PEER REVIEWED ARTICLE

Cattle Plague and Society: Rinderpest, anthrax and epizootic control in the eighteenth century Kingdom of Sweden

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Abstract: This article presents the findings of a study showing that rinderpest and anthrax were rife among cattle in eighteenth century Sweden and Finland. These diseases, which caused a widespread loss of animals, were the scourge of owners, medical practitioners and the authorities alike. The study also shows that the epizootic legislation and disease control that evolved at government level was influenced by the particular characteristics of rinderpest and anthrax. Previous research has identified the endemic nature of rinderpest and its far-reaching consequences for society. Yet major outbreaks of anthrax, and the degree to which the disease influenced the development of State epizootic control, were previously unknown. The study uses the perspectives of cultural history and the history of veterinary medicine, a wide range of historical sources, and a method of text analysis for making retrospective diagnoses.

In this article the findings are compared with the results of studies of eighteenth century cattle disease and epizootic control in other European countries. Similarities and differences in theoretical perspectives and research methods are identified. Here the use of retrospective diagnosis in the history of veterinary medicine is discussed in particular.

Keywords: rinderpest; anthrax; cattle plague; epizootic control; retrospective diagnoses; history of veterinary medicine.

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Cattle disease and epizootic control – an area of centuries-old research

Cattle played an indispensable role in the agrarian economy on which early modern society depended. They provided traction, manure, meat, butter, hide and tallow – and many other raw materials besides. They were essential to farming and, by extension, other activities that depended on the products of farming: trade, handicrafts, collection systems and the military.

Scholars have long been aware that infectious, deadly diseases were rife among cattle in eighteenth century Europe, which resulted in State-led epizootic control in many countries. European research here stretches back more than a century. Traditionally rinderpest was thought to be the culprit behind the worst outbreaks of disease, and for the emergence of epizootic control by governments. Today rinderpest has been eradicated, but in the past outbreaks were severe.[1] The disease caused the deaths of vast numbers of cattle – a total of two hundred million animals in Europe in the eighteenth and nineteenth centuries.[2] Over the years, numerous studies have highlighted the economic, social and political significance of the disease. International research on the subject has taken place mainly within the history of veterinary medicine.[3] More recently, studies from the perspective of agricultural and environmental history have also appeared.[4] Diagnoses in previous

1 Peter L. Roeder, 'Rinderpest: The End of Cattle Plague', *Preventive Veterinary Medicine*, 102 (2011), 98–106. Crossref; Jeremy Youde, 'Cattle Scourge no more', *Politics and the Life Sciences*, 32 (2013), 43–57. Crossref

2 Reinhard Stähle, 'Verlauf und Verbreitung der Rinderpest im Herzogtum Bremen und Verden von 1715 bis 1781' (doctoral thesis, Tierärztliche Hochschule Hannover, 1981), p. 1; Clive A. Spinage, *Cattle Plague: A History* (New York, 2003), pp. 103–150. Crossref

3 For example Lise Wilkinson, 'Rinderpest and the Mainstream Infectious Disease Concepts in the Eighteenth Century', *Medical History*, 28 (1984), 129–150. Crossref; Dénes Karasszon, *A Concise History of Veterinary Medicine* (Budapest: Akadémiai Kiadó, 1988), pp. 291–300; Lise Wilkinson, *Animals and Disease: An Introduction to the History of Comparative Medicine* (Cambridge: Cambridge University Press, 1992), pp. 51–64; Robert H. Dunlop and David J. Williams, *Veterinary Medicine: An Illustrated History* (St. Louis: Mosby, 1995), pp. 277–281; C. Huygelen, 'The Immunization of Cattle against Rinderpest in Eighteenth-Century Europe', *Medical History*, 41 (1997), 182 – 196 (pp. 182–183). Crossref; Joanna Swabe, *Animals, Disease and Human Society: Human-Animal Relations and the Rise of Veterinary Medicine* (London: Routledge, 1999), pp. 78–117. Crossref; Jean Blancou, *History of the Surveillance and Control of Transmissible Animal Disease* (Paris: Office international des épizooties, 2003), pp. 161–192; John Fisher, 'To Kill or not to Kill: The Eradication of Contagious Bovine Pleuro-Pneumonia in Western Europe', *Medical History*, 47 (2003), 314–331 (pp. 314–317). Crossref; Spinage, pp. 3, 324–326.

