forest Glen, Navy Dental Laboratory/ Tri-Service Research Laboratory, and Navy Medical Center in San Diego. In addition, VCOs are assigned to the Joint Pathology Center (JPC), formerly known as the Armed Forces Institute of Pathology, United States Army Research Institute of Environmental Medicine (USARIEM), Uniformed Services University of Health Sciences (USUHS), and Armed Forces Radiobiology Research Institute (AFRRI) at Bethesda. (AFRRI, which now falls under USUHS, formerly fell under the Defense Atomic Support Agency.[133]) Finally, Army veterinarians hold a variety of positions in biomedical research, serving as assistant or principal scientific investigators or directors of research.[133]

At USAMRIID, VCOs within the Pathology Division have brought about immunocytochemical and molecular diagnostic capabilities to identify emerging viruses in tissues. Using these methods, a team assisted in the definitive diagnosis of a case of Korean hemorrhagic fever in a soldier serving in Korea. In addition, the chief of the Applied Research Division at USAMRIID served as an expert consultant on a World Health Organization (WHO) team sent to Egypt to look into a Rift Valley fever epidemic and was responsible for the development and fielding of a new modified live vaccine for humans and livestock (personal electronic communication from Colonel [Retired] David Franz, former Deputy Chief, USAMRIID, to Lieutenant Colonel [Retired] William Inskeep II, Office of The Surgeon General, November 16, 1994).

Army VCOs have also supported biological nonproliferation efforts. Colonel (Retired) David Franz, Deputy Commander, USAMRIID served as chief inspector on three United Nations Special Commission biological warfare inspection missions to Iraq and as technical advisor on long-term monitoring. He was also a member of the first two US/UK teams visiting Russia in support of the Trilateral Joint Statement on Biological Weapons for Ukraine.[134] In addition, Colonel (Retired) Gerald Parker served in the Senior Executive Service, as the Deputy Assistant Secretary of Defense for Chemical and Biological Defense.[135] And finally, a Veterinary Corps officer, Colonel John V. Wade, served as medical chemical and biological warfare adviser to Army General Norman Schwarzkopf, Desert Storm commander during the Gulf War.[136,137]

A More Specific Review of Veterinary Service's Recent Research Efforts

Involvement in Ebolavirus Outbreaks and Contributions to the Advancement of Military Medical Ebola Virus Research

The USAMRIID at Ft Detrick, Maryland, is known for its high-hazard infectious disease research, including America's most extensive biocontainment capabilities (ie, Biosecurity Level-3 and Biosecurity Level-4, the two highest levels of biocontainment). In executing its mission to provide medical defense countermeasures against potential biowarfare agents, USAMRIID has conducted various biodefense research projects involving many high-consequence pathogens thought to pose a threat on the battlefield, including Marburg and Ebola viruses.[138] (See Chapter 15, Veterinary Pathology, for more information about USAMRIID efforts.)

In 1967, African green monkeys imported from Uganda transmitted a mysterious fatal hemorrhagic fever (25% mortality) to polio vaccine laboratory workers in Marburg, Germany, and in Yugoslavia. Eventually, the causative agent was identified as a deadly new virus, classified in the family Filoviridae, genus *Marburg*, but shortly after this discovery, the lethal virus disappeared as quickly as it had emerged.[139]

In 1976 and 1979, another filovirus called Ebolavirus emerged, causing several highly fatal outbreaks of hemorrhagic fever in humans in Zaire and Sudan, with exceedingly high mortality (60–90% mortality).[140] Unlike the 1967 Marburg outbreaks, the *Ebola Zaire* and *Ebola Sudan* strains had no known zoonotic connection. In the wake of an additional human Marburg case in South Africa in 1975 and concerned by the very real risk of introducing Marburg or other possible zoonotic diseases into the United States, the US Public Health Service instituted a mandatory 30-day quarantine for all nonhuman primate imports in 1975.[141,142]

The filoviruses disappeared back into the African bush, but the reservoir remained elusive. What follows is an account of the Ebola Reston emergence based on the personal recollections of doctors Nancy and Jerry Jaax, two retired VCOs who, along with countless other federal and military personnel, dealt with the 1989 Ebola Reston outbreak firsthand while on active duty.

Ebola Reston Outbreak, 1989. In the late fall of 1989, a shipment of cynomolgus (crab-eating) macaques imported from the Philippines arrived at a nonhuman primate quarantine facility in Reston, Virginia, that housed up to 500 monkeys. Dr Daniel Dalgaard, the consulting veterinarian, was concerned that the shipment contained an abnormally high number of dead monkeys and more that were sick and dying. Dalgaard concluded that the cause was Simian hemorrhagic fever virus, an arterivirus that is a dangerous to macaques but is not considered to be zoonotic, and sent diagnostic specimens to USAMRIID for further testing.

When the samples arrived at USAMRIID, US Army Veterinary Pathologist and Chief of the Pathology Division, Colonel Nancy Jaax, concurred that the samples were likely infected with the Simian hemorrhagic fever virus. However, in accordance with protocol, the diagnostic specimens were then sent to USAMRIID's Disease Assessment Division for virus isolation; the Pathology Division used histopathology and electron microscopy to evaluate the tissues. Surprisingly, the samples tested positive for a filovirus. Since Marburg was the only filovirus known to be associated with monkeys in natural outbreaks in 1989, Marburg was initially assumed to be the causative agent.

Subsequent electron microscopy revealed that the monkeys were co-infected with Simian hemorrhagic fever virus and a distinctive thread-like microbe pathognomonic for a filovirus. Immunogold electron microdiagnostics quickly identified the virus as positive for the Zaire strain of Ebola, not the relatively less pathogenic Marburg.

At this point, the stakes escalated considerably. The confirmation that a deadly hemorrhagic viral disease was spreading through a monkey quarantine facility in Reston, a community contiguous with Washington, DC, stunned USAMRIID and the world's infectious disease research community. In an emergency meeting, Colonel David Huxsoll, DVM, USAMRIID Commander (and the first Veterinary Corps Commander of USAMRIID); Colonel CJ Peters, MD, Chief, Disease Assessment Division; Dr Peter Jahrling, PhD, Disease Assessment Division; Colonel Nancy Jaax; and Dr Tom Geisbert, microbiologist and electron microscopist, presented the startling diagnostic evidence to Major General Phillip Russell, MD, Commander of the US Army's Medical Research and Development Command. Russell, a highly respected tropical medicine researcher, immediately consulted with other infectious and tropical disease experts, including those from the DoD, Centers for Disease Control and Prevention (CDC), WHO, and public health departments of Maryland and Virginia. Prominent filovirus experts Fred Murphy, DVM, PhD; Joe McCormick, MD; and Carl Johnson, MD, were at the CDC at the time. All of the experts concluded that a dangerous public health emergency existed and that an extraordinary and unprecedented response effort was needed.

In the chaotic hours and days that followed, there were more questions than answers:

- Ebola was an African virus, so why were monkeys from Asia affected?
- Ebola had never been reported in wild monkeys, so why was it was killing previously wild macaques shipped to Reston?
- How many humans might have been infected as the monkeys were imported?
- How quickly could it spread to the surrounding community?
- What should be done to respond and contain the outbreak, and who would and could do it?

