

THE COMPLEX MOVE OF PLUM ISLAND RESEARCH CENTER TO MANHATTAN, KANSAS AND POTENTIAL POLICY CONSIDERATIONS

Rashel L. Pack†

I. Introduction	501
II. Foot and Mouth Disease Overview	502
III. Historical Overview of FMD Outbreaks and Their Effects.....	503
IV. Plum Island History and the Potential for Relocation.....	505
V. The Potential Agricultural Impacts of Plum Island’s Move to the Mainland United States	508
VI. Laws, Policies, and Safeguards the United States has in Place against FMD	509
VII. Conclusion	517

I. INTRODUCTION

Plum Island Animal Disease Center (Plum Island) is one of our nation’s first lines of defense against foreign animal diseases.¹ Operated by the Department of Homeland Security, Plum Island is a science & technology national laboratory where diagnostics training, response training, and research and development for vaccines and bioforensics takes place.² Plum Island is the only laboratory in the United States with the ability to conduct research on live samples of the foot and mouth disease virus.³ Foot and mouth disease (FMD) is a highly contagious, viral disease affecting cloven-hoofed animal such as cattle, pigs, and sheep.⁴ FMD outbreaks have plagued agricultural industries around the world. Countries such as

† J.D., Drake University Law School, 2019; M.S., Louisiana State University, Chemistry, 2014; B.S., College of the Ozarks, Chemistry, 2012.

1. *Plum Island Animal Disease Center*, DEP’T OF HOMELAND SEC., <https://perma.cc/ZE9X-Z984> (archived Sept. 27, 2018).

2. *Id.*

3. *Id.*

4. ANIMAL & PLANT HEALTH INSPECTION SERV., U.S. DEP’T OF AGRIC., FOOT-AND-MOUTH DISEASE FACTSHEET (July 2013), <https://perma.cc/4DVA-8AYR> (archived on Sept. 26, 2018).

Taiwan, Uruguay, Argentina, and the United Kingdom have all experienced epidemics in the not so distant past.⁵

The research carried out on Plum Island is crucial to the safety of our country. However, a change is coming that should alarm the United States' agricultural industry. Plum Island research facilities established in 1954 deemed too small and outdated to meet the current needs for researching foreign animal diseases and will be closed.⁶ Despite the risk of accidental exposure, Plum Island will be relocated to the National Bio and Agro-Defense Facility (NBADF) in Manhattan, Kansas, slated to be completed in 2022.⁷

This Note will explore the agricultural and economic implications of FMD outbreaks, take a deeper look at Plum Island and its replacement facility in Kansas, and finally examine the policy considerations regarding the relocation of the facility, as well as measures to be considered to reduce the risk of accidental exposure in the heart of the United States agricultural country.

II. FOOT AND MOUTH DISEASE OVERVIEW

FMD is a contagious, viral disease affecting cloven-hoofed animals.⁸ It must not be confused with hand, foot, and mouth disease, which affects children.⁹ "There are 7 known types and over 60 subtypes of the FMD virus."¹⁰ A standard mode of transmission involves an infected animal coming into contact with other cloven-hoofed livestock.¹¹ However, due to the highly contagious nature of this virus, it can also be spread by the following: holding livestock in contaminated facilities, the livestock coming into contact with people wearing contaminated clothing or shoes, and exposure to contaminated feed, hay, and hides.¹² FMD presents itself in the infected livestock through a variety of symptoms, including high fever, lesions in the mouth, lameness, and anorexia.¹³ Once exposure occurs, it can take anywhere

5. Melissa McLaws & Carl Ribble, *Description of Recent Foot and Mouth Disease Outbreaks in Nonendemic Areas: Exploring the Relationship Between Early Detection and Epidemic Size*, 48 CAN. VETERINARIAN. J. 1051, (2007).

6. See Morgan Chilson, *Former Plum Island Director Excited about NBAP's Potential*, TOPEKA CAPITAL-J. (June 29, 2017), <https://perma.cc/LVH6-USS3>.

7. Tom Brune, *Plum Island Laboratory's Replacement in Kansas Breaks Ground*, NEWSDAY (May 27, 2015) <https://perma.cc/5FNR-L4ZT>.

8. *About FMD*, FOOT & MOUTH DISEASE CROSS-SPECIES TEAM, <https://perma.cc/F6AG-54MS> (archived Jan. 26, 2019).