4 For example François Vallat, *Les Bœufs Malades de la Peste: La Peste Bovine en France et en Europe XVIIIe–XIXe siècle* (Rennes: Presses universitaires de Rennes, 2009), pp. 51–95. Crossref; Karl Appuhn, 'Ecologies of Beef: Eighteenth-Century Epizootics and the Environmental History of Early Modern Europe', *Environmental History*, 15 (2010), 268–287. Crossref; Do-

research are often unclear. Diagnoses such as rinderpest and anthrax did not exist in the eighteenth century. Instead cattle diseases went by a variety of names and classifications. Scholars have therefore experienced some difficulty when identifying and separating rinderpest from other diseases.[5]

Most previous Swedish research into eighteenth century cattle disease and epizootic control was carried out in the first half of the twentieth century.[6] Earlier Swedish scholars identified rinderpest as the disease that presented the greatest danger to cattle in the Kingdom of Sweden, and exerted the greatest influence on the development of State disease control, just as elsewhere in Europe. Some scholars did suggest that anthrax may have lain behind certain epizootics. Yet no significant empirical studies of the scale of these diseases, or their methods of control, ever featured in earlier research.[7]

Given the importance of cattle in early-modern Western society, historians of various disciplines should be interested in the results of a major new study into the ravages of eighteenth century cattle disease. Empirically the study focuses exclusively on Sweden and Finland. Yet in terms of theory and methodology it ties in with similar international studies, thus contributing to current debate in the field of the history of veterinary medicine.

Research questions, source materials and theoretical perspectives

The article is based on research carried out within the framework of a wider historical research project. The empirical findings of this project have been presented earlier, as a monograph.[8] The purpose of this article is to discuss the findings

minik Hünniger, *Die Viehseuche von 1744–52: Deutungen und Herrschaftspraxis in Krisenzeiten* (Neumünster: Wachholtz, 2011).

5 Karen Brown and Daniel Gilfoyle, 'Appendix: Livestock Diseases', in *Healing the Herds: Disease, Livestock Economies, and the Globalization of Veterinary Medicine*, ed. by Karen Brown and Daniel Gilfoyle (Athens, OH: Ohio University Press, 2010), pp. 275–280 (p. 279).

6 One exception is Elisabeth Reuterswärd, 'Boskapspest och upproriska bönder: En studie i boskapspestens härjningar 1767 i Bodarps och Håslövs socknar i Skytts härad, Malmöhus län', *Ale* (1994), no. 3, pp. 19–30.

7 For example Otto E. A. Hjelt, *Svenska och finska medicinalverkets historia 1663–1812*, 3 vols (Helsingfors: Helsingfors central-tryckeri, 1891–1893), II (1892), pp. 543–550; Ernst Schoug, *Öfversigt af svenska veterinärväsendets historia* (Lund: Gleerup, 1899), pp. 14–28; Carl Gustaf Weibull, *Skånska jordbrukets historia: Intill 1800-talets början*, Skrifter utgivna av de skånska hushållningssällskapen, 1 (Lund: Gleerup, 1923), pp. 199–218; Gabriel Nikander, 'Boskapspesten i Österbotten på 1700-talet', *Budkavlen*, 16 (Åbo, 1937), 1–12 (pp. 1–4); Gustaf Utterström, *Jordbrukets arbetare: Levnadsvillkor och arbetsliv på landsbygden från frihetstiden till mitten av 1800-talet*, 2 vols (Stockholm: Tiden, 1957), II, pp. 128–131.

8 The research project was funded by the Swedish Research Council. The monograph in Swedish: Johanna Widenberg, *Den stora kreatursdöden. Kampen mot boskapspest och mjältbrand i*

more closely by comparing them with the results of studies of eighteenth century cattle disease and epizootic control in other European countries.