Finding answers to these questions, especially those involving response capabilities, took teamwork. In late 1989, there was no established national plan or infrastructure to respond to a dangerous emerging disease outbreak like Ebola, and no single organization had the designated mission or specialized training and equipment needed to handle this unanticipated outbreak. However, since the CDC typically handled public health concerns, the CDC was tasked to take the lead for the complex public health response to the outbreak. USAMRIID's Veterinary Medicine Division (VMD) was tasked with mounting an emergency response to the contaminated quarantine facility in Reston and the Ebola-infected animals. Even though USAMRIID had no deployment or field mission or equipment, the VMD had a contingent of experienced laboratory animal medicine veterinarians and animal care personnel.

Once preliminary planning was complete, Colonel Jerry Jaax, DVM, chief of the VMD, led a USAMRIID emergency response team (consisting of US Army veterinarians and animal care technicians with training and experience working with monkeys in biocontainment) to the Reston facility. VMD veterinarians (Major Mark Haines, Major Steve Denny, and Major Nate Powell); Army Veterinary Service animal technicians (led by Sergeant First Class Tom Amen and Sergeant Curtis Klages); and VMD animal caretakers (led by Bill Gibson and Merle Gibson) implemented the emergency operational plans and safety protocols devised for the Ebola-infected animals and premises.

As with any complex undertaking, the various military and federal agencies faced many challenges during the collaborated response:

- The USAMRIID emergency response team's daily travel between USAMRIID in Frederick, Maryland, and the outbreak site in Reston, Virginia, was problematic because a growing number of civilians traveling or residing in this metropolitan area believed the response team members might transmit disease from the biocontainment site to the general public. Controlling mounting fears in this highly populated area with extreme traffic congestion required coordinated and constant communication among public health officials from DoD, CDC, and local health departments.
- At this time, Ebola field management was completely unknown, except to a few infectious disease experts in Africa, Europe, the USAMRIID, the Soviet Union, and the CDC.
- Many of the VMD team had limited to no experience in "space suit" work (one nickname used to describe the protective gear worn when handling deadly pathogens). Facility operations had to be carefully monitored and personnel duly prepared to ensure that the safety of the VMD team was not compromised, especially given the scope and emergency nature of the team's work.
- The Reston quarantine facility's heating, ventilation, and air conditioning unit malfunctioned early in the operation. This malfunction caused ambient temperatures to rise to 90 degrees and above, creating extremely harsh working conditions for VMD personnel who had to wear full-body personal protective equipment (ie, the "space suits") while performing high-risk activities in contaminated premises.
- Infected animals were removed from the Reston quarantine facility for eventual necropsy at USAMRIID. However, about 40 percent of the monkeys were not housed in squeeze cages. (A squeeze cage is equipped with a mechanism that allows a caretaker to move the back of the cage to the front thereby "squeezing" the cage-housed animal [eg, monkey] for safe restraint and manipulation [eg, moving or administering an intramuscular vaccination] without causing harm to the animal or human.) The absence of squeeze cages eliminated the best and safest options for catching monkeys in cages, necessitating the innovative use of u-shaped padded poles and 3-foot long pole syringes to anesthetize the monkeys. Predictably, a monkey escaped in one of the animal rooms. Although there was never any concern that the animal could get out of the room or the biocontainment facility, catching an unrestrained monkey in a contaminated room, with limited capture options, in restrictive personal protective equipment, was an arduous task and posed serious safety concerns to the animals and the humans in the room.
- VMD veterinarians performed postmortem examinations and target tissue collection on all of the euthanized monkeys. Handling of sharps equipment, necessary to conduct the necropsies, was particularly risky because Ebola is primarily transmitted through contact with infected blood and bodily fluids. Infected sharps could easily cut through most protective gear as well as wound any unprotected or exposed body parts.

Once the building was depopulated, decontamination of the infected premises commenced. VMD and safety teams systematically used paraformaldehyde gas and other disinfectants throughout the whole facility, so there was no chance that the Ebola virus could escape. The Reston quarantine facility was successfully depopulated and decontaminated in just over 1 week.

Eventually, USAMRIID scientists discovered that a completely new Ebola virus species, Ebola Reston, had emerged—not the Ebola Zaire species (the causative agent for the 2013 West Africa Ebola outbreak). Fortunately, Ebola Reston virus was found to be nonpathogenic to humans; although this virus infected several quarantine facilities animal workers, its infection resulted in seroconversion (ie, development of anti-Ebola virus antibodies) but no clinical disease. Despite the prolonged and intensive activities by dozens of USAMRIID personnel in the Reston quarantine facility, not one USAMRIID-associated person seroconverted secondary to Ebola exposure. These clinical data strongly validated the success and effectiveness of the emergency procedures and operations carried out by the USAMRIID response teams.

In the end, the first Ebola virus outbreak in the United States was successfully eradicated. The USAMRIID emergency response to the 1989 Ebola Reston outbreak, spearheaded by a team of Army Veterinary Service personnel, remains a historical case template for emerging or intentional infectious disease threats and has been an important lessons learned application for DoD's medical and logistical response to the virulent Ebola Zaire epidemic that began ravaging portions of West Africa in late 2013. (The Acknowledgments section at the chapter's end further explains

the way a contemporary author recognized the work of the US Army Veterinary Service during the Ebola Reston outbreak.)

In the interim between the 1989 Ebola Reston outbreak and devastating 2013 Ebola Zaire virus outbreak, there were multiple smaller Ebola (and Marburg) outbreaks in Africa.[143] International research teams, coordinated by the WHO, have historically been involved with efforts to identify the elusive reservoir of Ebola. Supporting such efforts and lending Ebola-subject matter expertise, Army Veterinary Corps personnel deployed to the Ivory Coast (Major Neal Woollen, DVM, PhD, and Major Keith Steele, DVM, PhD) and Kikwit, Democratic Republic of the Congo (Major Woollen only) as part of the WHO-led international teams.

Ebola Zaire Virus Outbreak in West Africa and Operation United Assistance, 2013. In December 2013, an Ebola virus disease (EVD) epidemic began in the West African country of Guinea. On March 23, 2014, the rapidly evolving EVD outbreak was officially reported to the WHO.[144] On August 8, 2014, with rapid spread to four other countries in West Africa (Liberia, Nigeria, Senegal, and Sierra Leone), the WHO declared the epidemic to be a "public health emergency of international concern" because in terms of morbidity and mortality, it was larger than all previous EVD outbreaks combined.[145(p1481)] Despite multinational and international efforts to the control the spread of infection, reported EVD cases and deaths continued to grow from week to week.

Because EVD was becoming a threat to both national and global security, on September 16, 2014, President Barack Obama announced two major expansions of US efforts to halt spread of the deadly disease: (1) he mandated a regional joint forces command and control center be established in Liberia's capital, Monrovia, and (2) he deployed 3,000 US troops to West Africa.[146] Aptly named Operation United Assistance (OUA), US Africa Command, through US Army Africa, provided coordination of logistics, training, and engineering to the US Agency for International Development to assist in the overall US government foreign humanitarian assistance and disaster relief efforts to contain the spread of the EVD outbreak, as part of the international assistance effort supporting the governments of Liberia, Sierra Leone, and Guinea.[147,148]

US Army Veterinary Service personnel were highly concerned regarding the deployment of US service members (and potentially MWDs) into Ebola outbreak areas, their redeployment, and subsequent integration with family members and privately owned animals (ie, pets). Despite first being identified in 1976, Ebola virus remains an elusive and dynamic disease in humans, and more so in animals, both domestic and wildlife. Therefore, US Army Veterinary Services personnel were involved in tactical, operational, and strategic medical planning, coordination, and implementation across the full spectrum of veterinary operations (including, but not limited to, food protection and defense, veterinary public health, medical research and development, and global health engagement) not only in West Africa, but also in the United States, in the event the fatal disease made it to the homeland.