9. *Id.*

10. ANIMAL & PLANT HEALTH INSPECTION SERV., *supra* note 4.

11. *Id.*

12. *Id.*

13. *Id.*

from two to fourteen days for symptoms to begin presenting themselves.¹⁴ The FMD virus itself is not fatal to the infected livestock. However, small calves or piglets often die due to the pain associated with nursing from the lesions present in the mouth.¹⁵ While infected livestock do not die, most livestock have to be slaughtered to prevent spreading FMD, since the virus can live in tissue, breath, saliva, and urine for up to six months after exposure.¹⁶ The virus can also survive inside contaminated materials the length of survival depends on the condition the materials are maintained.¹⁷ The only effective ways to eliminate the virus are time, extreme temperatures, and extreme pH levels.¹⁸

III. HISTORICAL OVERVIEW OF FMD OUTBREAKS AND THEIR EFFECTS

At some point in time, many countries, including the United States, have seen FMD's detrimental effects.¹⁹ The United States, has experienced nine outbreaks of FMD since 1870.²⁰ In 1914, the United States saw its most serious outbreak when FMD entered into a Chicago stockyard.²¹ This outbreak of FMD spread throughout twenty-two different states and resulted in the slaughter of over 172,000 cattle, sheep, and swine by the end of 1915.²² The last outbreak of FMD in the United States was in 1929, when pigs were exposed via contaminated feed.²³ This outbreak had significantly less detrimental effects than the 1914 outbreak; however, it still resulted in the slaughter of five herds totaling 3,600 head of livestock.²⁴

The United Kingdom has also seen the devastation of FMD. In 1967, Britain endured one of the worst FMD outbreaks caused by swine consuming contaminated feed.²⁵ The consumption of the contaminated feed led to 2,228

14. *Id.*

15. *Id.*

16. *Id.*

17. *Id.*

18. *Id.*

19. See generally McLaws & Ribble, *supra* note 5, at 1051-62; ALEJANDRO E. SEGARRA & JEAN M. RAWSON, CONG. RESEARCH SERV., RS20890, FOOT AND MOUTH DISEASE: A THREAT TO U.S. AGRICULTURE (2001), <https://perma.cc/R86C-9HBK>.

20. SEGARRA & RAWSON, *supra* note 19.

21. *Id.*

22. *Id.*

23. *Id.*

24. *Id.*

25. *Foot and Mouth Disease: The 1967 Outbreak and its Aftermath*, THE HISTORY OF MODERN BIOMEDICINE RESEARCH GRP., <http://www.perma.cc/LCK8-DWQZ> (archived Sept. 27, 2018).

outbreaks and the eventual slaughtering of approximately 450,000 animals.²⁶ This epidemic prompted the United Kingdom to devise a plan to safeguard their country from another outbreak.²⁷ Even with a safeguard plan place, another horrifying outbreak of FMD occurred in the United Kingdom in 2001.²⁸ The United Kingdom's second outbreak started with the recognition of FMD in twenty-seven pigs after a routine inspection was performed and was believed the FMD had already spread to fifty-seven farms spanning across the nation by the time of discovery.²⁹ The United Kingdom's plans to handle FMD after the outbreak in 1967 were drafted with an expected maximum of ten farms being affected.³⁰ By the time of discovery, the plan was already inapplicable to the outbreak at hand.³¹ Importation and exportation bans were put into place and mass slaughter was implemented within days of the initial observations.³² This outbreak lead to mass governmental action, which resulted in calling the armed forces to assist with the cull, and approximately 3,750,222 animals were slaughtered within six months.³³ Due to the outbreak, the tourist industry estimated a loss of £250m.³⁴ The 2001 United Kingdom outbreak is an indicator of how quickly FMD can spread and the potential for large agricultural and economic loss can occur. It is also an example of how the expansion of the virus can occur even when procedures have been implemented to help aid in the prevention of spreading the disease. One of the most alarming outbreaks to address when discussing the move of Plum Island to Kansas is the 2007 United Kingdom outbreak of FMD at the Pirbright site.³⁵ Pirbright, a research institute, investigates thirty different viral diseases of farm animals and public health viruses with the ability to cross species.³⁶ These viral diseases include avian influenza, FMD, and poliovirus.³⁷ When the Pirbright outbreak of FMD occurred, the extent of exposure was unclear, and the means of virus transmission was

26. *Id.*

27. *Foot-and-Mouth Outbreak of 2001*, BBC NEWS (Feb. 18, 2011), <https://perma.cc/UQY8-UTX2>.

28. *Id.*

29. *Id.*

30. *Id.*

31. *Id.*

32. *Id.*

33. *Id.*

34. *Id.*

35. HEALTH & SAFETY EXEC., INITIAL REPORT ON POTENTIAL BREACHES OF BIOSECURITY AT THE PIRBRIGHT SITE 2007, <https://perma.cc/D4RM-SKL7> (archived Jan. 26, 2019).

36. *Viruses We Study*, THE PIRBRIGHT INST., <https://perma.cc/6977-ZTQF> (archived Sept. 27, 2018).

37. *Id.*

unknown.³⁸ At the request of the United Kingdom's government, the Health and Safety Executive (HSE) investigated the potential for airborne, waterborne, and human movements as the source of transmission.³⁹ While the exact method of virus release remains unknown, the HSE investigation concluded, waterborne release was a possibility, but release by human movement was a more likely cause.⁴⁰ This outbreak stemming from a research facility, much like Plum Island, led to eight infected premises and the slaughter of 1,578 animals.⁴¹ The outbreak incidents demonstrate even with safeguards in place, the release of viruses from research facilities can still occur. When this happens, it becomes nearly impossible to determine the exiting route. Every facility has set forth safety procedures, but it is nearly impossible to determine the adequacy of these procedures when the means of virus transmission is unknown. Not only should the 2001 and 2007 United Kingdom outbreaks warn of the potential dangers associated with moving a facility into the middle of the United States, but they should also guide the implementation of policy to safeguard the United States from the devastating effects that could arise by relocating Plum Island to Kansas.