The boundaries of the project have been defined by two principal groups of questions, along with subgroups of questions. The first group of questions deals with the panorama of disease. Which infectious, deadly cattle diseases were prevalent in the Kingdom of Sweden in the eighteenth century? Was rinderpest predominant? Was anthrax prevalent too? If so, what were the geographic and chronological distributions of these diseases? The second group of questions concerns disease control. How did central government, the authorities, medical practitioners, livestock owners and other rural groups act in the face of cattle disease? How did State disease control develop throughout the century?

The two groups of questions have been approached differently, each group of conclusions presented in a separate sub report. Yet the source material is principally the same. Both studies are mainly based on disease reports made by county governors and medical practitioners in counties of the Swedish realm that were ravaged by some form of cattle disease in the period 1710–1780. This timeframe was chosen given that rinderpest, according to previous research, culminated at this time, a period that was therefore deemed important in the evolution of State disease control. The source material in question comprises hand-written archive documents originally held by the central bodies to which county governors and medical practitioners reported: Kunglig Majestäts kansli (the Royal Chancery), Kommerskollegium (the Board of Trade), Collegium Medicum (the College of Medicine) and Sundhetskommissionen ('the Health Commission'). Cattle-disease related correspondence between these central bodies has been analysed too.[9]

1700-talets svenska rike (Stockholm: Carlssons, 2017). This monograph was awarded a prize by the Royal Swedish Academy of Letters, History and Antiquities in 2018 and a prize by the Royal Gustavus Adolphus Academy for Swedish Folk Culture in 2019. Parts of the project have also appeared in Swedish articles and book chapters by the author of this study: 'Veterinärmedicinhistoria i omvandling', *Historisk Tidskrift*, [134,]4 (2014), 698–707; 'Retrospektiv diagnosticering inom veterinärmedicinhistoria – exemplet boskapspest', *Historisk Tidskrift*, [135,]1 (2015), 35–62; 'Kampen mot boskapssjukan i 1700-talets svenska rike', in *Reformer og ressourcer: Rapporter til det 29. Nordiske Historikermøde, Aalborg, 15–18. August 2017*, ed. by Martin Dackling, Poul Duedahl and Bo Poulsen (Aalborg: Aalborg universitetsforlag, 2017), II, pp. 11–42. The results of the project have never before been published in English.

9 The most relevant records are held by the Swedish National Archives (Riksarkivet, RA) in Stockholm. These comprise reports by county governors to the Royal Chancery (Kungl. Maj:ts kansli, SE/RA/1134), and reports by county governors and medical practitioners to two medical institutions: College of Medicine (Collegium Medicum, SE/RA/420606) and the 'Health Commission' (Sundhetskommissionen, SE/RA/420607). In this context, reports by the Board of Trade (Kommerskollegium, SE/RA/1134) to the Royal Chancery are also of great interest. Some registers in the Home Office archives (Inrikescivilexpeditionens arkiv, SE/RA/11204) have also been used. References in brackets refer to NAD, the National Archives Database.

Moreover, royal decrees, medical literature, farming books and newspaper articles dealing with cattle disease have also been studied. The analysis is based on a fully comprehensive collection of historical sources, several thousand pages of text in all.[10]

Questions have been approached and answered from both a veterinary and a culture-historical perspective. This pair of perspectives provides two diametrically opposed ways to view and study disease. The veterinary perspective represents the modern viewpoint, scientific approach and external perspective. It highlights disease as a biological phenomenon. The culture-historical perspective represents the contemporaneous viewpoint, humanistic approach and internal perspective. Here human experience and the cultural framework of disease are placed centre stage. This perspective highlights disease as a social construction.[11]

The study uses both perspectives within the framework of the same research goal. This approach is quite controversial. Many previous researchers in the history of veterinary medicine have chosen either the one or the other perspective.