US Army veterinarians with advanced postdoctoral training in comparative medicine, pathology, and laboratory medicine have historically applied their disciplines as primary researchers or in direct support of the development of medical countermeasures and therapeutics against diseases of significant military medical relevance such as Ebola and Marburg viruses. In support of Operation United Assistance and the humanitarian assistance efforts in West Africa, US Army veterinarians within military medical research and development not only continued to provide such support, but also accelerated their efforts during the EVD outbreak in West Africa.

Similarly trained Army veterinarians in positions outside of "traditional" military medical research also actively contributed to efforts in West Africa and the military health and national public health response. Specifically, the interagency relationships (eg, the USDA, Department of Health and Human Services, and Department of State) developed and fostered through Defense Health Agency (DHA) Veterinary Service's active participation in the Foreign Animal Disease Threat Interagency Working Group (supporting the Committee on Homeland and National Security, in the White House's Office of Science and Technology Policy) were instrumental in the early response to the Ebola epidemic. Such early and sustained communication and coordination between DHA Veterinary Service and interagency partners ensured that the Army Veterinary Service stayed abreast of national and international efforts to control the epidemic.

Additionally, shortly following President Obama's expansion of US efforts to curb EVD expansion, the AVMA and CDC established the AVMA Ebola Companion Animal Response Plan Working Group, in which DHA Veterinary Service became a lead participant, mainly because of concerns about deploying MWDs into Ebola outbreak areas and their subsequent redeployment.

Equally concerning was the idea that a redeployed service member infected with Ebola virus while supporting efforts in Ebola outbreak areas could potentially transmit the virus to the family pet following redeployment. Such a scenario—although deemed highly unlikely because of the strict protocols and

procedures in place following the redeployment of service members (including a mandatory 21-day enhanced medical monitoring period on designated military installations)—might not be impossible.[149] The paucity of scientific literature on Ebola virus in companion animals (specifically dogs and cats), relative to virus shedding, length of virus shedding (if shedding does occur), or potential for carrier status to develop in asymptomatic companion animals, fueled such doubts.

As part of the AVMA interagency working group, subject matter experts representing multiple agencies and organizations, including DHA Veterinary Service, co-authored landmark EVD documents establishing baseline guidance for federal and state animal and human health officials who are confronted with an animal exposed to a human with confirmed EVD.[150,151] In concert with the guidance, DHA Veterinary Service also developed multiple information papers and implementation guidelines providing veterinary-specific recommendations and guidance to the Joint Staff Surgeon's office and US Africa Command, which were also widely disseminated to installation-level veterinary, preventive medicine, and public health personnel.[152,153,154]

A Confirmed Human Ebola Case in Texas and Army Veterinary Service Involvement. As a recognized force health protection asset, MWDs deploy in support of most military operations. The possibility of MWDs deploying in support of Operation United Assistance was no exception. Prior to the EVD outbreak in West Africa, there was no recognized diagnostic screening test for Ebola in dogs, a known circumstance that would create an operational gap in the event MWDs were deployed. (Previously, USAMRIID had developed a polymerase chain reaction assay for the detection of Ebola virus ribonucleic acid or RNA in humans. Although this assay was used by the DoD for Ebola virus detection in humans [under the Department of Health and Human Services-FDA's Emergency Use Authorization protocol], whether or not such a test could be used in dogs or if the limit of virus detection in dogs was the same [or similar] as in humans remained unknown[155]).

Through collection of blood samples from naïve MWDs at Ft Belvoir, Virginia, and coordinated efforts between DHA Veterinary Service and USAMRIID, USAMRIID's Special Pathogens Laboratory determined, for the first time, that the assay used for detection of Ebola virus RNA in human blood samples could detect Ebola virus RNA in canine blood samples at equivalent levels of detection. Similar results were produced via evaluation of canine urine and stool samples (personal written communication, then-Lieutenant Colonel Derron A. Alves, DHA Veterinary Service, Falls Church, Virginia, October 1, 2014, chapter author).

During this testing and evaluation process, Nina Pham, a 26-year-old nurse in Dallas, Texas, was diagnosed with EVD, after taking care of the first Ebola patient diagnosed on US soil.[156] Though Pham was transferred to the National Institutes of Health in Bethesda, Maryland, for treatment, her pet Cavalier King Charles spaniel dog "Bentley" remained in a quarantine at a Dallas decommissioned naval air base; the pet's future was uncertain. The CDC in Atlanta, Georgia, aware of the confirmation diagnostic testing in MWDs conducted at USAMRIID, contacted Lieutenant Colonel Derron A. Alves, an Army veterinary pathologist, to determine USAMRIID's interest in screening blood, urine, and feces that would be collected from Bentley for the Ebola virus.

USAMRIID's concurrence led to a collaborative effort among DHA Veterinary Service, USAMRIID, the CDC, and Texas local and state veterinary and public health authorities for the collection, submission, and testing of samples at two different time points while Bentley was quarantined. At both time points, blood, feces, and urine were negative for Ebola virus, and the dog was released to be reunited with the recovered owner, Pham, after completing the 21-day quarantine. This case clearly shows how the Army Veterinary Service, through its established and continued working relationships within military medical research not only advanced operational military veterinary medicine, but also contributed greatly to the larger veterinary and public health community. Without such collaboration, a healthy animal might have been unnecessarily euthanized, and a dutiful healthcare worker might be needlessly grieving the loss of a beloved companion animal.

The Veterinary Service's Impact Beyond Department of Defense Missions

US Army VCOs also impact the DoD and global populations in many other significant ways. VCOs are involved in food protection (food safety and defense) services, disease surveillance, epidemiology, zoonotic disease control, Special Forces, CA, stability operations, nation-building, and Veterinary Laboratory Services (such as rabies testing). In fact, recent national and global events have both refined the Veterinary Service's older missions and expanded its role into new avenues.[138(p8)] The Army Veterinary Service provides animal care to the Secret Service, Transportation Security Administration (TSA), and Border Patrol. In addition, it provides food inspection support to the Antarctica missions of the National Science Foundation.