IV. PLUM ISLAND HISTORY AND THE POTENTIAL FOR RELOCATION

Plum Island "operates BioSafety Level (BSL) 2, BSL-3 Enhanced, Animal Biosafety Level 3 (ABSL-3) and Biosafety Level 3 Agriculture (BSL-3Ag) laboratory and animal research facilities."⁴² Since 1954, Plum Island has played an integral role in the United States' defense against foreign animal diseases through its research and vaccine development designed to protect against certain pathogens.⁴³ For example, Plum Island developed an FMD vaccine that does not require the live FMD virus to be utilized in the manufacturing process.⁴⁴ This allows for a vaccine to be manufactured on the United States mainland with no risk of accidental exposure or violation of 21 U.S.C. § 113a.⁴⁵ However, there is a high risk associated with a facility such as Plum Island. Therefore, they take strict safety measures including: restricting access, treating all waste in a manner to decontaminate, no exposure to animals for five days after leaving the island, and

38. See HEALTH & SAFETY EXEC., *supra* note 35.

39. *Id.*

40. *Id.*

41. NICK JULEFF, INST. FOR ANIMAL HEALTH, THE 2007 UK FMD OUTBREAK: FIELD INVESTIGATION PERSPECTIVE, <https://perma.cc/RCP4-E2FQ> (archived Sept. 27, 2018).

42. *Plum Island Animal Disease Center*, *supra* note 1.

43. *Id.*; *Plumbing the Mysteries of Plum Island*, CBS NEWS (June 10, 2012), <https://perma.cc/M9SX-B88K>.

44. *Plum Island Animal Disease Center*, *supra* note 1.

45. *Plum Island Animal Disease Center*, *supra* note 1; 21 U.S.C. § 113a (2018).

having highly trained personnel take precautions, such as shower in and shower out procedures, to minimize self-contamination risk or accidental virus releases outside the laboratory environment.⁴⁶

Even with all precautions taken by Plum Island, accidental disease releases from the facility have occurred.⁴⁷ In 1978, during construction on the island, FMD was accidentally released and led to the slaughter of 200 animals on the island.⁴⁸ This FMD release never left the island or reached the mainland United States.⁴⁹ After the initial accidental release in 1978, Plum Island took measures to reduce the risk including constructing biocontainment facilities, which allow for all animals to be housed inside.⁵⁰ Even with extra measures, two more outbreaks occurred within five years, but were contained to the new biocontainment units.⁵¹ Since none of the previous Plum Island outbreaks have reached mainland United States, one should conclude, housing a facility working with FMD on the island is a safeguard in maintaining the eradication of FMD from the United States and provides security to our agricultural industry.

The extensive degree of protection required to house the viruses on Plum Island becomes extremely relevant with the potential threat of agroterrorism. Agroterrorism is “the deliberate introduction of an animal or plant disease with the goal of generating fear over the safety of food, causing economic losses, and/or undermining social stability.”⁵² The threat of someone utilizing one of the United States’ research facilities against its population became a reality after the September 11th terrorist attacks. During the September 11th aftermath, an MIT graduate affiliated with al-Qaeda was captured with a target list, including Plum Island.⁵³ Many aspects of FMD make it an attractive method for terrorists to wreak havoc on the United States. First, the virus’s contagious nature allows the initial exposure to take place in a small livestock population.⁵⁴ Second, to use FMD as a weapon, the virus does not require conversion.⁵⁵ Third, the human infection risk

46. *Plum Island Animal Disease Center*, *supra* note 1.

47. *Plumbing the Mysteries of Plum Island*, *supra* note 43.

48. *Id.*

49. *Id.*

50. *Id.*

51. *Id.*

52. JIM MONKE, CONG. RESEARCH SERV., RL32521 AGROTERRORISM: THREATS AND PREPAREDNESS CRS-1 (2007), <https://perma.cc/T5YA-DXD8>.

53. *Plumbing the Mysteries of Plum Island*, *supra* note 43.

54. Dean Olson, *Agroterrorism: Threats to America’s Economy and Food Supply*, FBI LAW ENFORCEMENT BULL. (Feb. 1, 2012), <https://perma.cc/E95F-R2XM> (explaining FMD is twenty times more infectious than small pox).

