



Elephants and Tuberculosis: A Real Threat

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Brief Overview: Elephants and Tuberculosis

Mycobacterium tuberculosis (*M.tb*) in humans is a type of bacteria and the causative agent of tuberculosis, a complex disease in which there are still many unknowns. Tuberculosis is a global pandemic, of which millions are affected. It has only recently been acknowledged that elephants can not only be diagnosed with a strain of tuberculosis, but that they can actually transmit *M.tb* to humans, even with no direct contact. And because there are still many unanswered questions surrounding tuberculosis in humans, it is not surprising that even less is known about tuberculosis in elephants.

The first wide-spread case of tuberculosis in elephants was in 1996 after two elephants died only three days apart. Both of these elephants came from the Hawthorn Corporation, a circus exhibitor, located in Illinois – the Hawthorn herd is now known as “The Index Herd” and was the beginning of the elephant and tuberculosis epidemic. The deaths of these elephants, Joyce and Hattie, sparked public concern and immense media attention.

There are multiple screening methods to test for tuberculosis in elephants, and many that had been used for decades were highly inconclusive. Even with modern medicine, blood cultures and tests alike are unreliable. To make matters worse, even with the diagnostic methods at elephant owners’ disposal, because of the lack of federal oversight, many captive elephant owners and handlers simply do not test their elephants for TB. The lack of testing puts both elephants and the public at risk of transmission of tuberculosis.

Executive Summary: Elephants and Tuberculosis

Tuberculosis is a chronic, bacterial disease that attacks the respiratory system. It is a dangerous threat to humans, and sadly, is often fatal. Tuberculosis in elephants is a re-emerging zoonotic disease caused primarily by *Mycobacterium tuberculosis*. This strain of TB threatens the lives of elephants, as a captive Asian elephant has a one in six chance of acquiring *M.tb*. Though the first high-profile case occurred in the year 1996, the first report in modern times of TB in an elephant happened at the London Zoo in 1875. Sporadic reports of TB in Asian elephants appeared in the earlier 1900s, and in 1962 the first report of tuberculosis in an African elephant was reported. It is believed that elephants contracted the disease from humans, as tuberculosis is only found in captive elephants.

The outbreak in 1996 caused panic, and the United States Department of Agriculture (USDA) formed the Tuberculosis Panel as an answer to public concern. Soon after, the TB Panel merged with experts in the field of tuberculosis, and in 1997, the Guidelines for the Control of Tuberculosis in Elephants was published. The Guidelines were administered by the USDA, and revised in the following years. In a series of questionable events, the USDA announced in 2012 its decision to repeal its entire United States American Health Association's (USAHA) "Guidelines for the Control of Tuberculosis in Elephants 2010." After years of relying on the USAHA Guidelines and interpreting them as necessary for licensee compliance with the Animal Welfare Act veterinary care regulations, the USDA repealed the monitoring and testing requirements altogether. This decision came as a shock to many animal welfare activists, after the USDA solicited comments regarding the proper monitoring of tuberculosis in captive elephants. Today, the only oversight an owner of a captive elephant may have in regards to testing for TB is by a patchwork of state laws that are mostly inadequate.

The Guidelines provide for different testing methods, the most popular of which has been the trunk wash. This type of culture screening method is extremely unreliable, as the elephant's trunk needs to be shedding the mycobacterium at the time of the trunk wash – a very unlikely chance. Indeed, elephants who have tested negative in a trunk wash and were allowed to give rides to children up until their death were found to have active TB during their necropsies.

The Stat Pak, DPP test, and the MAPIA, along with standard blood testing, are also available serological screening tests. The qPCR test was developed, which can be used along with a trunk wash to identify tuberculosis in a culture sample, which traces the exact strain of TB. However, even with these culture tests and serological screening for antibodies, without USDA oversight and mandatory compliance, many owners simply do not test their elephants.

Elephants' living conditions also play a role in their chances of acquiring the disease. Stress, proximity to other possibly infected elephants, and lack of proper testing are all dangers to healthy elephants. Moreover, because of their inherent social nature, separating elephants – especially mothers from their young – can cause depression, and mental and emotional hardships on the infected elephant. Thus, even if an elephant tests positive, it is still unclear whether separation from its herd is the best option. However, separation from the *public* is an absolute necessity, and far too often is not the reality. Circuses are known to put profit before the health of their animals and their audiences, and conditions of captivity subject elephants to conditions that negatively impact their immune systems. Consequently, elephants are often kept in traveling shows and expected to perform, even while their physical health is clearly deteriorating.

It is essential that the dangers of tuberculosis in elephants becomes public knowledge, for the sake of elephants and the public.

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Introduction

Captain Jacob Crowninshield brought the first elephant on the *America* ship to the United States on April 13, 1796.¹ She was originally from India, and was docked in New York City at only two years old. Hackaliah Bailey purchased the elephant for \$1,000 and the Barnum & Bailey Circus was born.² Over two centuries later, elephants are still used for entertainment purposes in circuses and zoos.³ They suffer too often because of inadequate space or care – to prepare them for the circus, they are frequently torn away from their mothers at an early age, forced to live on concrete floors, and trained using fire poker like bullhooks and electric prods.⁴ The suffering of captive elephants has long been a fight that organizations such as People for the Ethical Treatment of Animals (PETA) have tackled. In addition to the horrid conditions the majority of captive elephants are forced to live in, there is an emerging crisis for circuses and zoos – elephants can carry, and can transmit to humans – tuberculosis.

Tuberculosis (TB) is a “global pandemic, killing someone approximately every 19 seconds – about 1.7 million in 2016 alone.”⁵ TB is found in every country in the world, and is the leading infectious cause of death worldwide.⁶ It is estimated that two billion people, one third of the world’s population, are infected with *Mycobacterium tuberculosis* (*M.tb*),⁷ an obligate

¹ *Elephants in Captivity in the United States*, National Anti-Vivisection Society, <https://www.navs.org/what-we-do/keep-you-informed/legal-arena/wildlife/elephants-captivity-united-states/#.WigSQraZPBI> (last visited Nov. 15, 2017).

² *Id.*

³ *Id.*

⁴ *12 Things Ringling Doesn’t Want You to Know*, People for the Ethical Treatment of Animals, <https://www.peta.org/features/ringling-bros-elephant-cruelty/> (last visited Nov. 15, 2017).

⁵ *The Pandemic*, TB Alliance, <https://www.tballiance.org/why-new-tb-drugs/global-pandemic> (last visited Nov. 1, 2017).

⁶ *Id.*

⁷ *Tuberculosis*, World Health Organization, <http://www.who.int/tb/en/> (last visited Nov. 1, 2017).

pathogenic bacterial species and the causative agent of tuberculosis.⁸ Tuberculosis is a devastating, chronic bacterial disease that attacks the respiratory system, most often the lungs and the lymph nodes, and may spread to other parts of the body as the disease worsens. It is a dangerous and often fatal threat to millions of humans, but TB is also a “widespread and deadly problem”⁹ among captive elephants. Tuberculosis is a zoonotic disease, diseases that are caused by infections that are shared between animals and people,¹⁰ that can easily spread through the air. An infected elephant can put anyone at risk of transmission – elephants and humans alike.

This paper addresses the catastrophic epidemic that is elephants infected with Tuberculosis, and the crisis that surrounds every diagnosis. Lack of Federal law and patchwork state laws makes it difficult, if not impossible, to control this pandemic. Moreover, inadequate testing for Tuberculosis in elephants is a safety hazard for elephants and humans. The lack of legal oversight and the absence of care by the agencies meant to protect elephants used for exhibition purposes is not only an animal welfare issue, but is a dire public safety concern.

I. History of Tuberculosis in Elephants

Tuberculosis in humans has been studied for over one hundred years, yet still in today’s technologically and medically advanced world, there are still many unanswered questions.¹¹ Unlike the research that has been implemented for humans, investigations into the zoonotic

⁸ See *Pathogens – Types Of Bacterial Pathogens*, Science Encyclopedia, <http://science.jrank.org/pages/5068/Pathogens-Types-bacterial-pathogens.html> (last visited Feb. 20, 2018). There are three categories of bacterial pathogens. Obligate pathogens are those bacteria that must cause disease in order to be transmitted from one host to another. These bacteria must also infect a host in order to survive, in contrast to other bacteria that are capable of survival outside of a host.