Army veterinarians have also served as liaisons to numerous activities in support of Homeland Defense.[138(p9)] These include a public health veterinarian assigned to the Northern Command Surgeon's Staff; DoD Liaison to the USDA; support to the US Joint Forces Commands Joint Task Force-Civil Support; participation in the White House working groups on agroterrorism; and work with the Government Coordinating Council, comprised of federal, state, tribal, and local governmental agencies responsible for many types of activities, including agricultural, food, veterinary, public health, laboratory, and law enforcement programs.[138(p9)]

Finally, veterinary teams have served at events such as the 2002 Olympic Games in Salt Lake City, the opening of the United Nations General Assembly, Republican and Democratic national conventions, the G-8 Summit, presidential inaugurals and funerals, and other activities as part of the Veterinary Service's defense support to civil authorities.[138(p9)]

SUMMARY

US Army Veterinary Service has a rich history of accomplishment that officially dates back to 1916 and unofficially starts with the dawn of the American Army. It is interesting to note how the Veterinary Service began and how it has changed over time. The Army recognized the need for and utilized veterinary medicine long before most other US government agencies. Through the publication of this chapter, it is hoped that by understanding the past, Americans can better understand where they are today and have a better appreciation for what the Veterinary Service does, not only for the Army, but for the Department of Defense and beyond. Brigadier General Raymond Kelser perhaps stated it best:

> The field of the medical sciences covers a broad expanse. Many of the problems and difficulties of one branch are likewise those of another branch. The accomplishments of one often shed light on questions of the other. Thus, as research in the realm of human medicine has contributed to the welfare of our lower animals, so has research in the field of veterinary science contributed to the welfare of mankind. This is as it should be, and I am certain that the closer the alliance the greater will be the benefits to both.[157(p330)]

Acknowledgments

In 1994, author Richard Preston made a powerful contribution to the cause of public health and infectious disease awareness when he published his number one *New York Times* bestseller *The Hot Zone*, which detailed the *Ebola Reston* outbreak. The Army Medical Department and the Veterinary Corps owe Preston a special debt for the way he showcased the significant roles and contributions of USAMRIID, Army biomedical research, and uniformed veterinarians in public and human health. Preston went on to write other successful books focused on infectious disease and biowarfare topics, but this chapter's authors feel none captured the public's imagination like *The Hot Zone*.

While not directly quoted, Brigadier General (Retired) Charles V. L. Elia and Brigadier General (Retired) Thomas G. Murnane, 15th and 16th chiefs, respectively, of the US Army Veterinary Corps, were instrumental in preserving and presenting much of the history of the Veterinary Corps. Their first-hand knowledge and experiences were of great benefit in the writing of this chapter. The AMEDD Center of History and Heritage's Archives and record collection maintained by Ms. Mary Hope and Mr. Carlos Alvarado were also of great assistance in historical research.

Special thanks should also be given to Brigadier General (Retired) John L. Poppe for envisioning this Textbook of Military Veterinary Services and to both Poppe and the current Veterinary Corps Chief, Brigadier General Eric H. Torring III, for helping to keep this vision alive until its final publication.

REFERENCES

1. Miller EB. *United States Army Veterinary Service in World War II*. Washington, DC: Office of The Surgeon General, Department of the Army; 1961. http://history.amedd.army.mil/booksdocs/wwii/vetservicewwii/default.htm. Accessed January 14, 2014.

2. Merillat LA, Campbell DM. *Veterinary Military History of the United States.* Vol. 1. Kansas City, MO: Haver-Glover Laboratories; 1935.

3. Miller EB. Veterinary-farriery services in the Continental Army April 1775-1777. *J Am Vet Med] Assoc*. 1976;169:111. Army Medical Department Center of History and Heritage, Archival Repository, Joint Base San Antonio-Ft Sam Houston, TX.

4. Orders to Lieutenant Colonel Elisha Sheldon, December 16, 1776. In Philander D ed. *The Papers of George Washington, Revolutionary War Series*, Vol. 7, 21 October 1776–5 January 1777. Charlottesville, VA: University Press of Virginia; 1997: 357–359.

5. US War Department. *Report of the Secretary of War, Communicating the Report of Captain George B. McClellan (First Regiment United States Cavalry), One of the Officers Sent to the Seat of War in Europe, in 1855 and 1856.* Washington, DC: AOP Nicholson, Printer; 1857. Senate. https://archive.org/stream/reportofsecretar1857unit/reportofsecretar1857unit_djvu.txt. Accessed January 30, 2017.

6. Society of the Military Horse. The McClellan military saddle. http://www.militaryhorse.org/studies/mcclellan/. Accessed May 18, 2014.

7. Gray JS. Veterinary service on Custer's last campaign. *Kansas Hist Q*. 1977;43(3):249–263.

8. Miller EB. A veterinarian's notes on the Civil War. Paper prepared for 3rd Formal Meeting of the American Veterinary Historical Society; July 22, 1980; Washington, DC. Army Medical Department Center of History and Heritage, Archival Repository, Joint Base San Antonio-Ft Sam Houston, TX.

9. Cotner JR. America's Civil War: horses and field artillery. http://www.historynet.com/civil-war-cannon. Accessed March 14, 2016.

10. Steward MJ. Too little, too late, the Veterinary Service of the Civil War. *Modern Veterinary Pract*. 1983;Nov:894–895.

11. Civil War Trust. Civil War casualties. http://www.civilwar.org/education/civil-war-casualties.html. Accessed June 13, 2014.

12. Hayter EW. Livestock doctors, 1850-1890. *Wisconsin Magazine of History*. 1960. XLIII(3):171-173. http://content.wisconsinhistory.org/cdm/search/collection/wmh/searchterm/livestock%20doctors/field/all/mode/all/conn/and/cosuppress/0. Accessed February 6, 2017.

13. General Orders and Circulars. Adjutant General's Office 1889. Google Books. https://books.google.com/books?id=8ywtAAAAIAAJ&pg=RA3-PA12-IA3&lpg=RA3-PA12-IA3&dq=General+Orders+19,+February+20,+1889&source=bl&ots=NEhxXPPBOR&sig=1Bj6BvoG3B3yEPCHJT4unYIUtVc&hl=en&sa=X&ei=OO3HVJ7BGoK9ggSgv4DoDA&ved=0CCMQ6AEwAQ#v=onepage&q=Veterinary&f=false. Pages 3,9. Accessed January 27, 2015.

14. Salmon DE. *Rules and Regulations Governing the Operations of the Bureau of Animal Industry; Also the Acts of Congress Under Which They Are Made.* Washington, DC: US Department of Agriculture, Bureau of Animal Industry; 1895. Bulletin No. 9.

15. *Report of the Commission Appointed by the President to Investigate the Conduct of the War Department in the War With Spain*. Washington, DC: Government Printing Office; February 9, 1899.

16. Derstine HW. *Military Food Inspection: Its History and Its Effect on Readiness*. Carlisle Barracks, PA: US Army War College; 1991. United States Army War College Military Studies Paper.

17. US Department of Agriculture, Food Safety and Inspection Service. Celebrating 100 years of the Federal Meat Inspection Act. https://www.fsis.usda.gov/wps/wcm/connect/fsis-content/fsis-questionable-content/celebrating-100-years-of-fmia/overview/ct_index. Accessed March 14, 2014.

18. Gillett MC. *The Army Medical Department, 1917–1941.* Washington, DC: US Army Center of Military History; 2009. CMH Pub 10-8.

19. Lytle GA. The United States Army meat supply. *J Am Vet Med Assoc.* 1920;10(57):165-175. https://books.google.com/books?id=zpk_AQAAMAAJ&pg=PA165&lpg=PA165&dq=Lytle+The+United+States+Army+meat+supply&source=bl&ots=MAMMYXBxgw&sig=o5xe3pHvRYJ_6YnTBi44th51POM&hl=en&sa=X&ved=0ahUKEwiFp4Xe8OzRAhVpqlQKHVvhAygQ6AEIIjAB#v=onepage&q=Lytle%20The%20United%20States%20Army%20meat%20supply&f=false. Accessed January 30, 2017.

20. Ireland MW, Lynch C, Weed FW, McAfee L. Excerpt from *The Medical Department of the United States Army in The World War*. Vol. 1. Washington, DC: Government Printing Office; 1923. http://history.amedd.army.mil/booksdocs/wwi/VetDivWWI.htm. Accessed February 1, 2016.