55. *Id.*

does not exist.⁵⁶ While many agroterroristic agents require personal protective equipment, FMD does not pose a risk to the perpetrator,⁵⁷ reducing the execution cost when performing an attack with this pathogen. The attack's reduced cost makes this pathogen an attractive mode for achieving their goal. Finally, the virus's nature allows terrorists to introduce it into our livestock through many different routes.⁵⁸ Terrorists can introduce FMD by infecting a single head of livestock, introducing a contaminated feed product, entering onto a farm in contaminated clothing, etc.⁵⁹ These factors, coupled with highly concentrated livestock production, such as feed lots, make FMD an attractive form of agroterrorism against the American economy.⁶⁰

While there are risks associated with housing FMD's live viral form on Plum Island, there are many benefits. By allowing this research facility to undertake research and development with this hazardous material, Plum Island has made great advances in FMD research.⁶¹ Not only did they discover a manufacturing process for FMD vaccine without needing the live virus to be present during the process, Plum Island developed the first molecular vaccine against FMD with the ability to protect cattle and pigs.⁶² Another Plum Island developed vaccine can distinguish between infected and vaccinated animals and provide protection to pigs within twenty-four hours of vaccination.⁶³ While negative effects are present, facilities such as Plum Island are necessary in furthering scientific research with the potential to prevent the spread of a wide variety of highly contagious diseases, providing a safeguard for agricultural and economic stability.

Even with knowledge of potential agroterrorism threats and accidental exposures, in 2008 Congress decided to replace the Plum Island facility with the newly constructed NBADF.⁶⁴ Congress's decision came after the Department of Homeland Security determined the Plum Island facilities were no longer adequate, likely because expansions and renovations were costly.⁶⁵ The number of animals allowed per room is one example of the inadequate working environment in regards to.⁶⁶ While room sizes were adequate under the 1950s regulations, they are

56. *Id.*

57. *Id.*

58. *Id.*

59. *Id.*

60. *Id.*

61. OFFICE OF NAT'L LABS., DEP'T OF HOMELAND SEC., PLUM ISLAND ANIMAL DISEASE CENTER (PIADC), <https://perma.cc/DGQ5-L46N> (archived September 27, 2018).

62. *Id.*

63. *Id.*

64. Brune, *supra* note 7.

65. Chilson, *supra* note 6.

66. *Id.*

now inadequate and do not allow the facility to operate efficiently.⁶⁷ The burden to renovate is largely because the facility is only accessible by boat. This factor leads to heightened costs due when transporting materials and workers.⁶⁸ Rather than renovate, Plum Island will be sold and the research center moved to Manhattan, Kansas with an estimated completion date of 2022.⁶⁹

V. THE POTENTIAL AGRICULTURAL IMPACTS OF PLUM ISLAND'S MOVE TO THE MAINLAND UNITED STATES

The United States agricultural industry is an integral component of the overall United States gross domestic product (GDP).⁷⁰ The “[m]arkets for livestock, meat, milk, and other animal products contribute more than \$1.5 trillion annually to the U.S. economy and represent one-sixth of our gross national product.”⁷¹ If we focus on the agricultural economics of the site of the NBAF and surrounding states, the effect of an accidental exposure of FMD becomes even more alarming.⁷² Among the top ten agricultural producing states are Kansas, Iowa, Texas, and Nebraska.⁷³ It is imperative to keep in mind FMD affects only cloven-hoofed animals so to truly understand the potential agricultural economic impact; we must focus solely on production of those livestock and livestock products. For example in Kansas, the state of relocation of Plum Island, livestock and livestock products consisted of \$8,988,822 of the total \$15,470,214 commodity receipts for the state in 2016.⁷⁴ When this data is broken down even further, cattle and calves account for \$7,863,616; dairy products account for \$530,400; hogs account for \$474,168; and wool accounts for \$254.⁷⁵ When the data for Iowa is examined, cattle and calves represent \$3,773,556; dairy products represent \$833,154; hogs represent \$6,514,512; and wool represents \$504.⁷⁶ This data provides some insight to help

67. *Id.*

68. *Id.*

69. Brune, *supra* note 7.

70. See ECON. RESEARCH SERV., U.S. DEP'T OF AGRIC., AG AND FOOD SECTORS AND THE ECONOMY, (last updated May 2, 2018), <https://perma.cc/643V-CNBY> (noting “Agriculture, food, and related industries contributed \$992 billion to the U.S. gross domestic product in 2015, a 5.5% share”).

71. *Plum Island Animal Disease Center*, *supra* note 1.

72. See *Generally* ECON. RESEARCH SERVICE, U.S. DEP'T OF AGRIC., FAQs, (Aug. 30, 2017) <https://perma.cc/XZ9T-QM62> [hereinafter FAQs]; *Plum Island Animal Disease Center*, *supra* note 1.

73. FAQs, *supra* note 72.

74. ECON. RES. SERV., U.S. DEP'T OF AGRIC., CASH RECEIPTS BY STATE, (Nov. 30, 2018), <https://perma.cc/R3RN-JKCU>.

75. *Id.*

76. *Id.*

understand why agricultural producers are hesitant to welcome the move of the research center into their backyards.

While the statics are alarming for the potential impact on the agricultural industry, we should also turn to the economic impacts seen in countries who have experienced outbreaks in order to gain insight on the full economic impact. FMD outbreaks have a devastating effect on the agricultural industry but the impact reaches other industries as well. The 2001 epidemic in the United Kingdom sparked a loss in the tourism industry.⁷⁷ This decline in tourism led to a loss of approximately £250 million.⁷⁸ In the United States, the travel and tourism industry directly contributed \$503.7 billion to the GDP in 2016.⁷⁹ Additionally, tourism was the source of 5,486,000 jobs in 2016.⁸⁰ From this information it becomes clear not only will FMD impact the agricultural industry and economics, it will also dramatically affect the travel and tourism industry. The potential economic and multi-industry consequences should be top of mind for legislation when implementing new policy to provide safeguards for the entire nation.