⁹ *Tuberculosis at the Circus*, People for the Ethical Treatment of Animals, <https://www.peta.org/issues/animals-in-entertainment/circuses/circus-inspection-information-law-enforcement-officials/contagious-tuberculosis/> (last visited Nov. 1, 2017).

¹⁰ *Zoonotic Disease*, Centers for Control and Disease Prevention (July 2014) <https://www.cdc.gov/onehealth/basics/zoonotic-diseases.html> (last visited Feb. 20, 2018).

¹¹ Susan K. Mikota, *A Brief History of TB in Elephants*, United States Department of Agriculture Tuberculosis in Elephants, (April 5-6, 2011) at 2, https://www.aphis.usda.gov/animal_welfare/downloads/elephant/A%20Brief%20History%20of%20TB%20in%20Elephants.pdf.

disease found in elephants has been ongoing for only the past 15 years.¹² The same strain, *M.tb*, is found in both humans and elephants, but far more research has been done for human cases than for elephants, despite the fact that it is highly transmissible to humans, and the majority of captive elephants are presumed to have been exposed to or infected with TB.¹³ It can be deduced then, that while over one hundred years of research has not yet rid of TB in humans entirely, the strain of *Mycobacterium tuberculosis* (*M.tb*) found in both humans and elephants is extremely dangerous. *M.tb* is a frightening threat to public health, and the lack of *M.tb* elephant research is hazardous because it is not known with certainty how many elephants are infected and how many people who work with elephants are at risk¹⁴ if not simply because of lack of research, studies, and protocol. Ironically, tuberculosis has been “recognized in elephants for millennia,” but was not given the name ‘Tuberculosis.’¹⁵ Indeed, a disease distinctly resembling TB was found in elephants over 2,000 years ago by ancient Ayurvedic physicians in Ceylon [now Sri Lanka] and was portrayed in Sanskrit documents.¹⁶

However, the first report in post Industrial Society of tuberculosis in an elephant was a case at the London Zoo in 1875.¹⁷ There are erratic case reports of tuberculosis in captive Asian elephants in the twentieth century, and in 1962 the first case of tuberculosis in a captive African

¹² *Id.*

¹³ *Id.*

¹⁴ *Id.*

¹⁵ *Id.* at 3.

¹⁶ *Id.*; Susan K. Mikota et al., *Tuberculosis in Elephants in North America* (2000), <https://repository.si.edu/bitstream/handle/10088/4303/Mikota2000.pdf?sequence=1&isAllowed=y> (last visted Feb. 22, 2018).

¹⁷ *A Brief History of TB in Elephants*, *supra* note 11 at 5.

elephant was suspected.¹⁸ Despite evidence that tuberculosis has existed in captive elephants for well over a century, research began earnest in 1996.¹⁹

In his 1981 letter to the New Orleans Health Department, Andrew E. Gutter, D.V.M. and past Director of Veterinary Sciences at Audubon Park and Zoological Garden in New Orleans, confirmed that Hazel, a performing elephant for a travelling circus, died at the young age of 35.²⁰ An elephant's lifespan highly mirrors that of a human, and healthy elephants can live into their 60s and 70s.²¹ Hazel had been "good-humored and loving," but had stopped eating, was apathetic, and "her eyes lost their sparkle."²² Hazel nonetheless continued to perform for the circus' audience. Hazel died in isolation, where Gutter performed a necropsy and diagnosed Hazel with tuberculosis. Gutter examined those who had contact with Hazel and found "three persons with positive tuberculin test results," but none had tuberculosis disease.²³ The travelling circus which kept Hazel had left Louisiana before necropsy results had been revealed. However, the United States Public Health Service found Hazel's circus trainer, diseased with cavitary tuberculosis,²⁴ and who had given Hazel the fatal disease.²⁵ In 1981, Gutter reported on *M.tb* in a circus elephant, and in 1983, Devine published the first anti-TB drug report on isoniazid levels²⁶

¹⁸ *Id.* at 6-7. See Mikota, *supra* note 16. The African elephant was located in Israel and TB was not confirmed by culture.

¹⁹ Nathalia Holt, *The Infected Elephant in the Room*, Slate, http://www.slate.com/blogs/wild_things/2015/03/24/elephant_tuberculosis_epidemic_zoo_and_circus_animals_passing_tb_to_humans.html (last visited Feb. 15, 2018).

²⁰ Andrew E. Gutter et al., *Hazel Elephant is Dead (of Tuberculosis)* ATS Journals (May 15, 1981) <http://www.atsjournals.org/doi/abs/10.1164/arrd.1981.124.3.341>.

²¹ Tammy Dray, *The Life Span on Elephants*, Pets, <http://animals.mom.me/life-span-elephants-2233.html> (last visited Feb. 22, 2018).

²² *Id.*

²³ *Id.*

²⁴ *Tuberculosis*, Remedy's Health Communities Cavitary, <http://www.healthcommunities.com/tuberculosis/types.shtml#cav> (last visited Feb. 22, 2018). Cavitary TB involves the upper lobes of the lung, and the bacteria causes progressive lung destruction, forming cavities within the lungs. The lungs are highly affected because they are highly oxygenated, an environment in which *M. tuberculosis* thrives.

²⁵ *Id.*

²⁶ *Isoniazid*, WebMD, <https://www.webmd.com/drugs/2/drug-8665/isoniazid-oral/details> (last visited Feb. 22, 2018). Isoniazid is an antibiotic used for the treatment of tuberculosis.

in a single elephant, and this study foreshadowed the widespread crisis of tuberculosis in captive elephants that would not become apparent until 1996, more than a decade later.²⁷ The Hawthorn Corporation in Illinois owned this single elephant, and in 1996 TB reemerged in a Hawthorn herd, now considered the “Index Herd.”²⁸

The retrospective study of 379 zoo elephants by researchers and doctors of veterinary medicine Mikota, Sargent, and Ranglack found that eight elephants were confirmed to have had tuberculosis between the years of 1908 and 1994.²⁹ That number was likely significantly higher since the study was conducted before routine diagnostic testing for TB was established, and because the study omitted privately owned elephants.³⁰ The study, though one of the first of its kind, did not reveal truly how common tuberculosis is found in elephants in North America.

In 1996, tuberculosis resulted in the deaths of Joyce and Hattie, two Hawthorn Corporation elephants in a herd of 18, located in Illinois.³¹ Their deaths, only three days apart, resulted in public and safety concern. This public concern resulted in mass media coverage, of which continues to this day. In response, the United States Department of Agriculture consulted with the American Association of Zoo Veterinarians to form a Tuberculosis Panel.³² The Panel was initially formed to make decisions concerning the remaining elephants in the herd, where diagnostic testing revealed that one additional elephant tested culture-positive for TB.³³

Many publications arose out of response to the index herd, but in 1997, diagnostic testing revealed five new culture-positive cases at four separate facilities.³⁴ Additionally in 1997, the

²⁷ *A Brief History of TB in Elephants*, *supra* note 11 at 8.

²⁸ *Id.* at 9.

²⁹ *Id.*

³⁰ *Id.*

³¹ *Id.* at 11-12; Email from Deborah Robinson to Sophie Pierce (Dec. 5, 2017).

³² *A Brief History of TB in Elephants*, *supra* note 11 at 11.

³³ *Id.* at 12; *See infra* Part II.

³⁴ *Id.* at 14.

transmission of tuberculosis between elephant and human was documented when 87 people from the original five infected herds were tested.³⁵ From the original index herd, eleven people tested skin positive for TB.³⁶ An additional eleven people tested positive, and one active case of human tuberculosis was discovered, where the infected handler and elephant shared the same strain of the disease.³⁷ Though it was unclear whether the elephant its handler had been infected first, the identical strain of tuberculosis cemented the reality that TB could be, and had been already, transmitted from human to elephant or vice versa.

As a result of all of these outbreaks, it became apparent that tuberculosis was an epidemic that had to be addressed. The Tuberculosis Panel formed by the USDA merged with the National Tuberculosis Working Group for Zoo and Wildlife Species that had been formed in 1997 by the American Association of Zoo Veterinarians.³⁸ The merger occurred to address the tuberculosis outbreaks in zoo mammals. The group formed the Elephant Subcommittee, which produced the first Guidelines for the Control of Tuberculosis in 1997.³⁹

II. Testing for Tuberculosis in Elephants

The “Guidelines for the Control of Tuberculosis in Elephants 2010,” published by the United States Animal Health Association (USAHA) Elephant Tuberculosis Subcommittee is the current source for elephants that may be exposed, or have tested positive, for tuberculosis. The USDA’s Animal and Plant Health Inspection Service (APHIS), responsible for enforcing federal Animal Welfare Act regulations – including veterinary care regulations, determined that the 2010 Guidelines represent the best standards of care for these elephants. APHIS strongly

³⁵ *Id.* at 15.