21. Merillat LA, Campbell DM. *Veterinary Military History of the United States.* Vol. 2. Kansas City, MO: Haver-Glover Laboratories; 1935.

22. Casualties World War Veterinary Corps AEF. *Veterinary Bull*. 1920;1(4):1.

23. Hemenway FV. *History of the Third Division, United States Army in the World War for the Period December 1, 1917, to January 1, 1919.* Andernach-on-the-Rhine, Germany: M. Dumont Schauberg; 1919.

24. Clark WHH. *The History of the United States Army Veterinary Corps in Vietnam, 1962–1973.* Roswell, VA: WH Wolfe Associates; 1991.

25. Shope RE. *Raymond Alexander Kelser, 1892–1952*. Washington, DC: National Academy of Sciences; 1954.

26. Service of the American Expeditionary Forces, Siberia. In: *Report of The Surgeon General of the Army 1920*. Washington, DC: US Army Veterinary Division; 1920: 323–324.

27. Dethloff HC, Dyal DH. *A Special Kind of Doctor: A History of Veterinary Medicine in Texas.* College Station, TX: Texas A&M University Press; 1991:88. https://books.google.com/books?id=YiVaePJT6UUC&printsec=frontcover&dq=A+Special+Kind+of+Doctor:+A+History+of+Veterinary+Medicine+in+Texas&hl=en&sa=X&ved=0ahUKEwjzkJa6qerRAhXlyVQKHRcGB0UQ6AEIGjAA#v=onepage&q=aerospace&f=false. Accessed January 30, 2017.

28. Special Study of Eighth Army Veterinary Service. Prepared by 10th Information and Historical Service, Headquarters Eighth Army. 1948. Army Medical Department Center of History and Heritage, Archival Repository, Joint Base San Antonio-Ft Sam Houston, TX.

29. Clark WHH. History of the US Army Veterinary Corps during the Korean conflict. Office Files Collection. 1998.34.75. Army Medical Department Center of History and Heritage, Archival Repository, Joint Base San Antonio-Ft Sam Houston, TX.

30. Annual Report of Medical Service Activities, Medical Section, General Headquarters, Far East Command; January–December 1951. Army Medical Department Center of History and Heritage, Archival Repository, Joint Base San Antonio-Ft Sam Houston, TX.

31. Eighth Army Surgeon Report of Activities. Section VI, Veterinary Service. 1951. Army Medical Department Center of History and Heritage, Archival Repository, Joint Base San Antonio-Ft Sam Houston, TX.

32. Fickbohm R, Granger SF. *Cold Noses, Brave Hearts: Dogs and Men of the 26th Infantry Scout Dog Platoon*. Bloomington, IN: Xlibris Corporation; 2011.

33. Brown D. Squad of war dogs new on recon duty. *Pacific Stars and Stripes*. September 4, 1951:10.

34. 3d, 25th Division Yanks get Silver Stars for valor. *Pacific Stars and Stripes*. February 4, 1953:7.

35. Eighth Army Public Information Office. Airborne dogs. *Pacific Stars and Stripes*. February 12, 1954:9.

36. Even Jackass knows Communists licked. *Pacific Stars and Stripes*. July 15, 1952:7.

37. Towles D. Parachuting Bear compiles heroic record with the 187th Airborne RCT. *Pacific Stars and Stripes.* April 8, 1954:7.

38. Vogel LP. *History of the United States Army Veterinary Detachment Europe 1945–1993.* Army Medical Department Center of History and Heritage, Archival Repository, Joint Base San Antonio-Ft Sam Houston, TX.

39. Mraz S. Dog center to replace 51st Veterinary Clinic. *Stars and Stripes*. May 8, 2008. https://www.stripes.com/news/dog-center-to-replace-51st-veterinary-clinic-1.78587. Accessed January 26, 2017.

40. Benson JH. The military veterinarian's laboratory in Europe. *Med Bull US Army Europe*. 1965;22(6):227.

41. Fechner WW. Veterinary activities of the 9th Hospital Center. *Med Bull US Army Europe*. 1965;22(6):223.

42. Henry RS. *The Armed Forces Institute of Pathology: Its First Century 1862–1962*. Washington, DC: Department of the Army, Office of The Surgeon General; 1964:385.

43. Engelman RC, Joy RJT. *Two Hundred Years of Military Medicine*. Ft Detrick, MD: US Army Medical Department Historical Unit; 1975: 35.

44. Israeloff J. Ed. Gochenour WS Jr., VC. *Newsletter of the US Army Med Dep*. April 1971:17.

45. National Archives and Records. WWII prisoners of the Japanese data files. https://aad.archives.gov/aad/series-description.jsp?s=644. Accessed September 2, 2014.

46. Military veterinarians ordered to find new jobs or quit forces. *European Stars and Stripes.* May 22, 1956:7.

47. Leighton RM. *Strategy, Money, and the New Look, 1953–1956*. Washington, DC: Secretary of Defense History Office; 2001: 624–630.

48. Annual Report of Medical Service Activities, Medical Field Service School. 1952. Army Medical Department Center of History and Heritage, Archival Repository, Joint Base San Antonio-Ft Sam Houston, TX.

49. Manguso J. *Images of America, Fort Sam Houston.* Charleston, SC: Arcadia Publishing; 2012: 56,70.

50. Trevino GS. *From Pescadito to the Pentagon*. San Antonio, TX: Lobo Creek Publishers; 2010: 92–94.

51. Annual Report of Army Medical Service School Activities, 1955:21. http://stimson.contentdm.oclc.org/cdm/singleitem/collection/p16379coll4/id/3/rec/1. Accessed January 26, 2017.

52. Dr Robert Via, Brigadier General (Retired), interview by Nolan A. Watson. April 2013. Oral History Collection. 2010.8.3.873 Army Medical Department Center of History and Heritage, Joint Base San Antonio-Ft Sam Houston, TX.

53. Find a Grave. Jack Patrick Blake. https://www.findagrave.com/cgi-bin/fg.cgi?page=gr&GRid=66668260. Accessed September 13, 2017.

54. Vietnam Veterans Memorial Fund. Virtual Vietnam Veterans Wall-of-Faces. http://www.vvmf.org/wall-of-faces/. Accessed July 21, 2014.

55. Clark WHH. Fight for survival: The administrative history of the United States Army Veterinary Corps, 1971–1983. Veterinary Corps Collection. 2010.10.4.18. Army Medical Department Center of History and Heritage, Archival Repository, Joint Base San Antonio-Ft Sam Houston, TX.

56. Report to the Congress. Need to Reassess Food Inspection Roles of Federal Organizations. Comptroller General of the United States; June 30, 1970. http://www.gao.gov/assets/80/79388.pdf. Accessed January 30, 2017.

57. General Order No. 8. Department of the Army, Office of the Surgeon General. Reassignment of Organization/Unit Office of the Surgeon General. January 19, 1973. 2010.10.4.211. Army Medical Department Center of History and Heritage, Archival Repository, Joint Base San Antonio-Ft Sam Houston, TX.

58. *Army Medical Department Activities Report*. Ft Sam Houston, TX: Department of the Army, Academy of Health Sciences; 1974:5. http://stimson.contentdm.oclc.org/cdm/singleitem/collection/p16379coll4/id/22/rec/1. Accessed January 30, 2017.

59. DA Historical Summary for FY 1979; October 17, 1979:105. http://www.history.army.mil/books/DAHSUM/1979/ch07.htm. Accessed January 30, 2017.