Although the two perspectives have been used parallel to each other in this study, the degree of focus upon them has shifted according to the nature of each particular part of the study. For example, the veterinary perspective has set the tone when studying the panorama of disease. Using a specific method for retrospective diagnosis – described in detail below – veterinary diagnoses have been given to the cattle diseases that ravaged the Swedish realm in the eighteenth century. These diagnoses are important to determine what cattle actually died of, and to define the nature of outbreaks of disease and their course among herds. In contrast, the culture-historical perspective has characterized the study of disease control, thus focusing on concepts and attitudes to cattle disease on the part of livestock owners, medical practitioners and officials. The culture-historical method of approach highlights underlying motives for how people reacted. This perspective is important to understand how people in the eighteenth century chose to plan and organize disease control, both small-scale measures and epizootic control as a whole.[12]

[10] For a full account of the empirical bases for all parts of the study, see Widenberg, *Den stora kreatursdöden*. The current article presents only examples of empirical support for some of the more significant results.

[11] On disease as a biological and social phenomenon, see for example, Charles E. Rosenberg, 'Introduction', in *Framing Disease: Studies in cultural history*, ed. by Charles E. Rosenberg and Janet Goldman (New Brunswick, N.J,: Rutgers University Press, 1992), pp. xiii–xxvi; Jon Arrizabalaga, 'Problematizing Retrospective Diagnosis in the History of Disease', *Asclepio*, LIV (2002), 51–70.

[12] For a full account of the theoretical perspectives, see Widenberg, *Den stora kreatursdöden*, pp. 61–84.

Veterinary and cultural-historical perspectives on disease and diagnosis

While I believe modern diagnoses are valuable analytical tools in the study of historical cattle diseases, it is important that the modern diagnoses are based on a retrospective diagnostic procedure applied to the epidemics mentioned in the historical sources. This is primarily a matter of validity – ensuring that researchers are really studying the diseases they say they are studying. It is then important to get to the bottom of things when it comes to the identity of the historical diseases. This also involves safeguarding the ability to outline larger historical contexts. When modern diagnoses are assigned to historical epidemics, it may become apparent that historical disease outbreaks that have been described under several different names, in various regions and at various times, were actually caused by a single causative agent. The connection between the transmission of various contagions can thus become more apparent. Finally, this is a matter of enhancing the capacity to understand the people of the past and to make their reactions comprehensible by seeking, as far as possible, to reconstruct the medical course of events they witnessed and the medical challenges they confronted. Modern diagnoses can constitute an important knowledge base here; they can quite simply contribute to creating a holistic perspective on the disease situation. This argument is taken from environmental history. The American researcher Andrew C. Isenberg wrote in *The Oxford Handbook of Environmental History* (2014): 'environmental history understands the environment in a historical context, while at the same time understanding human history in an environmental context.'[13] The main task in environmental history is thus not only to describe how people in ancient times perceived the environment and how they acted in relation to their perceptions. The main task is also to explore important phenomena and events in the historical environment itself – for examples climate changes, earthquakes, crop failures and diseases – in order to better understand the human actions and reactions. The last statement is of great importance here. It points out that it is an urgent task to clarify the identities and characteristics of the cattle diseases in the eighteenth century Sweden and Finland.

Accordingly, I believe there are three main reasons for using retrospective diagnosis: validity, context and holistic perspective.

Not all of the scholars who have purported to write the history of rinderpest have, however, used any retrospective diagnostic method. Many have proceeded only from the disease name found in the historical sources – 'cattle plague' and

[13] Andrew C. Isenberg, 'Introduction: A New Environmental History', in *The Oxford Handbook of Environmental History*, ed. by Andrew C. Isenberg (New York: Oxford University Press, 2014), pp. 1–20 (p. 6).

the corresponding terms in the various European languages – and have assumed that these designations referred to the disease that we would today diagnose as rinderpest.

However, historians of veterinary medicine have long been aware that the use of historical terms like cattle plague as defining elements in the study of rinderpest is problematical. For example, Karen Brown and Daniel Gilfoyle, editors of the anthology *Healing the Herds* (2010), wrote: 'European accounts often referred to rinderpest as cattle plague, although, historically, a lack of diagnostic tools has meant that other diseases might have come under that same name.'[14] The researchers who use 'cattle plague' as the compass of their research on rinderpest are thus at risk of being led astray. One simply cannot rely on the historical names of diseases because, just as Brown and Gilfoyle write, there were no consistent diagnoses of cattle diseases in the distant past. 'Cattle plague' therefore may not necessarily refer only to rinderpest. The term was often used, as it is now, as a collective term for many different contagious and lethal cattle diseases. Even though this is not a new insight, many scholars have for a long time chosen to rely on the concept of cattle plague in their research on the history of rinderpest. There are several reasons for this.