³⁶ *Id.*

³⁷ *Id.* at 15.

³⁸ *Id.* at 16.

³⁹ *Id.*

encourages licensees who own elephants to comply with the Guidelines, even though the agency used to *mandate* adherence until the agency repealed the entire requirement.⁴⁰

Elephants lack clinical signs throughout most of the tuberculosis infection period, and thus can be difficult to detect.⁴¹ However, early diagnosis of TB is critical to effectively manage the disease, and to reduce the likelihood that the disease spreads, creating new cases of TB.⁴² There are a number of diagnostic methods that have been implemented to diagnose tuberculosis in elephants.

A. Culture Collection Procedure

The trunk wash culture became a widespread screening test in 1999,⁴³ and still serves as the primary diagnostic tool for diagnosing tuberculosis in elephants, yet it is a highly unreliable diagnostic method.⁴⁴ It produces low sensitivity for accuracy, needing more than 100 organisms per milliliter for detection of TB,⁴⁵ and therefore there is a high likelihood of false negative results. Moreover, it can take up to eight weeks for the bacteria to grow in culture, leaving a wide window of time while awaiting results during which the elephant may transmit disease to another animal or human.⁴⁶ The process is exactly what it sounds like: 60 milliliters of sterile water or saline is injected into the trunk of the elephant. The trunk is elevated then lowered, and the elephant's trunk is directed into a one-gallon bag to collect the sample.⁴⁷ The elephant is then

⁴⁰ *Protocols and Guidelines (Health, Management, Welfare)*, Elephant Care International, <http://elephantcare.org/resources/protocols/> (last visited Dec. 10, 2017).

⁴¹ Meagen Kay et al., *Evaluation of DNA Extraction Techniques for Detecting Mycobacterium tuberculosis Complex Organisms in Asian Elephants Trunk Wash Samples*, USDA APHIS https://www.aphis.usda.gov/animal_welfare/downloads/elephant/TB%20in%20Elephants%20-%20DNA%20Extraction%20Techniques.pdf. (last visited Dec. 10, 2017).

⁴² *Id.*

⁴³ *A Brief History of TB in Elephants*, *supra* note 11 at 18.

⁴⁴ Kay, *supra* note 41.

⁴⁵ *Id.*

⁴⁶ *Id.*

⁴⁷ Harshini Mukundan et al., *Tuberculosis, Leprosy and Other Mycobacterial Diseases of Man and Animals: The Many Hosts of Mycobacteria* (2015) at 261.

forced to exhale to collect a sample from the distal respiratory tract.⁴⁸ Completion of the test requires cooperating by the multi-ton pachyderm, and resistance also may interfere with collection and test results.⁴⁹ Moreover, an elephant's trunk has 150,000 muscles and is strong enough to lift and throw an adult human, but dexterous enough to detect and pick up a single blade of grass, making it an extraordinary tool. Elephants naturally use their trunks for an assortment of reasons – contamination and overgrowth of bacterium other than tuberculosis is a common occurrence and easily compromises the results of the trunk wash.⁵⁰ The *Guidelines* recommends that trunk washes from elephants are collected as a three serial sample over a period of up to one week.⁵¹ This recommendation is based on the diagnostic method for humans by sputum smear examination, as shedding of the tuberculosis bacteria varies from day to day.⁵²

While the shedding in a human *may* vary day to day, elephants are known to shed sporadically over time. Most notably, in an outbreak in a Swedish zoo, “only seven of 189 trunk wash samples sequentially collected from five elephants diagnosed with TB were culture positive.”⁵³ The outbreak occurred between 2001 and 2003, where four different tuberculosis strains were identified in five elephants. Woefully, all affected elephants were euthanized.⁵⁴ The incident at the Swedish zoo demonstrates how terribly unreliable the trunk wash procedure truly is. The reliance on a test that produces questionable results even when properly administered is alarming⁵⁵ – the unreliability too often results in the deaths of elephants that otherwise could have been assisted and possibly even saved.

⁴⁸ *Id.*

⁴⁹ *Id.*

⁵⁰ *Id.*

⁵¹ *Id.*; *Guidelines for the Control of Tuberculosis in Elephants 2010*, Elephant Care International, <http://elephantcare.org/wp-content/uploads/2017/02/2010-Elephant-TB-Guidelines.pdf> (last visited Dec. 17, 2017).

⁵² Mukundan, *supra* note 47.

⁵³ *Id.* at 266.

⁵⁴ *Id.* at 261.

⁵⁵ Email from Deborah Robinson to Sophie Pierce (Dec. 5, 2017).

B. Serological Testing

Recent medical advances in the understanding of the humoral immune response to tuberculosis have led to the development of sero-diagnostic tests which look for antibodies in the blood, rather than the bacteria itself.⁵⁶ There are a number of commercial sero-diagnostic tests for elephants, including the STAT-PAK, MultiAntigen Print ImmunoAssay (MAPIA) and Dual Path Platform (DPP),⁵⁷ all of which are recommended by the Guidelines. Incredibly, serological testing in elephants approaches 100% sensitivity and more than 95% specificity.⁵⁸ The presence of tuberculosis-specific antibodies in a group of 14 elephants from 11 facilities in five countries was confirmed by MAPIA and DPP.⁵⁹ When the serological testing had been performed, all elephants tested negative in the trunk wash procedure, but eventually, all 11 of the elephants became culture positive in the following months, years, or diagnosed in necropsy.⁶⁰ Moreover, in a study of four Asian elephants, three were diagnosed with tuberculosis in Thailand up to two and a half years prior to their isolation as a result of the diagnosis of tuberculosis.⁶¹

Although there is higher diagnostic accuracy with serological testing, these tests are unlikely to replace the “gold standard” culture tests for elephant tuberculosis, “as isolation of the pathogen to confirm the diagnosis, identify the strain, determine the drug susceptibility and collect epidemiology data” are all needed for an accurate, positive diagnosis of tuberculosis.⁶² Moreover, elephants test reactive in some cases based on mere exposure rather than active TB.

⁵⁶ Mukundan, *supra* note 47 at 267.

⁵⁷ Konstantin Lyashchenko, *Serological Testing: Elephant TB STAT-PAK, MAPIA, and DPP VetTB*, United States Department of Agriculture Tuberculosis in Elephants (April 5-6, 2011) https://www.aphis.usda.gov/animal_welfare/downloads/elephant/Serological%20Testing%20-%20Elephant%20TB.pdf (last visited Dec. 10, 2017).

⁵⁸ Mukundan, *supra* note 47 at 267.

⁵⁹ *Id.*

⁶⁰ *Id.*

⁶¹ *Id.*

⁶² *Id.*

However, these tests come at low costs, and with an increased frequency of trunk wash culture testing for antibody-positive elephants, the confirmation of tuberculosis diagnosis in elephants could be dramatically increased.⁶³

III. Federal Laws Concerning Tuberculosis in Elephants

The United States Department of Agriculture, the federal agency charged with drafting animal-health laws, promulgates and enforces Animal Welfare Act (AWA) and regulations. The Act ostensibly seeks to ensure the humane care and treatment of some warm-blooded animals⁶⁴ used in biomedical research or exhibited to the public, exotic animals, cats, and dogs bred for commercial sale. The Act requires that licensees provide animals with bare minimum standards of housing, nutrition, water, sanitation, veterinary care, and protection from extreme weather and temperatures. The AWA does not prescribe specific measures that licensees must take to be in compliance with the Act, nor does it include any species-specific regulations for elephants. Instead, the USDA's Animal and Plant Health Inspection Service promulgates regulations and adopts and issues proper guidance materials for licensees to follow.

In 1997, in accordance with the USDA's and APHIS' official duties, in an effort to address the widespread issue of tuberculosis in elephants by providing licensees with tangible and specific ways to properly care for their potentially infected captive elephants, APHIS adopted the USAHA's "Guidelines for the Control of Tuberculosis in Elephants," developed by USAHA's National Tuberculosis Working Group for Zoo and Wildlife Species.⁶⁵ Between 1997 and 2012, USAHA worked with State and Federal regulatory veterinary leaders to update the

⁶³ *Id.*

⁶⁴ See generally 7 U.S.C. § 2131 *et seq.* Rats, mice, etc. are exempt; horses used for exhibition purposes are also exempt.