60. Letter from Senator Strom Thurmond to Senator Warren G. Magnuson, September 26, 1979; United States Senate, Committee on Armed Services, Washington, DC. 2010.10.4.275. Army Medical Department Center of History and Heritage, Archival Repository, Joint Base San Antonio-Ft Sam Houston, TX.

61. Murnane TG. *The House and Senate Appropriations Report*. Memorandum for Acting Assistant Secretary of the Army (Manpower and Reserve Affairs). Washington, DC: Department of the Army, Office of the Surgeon General; January 8, 1980:1. 2010.10.4.272. Army Medical Department Center of History and Heritage, Archival Repository, Joint Base San Antonio-Ft Sam Houston, TX.

62. Zehmer R, Dean P, Sudia W, Calisher C, Sather G, Parker R. Venezuelan Equine Encephalitis epidemic in Texas, 1971. *Health Serv Rep*. 1974;89(3):278–282.

63. Public Law 95-114, 95th Congress. 303 Special Pay Veterinarians. http://uscode.house.gov/statutes/pl/95/114.pdf. Accessed January 26, 2017.

64. National Defense Authorization Act for Fiscal Year 2000; Public Law 106-65, 113 Stat 512 (1999).

65. Woman veterinarian promoted. *J Am Vet Med Assoc*. 1948;112(854):427.

66. Riordan PJ. *Report of Army Medical Department Activities of the US Army Medical Field Service School*. Ft Sam Houston, TX: Army Medical Department; 1970.

67. Lady veterinarian cares for horses. *HSC Mercury*. 1975;3(2):6. http://stimson.contentdm.oclc.org/cdm/singleitem/collection/p16379coll1/id/5942/rec/1. Accessed January 30, 2017.

68. Report, FY 1984 Strength Management Objectives. DASG-PTH. July 1, 1983. 1998.34.49. Army Medical Department Center of History and Heritage, Archival Repository, Joint Base San Antonio-Ft Sam Houston, TX .

69. Army trains WO food inspectors. *HSC Mercury*.1981;9(1):1. http://stimson.contentdm.oclc.org/cdm/singleitem/collection/p16379coll1/id/5871/rec/69. Accessed January 30, 2017.

70. Interview of Army Veterinary Corps chiefs by Nolan A. Watson [videotape]. June 2, 2015. Army Medical Department Center of History and Heritage, Archival Repository, Joint Base San Antonio-Ft Sam Houston, TX .

71. Raines EF. *The Rucksack War: US Army Operational Logistics in Grenada, 1983*. Washington, DC: US Army Center of Military History; 2010.

72. Letter from Major TJ Callahan to Colonel WK Kerr. Subject: Army Vet Corps in Action–Grenada. 248th Medical Detachment (Veterinary Service) Ft Bragg, NC. 1984. 2010.10.4.214 Army Medical Department Center of History and Heritage, Archival Repository, Joint Base San Antonio-Ft Sam Houston, TX.

73. Rumbaugh JR. *Urgent Fury Interim After Action Report-Chronology*. Fort Bragg, North Carolina, Department of the Army, Headquarters XVIII Airborne Corps; 1984. Army Medical Department Center of History and Heritage, Archival Repository, Joint Base San Antonio-Ft Sam Houston, TX.

74. Barck JC. Letter to the Bundesministerium. Headquarters United States European Command, Office of the Veterinary Service. Heidelberg, Germany. March 6, 1990. Army Medical Department Center of History and Heritage, Archival Repository, Joint Base San Antonio-Ft Sam Houston, TX.

75. Information Paper, DASG-VC. July 18, 1989; Hormone Testing Beef Supply in Europe. LTC Howard C. Johnson. Army Medical Department Center of History and Heritage, Archival Repository, Joint Base San Antonio-Ft Sam Houston, TX.

76. Severin SR. Bovine spongiform encephalopathy (BSE) and DOD procurement of European beef. Information paper, Department of Defense Veterinary Service Activity, Washington, DC. March 6, 2000. Scott Severin Files. 2010.11.50. Army Medical Department Center of History and Heritage, Archival Repository, Joint Base San Antonio-Ft Sam Houston, TX.

77. Dr Paul L. Barrows, Colonel, US Army Veterinary Corps (Retired), interview by Dr John T. Greenwood, US Army Medical Department, Office of Medical History. April 15, 1999. Oral History Collection, box 6. 2010.8.3.64. Army Medical Department Center of History and Heritage, Archival Repository, Joint Base San Antonio-Ft Sam Houston, TX.

78. Dr John S. Fournier, Colonel, US Army Veterinary Corps (Retired), interview by Nolan A. Watson, US Army Medical Department, Office of Medical History. April 14, 2013. Oral History Collection. 2010.8.3.874. Army Medical Department Center of History and Heritage, Archival Repository, Joint Base San Antonio-Ft Sam Houston, TX.

79. Severin SR. Presentation notes from Armed Forces Epidemiological Board on Bovine Spongiform Encephalopathy; Scott Severin Electronic Files. 2010.11.50. Army Medical Department Center of History and Heritage, Archival Repository, Joint Base San Antonio-Ft Sam Houston, TX.

80. Challenges and issues in food safety [Power Point presentation for the American Veterinary Medical Association's National Convention by Colonel (Retired) Scott R. Severin, US Army Veterinary Corps]. Scott Severin Electronic Files. 2010.11.50. Army Medical Department Center of History and Heritage, Archival Repository, Joint Base San Antonio-Ft Sam Houston, TX.

81. Severin SR. Executive summary [concerning Bovine Spongiform Encephalopathy]. Washington, DC, December 4, 2000; Scott Severin Electronic Files. 2010.11.50. Army Medical Department Center of History and Heritage, Archival Repository, Joint Base San Antonio-Ft Sam Houston, TX.

82. American Red Cross. Donating blood, eligibility criteria: alphabetical. http://www.redcrossblood.org/donating-blood/eligibility-requirements/eligibility-criteria-alphabetical-listing#arc5. Accessed February 12, 2015.

83. De Mena D. *Annual Command History, 1 October 1989–30 September 1990*. Ft Clayton, Panama: US Army South; 1990.

84. De Mena D. *Operation Just Cause/Promote Liberty Supplement to the Annual Command History, 1 October 1989–30 September 1990*. Ft Clayton, Panama: US Army South; 1990:56.

85. Ledford FF. Medical support for Operation Desert Storm. *J AMEDD*. 1992;Jan/Feb:3-6. PB 8-92-1/2.

86. Brinkerhoff JR, Silva T, Seitz J. United States Army Reserve in Operation Desert Storm: Reservists of the Army Medical Department. September 23, 1993. http://www.dtic.mil/docs/citations/ADA277591. Accessed February 2, 2017.

87. Salamone BP. Veterinary Corps Study. Department of the Army Academy of Health Sciences, Fort Sam Houston, Texas. February 22, 1991. 2010.10.4.315 Army Medical Department Center of History and Heritage, Archival Repository, Joint Base San Antonio-Ft Sam Houston, TX.

88. ARCENT/CENTCOM Command Reports, Operation Desert Shield 483rd Medical Detachment (Veterinary Service) (Large) 6 Aug 1990–16 Jan 1991. GulfLink: Office of the Special Assistant for Gulf War Illnesses. http://www.gulflink.osd.mil/declassdocs/army/19961024/102496_aug96_decls9_0001.html. Accessed October 20, 2014.