An additional aspect should be weighed along with agricultural and economic statistics when considering the move of Plum Island to Kansas. Kansas is located in what is commonly referred to as tornado alley.⁸¹ In 2016, the state of Kansas saw a total of 102 tornados.⁸² Of those tornados, one was considered to be violent, thirteen were considered to be strong, and eighty-eight were considered to be weak.⁸³ Since 1950 Riley County, where Manhattan is located, experienced twenty-nine tornados leading to fifty-one injuries.⁸⁴ These tornado statistics add a layer of danger to moving this research facility to Kansas. Not only is there a heightened risk of damage to the facility itself, but also a chance the weather spreads the disease faster and further if it were to escape the facility during the tornado season.

VI. LAWS, POLICIES, AND SAFEGUARDS THE UNITED STATES HAS IN PLACE

77. *Foot-and-Mouth Outbreak of 2001*, *supra* note 27.

78. *Id.*

79. WORLD TRAVEL & TOURISM COUNCIL, TRAVEL & TOURISM: ECONOMIC IMPACT 2017 UNITED STATES (2017), <https://perma.cc/YW52-NJ2A> (Sept. 27, 2018).

80. *Id.*

81. *Tornado Alley*, NAT'L CTRS. FOR ENVTL. INFO., <https://perma.cc/HRT9-8HZG> (archived Sept. 27, 2018).

82. NAT'L WEATHER SERV.; 2017 KANSAS: SEVERE WEATHER AWARENESS WEEK, <https://perma.cc/35P3-HDJY> (archived Sept. 26, 2018).

83. *Id.*

84. *Id.*

AGAINST FMD

FMD is a virus with devastating effects and could spread across the entire country in a short span of time. Due to the drastic impact FMD could have on our agricultural economy, general economy, and national morale, state and federal governments have taken steps to address the potential issues in the virus's path of expansion. Issues arise mainly because FMD is housed within personal property and livestock, but the government needs to have a mechanism allowing for interference when it poses such a substantial risk. States should consider the potential importance of provisions to carve out the right to enter onto private property, the right to quarantine, the right to dispose of such property, etc. in order to safeguard their state, and the entire nation from a potential outbreak.

Different levels and branches of government have taken on the task of prevention, containment, and recovery of FMD. States implemented laws regarding testing, quarantining, indemnifying the farmer, etc. However, state governments vary in their level of involvement. This section will compare states closely related to Plum Island's move to Kansas, as well as federal laws and court cases resulting from FMD. It will then explore potential policy considerations to be taken into account in determining if the laws and policies currently in place are adequate to safeguard our country from the movement of this disease onto the mainland of the United States.

The state laws of Iowa, Nebraska, and Kansas addressing infectious diseases, with a focus on FMD, will be analyzed and compared to determine the similarities and differences which will lead to a conclusion on whether the differences would create a larger risk for the introduction and spread of FMD. Iowa Code chapter 163 is dedicated to addressing infectious and contagious diseases among animals.⁸⁵ Iowa claims the state possesses a right to require testing,⁸⁶ a right to quarantine,⁸⁷ a right to require disinfection of a premise,⁸⁸ and a right to enter onto private property where the animal currently is or was kept in order to examine if exposure to an infectious disease had occurred.⁸⁹ While Chapter 163 of the Iowa Code addresses any infectious and contagious disease affecting animals, an entire subsection of Chapter 163 is specifically dedicated to FMD.⁹⁰ This dedication is further indication the state acknowledges the dangers and impact an outbreak of FMD would bring to their state. Iowa Code § 163.51(1) states, "[t]he department may establish

85. IOWA CODE § 163 (2018).

86. IOWA CODE § 163.1 (2018).

87. *Id.*

88. *Id.*

89. *Id.*

90. IOWA CODE § 163.51 (2018).

security measures in order to control outbreaks of foot and mouth disease in this state....”⁹¹ They include the rights listed in Chapter 163, but also the additional provisions of notification and cooperation.⁹² If FMD were to enter into Iowa, Iowa Code requires those affected notify the governor and the administrative unit of the Department of Agriculture responsible for handling the outbreak.⁹³ Iowa also requires the department cooperate with federal agencies, all Iowa state agencies and law enforcement, and other state agencies to provide the quickest and most comprehensive response to an outbreak of FMD.⁹⁴

Nebraska classifies FMD as a “category 1 foreign animal disease.”⁹⁵ The state has set forth special reporting requirements for diseases within this category. Once a diagnosis or laboratory confirmation of the disease has been made, the veterinarian or laboratory must report the results to the state veterinarian by phone.⁹⁶ When the report is made they must include information such as the clinical history, animal location, and the number of animals with the potential to be exposed or any suspected animals to be infected.⁹⁷