To a certain extent, the approach has been a matter of convenience on the part of researchers. This applies particularly to local historical studies and general works with limited scope for diagnostic studies. By assuming that the historical term 'cattle plague' was synonymous with the modern diagnosis of rinderpest or by relying on earlier research that made this assumption, the researchers have avoided becoming entangled in complex medical arguments.[15]

Sometimes, however, this has involved explicit scepticism about retrospective diagnosis, of the very phenomenon of assigning modern diagnoses to historical diseases.[16] Here, research in the history of veterinary medicine has been influenced by the debate within the sister discipline of the history of human medicine. Historians of human medicine have long discussed the question of whether or not it is theoretically possible to establish modern diagnoses of historical diseases.

[14] Brown and Gilfoyle, p. 279. See also Peter Koolmees, 'Epizootic Diseases in the Netherlands 1713–2002. Veterinary Science, Agricultural Policy, and Public Response', in *Healing the Herds*, ed. by Brown and Gilfoyle, pp. 19–41 (p. 37).

[15] For example Wilkinson, *Animals and Disease*, pp. 35–37; Dominik Hünniger, 'Policing Epizootics: Legislation and Administration during Outbreaks of Cattle Plague in Eighteenth-Century Northern Germany as Continious Crisis Management', in *Healing the Herds*, ed. by Brown and Gilfoyle, pp. 76–91; Louise Hill Curth, *The Care of Brute Beasts: A Social and Cultural Study of Veterinary Medicine in Early Modern England* (Leiden: Brill, 2010), pp. 142–143; Hünniger, *Die Viehseuche*, p. 9.

[16] For example Hünniger, 'Policing Epizootics', pp. 76–77.

Were not the historical diseases actually completely different to the modern diseases? Can the historical diseases really be diagnosed analogously with modern diseases, based on modern medical science? The disease known by the name the 'English sweat' (Latin, *sudor anglicus*) in the fifteenth and sixteenth centuries has often been used as an example in this debate. Researchers have been unable to identify any completely fitting modern equivalent to this disease. It has thus not been possible to assign any reliable modern diagnosis to the disease, even though the symptoms are relatively well documented. The discussion concerning the nature of the 'English sweat' has been intense and consequently, doubt has been cast on whether retrospective diagnosis of historical diseases is possible in general.[17]

There has also been a debate within the history of human medicine, inspired by anthropology, as to whether it is scientifically defensible to slap modern labels on scourges that did their work under completely different names and in utterly different belief worlds during historical times. This has involved the seeking of an inside-out perspective and respect for historically settled concepts. In this debate, retrospective diagnosis has often been painted as the height of anachronism.[18] The fundamental issue of the debate has been the *reasons* for assigning modern diagnoses to historical diseases. The British researcher Andrew Cunningham generally questioned the scientific aim of studying history based on modern diagnoses: 'Most important of all, do they [the modern diagnoses, my note] tell us anything at all about *the past*, or are they simply projections backwards of present-day issues and concerns?'[19]

Many medical historians have, however, defended the use of modern diagnoses in studies of historical diseases and have emphasised the scientific value of the approach. They have also developed retrospective diagnostic methods and have successfully used them in their research – the human plague research seems to be a particularly good example here.[20]

17 Alan Dyer, 'The English Sweating Sickness of 1551: An Epidemic Anatomized', *Medical History*, 41 (1997), 362–384. Crossref; Arrizabalaga, 'Problematizing Retrospective Diagnosis'; Andrew Cunningham, 'Identifying Disease in the Past: Cutting the Gordian Knot', *Asclepio*, LIV (2002), 13–34; John Christiansen, 'The English Sweat in Lübeck and North Germany, 1529', *Medical History*, 53 (2009), 415–424. Crossref

18 Cunningham, 'Identifying Disease'; A. Karenberg, 'Retrospective Diagnosis: Use and Abuse in Medical Historiography', *Prague Medical Report*, 110 (2009), 140–145.