89. Trask DR. *Veterinary Command Feeder Report for Operation Desert Storm*. Riyadh, Saudi Arabia: 320th Veterinary Headquarters; April 15, 1991. Memorandum for US Army Central, Medical Command.

90. Vogelsang R. Treating the animals of Kuwait. *Special Warfare*. 1992;5(1):7. PB 80-92-1

91. Harben J. Inspectors face mountains of food. *HSC Mercury*. 1992;19(7):1.

92. Coker KR. *The Indispensable Force: The Post-Cold War Operational Army Reserve, 1990–2010.* Ft Bragg, NC: Office of Army Reserve History, US Army Reserve Command; 2013: 122.

93. Harmon JM. Operation Provide Comfort. *J AMEDD*. 1992;Nov/Dec:31-37. PB 8-92-11/12.

94. Cooper P. Garner seeks to reprise his success. CNN.com/World. April 10, 2003. http://edition.cnn.com/2003/WORLD/meast/04/10/sprj.irq.garner.profile/. Accessed February 9, 2017.

95. Rudd GW. *Humanitarian Intervention: Assisting the Iraqi Kurds in Operation Provide Comfort, 1991.* Washington, DC: Department of the Army, Center of Military History; 2004. CMH Pub 70-78-1.

96. Steward RW *The United States Army in Somalia, 1992-1994*. Washington, DC: US Army Center of Military History; nd. CMH Pub 70-81-1. http://www.history.army.mil/brochures/Somalia/Somalia.htm. Accessed November 14, 2014.

97. Veterinary Operations in Somalia: 2 January 1993–22 March 1994 [slide set donated by Colonel (Retired) Scott Severin, US Army Veterinary Corps]. Scott Severin Electronic Files. 2010.11.50. Army Medical Department Center of History and Heritage, Archival Repository, Joint Base San Antonio-Ft Sam Houston, TX.

98. US Army Medical Department, Office of Medical History. Establishment of US Army Medical Command. http://history.amedd.army.mil/orgnztnlhistories/estabmedcmmnd.html. Accessed March 4, 2015.

99. Rigdon KA. US Army Health Service Support in 2025. School of Advanced Military Studies United States Army Command and General Staff College Ft Leavenworth, KS. http://www.dtic.mil/docs/citations/ADA436131. Accessed February 8, 2017.

100. Carpenter L. Operation MAD DOG—A humanitarian civic action project in Haiti. *US Army Med Dept J*. 1996;7/8:17–20.

101. LaGodna MM. Seven-deuce on the loose: Operation Joint Endeavor; US Army Veterinary Services in former Yugoslavia. January 5, 2015. Veterinary Corps Collection. 21.10.4.16. Army Medical Department Center of History and Heritage, Archival Repository, Joint Base San Antonio-Fort Sam Houston, TX.

102. Collins SS. Bread for the troops. *The Talon.* March 14, 1997:4. http://www.dtic.mil/bosnia/talon/tal19970314.pdf. Accessed October 24, 2014.

103. Hougdahl P. Watch pigs, they're trichi. *The Talon*. March 21, 1997:11. http://www.dtic.mil/bosnia/talon/tal19970321.pdf. Accessed October 24, 2014.

104. Center of Military History. Bosnia-Herzegovina, The U.S. Army's Role in Peace Enforcement Operations, 1995–2004. CMH Pub 70–97–1. http://www.history.army.mil/html/books/070/70-97-1/index.html. Accessed February 10, 2017.

105. Center of Military History. Operation Joint Guardian, The U.S. Army in Kosovo. CMH Pub 70–109–1. http://www.history.army.mil/html/books/070/70-109-1/index.html. Accessed February 10, 2017.

106. Richardson M. Teamwork and healing hands in Kosovo. Page 1.Veterinary Corps Collection. 2010.10.4.17. Army Medical Department Center of History and Heritage, Archival Repository, Joint Base San Antonio-Ft Sam Houston, TX.

107. Veterinary Services KFOR IX: continuity book information, updated November 2003:1. Veterinary Corps Collection. 2010.10.4.18. Army Medical Department Center of History and Heritage, Archival Repository, Joint Base San Antonio-Ft Sam Houston, TX.

108. Wildlife oral rabies vaccination in Kosovo. *Veterinary Service News November*. December 2, 2014:5.

109. Rezendes A. On a mission in Iraq, Afghanistan. *J Am Vet Med Assoc.* 2007;231(2).

110. Carter CN. Army Veterinary Services after action report: Operation Enduring Freedom, 2001–2002. Power Point Presentation. Veterinary Corps Collection. 2010.10. 4.21. Army Medical Department Center of History and Heritage, Archival Repository, Joint Base San Antonio-Ft Sam Houston, TX.

111. King JE, Passo SA, Watson NA. *Highlights in the History of US Army Dentistry*. Falls Church, VA: Office of The Surgeon General; 2012:46.

112. Cates MB. Healthy animals, healthy people: inextricably linked. *J AMEDD.* 2007;July–Sep:4–7.

113. Yingst S. A veterinary comparative medicine officer's dream assignment. *J AMEDD.* 2007;July–Sep:38–43.

114. CALL Lesson of the Day; Subject: Garrison Authorized Food Vendors; October 20, 2010. https://call2.army.mil/docs/doc6703/LOD-6703.pdf. Accessed February 10, 2017.

115. Jacobsen E. News from the Front. http://call.army.mil. USD-S Culminates a Unity of Effort in Agribusiness by Hosting Semi Annual Inter-Agency Agribusiness Conferences. June 1, 2010. Army Medical Department Center of History and Heritage, Archival Repository, Joint Base San Antonio-Ft Sam Houston, TX.

116. Centers for Disease Control and Prevention. Imported human rabies in a U.S. Army soldier–New York, 2011. *MMWR Morb Morta Wkly Rep.* 2012;61:302–305. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6117a2.htm. Accessed March 12, 2015.

117. Randolph A. Task Force MED – Afghanistan. Armed Forces Network Afghanistan/Defense Video and Imagery Distribution System. https://www.dvidshub.net/news/93075/fob-salerno-medical-personnel-exhibit-warrior-ethos-during-recent-attack. Accessed February 13, 2017.

118. Partlow J, Whitlock C. Attack on U.S. outpost in Afghanistan worse than originally reported. *The Washington Post*. https://www.washingtonpost.com/world/national-security/attack-on-us-outpost-in-afghanistan-worse-than-originally-reported/2012/06/16/gJQAlyaihV_story.html?utm_term=.6d62cc44739a. Accessed February 13, 2017.

119. Connor J. *Enduring Freedom SGT Raffique Khan* [video]. Armed Forces Network Afghanistan/Defense Video and Imagery Distribution System. September 26, 2012. http://www.dvidshub.net/video/157109/enduring-freedom-sgt-raffique-khan#.VNT2ASjitc4. Accessed August 1, 2014.

120. *One Health*. Aberdeen Proving Ground, MD: US Army Public Health Command; Winter 2014:12.

121. Veterinary Service News. 72nd MDVSS in Afghanistan. August 2014. September 2, 2014:1.

122. Smith JC. Stabilization and reconstruction operations: The role of the US Army Veterinary Corps. *J AMEDD*. 2007;July–Sep:71–80.

123. Kirk SK. *The Role of the US Army Veterinary Corps Officer in Stability Operations.* Carlisle Barracks, PA: US Army War College; September 25, 1970.