⁶⁵ *Questions and Answers: Guidelines for the Control of TB in Elephants*, APHIS, (Dec. 2012) https://secure.mediapeta.com/peta/PDF/2012USDAelephant_tb_faq.pdf (last visited Dec. 10, 2017). The United States Animal Health Association (USAHA) is the nation's science-based, non-profit animal health forum.

guidelines in accordance with emerging scientific discoveries and information about TB and advances in diagnostic and screening methods.⁶⁶ The Guidelines were widely used, and subsequently, the detection of TB in elephants and the prevention of tuberculosis spreading by infected elephants greatly increased.

In 2012, the USDA assured the public that the agency would require licensees to adhere to a policy implemented as an interpretation required for compliance with the veterinarian care provision. Tuberculosis does not appear in the AWA Regulations, and this policy would provide captive elephants with adequate veterinary care in regards to tuberculosis, require TB testing, and assure elephants' overall health in accordance with the leading-animal health standards promulgated by USAHA.⁶⁷ This assurance by the USDA was to protect captive elephants' health, and to protect the safety and health of humans. The Agency published a Notice to Comment advising the public that APHIS intended to use the 2010 Guidelines "issued by [USAHA] to assess compliance with the animal welfare regulations as related to elephant tuberculosis as well as to aid users in their compliance with those regulations,"⁶⁸ and welcomed public comments on this intention.

The USDA was effectively going to implement the 2010 Guidelines as an interpretation required for compliance with 9 C.F.R. § 2.40. Beginning in 1997, and modified in 2000, 2003, 2008, 2010, and 2012, the Guidelines were mandated by the USDA under APHIS. Among other requirements, the testing was to be performed by a licensed USDA veterinarian.⁶⁹ The Guidelines are over 25 pages long, and include in depth testing requirements, treatment options

⁶⁶ *Id.*

⁶⁷ *See* 9 C.F.R. § 2.40.

⁶⁸ Guidelines for the Control of Tuberculosis in Elephants, 78 FR 690 (Jan. 4, 2013).

⁶⁹ *Guidelines for the Control of Tuberculosis in Elephants 2010*, USDA APHIS (Nov. 8, 2010), https://www.aphis.usda.gov/animal_welfare/downloads/elephant/Elephant%20TB%20Guidelines-2010.pdf (last visited Mar. 6, 2018).

for reactive and TB positive elephants, and a section on employee health and safety.⁷⁰ The Guidelines provide the only procedures available for captive elephant owners to follow and allowed for regulation, decreasing the likelihood of a tuberculosis outbreak or elephant suffering.

After receiving over 1,600 comments on its Notice to Comment in the *Federal Register* regarding the adoption of the 2010 Guidelines, APHIS finalized a voluntary elephant TB policy.⁷¹ This voluntary approach rids of any regulation by the USDA and forces the States to adopt policies similar to the Guidelines, and asks that licensees abide by the Guidelines – even though no consequences await if the Guidelines are not followed.

APHIS strongly *encourages* licensees who own captive elephants to *voluntarily* abide by and comply with the Guidelines. APHIS “believes” that this voluntary approach will continue to protect elephant health, and such voluntary approach reinforces the relationship between licensees and their veterinarians, ensuring the best approach oversee and protect the health and welfare of the elephants.⁷² The USDA effectively repealed its mandate of tuberculosis testing, relying instead on licensees to care for their elephants – a plan that is clearly backfiring.

The USDA assured the public that it would continue to “focus on ensuring that elephants receive proper care under the AWA.”⁷³ The USDA continued to assure the public by stating that it would use its full authority under the AWA’s veterinary care provisions to take any necessary proper action.⁷⁴ In sum, the USDA now relies only on the AWA’s veterinary care provisions and States using their own authority to address the risk of tuberculosis in elephants.

⁷⁰ *Id.*

⁷¹ *APHIS Finalizes Voluntary Elephant TB Policy*, USDA APHIS (Oct. 16, 2015) <https://content.govdelivery.com/accounts/USDAAPHIS/bulletins/11fcea8> (last visited Dec. 10, 2017).

⁷² *Id.*

⁷³ *Id.*

⁷⁴ *Id.*

The AWA’s veterinary provisions are promulgated in the Regulations, and states that a “dealer or exhibitor shall have an attending veterinarian who shall provide adequate veterinary care to its animals.”⁷⁵ The veterinary care provision ensures the *minimum* standards of care, and certainly does not specify about the testing of tuberculosis. Moreover, the Act provides for certain species-specific requirements for dogs, cats, rabbits, hamsters, guinea pigs, nonhuman primates, and marine animals. Despite lack of clear knowledge of the dangers of tuberculosis, the USDA is refusing to take appropriate precautions with exhibited elephants.⁷⁶ In essence, “the USDA has washed its hands of the tuberculosis crisis” by eliminating *any* requirements that exhibitors test and treat elephants for TB.⁷⁷

A policy interpretation repeal is the quickest and easiest way to reduce the Agency’s workload. APHIS started with the repeal of the tuberculosis testing requirements, and the Agency has continued to deregulate, reduced its workload, and its transparency. In earlier 2017, the USDA initiated a blackout, where it pulled from its website records pertaining to the enforcement of the Animal Welfare Act⁷⁸ – over 9,000 research labs, dog breeders, and many other facilities.⁷⁹ It took the USDA months to publish decisions in administrative proceedings to enforce the AWA, records that were meant to be kept public.⁸⁰ The USDA blackout was an immense step in limiting APHIS transparency.

The USDA is currently considering to allow some third-party inspections of certain regulated businesses, such as puppy mills, zoos, aquariums, and animal research labs, to

⁷⁵ See 9 C.F.R. § 2.40.

⁷⁶ Email from Deborah Robinson to Sophie Pierce (Dec. 5, 2017).

⁷⁷ *Tuberculosis at the Circus*, *supra* note 9.

⁷⁸ *USDA’s New ‘Public Search Tool’ Falls Short*, PETA (Aug. 18, 2017) <https://www.peta.org/blog/leading-animal-protection-groups-others-sue-usda-website-blackout/> (last visited Mar. 6, 2018).

⁷⁹ Karen Brulliard, *Resistance is growing to the USDA’s blackout of animal welfare records*, The Wa. Post (Feb. 16, 2017) https://www.washingtonpost.com/news/animalia/wp/2017/02/16/resistance-is-growing-to-the-usdas-blackout-of-animalwelfarerecords/?utm_term=.390b18a3f7de (last visited Mar. 6, 2018).

⁸⁰ *USDA’s New ‘Public Search Tool’ Falls Short*, PETA (Aug. 18, 2017).

determine which facilities actually require agency oversight.⁸¹ The plan could allow industries to police themselves, and animal welfare would surely suffer. While APHIS has arranged for four in-person listening sessions to solicit public comments,⁸² the public has clearly expressed its very unfavorable opinion of outsourcing.⁸³ Nonetheless, it is likely that the USDA will ignore the public comments and implement the third party inspection program – especially since the agency’s announcement asked commenters to “aid in the development of criteria for recognizing the use of third-party inspection and certification programs as a *positive* factor when determining APHIS inspection frequencies at facilities licensed or registered under the [AWA].”⁸⁴

The USDA is undoubtedly intending to reduce its workload, even despite the Inspector General’s worries,⁸⁵ and the agency is doing less and less – contrary to the AWA’s intent to insure the health, safety, and wellbeing of animals. It has become the States’ and localities’ burden to become active as the USDA takes its eyes off the public, and continues its ignorance of important animal health and welfare issues.

IV. Survey of State Action Concerning Tuberculosis in Elephants

Though the USDA has discontinued agency oversight of tuberculosis in elephants, certain states passed laws to protect and the public. Other states continue to ignore the epidemic.

⁸¹ Kitty Block, *Help us keep the pressure on USDA to prevent outsourcing of animal welfare inspections*, A Humane Nation (Feb. 27, 2018) <https://blog.humanesociety.org/2018/02/help-us-keep-pressure-usda-prevent-outsourcing-animal-welfare-inspections.html> (last visited Mar. 6, 2018).

⁸² *Use of Third Party Inspection Program Listening Sessions*, USDA APHIS (last modified Jan. 26, 2018) https://www.aphis.usda.gov/aphis/ourfocus/animalwelfare/sa_animal_welfare_news/third-party-inspection-certification-programs (last visited Mar. 6, 2018).