Kansas state law regarding FMD is found mainly in Chapter 46, Section 6 of the state code regarding the protection of domestic animals.⁹⁸ Kansas has given their animal health commissioner the ability to set and enforce sanitation regulations, as well as quarantine regulations to safeguard their state against contagious or infectious diseases.⁹⁹ Once the commissioner has made this determination, he/she must report to the governor and the sheriff and then participate in the notification and quarantine processes.¹⁰⁰ Not only does Kansas establish procedures to prevent the rapid spread of FMD within their state, they have also set forth regulations to prevent the disease from entering into their borders.¹⁰¹ Kansas established a procedure through which the state can prohibit animals coming into the state from areas where a contagious or infectious disease epidemic is occurring.¹⁰² While the laws for Iowa, Nebraska, and Kansas are not identical, they are substantially

91. IOWA CODE § 163.51(1).

92. IOWA CODE § 163.51.

93. IOWA CODE § 163.51 2(a)(1-2).

94. IOWA CODE § 163.51(3).

95. 23 NEB. ADMIN. CODE § 1-004.01A (2017).

96. 23 NEB. ADMIN. CODE § 1-004.01B(1)-(2).

97. 23 NEB. ADMIN. CODE § 1-004.01B(3).

98. KAN. STAT. ANN. § 47-635 (2017).

99. KAN. STAT. ANN. § 47-610 (2017).

100. KAN. STAT. ANN. § 47-611 (2017); KAN. STAT. ANN. § 47-613 (2017).

101. KAN. STAT. ANN. § 47-620 (2017).

102. KAN. STAT. ANN. § 47-620 (2017).

similar as they provide rights to the state to regulate private property under specific circumstances and require state personnel to cooperate with federal agencies.

Though states have laws in place, they come with hurdles to enforce them. If an outbreak of FMD were to occur, it would rapidly deplete law enforcement resources.¹⁰³ Law enforcement would assist in enforcing any quarantine orders ordered by the appropriate state official.¹⁰⁴ Additionally, if stop movement orders have been issued in an attempt to contain the outbreak, the police force would also be responsible for ensuring the orders were followed.¹⁰⁵ Finally, if an investigation to ensure acts of terrorism did not lead to the exposure were to follow, it could place an additional burden upon a police force operating with minimal resources.¹⁰⁶

While the states have these safeguards in place to provide an initial layer of protection, they could be met with some resistance by state citizens. In *Durand v. Dyson*, the owner of a FMD infected herd sought an injunction to prevent the slaughter of the herd after¹⁰⁷ the Board of Livestock Commissioners of the State of Illinois and the State Veterinarian determined the herd was infected. Acting under power granted by state law to suppress and prevent the spread of contagious and infectious disease among domestic animals, they determined the herd should be killed and the owner compensated.¹⁰⁸ The herd owners argued the law providing the power to these state agents was unconstitutional as an unreasonable exercise of the states police powers and allowed for the taking of private property without due process of law.¹⁰⁹ The court held the state may interfere with cattle infected with contagious and infectious diseases.¹¹⁰ This interference lies within the states inherent police powers because of the nexus between disease control and public health.¹¹¹ The court further stated a hearing is not required due to the urgency of eradication of the diseased animals to prevent further spread of the disease.¹¹² Additionally, compensation for animals killed to prevent the spread of diseases was addressed in *Durand*.¹¹³ The livestock owners were offered a sum of which the herd was appraised.¹¹⁴ The law –providing the state the power to eradicate the herd

103. Olson, *supra* note 54.

104. *Id.*

105. *Id.*

106. *Id.*

107. *Durand v. Dyson*, 111 N.E. 143, 144 (Ill. 1915).

108. *Id.*

109. *Id.*

110. *Id.* at 145-146.

111. *Id.* at 146.

112. *Id.*

113. *Id.* at 144.

114. *Id.*

– stated if the owner did not consent to the appraised value of their property, the state agents were able to move forward with the eradication process without providing any compensation to the owners.¹¹⁵ Further, the court stated cattle, which are infected with a contagious disease, are considered to be public nuisances under common law in Illinois.¹¹⁶ This classification of public nuisance allows for destruction of valuable property without compensation,¹¹⁷ permitting for the potential slaughter of entire herds without monetary relief.

With the brief overview of state law and an example of some issues arising in a court case, the potential hazards become more apparent. While state laws tend to be similar in the rights provided to state agents, duties to report, and duties to cooperate with federal agencies, the differences could lead to potential issues. Many states require veterinarians or laboratories to report cases of FMD once the diagnosis is made, but the timeframe the report must occur can vary from state to state. This variation could lead to a potential spread of FMD across the country if the reporting is not done in a timely manner. Another area of concern is the compensation to the owner of the herd. As a result of *Durand*, an owner could potentially receive no compensation if their herd becomes infected and must be eradicated by a state agency.¹¹⁸ The chance of receiving no compensation increases the possibility the owner would not report signs of the disease when first noticed if they believe they would be able to receive compensation by selling or slaughtering themselves. This would open up the opportunity for transportation to sale, potentially across state lines, leading to rapid spread of the disease.