124. Agribusiness Development Teams in Afghanistan; Tactics, Techniques, and Procedures Handbook; No. 10-10; Nov 2009:1. http://usacac.army.mil/sites/default/files/publications/10-10.pdf. Accessed February 13, 2017.

125. Wombwell JA. *Army Support During Hurricane Katrina Disaster*. US Army Combined Arms Center Combat Studies Institute Press; 2009:176. The Long War Series occasional paper no. 29. Ft Leavenworth, KS.

126. Hearns JS Jr. *Veterinary Command After Action Report, Mobilization Center Shelby Veterinary Services*. Camp Shelby, MS; 2005. https://secure-ll.amedd.army.mil/lessonslearned/popup.aspx?id=676. Accessed July 21, 2014.

127. Still KM. *Vet Corps After Action Report, Fort Rucker Branch Veterinary Services*. Gulf Coast Veterinary District Command; 2005. Army Medical Department Center of History and Heritage, Archival Repository, Joint Base San Antonio-Ft Sam Houston, TX.

128. Watson NA. US Army public health and veterinary support in Japan following the Tohuku earthquake and tsunami, March–April 2011. *US Army Med Dep J*. 2013;Apr–June:19–24. http://www.cs.amedd.army.mil/FileDownloadpublic.aspx?docid=b8197181-a330-4a08-813d-8282f7b06be0. Accessed 21 July 2014.

129. Kalinich JF, Kasper CE. Are internalized metals a long-term health hazard for military veterans? *Public Health Rep.* 2016 Nov;131(6):831–833.

130. Alibek K. *Biohazard.* New York, NY: Random House; 1999.

131. Preston R. *The Hot Zone.* New York, NY: Anchor Books, Doubleday; 1994.

132. Amerithrax or anthrax investigation. Federal Bureau of Investigation. History. htttps://www.fbi.gov/history/famous-cases/amerithrax-or-anthrax-investigation. Accessed October 18, 2017.

133. US Department of Defense, Defense Threat Reduction Agency. *Defense's Nuclear Agency 1947–1997*. Washington, DC: US Department of Defense, Defense Threat Reduction Agency; 2002. DTRA History Series.

134. Franz DR. *Defense Against Toxin Weapons.* Ft Detrick, MD: US Army Medical Research and Materiel Command; 1997.

135. Office of the Assistant Secretary of Defense for Nuclear, Chemical and Biological Defense Programs. Chemical and biological defense. http://www.acq.osd.mil/cp/. Accessed March 17, 2016.

136. Kozaryn LD. Knowledge key to combating chemical, biological warfare. US Department of Defense website. http://www.defense.gov/News/NewsArticle.aspx?ID=41946. Accessed July 21, 2014.

137. Kozaryn LD. Defending against invisible killers—biological agents. US Department of Defense website. http://www.defense.gov/specials/chembio/. Accessed July 21, 2014.

138. Vroegindewey G. Emerging roles of the US Army Veterinary Service. *US Army Med Dep J*. 2007;Jul–Sep:8–11.

139. Smith CE, Simpson DI, Bowen ET, Zlotnik I. Fatal human disease from vervet monkeys. *Lancet*. 1967;2:1119–1121.

140. Bowen ET, Lloyd G, Harris WJ, Platt GS, Baskerville A, Vella EE. Viral haemorrhagic fever in southern Sudan and northern Zaire. Preliminary studies on the aetiological agent. *Lancet*. 1977;309:571–573.

141. Parker RL. Import quarantine regulations: do they meet our needs? *J Am Vet Med Assoc.* 1975;166(10):988–990.

142. Roberts JA, Andrews K. Nonhuman primate quarantine: its evolution and practice. *ILAR J.* 2008;2:145–156.

143. Centers for Disease Control and Prevention. Outbreaks chronology: Ebola virus disease. http://www.cdc.gov/vhf/ebola/outbreaks/history/chronology.html. Accessed January 15, 2014.

144. Briand S, Bertherat E, Cox P, et al. The international Ebola emergency. *N Engl J Med.* 2014; 371(13):1180–1183. DOI: 10.1056/NEJMp1409858.

145. WHO Ebola response team. Ebola virus disease in West Africa—the first 9 months of the epidemic and forward projections. *N Eng J Med*. 2014;371:1481–1495.

146. Mason J, Giahyue JH. Citing security threat, Obama expands U.S. role fighting Ebola. September 16, 2014. https://www.todayonline.com/world/obama-ramp-us-response-ebola-military-mission. Accessed October 18, 2017.

147. Reibstein, J. Logistics in support of operation united assistance: teamwork, transition and lessons learned. United States Africa Command website. https://www.africom.mil/media-room/article/25458/logistics-in-support-of-operation-united-assistance-teamwork-transitions-and-lessons-learned. Accessed October 19, 2017.

148. Pentagon briefing on DoD Response to Ebola with GEN Rodriguez [transcript]. US Army Africa Command. October 7, 2014. http://www.africom.mil/newsroom/article/23695/transcript-pentagon-briefing-on-dod-response-to-ebola-with-gen-rodriguez. Accessed December 8, 2014.

149. Office of the Chairman of the Joint Chiefs of Staff (CJCS). *Post-Deployment Policy for 21-Day Controlled Monitoring of DoD Service Members, Civilians, and Contractors Returning from Ebola Virus Disease Outbreak Areas in West Africa and CONUS*. Washington, DC: Office of the CJCS; November 7, 2014. CJCS Instruction 4220.01.

150. American Veterinary Medical Association (AVMA) Ebola Companion Animal Response Plan Working Group. Interim guidance for dog or cat quarantine after exposure to a human with confirmed Ebola virus disease. November 10, 2014. http://www.cdc.gov/vhf/ebola/pdf/dog-cat-quarantine.pdf. Accessed December 8, 2014.

151. American Veterinary Medical Association (AVMA) Ebola Companion Animal Response Plan Working Group. Interim guidance for public health officials on pets of Ebola virus disease. November 10, 2014. http://www.cdc.gov/vhf/ebola/pdf/pets-of-ebola-contacts.pdf. Accessed December 8, 2014.

152. Defense Health Agency. *Rabies Testing of Animal Specimens for Operation United Assistance*. Falls Church, VA: Defense Health Agency. Memorandum. January 8, 2015.

153. DoD Veterinary Services Activity (DODVSA). *Ebola Virus Information for Army Veterinary Services*. Joint Base San Antonio-Ft Sam Houston, TX: DODVSA. Information paper, September 2, 2014.

154. DoD Veterinary Services Activity (DODVSA). *Recommendations for deployment and redeployment of military working dogs from Ebola outbreak area.* Joint Base San Antonio-Ft Sam Houston, TX: DODVSA. Information paper, September 22, 2014.

155. Department of Defense. *Instruction Booklet: Ebola Zaire (EZ1) rRT-PCR (TaqMan®) on ABI® 7500 Fast Dx, LightCycler®, and JBAIDS.* Washington, DC: DoD; August 5, 2014. DoD-Joint Project Manager Medical Countermeasures System Manual.

156. Crown E. An Ebola tale with a tail. US Army website. http://www.army.mil/article/139211/An_Ebola_tale_with_a_tail/. Accessed December 10, 2014.

157. Kelser RA. Contributions of veterinary medicine to Medical Sciences. *Boletin de la Oficina Sanitaria Panamericana.* 1946;Apr:330.