⁸³ Kitty Block, *Help us keep the pressure on USDA to prevent outsourcing of animal welfare inspections*, A Humane Nation (Feb. 27, 2018).

⁸⁴ *Use of Third Party Inspection Program Listening Sessions*, USDA APHIS (last modified Jan. 26, 2018) [*emphasis added*].

⁸⁵ Email from Carney Anne Nasser to Sophie Pierce (Feb. 27, 2018).

A. Maine

An elephant traveling with the Piccadilly Circus was barred entrance to the state of Maine following a positive test for TB. The state veterinarian, Dr. Don Hoenig, barred Topsy the elephant's entrance to Maine after visiting Massachusetts and, through routine testing, the presence of tuberculosis antibodies were revealed.⁸⁶ Though the former state veterinarian's efforts to keep tuberculosis out of Maine are vital, the legislature failed to pass legislation introduced in 2017 that would have prohibited the use of elephants in traveling animal acts, despite the evidence of animal cruelty and the serious looming threat of the spread of tuberculosis.⁸⁷

Though the state failed to pass legislation, the City of Portland in Maine banned exotic animals, such as circus elephants, in their city.⁸⁸ Portland is Maine's largest city, and passed the ban, citing particularly to the cruel and inhumane handling and training.⁸⁹ Although the ban was not centered on the existence of tuberculosis in elephants, it will surely help keep TB out of the city, and help keep Portland, Maine's citizens safe.

B. Massachusetts

Though Maine banned the entrance of Topsy into its state, Massachusetts allowed it.⁹⁰ Massachusetts is well known for having abysmal zoos – they violate the Animal Welfare Act, keep their animals in inhumane conditions, and too often have animals die prematurely as a

⁸⁶ Christopher Cousins, *Circus elephant barred from Maine after testing positive for tuberculosis antibodies*, Bangor Daily News (June 8, 2012). <http://bangordailynews.com/2012/06/08/news/midcoast/circus-elephant-barred-from-maine-after-testing-positive-for-tuberculosis-antibodies/> (last visited Dec. 17, 2017).

⁸⁷ 2017 Legislation, <http://www.uappeal.org/legislation-1.html> (last visited Dec. 15, 2017); HP 287.

⁸⁸ Portland, Me., Animals and Fowl § 5-506 *et seq* (2017).

⁸⁹ Jake Bleiberg, *Portland becomes first in Maine to ban exotic animals like circus elephants*, Bangor Daily News (Sept. 19, 2017). <https://bangordailynews.com/2017/09/19/news/portland-becomes-first-in-maine-to-ban-exotic-animals-like-circus-elephants/> (last visited Dec. 20, 2017).

⁹⁰ *Id.*

result of neglect and abuse.⁹¹ Massachusetts is not only inherently the wrong climate for elephants, facilities in Massachusetts that do house elephants have come under fire for failing to meet minimum standards of care – including by failing to protect the animals and public from TB.

Southwick’s Zoo, a roadside zoo in Mendon, Massachusetts, hires a California-based company to transport their elephants to its facility, and sells elephant rides to their customers. The rental company, Have Trunk Will Travel (HTWT), is notorious for barbaric and violent behaviors towards their elephants; the company was caught on tape viciously beating elephants, using electric shock devices, and even striking a baby elephant over her head and pulling her trunk.⁹² HTWT was captured on undercover video footage violently beating elephants, Tai, who was later used for the movie *Water for Elephants*, and jabbing Rosie with a sharp bullhook just to make her run faster.⁹³ Elephants were observed chained for twelve hours a day, barely able to move, and certainly not able to walk.⁹⁴ Not only does this zoo show a blatant disregard for the health and welfare of its elephants, but it clearly has no interest in keeping the public safe either. An elephant named Dondi was used to give rides to patrons, often children, and after her death in 2010, she was found to have carried tuberculosis.⁹⁵ This was the second elephant at the facility to have TB and still be in contact with the public.⁹⁶ Even multiple county fairs, which exist purely for profit, have decided to discontinue elephant rentals from HTWT.⁹⁷ Southwick’s Zoo, “with a mandate to inform and educate”⁹⁸ has not yet ceased giving rides to an unsuspecting public.

⁹¹ Toni Frohoff, *Massachusetts Zoos Named and Shamed in Worst Zoo List*, In *Defense of Animals* (Jan. 2016). <https://www.idausa.org/massachusetts-zoos-named-shamed-worst-zoo-list/> (last visited Mar. 6, 2018).

⁹² *Id.*

⁹³ *Id.*

⁹⁴ *Id.*

⁹⁵ *Id.*

⁹⁶ *Id.*

⁹⁷ *Id.*

⁹⁸ *Id.*

Unfortunately, it is only a matter of time before a patron is infected with TB because of Southwick's Zoo and HTWT, and their horrifying disregard to protect elephants and the public.

C. Tennessee

Tennessee is the home of The Elephant Sanctuary, an accredited sanctuary that serves as a forever home to abused elephants who have been rescued or relinquished. Because many of the elephants who are lucky enough to end up at TES have been used for circus performances, many have been exposed to or diagnosed with TB. In 2009 a tuberculosis outbreak was the cause for an investigation by the Centers for Disease Control and Prevention (CDC), officially establishing within the scientific community that transmission of tuberculosis from elephant to human is a threat.⁹⁹ The elephant refuge was established in 1995, with a mission to care for sick, old, or abused elephants transferred from private owners, zoos, and circuses.¹⁰⁰ The Elephant Sanctuary was home to the Hawthorn Index Herd elephants, the result of a USDA ALJ order and confiscation, two of which were known to have a history of active tuberculosis. The Tennessee Department of Health received reports of five tuberculin skin test conversions among the employees of the elephant refuge.¹⁰¹ The study concluded that “indirect exposure to aerosolized *M. tuberculosis* and delayed or inadequate infection control practices”¹⁰² were likely the main contributors to the transmission of TB from elephants to the employees.

Following this episode, a reactive serological screening test in Karen the elephant was enough to bar her from entering the state with the rest of the traveling circus in December of

⁹⁹ *Elephant-to-Human Transmission of Tuberculosis, 2009*, Centers for Disease Control and Prevention (Mar. 2011) https://wwwnc.cdc.gov/eid/article/17/3/10-1668_article (last visited Dec. 10, 2017).

¹⁰⁰ *Id.*

¹⁰¹ *Id.*

¹⁰² *Id.*

2010, in a decision made by state health officials.¹⁰³ This state decision took a stronger stance than the USDA's – which called for quarantine only if an active case of tuberculosis has been proven.¹⁰⁴ Karen was allowed into Baltimore City, a decision made by the City Health Department, which followed the USDA's then minimum standards of prevention.¹⁰⁵

D. Wisconsin

The Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) made a decision to create stricter guidelines for any exotic animal that comes into the state, after an elephant owner brought four elephants without an import permit to Circus World in the summer of 2012.¹⁰⁶

The Wisconsin DATCP has strict guidelines regarding the entry of elephants, and those guidelines include that any elephant brought into the state must follow the USDA Guidelines for the Control of Tuberculosis in Elephants 2010 requirements.¹⁰⁷ Copies of all trunk washes and serum tests from the previous 12 months, along with import permits, current certificate of veterinary inspection, and a signed statement from the animal owner regarding any *possible* exposure to tuberculosis within the past five years must be included in the application to bring an elephant into the state of Wisconsin.¹⁰⁸ The state of Wisconsin is an actual example of compliance with the 2010 Guidelines – despite the USDA's lack of any actual legal intervention or enforcement.

¹⁰³ Laura Vozzella, *TB in elephants called 'a gray area'* The Baltimore Sun (Apr. 6, 2011) <http://www.baltimoresun.com/entertainment/bs-ae-elephant-tuberculosis-20110406-story.html> (last visited Dec. 20, 2017).

¹⁰⁴ *Id.*

¹⁰⁵ *Id.*

¹⁰⁶ Ed Zagorski, *Circus World animals to get more scrutiny*, WiscNews (Sept. 28, 2012) http://www.wiscnews.com/news/article_b177ff46-09e9-11e2-8733-0019bb2963f4.html (last visited Dec. 20, 2017).

¹⁰⁷ See Wis. Admin. Code ATCP § 10.84 (2006).

¹⁰⁸ *Elephants*, State of Wisconsin, Department of Agriculture, Trade, and Consumer Protection https://datcp.wi.gov/Pages/Programs_Services/Elephants.aspx (last visited Mar. 6, 2018) [*emphasis added*].