19 Cunningham, 'Identifying Disease', p. 13.

20 Bodil E. B. Persson, *Pestens gåta: Farsoter i det tidiga 1700-talets Skåne* (Lund: Nordic Academic Press, 2001), pp. 35–42, 62–69; Piers D. Mitchell, 'Retrospective Diagnosis and the Use of Historical Texts for Investigating Disease in the Past', *International Journal of Paleopathology*, 1 (2011), 81–88. Crossref

Retrospective diagnosis of rinderpest and anthrax

Diagnostic methods have been discussed within veterinary medical history too, but there has not been especially copious research in this particular area.[21] A few historians of veterinary medicine have presented methods for the retrospective diagnosis of rinderpest. They have, more specifically, developed diagnostic tools that make it possible to identify rinderpest in the accounts of 'cattle plague' (and equivalent historical terms in other European languages) in the historical sources and to differentiate the disease from the other diseases that may have been included in these terms in the past. Their methodological contributions have not received much attention in the research but I believe they are certainly deserving of consideration. The German veterinarian Reinhard Stähle has used a method based mainly on comparisons of mortality statistics between different outbreaks of cattle diseases. The French historian and veterinarian François Vallat has used a method based on comparisons of information about transmission, symptoms of disease, post-mortem observations and mortality for various outbreaks of cattle diseases. Both Stähle and Vallat have based their methods on the differential diagnosis technique used in medical science. They have thus sought to highlight the distinguishing characteristics of rinderpest in relation to other possible historical diseases with many similar symptoms – the 'differential diagnoses' of the diseases.[22]

The retrospective diagnostic method used in this study is also based on differential diagnostics, but the method includes additional diagnoses and also considers additional differentiating disease characteristics. The historical and source-critical arguments also form a more prominent aspect of the analysis. Simply put, the approach described constitutes a further development of the methods of Stähle and Vallat in veterinary medical and historical research.[23]

The retrospective diagnostic procedure used in this study is based on an abductive process whereby preliminary assumptions – hypotheses – are tested against analyses of empirical data. The hypotheses relate to the incidence of rinderpest and anthrax among cattle in the eighteenth century Kingdom of Sweden. The

[21] For example Stähle, 'Verlauf und Verbreitung der Rinderpest', pp. 5–20; Wilkinson, 'Rinderpest and the Mainstream'; Spinage, pp. 3–19; Vallat, pp. 13–50; Timothy P. Newfield, 'A Cattle Panzootic in Early Fourteenth-Century Europe', *Agricultural History Review*, 57 (2009), 155–190 (pp. 180–190).

[22] Stähle, 'Verlauf und Verbreitung der Rinderpest', pp. 5–20; Vallat, pp. 48–50; Norman F. Cheville, *Introduction to Veterinary Pathology*, 3rd edn (Ames: Blackwell, 2006), p. 2.

[23] For a full account of the method, see Widenberg, *Den stora kreatursdöden*. For a discussion of the retrospective diagnosis in the history of veterinary medicine, see Widenberg, 'Retrospektiv diagnosticering'.

method of analysis is text based, more specifically it analyses the nature of outbreaks as detailed in government reports, journals and books.

Disease outbreaks have been the focus of the analysis, for two reasons. First, the main body of source material – reports of disease, articles in journals, and books – relate specifically to outbreaks of disease, in other words the collective course of an outbreak among groups of cattle in villages, parishes, hundreds or counties. Analysing the details of outbreaks in the written sources thus supports an empirical way of working. Second, outbreaks of disease as phenomena have clearly defined dimensions in time and space. Studying outbreaks as they were reported and discussed at the time thus not only makes a solid diagnosis possible, it also allows us to comprehensively chart the chronological and geographic distribution of various diseases in the Swedish realm. Only significant outbreaks have been selected for the study, in other words those that in medical reports, journals and books were said to have claimed the lives of more than thirty head of cattle. This is because the study aims to take in major outbreaks of disease, those with a significant impact on agrarian society. An estimated 69 major outbreaks took place in the period 1710–1780. Their geographic distribution spanned the entire Swedish realm, in other words both Sweden and Finland, with a certain concentration in southern Sweden.[24]