State courts and legislatures are not the only branches of the government that deal with FMD. Congress, as well as regulatory bodies, have taken steps to provide safeguards against exposure and implemented policy and procedures to follow if exposure does occur.¹¹⁹ Congressional action regarding FMD is located in 21 U.S.C. § 113a, which states:

No live virus of foot-and-mouth disease may be introduced for any purpose into any part of the mainland of the United States (except coastal islands separated therefrom by waters navigable for deep-water navigation and which shall not be connected with the mainland by any tunnel) unless the Secretary [of Agriculture] determines that it is necessary and in the public interest for the conduct of research and study in the United States¹²⁰

115. *Id.*

116. *Id.* at 146.

117. *Id.*

118. *See id.*

119. *See* 21 U.S.C. § 113a (2018).

120. *Id.*

This statute reserves the availability of live FMD on the mainland United States for instances in which the Secretary of Agriculture deems necessary and in the public interest. This is an indication Congress has observed the effects of FMD outbreaks in our history and determined legislative action may need to be taken to ensure the economic stability of our nation.

Additionally, Congress has recognized neighboring countries with FMD present a hazard. Potential exposure by neighboring countries is noted in the Animal Disease Control Cooperation Act of 1947.¹²¹ This Act provides the Secretary of Agriculture authorization to cooperate with the Mexican government to carry “out operations or measures to eradicate, suppress, or control, or to prevent or retard, foot-and-mouth disease . . . where he deems such action necessary to protect the livestock and related industries of the United States.”¹²² Our neighboring countries, Canada and Mexico, have not seen an outbreak since 1952 for the former and 1954 for the latter.¹²³ Congress also enacted the Animal Health Protection Act to provide another layer of protection for the United States against diseases that could have a drastic effect on our country.¹²⁴ This act provides the Secretary of Agriculture with the power “to restrict importation, entry, or further movement in the United States, or order the destruction or removal of animals (including livestock) and related conveyances and facilities for reasons of livestock pest or disease control, or human treatment.”¹²⁵

While Congress is trying to safeguard against the presence of FMD within the United States by implementing statutes, regulation, and cooperation with neighboring governments, the Animal and Plant Health Inspection Service (APHIS) is not only implementing prevention strategies, but also sets forth multiple strategies if an outbreak were to occur.

APHIS was established in 1972 with the mission, “[t]o protect the health and value of American agriculture and natural resources.”¹²⁶ One of APHIS’ main objectives is to “defend America’s animal and plant resources from agricultural pests and diseases.”¹²⁷ APHIS commitment to their mission and the safety of our country is exhibited by the fact they are on the job twenty-four hours a day, seven

121. Animal Disease Control Cooperation Act of 1947, 21 U.S.C. § 114b (2002).

122. *Id.*

123. ANIMAL & PLANT HEALTH INSPECTION SERV., U.S. DEP’T OF AGRIC., PLANNING AND PREPARING FOR FOOT-AND-MOUTH DISEASE 2 (Sept. 2017), <https://perma.cc/9JYW-RH4S> [hereinafter PLANNING AND PREPARING].

124. Animal Health Protection Act, S.1482, 107th Cong. (2001).

125. *Id.*

126. *About APHIS*, U.S. DEP’T OF AGRIC., <https://perma.cc/7HMG-A8PF> (archived Sept. 27, 2018).

127. *Id.*

days a week.¹²⁸ This commitment is largely due to the risk of the occurrence of huge losses if any delay was encountered when an outbreak takes place.

Our best line of defense against FMD is to eliminate exposure. This is achieved mainly by working closely with U.S. Customs and Border Patrol to ensure importation restrictions and requirements are being followed.¹²⁹ Also, helping other countries eradicate the disease will in turn reduce virus circulation.¹³⁰ Finally public education regarding risks and preventative measures will help to eliminate exposure.¹³¹ However, these measures set forth by APHIS to eliminate exposure are null and void once the live FMD is present on the mainland U.S.

Realizing a complete eradication of FMD may not be viable, APHIS then turns to response strategies in case an outbreak occurs. They are quick to point out vaccination before an outbreak is not necessarily a viable option.¹³² Even though known effective FMD vaccines exist, the issue of preventative vaccination is due largely to the diverse strains and subtypes of the virus.¹³³ Since vaccines would not be effective with cross-protection, if the exact strain and subtype are not vaccinated for, no protection is provided to the animal against FMD.¹³⁴ Since an outbreak of FMD will not be of a known strain and subtype, it would render vaccination an unnecessary cost passed to the farmer with no benefit. Currently the United States pork industry is pushing for the 2018 farm bill to budget for creation, storage, and supply for an FMD vaccine.¹³⁵ The pork industry is aiming to achieve funding of \$150 million annually, which could provide 10 to 20 million doses of vaccine protecting against the twenty-three most common strains of FMD.¹³⁶ While this cost may seem high, the National Pork Producers Council has stated an outbreak of FMD could be a \$200 billion cost to the pork industry alone.¹³⁷ While industry, regulatory bodies, and the legislature are at odds in regards to the importance of vaccination against FMD as a preventative or reactive measure to an outbreak, APHIS has continually focused on managing the spread of the disease in the case of exposure.