V. Elephants in Entertainment and Public Health Risks

A. *Elephants in the Circus*

Tuberculosis flared first in circus elephants, where documented infection rates rose as high as 40 percent in some captive populations.¹⁰⁹ Circuses travel year-round, in extreme weather conditions, and the travel from one circus to the next can sometimes take days.¹¹⁰ Elephants are chained and confined to box cars or trailers for their travels, and kept in extremely close proximity to other elephants who are used for performances.¹¹¹ Elephants are imprisoned in these tiny confinements, forced to sleep, eat, defecate, and urinate all in the same area.¹¹² It comes as no surprise that the elephants are put under an enormous amount of physical, mental, and emotional stress – just another factor as to why TB is spread among circus elephants so easily, and so quickly.¹¹³ If a circus elephant does test positive for TB, it is highly unlikely that circuses take the correct precautions. In fact, Patty Zerbini from Two Tails Ranch in Florida was cited by the USDA *several* times for having her TB-positive elephant, Luke, in the same barn as other elephants, *separated only by plastic sheeting*.¹¹⁴ Circuses are tainted with tuberculosis, and each visiting patron is a sitting duck.

The first high-profile elephant-tuberculosis outbreak occurred in 1996, and the outbreak was among circus elephants.¹¹⁵ In March of 1996, five elephants from Hawthorn Corporation

¹⁰⁹ Sandi Doughton, *Zoos clash with sanctuaries over treatment of elephant tuberculosis*, Seattle Times, (Mar. 30, 2015) <https://www.seattletimes.com/seattle-news/zoos-resist-guidelines-that-limit-elephant-tuberculosis/> (last visited Dec. 1, 2017).

¹¹⁰ *Circuses*, PETA <https://www.peta.org/issues/animals-in-entertainment/circuses/> (last visited Dec. 20, 2017).

¹¹¹ *Id.*

¹¹² *Id.*

¹¹³ See discussion *infra* Part V.C.

¹¹⁴ Email from Deborah Robinson to Sophie Pierce (Dec. 5, 2017) [*emphasis added*].

¹¹⁵ Doughton, *supra* note 109.

were traveling to California as part of a circus act.¹¹⁶ On August 3, 1996, one elephant died, and via necropsy, a presumptive diagnosis of tuberculosis was made.¹¹⁷ The remaining four elephants were recalled to the farm in Illinois, and on August 6, 1996 during the transit home, a second elephant died.¹¹⁸ Known today as The Index Herd, the death of the traveling elephants frightened the public and caught the attention of the media.¹¹⁹

To determine to risk of possible infection among the animal handlers, an investigation began. Soon after, the remaining elephants and trainers still traveling were also sent back to Illinois, and in December of the same year, all elephants began anti-tuberculosis therapy.¹²⁰ The farm was visited numerous times to establish the degree to which the handlers had been in contact with the infected elephants. Most of the elephants were “tethered on a chain in one large barn,” several were kept in a separate room, and a baby elephant was left in the third room with numerous tigers.¹²¹ More than 80 tigers were housed in a separate barn.¹²²

Both elephant and tiger handlers were tested; 6 of the 12 elephant handlers tested purified protein derivative (PPD) positive, and 5 of the 9 tiger handlers tested PPD positive, despite the tiger handlers working in far less proximity and longevity than the elephant handlers.¹²³

The Ringling Bros. Barnum and Bailey Circus, duped “The Greatest Show on Earth,” was said to “create experiences that uplift the human spirit and bring people together.”¹²⁴

¹¹⁶ *Mycobacterium tuberculosis infection as a Zoonotic Disease: Transmission between Humans and Elephants*, Centers for Disease Control and Prevention (June 1998) https://wwwnc.cdc.gov/eid/article/4/2/98-0217_article (last visited Dec. 20, 2017).

¹¹⁷ *Id.*

¹¹⁸ *Id.*

¹¹⁹ *A Brief History of TB in Elephants*, *supra* note 11 at 12.

¹²⁰ *Mycobacterium tuberculosis infection as a Zoonotic Disease: Transmission between Humans and Elephants*, *supra* note 116.

¹²¹ *Id.*

¹²² *Id.*

¹²³ *Id.*

¹²⁴ Ringling Bros. and Barnum & Bailey, <https://www.ringling.com> (last visited Dec. 19, 2017).

Although all of their elephants are now retired and are no longer traveling or exhibited, the historical significance of the Circus is monumental.¹²⁵ After two years of research, world-renowned epidemiologist and leader of the first HIV division for the Centers for Disease Control Don Francis and journalist Leslie Griffith collected correspondences, affidavits, and depositions that concluded that between 1993 and 2007 many of the Ringling Bros. Barnum and Bailey’s elephants had *mycobacterium tuberculosis*, the same strand of TB that humans contract.¹²⁶ Even worse, the documents revealed that treatment was attempted on many elephants but to no avail, either because the elephants could not tolerate the drugs, or because they had become drug resistant.¹²⁷ These drugs used to treat elephants are the same given to treat an m-tuberculosis diagnosis in a human.¹²⁸

Children and adults alike are drawn to the “death defying acts” of circus performances and the rare opportunity to see exotic animals live and in action.¹²⁹ Many are especially in awe of the performing elephants – the animals that bring a prehistoric spirit to the show.¹³⁰ The elephants stand on their heads and balance on balls, and the crowds go wild.¹³¹ The audience does not stop to think why the elephants are performing such tricks that go so greatly against their instincts – indeed, the images of trainers beating their elephants with bullhooks and shocking them with an electric rod is the least of the spectators’ worries.¹³² Even if animal welfare is not a worry to the crowds, their own welfare should be.

¹²⁵ Email from Deborah Robinson to Sophie Pierce (Dec. 5, 2017).

¹²⁶ Leslie Griffith, *Circus Elephants with Tuberculosis are a Real Threat to People*, HuffPost (Apr. 24, 2008) https://www.huffingtonpost.com/leslie-griffith/circus-elephants-with-tub_b_98350.html (last visited Dec. 18, 2017).

¹²⁷ *Id.*

¹²⁸ *Id.*

¹²⁹ *Id.*

¹³⁰ *Id.*

¹³¹ *Circuses*, *supra* note 110.

¹³² *Id.*

Among many other acts, when “elephants enter an arena they often spew mucus from their spouts,” and “if circus patrons are within shot of the effluence and the animal is sick,” tuberculosis can easily spread to the patron; or worse, a drug resistant strand of tuberculosis can spread from elephant to patron.¹³³ The animal welfare issue of elephants performing in circuses is not an issue that everyone may have on their mind. But elephants performing is a public safety risk that should concern crowds; it is a public safety risk so large that the CDC has had to investigate the problem on many occasions.¹³⁴ Crowds might think that a circus would never keep an elephant riddled with TB working, but this is so far from the truth. Circuses have, and always will, put profits over the safety of both their animals and their spectators. Joyce and Hattie, two elephants of The Index Herd, were traveling and giving rides to children while obviously *extremely* ill, right up to a day or two before their deaths.¹³⁵ The first to die had chronic, unexplained weight loss *for over six months* before her death, yet still was put to work.¹³⁶ The performing elephants fade away while on the road, looking worse with each day that passes.¹³⁷ Eventually, the elephants disappear and are often reported dead shortly thereafter, or they simply disappear, with reports of their deaths never coming to light.¹³⁸ David Tesch, a circus elephant handler, carted Lydia the elephant to Maine every summer to give rides at an amusement park in York, and with each passing summer her physical appearance deteriorated.¹³⁹ It took years, but eventually in 2012 she was prohibited from returning to Maine because a blood test was positive for TB.¹⁴⁰ It only took her a year thereafter to die, and her exhibitor did not

¹³³ Griffith, *supra* note 126.

¹³⁴ *See supra* notes 99 and 109.

¹³⁵ Email from Deborah Robinson to Sophie Pierce (Dec. 6, 2017) [*emphasis added*].

¹³⁶ CDC, *supra* note 89 [*emphasis added*].

¹³⁷ Email from Deborah Robinson to Sophie Pierce (Dec. 6, 2017).

¹³⁸ *Id.*

¹³⁹ *Id.*; *The sad death of a forgotten elephant*, animal rights foundation of florida (Sept. 2014) <http://arff.org/blog/sad-death-of-a-forgotten-elephant> (last visited Feb. 20, 2018).

¹⁴⁰ Email from Deborah Robinson to Sophie Pierce (Dec. 6, 2017).

have the sense to inform the public of her passing nor the reason for it.¹⁴¹ Lydia’s exhibitor left quite a lot of potentially exposed people in Maine¹⁴² – people who thought they were getting a ride of a lifetime instead ran the risk of exposure to tuberculosis.

B. Elephants in the Zoo

Tuberculosis outbreaks among zoos also pose a threat to elephants, workers, and zoo spectators. Very recently, in November of 2017, Ellie, a popular, mother of three, 46-year old Asian elephant was diagnosed with tuberculosis at the St. Louis Zoo.¹⁴³ Ellie’s prognosis is good as a result of early detection through routine blood tests and trunk culture.¹⁴⁴ Ellie has yet to show symptoms, and her family is being closely monitored.¹⁴⁵ The zoo was quoted stating that TB occurs “*occasionally*” in elephants¹⁴⁶ – despite contradicting evidence, and the reality that Asian elephants have at least a one in six chance of contracting the disease.¹⁴⁷

In 2013, three elephants, Packy and his sons Rama and Tusko were diagnosed with TB at the Oregon Zoo.¹⁴⁸ In 2016, it was confirmed that seven staff members were infected with tuberculosis and developed a latent form of the disease, showing no symptoms.¹⁴⁹ The seven staff members had close contact with the elephants, and an eight person, a volunteer, “mysteriously” also developed a case of tuberculosis.¹⁵⁰ The zoo reports that none of the eight

¹⁴¹ *Id.*

¹⁴² *Id.*

¹⁴³ *St. Louis Elephant Ellie Treated for Tuberculosis*, US News (Nov. 9, 2017) <https://www.usnews.com/news/best-states/missouri/articles/2017-11-09/st-louis-zoo-elephant-ellie-treated-for-tuberculosis> (last visited Dec. 14, 2017).

¹⁴⁴ *Id.*

¹⁴⁵ *Id.*

¹⁴⁶ *Id.*

¹⁴⁷ Doughton, *supra* note 115 [*emphasis added*].

¹⁴⁸ Lynne Terry, *Oregon Zoo staff infected by tuberculosis after exposure to infected elephants*, The Oregonian (Jan. 8, 2016) http://www.oregonlive.com/health/index.ssf/2016/01/officials_identify_tuberculosis.html (last visited Dec. 20, 2017).

¹⁴⁹ *Id.*

¹⁵⁰ *Id.*

affected are infectious, and that “nobody in the public was at risk,”¹⁵¹ despite attendance by the public for Rama’s painting parties, where he created splatter paintings with his trunk.¹⁵²

All three elephants underwent months-long treatment, and the zoo enacted safety measures via quarantine, use of protective masks, ending pressure water disinfection that blasts bacteria around, and keeping the infected elephants “100 feet away from the public.”¹⁵³ The elephants completed treatment, but both Rama and Tusko were euthanized shortly thereafter, though the zoo states the TB diagnosis was not a factor in the decision.¹⁵⁴

Health officials found 118 people who could have been at risk of transmission from one of the elephants.¹⁵⁵ The zoo has not reported much on impact to the public, but found that seven of the staff members were likely infected by Rama.¹⁵⁶ The eighth person to test positive was a volunteer who spent only an hour of time in the elephant barn, and was found to have the exact bacterial strain as Rama, but had been diagnosed and treated in 2012, before the elephants tested positive.¹⁵⁷ Curiously, the deputy health officer debates how the volunteer became sick with the same strain of TB that Rama carried before he tested positive.¹⁵⁸ It should be clear that at least one of the elephants had tuberculosis before the zoo discovered it, and that a negative elephants test is certainly *not* conclusive.¹⁵⁹ The risk that a captive elephant can transmit tuberculosis to a human is a very real and serious threat to human health.

¹⁵¹ *Id.* (quoting Dr. Jennifer Vines, Deputy Health Officer).

¹⁵² Terry, *supra* note 148.

¹⁵³ *Id.*

¹⁵⁴ *Id.*

¹⁵⁵ *Id.*

¹⁵⁶ *Id.*

¹⁵⁷ *Id.*

¹⁵⁸ *Id.*

¹⁵⁹ *Id.*

C. Transportation and the Spread of Tuberculosis

In a sense, the spread of tuberculosis started with the Endangered Species Act (ESA) when it restricted elephant imports into the United States.¹⁶⁰ In response to the restriction, corporations such as the Disney Corporation, Ringling Brothers Barnum & Bailey Circus, and Busch Gardens developed large elephant breeding facilities.¹⁶¹ Females have low rates of fertility and there are a limited number of mature males, thus it is difficult to breed captive elephants.¹⁶² It was estimated by Michael Fouraker, executive director of the Fort Worth Zoo, that in just 45 years, there will only be 50 captive female elephants to populate zoos.¹⁶³ Without an increase in “successful elephant births in the coming years, the North American Asian elephant population will face near extinction.”¹⁶⁴ Corporations thereafter established the first artificial insemination program for elephants to increase successful elephant births.¹⁶⁵ Subsequently, corporations began breeding-loan programs where zoo and circus animals are shipped all over the country.¹⁶⁶ This movement of elephants undoubtedly is a leading cause of disease outbreak.¹⁶⁷

The inherent purpose of a circus is to travel across the nation and perform at different locations; therefore, the circus animals must be transported with the circuses, subjecting

¹⁶⁰ See Holt, *supra* note 19.

¹⁶¹ *Id.*

¹⁶² *Id.*

¹⁶³ *Id.*

¹⁶⁴ *Id.*

¹⁶⁵ *Id.*; *Captive Elephants: Broken Spirits*, PETA, <https://www.peta.org/issues/animals-in-entertainment/circuses/elephants-broken-spirits/> (last visited Feb. 12, 2018). Although breeding programs were implemented to increase successful elephant births, it is extremely important to note that corporations do not actually use these breeding programs to prevent elephants from going extinct. Instead, the elephants bred by circuses and zoos are kept for profit – they will never be released into the wild and will forever suffer because of corporate greed.

¹⁶⁶ See Holt, *supra* note 19.

¹⁶⁷ *Id.*

elephants to constant confinement.¹⁶⁸ It is estimated that circuses travel up to 48 weeks a year¹⁶⁹ – thus, circus elephants live on the road, and are robbed of appropriate physical and social environments.¹⁷⁰ The constant travel often includes prolonged restraint through chaining or confinement in tiny barred cages.¹⁷¹ One investigation revealed that elephants spent most of their days in chains or transportation vehicles; they are confined for days without proper exercise; and, not surprisingly, elephants contract diseases such as TB.¹⁷² Elephants often spend up to 100 consecutive hours in confined spaces – allocating up to 96% of their time¹⁷³ – while in the wild, they travel up to 30 miles a day on foot.¹⁷⁴ This confinement has been described as a “living death”¹⁷⁵ for elephants, who are highly intelligent, family oriented, and share many humanlike characteristics. The confinement they must endure during travel has often produced aggression, depression, and even post-traumatic stress disorder.¹⁷⁶

The amount of stress that circus elephants endure is yet another contributing factor to the likelihood of a TB outbreak. Stress weakens the immune system, making the elephant even more susceptible to infections. Recent studies in humans show that chronic stress results in permanent changes in the body, and the continuous increase in stress hormones result in suppression of the

¹⁶⁸ See *Circus Inspection Information for Law Enforcement Officials: Introduction*, PETA <https://www.peta.org/issues/animals-in-entertainment/circuses/circus-inspection-information-law-enforcement-officials/introduction/> (last visited Feb. 12, 2018).

¹⁶⁹ See *Sad But True: This is What Life in the Circus is Doing to the Health of Performing Animals*, One Green Planet (Sept. 2014), <http://www.onegreenplanet.org/animalsandnature/ailments-suffered-by-circus-animals/> (last visited Feb. 20, 2018).

¹⁷⁰ See *Circus Inspection Information for Law Enforcement Officials: Introduction*, *supra* note 168.

¹⁷¹ *Id.*

¹⁷² Deborah Nelson, *The Cruellest Show on Earth*, Mother Jones (Dec. 2011). <https://www.motherjones.com/environment/2011/10/ringling-bros-elephant-abuse/> (last visited Feb. 13, 2018).

¹⁷³ See *Enjoy the Circus? The Animals Don't*, People Helping Animals <https://www.paws.org/get-involved/take-action/explore-the-issues/circus-cruelty/> (last visited Feb. 11, 2018).