128. *Id.*

129. PLANNING AND PREPARING, *supra* note 123, at 8.

130. *Id.*

131. *Id.*

132. *Id.* at 7.

133. *Id.*

134. *Id.*

135. Betsy Jibben, *Potential Foot-and-Mouth Disease Outbreak Would be Devastating*, AGWEB (June 12, 2017) <https://perma.cc/W97E-PNZZ>.

136. *Id.*

137. *Id.*

APHIS has developed five strategies in response to an FMD outbreak including: stamping-out; stamping-out modified with emergency vaccination to kill; stamping-out modified with emergency vaccination to slaughter; stamping-out modified with emergency vaccination to live; and emergency vaccination to live without stamping-out.¹³⁸

The response plan of stamping-out consists of the “depopulation of clinically affected and in-contact susceptible animals.”¹³⁹ However, stamping-out has its drawbacks. It is most effective for outbreaks contained to a specific region where the likelihood of the virus spreading is low.¹⁴⁰ Additionally, the availability of resources plays a critical role. When resources are limited, a prioritization of the affected animals must be done to determine those that should be stamped-out first.¹⁴¹ This process of prioritization could potentially lead to a spread of FMD by animals considered to be lower priority while waiting for resources to become available to stamp-out.

The second response plan, stamping-out modified with emergency vaccination to kill, is similar to stamping out. However, in addition to the depopulation of affected and in-contact susceptible animals, at-risk animals are vaccinated and subsequently killed.¹⁴² The process of vaccination is intended to suppress the replication of the FMD virus, which would lower the risk of contamination to other herds until the herd could be depopulated and disposed of.¹⁴³ The response plans of stamping-out modified with emergency vaccination to slaughter and stamping-out modified with emergency vaccination to live operate in the same manner except the final outcome for the vaccinated at-risk animals. The stamping-out modified with emergency vaccination to slaughter allows for the at-risk vaccinated animals to be slaughtered and processed as long as they are slaughter eligible under United States Department of Agriculture Food Safety and Inspection Service or State and Tribal authority and rules.¹⁴⁴ The stamping-out modified with emergency vaccination to live allows for the at-risk animals to be vaccinated.¹⁴⁵ In turn, this would allow for animals intended for breeding, slaughter, milking, and other purposes to avoid the depopulation process and live out their

138. PLANNING AND PREPARING, *supra* note 123, at 6.

139. ANIMAL & PLANT HEALTH INSPECTION SERV., U.S. DEP’T OF AGRIC., FOOT-AND-MOUTH DISEASE RESPONSE PLAN: THE RED BOOK 4-5 (Sept. 2017), <https://perma.cc/6M5A-ZGE4>.

140. *Id.*

141. *Id.* at 4-6.

142. *Id.* at 4-7.

143. *Id.*

144. *Id.* at 4-9.

145. *Id.* at 4-7.

useful lives.¹⁴⁶ While having these response plans in place is imperative, APHIS also realizes there are multiple ways to help implement the response plans to make them as effective as possible.¹⁴⁷ APHIS helps provide training to veterinarians to recognize FMD, coordinates with National Animal Health Laboratory Network so the labs can run preliminary testing during an investigation of potential FMD, and observes the current global status of FMD.¹⁴⁸ APHIS also focuses on carrying out exercises to ensure proper personnel understand the procedures before having to perform in a time of crisis.¹⁴⁹ APHIS has a national training and exercise program where they conduct exercises testing the Incident Command System.¹⁵⁰ These exercises are completed to ensure the proper procedure to ship, transport, and receive the FMD vaccine are followed.¹⁵¹ During the exercises they stage depopulation and disposal processes, and exercise the laboratory procedures to ensure proper procedure is followed during a time of outbreak.¹⁵² The steps taken by APHIS indicate this agency understands the severity of this disease and recognizes a proactive, rather than reactive, approach is the best way to safeguard our country.

VII. CONCLUSION

This Note explored the devastating consequences the FMD virus could have on our country by reviewing past outbreaks in the United States and the United Kingdom. With these consequences in mind, the move of Plum Island research facility to Manhattan, Kansas and possible ramifications the move could have on our country was discussed. Finally, state and federal laws were examined, case law explored, and APHIS's plans regarding if a FMD outbreak occurred. There is no clear answer on how to best protect our country from a FMD outbreak when the research facility is moved to Kansas. We currently have state laws granting rights to the states to afford protection; however, with limited resources, their involvement will likely not provide the support needed during an outbreak. APHIS has thoroughly researched and determined what the best ways to tackle an outbreak are if one were to occur. However, in order for their plans to succeed as desired, it would require cooperation from the farmer, state agents, laboratory personnel, etc. The key component to provide the most safety and security to our country, with the move of Plum Island to Kansas, is cooperation and willingness of everyone

146. *Id.* at 4-11.

147. *Id.*

148. PLANNING AND PREPARING, *supra* note 123, at 9.

149. *Id.* at 11.

150. *Id.*

151. *Id.*

152. *Id.*

involved to work together to contain the outbreak to reduce its effect of the as much as possible.