¹⁷⁴ See *Sad But True: This is What Life in the Circus is Doing to the Health of Performing Animals*, *supra* note 159.

¹⁷⁵ See *An Elephant Crackup?*, The New York Times (Oct. 2006) <http://www.nytimes.com/2006/10/08/magazine/08elephant.html?pagewanted=all&r=0> (last visited Feb. 20, 2018).

¹⁷⁶ See *Why the Circus is Saying Goodbye to Elephants*, Time Magazine (Mar. 2015) <http://time.com/3733447/elephants-animal-cruelty-abuse-circus/> (last visited Feb. 12, 2018).

immune system's white blood cells, leading to an increased risk of infection.¹⁷⁷ It can be deduced that an increase in stress hormones in elephants can also increase the risk of infection. For example, Dr. Barry Kreiswirth, founding director of the Public Health Research Institute, Tuberculosis Center, at Rutgers University, discussed an instance where an elephant at the age of 32 was diagnosed with tuberculosis. It was assumed that she was infected as a baby elephant, and the TB became “reactived”¹⁷⁸ due to stress and malnourishment.¹⁷⁹ Because circus elephants are under constant stress due to travel, harsh conditions, barbaric ‘training’ methods, and generally lead a difficult, sad life, stress is just another risk for the transmission and outbreak of tuberculosis.

While some zoos may offer better living environments for captive elephants, tuberculosis is still a dangerous threat. Because it is difficult to breed captive elephants, zoos share their elephants – they import elephants, often for the purpose of the enhancement of breeding.¹⁸⁰ AZA wishes to increase the elephant population to improve demographics and sustainability by “adding unrelated, zoo-born elephants to the population that are capable of breeding.”¹⁸¹ The elephants are managed within the AZA Elephant Species Survival Plan (SSP), and the zoos must conform to environment, biological, behavioral, and philosophical standards.¹⁸² While the AZA requires high standards of care, TB is nevertheless a looming threat.

¹⁷⁷ *Stress leading to TB in young professionals*, The Times of India (Jun. 2014), <https://timesofindia.indiatimes.com/india/Stress-leading-to-TB-in-young-professionals/articleshow/37038327.cms> (last visited Feb. 20, 2018).

¹⁷⁸ *TB in Captive Elephants*, Centers for Disease and Protection (Mar. 2017) https://www2c.cdc.gov/podcasts/media/pdf/EID_3-17_TB_in_Captive_Elephants.pdf (last visited Feb. 20, 2018).

¹⁷⁹ *Id.*

¹⁸⁰ See San Diego Zoo Asian Elephant Import Applications at 14.

¹⁸¹ *Id.*

¹⁸² *Id.* at 16.

Recently, San Antonio Zoo adopted two Asian elephants, Karen and Nicole.¹⁸³ The Ringling Bros. Circus owned Karen, and in 2011 it was discovered that Karen had tuberculosis.¹⁸⁴ Karen, along with elephants Nicole, and Lucky now live together at the Zoo, and are humorously referred to as the Golden Girls.¹⁸⁵ The shipment of Karen from circus to zoo is a representation of the typical movement of an elephant. Male elephants are often transported to breed with female elephants; Jackson has fathered *at least* five calves at the Pittsburgh Zoo¹⁸⁶, two at Disney in Florida, and an additional two through artificial insemination, based on the only available data that is nearly a decade old.¹⁸⁷ He still resides at the International Conservation Center – a project started by the Pittsburgh Zoo, now home to five elephants.¹⁸⁸ He is “responsible for elephant babies *across* the U.S.”¹⁸⁹ Although the Pittsburgh Zoo is AZA accredited and the standards of care are high, the likelihood of transmission of disease is higher because of the constant movement of elephants – whether for breeding or any commercial purpose.

It is estimated that at least 100,000 wild elephants are killed for ivory each year.¹⁹⁰ Therefore, it is important that the AZA continue its Species Survival Program, because the Program is implemented to protect the diversity of captive elephants and ensure that the species

¹⁸³ See *San Antonio Zoo adopts two Asian Elephants*, San Antonio News <http://news4sanantonio.com/news/local/photos-san-antonio-zoo-adopts-two-asian-elephants> (last visited Feb. 20, 2018).

¹⁸⁴ See *Ringling Elephant Diagnosed With TB*, PETA (Apr. 2011) <https://www.peta.org/blog/ringling-elephant-diagnosed-tb/> (last visited Feb. 20, 2018).

¹⁸⁵ See *San Antonio Zoo adopts two Asian Elephants*, *supra* note 183.

¹⁸⁶ Don Hope, *African elephants make themselves at home in Somerset County*, Pittsburgh Post-Gazette (July 28, 2009) <http://www.post-gazette.com/life/lifestyle/2009/07/28/African-elephants-make-themselves-at-home-in-Somerset-County/stories/200907280205> (last visited Mar. 6, 2018). Jackson was supposedly expected to breed with two Philadelphia female elephants in 2009.

¹⁸⁷ *Id.*

¹⁸⁸ David Highfield, *Pittsburgh Zoo's Elephant Conservation Center*, CBS Pittsburgh (Nov. 17, 2014) <http://pittsburgh.cbslocal.com/2014/11/17/inside-the-pittsburgh-zoos-elephant-conservation-center/> (last visited Mar. 6, 2018).

¹⁸⁹ *Id.* [*emphasis added*].

¹⁹⁰ *Id.*

is kept alive. However, because of the inherent need to transport elephants to breed, or to rescue them from circuses, roadside zoos, or any inadequate facility, it is each facility's burden to test and manage tuberculosis. The purpose of the SSP is to increase population and improve sustainability of a species. This purpose cannot be achieved if the testing and management of tuberculosis is inadequate or ignored.

VI. Conclusion

There is still an immense of unknown knowledge surrounding the transmission of tuberculosis, especially when it comes to the existence of the disease in an elephant, and the transmission from elephant to human. One thing is for certain – the existence of tuberculosis in elephants is both an animal welfare and a public health issue, and the threat is very real. The public does not need to have direct contact with an elephant to run the risk of transmission. Moreover, the handlers of elephants are at an even greater risk because of their proximity to the animals. Exposure to the disease can come from droplets through vents, a sneeze, or otherwise any action whereby an elephant would blow out water through its trunk.¹⁹¹ The possibility of exposure exists everywhere, and can affect even the public. And despite lack of clear knowledge that elephants diseased with tuberculosis are not only a true threat to other elephants, but also to the *public*, the USDA is refusing to take appropriate precautions with captive elephants – a shocking disappointment.¹⁹²

Elephants are beautiful, gentle, and social creatures. They form extremely close familial bonds with their families and other herds, and elephants who become mothers are intensely

¹⁹¹ Email from Deborah Robinson to Sophie Pierce (Dec. 6, 2017).

¹⁹² *Id.*

maternal and protective of their young.¹⁹³ In a sense, the human population has already broken the elephant spirit by imprisoning them and taking them away from their natural habitat. Some are even worse off and forced into circuses, where they experience violent training to perform tricks that go against their very nature and instincts. Some still-nursing elephants are dragged away from their mothers, just to experience the same violence, often for their entire lives.

Many captive elephants already live in inhumane environments. The danger of tuberculosis is just another threat to these creatures. As a result of the USDA's refusal to take action, it has become each state's duty to enforce proper care and testing for every captive elephant that either resides or will be traveling to each respective state. And it is the duty of the public to avoid circuses, zoos, or private owners who refuse to properly care for and test their elephants.

Acknowledgments

Deborah Robinson, Esq. is a captive wildlife specialist and independent legal expert with decades of experience and special expertise in captive elephants. She counsels and collaborates with animal protection organizations and sanctuaries alike on litigation, regulatory, and campaign strategies. Not only does she contribute to strategy and public messaging, as the founder of forums like *In Defense of Elephants* and *The Big Rumble*, she utilizes her social media expertise to engage and educate thousands of individuals on critical and timely issues concerning the welfare of captive exotic animals. She is a frequent contributor and panelist at conferences on captive wildlife, and has been recognized by numerous groups including the Animal Legal Defense Fund for her invaluable contributions to the field of captive wildlife protection.

¹⁹³ *Captive Elephants: Broken Spirits*, People for the Ethical Treatment of Animals <https://www.peta.org/issues/animals-in-entertainment/circuses/elephants-broken-spirits/> (last visited Dec. 20, 2017).

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