The retrospective diagnostic procedure used in the study is based on differential diagnosis. On the basis of the modern diagnosis of rinderpest and its major symptoms, a veterinary description of rinderpest has been produced in relation to the most important differential diagnoses of the disease. These are malignant catarrhal fever, bluetongue disease, foot-and-mouth disease and mucosal disease, which is a form of bovine virus diarrhoea.[25] Historians have also noted malignant pulmonary disease and anthrax as historically possible differential diagnoses.[26] By systematically comparing the differential diagnoses, the most important differentiating characteristics of rinderpest are revealed. These are that the disease primarily affected cattle; it gave rise to a virulent spread of infection and high mortality; the incubation period was three to fifteen days; the disease itself lasted between six and twelve days; it caused copious ocular, nasal and oral discharges, diarrhoea containing various amounts of blood, and severe gastrointestinal injury. The disease also generated immunity in the animals that survived. In addition to

[24] For a detailed account of these outbreaks, see Widenberg, *Den stora kreatursdöden*, pp. 103–106.

[25] Blancou, p. 185; Otto Radostits, Clive C. Gay, Kenneth W. Hinchcliff and Peter D. Constable, *Veterinary Medicine: A Textbook of the Diseases of Cattle, Horses, Sheep, Pigs, and Goats*, 10th edn (Edinburgh: Saunders, 2007), pp. 1240, 1265–1266.

[26] Wilkinson, 'Rinderpest and the Mainstream', p. 129; Wilkinson, *Animals and Disease*, p. 37; Stähle, 'Verlauf und Verbreitung der Rinderpest', p. 19; Vallat, pp. 45–50; Spinage, p. 133.

general disease symptoms such as pyrexia, anorexia, reduction of rumination, reduced milk production, depression and poor general condition, the typical characteristics of the disease described above have been used to identify and differentiate rinderpest in the historical sources that describe cattle plague.[27]

Similarly, a veterinary description of anthrax in cattle has been produced both in relation to rinderpest, counted here as a historically possible differential diagnosis, and in relation to the most important differential diagnoses according to modern veterinary medicine: blackleg, malignant oedema, bacillary haemoglobinuria and hypomagnesaemic tetany. By systematically comparing the differential diagnoses, the most important differentiating characteristics of anthrax are revealed. These are that outbreaks of the disease usually occurred in the summer; it could affect animal species other than cattle; it was easily transmitted; infection spread not only between animals but also via soil bacteria; the course of the disease was very swift; it usually caused swellings in the head, throat and abdomen; ocular, oral and nasal discharges sometimes occurred; it profoundly affected the consistency of the spleen; it did not cause rigor mortis; it sometimes caused a discharge of blood from the mouth and anus shortly after death; and finally that the disease was a zoonosis, in other words it could be transmitted to humans. People who were infected developed blue-black swellings (primarily on the arms and face) or a fever, along with a marked deterioration in their general condition. In addition to general disease symptoms in cattle, such as pyrexia, anorexia, reduced rumination, reduced milk production, depression and poor general condition, the typical characteristics of the disease described above have been used to identify and differentiate anthrax.[28]

Rinderpest distribution in the Kingdom of Sweden

The study shows that in the eighteenth century Swedish realm, many outbreaks described as 'cattle plague' (Swedish: *boskapssjuka*, *kreatürssjuka*, *fäsjuka* and similar concepts) were caused by rinderpest. The disease lay behind 33 out of 69 outbreaks in all. It has been possible to connect these 33 outbreaks with information about high infection rates; acute mortality; ocular, nasal and oral discharges; severe diarrhoea and many other characteristic symptoms of rinderpest.

Through detailed information about various outbreaks provided by county governors and medical practitioners, it has been possible to reconstruct the ravages of rinderpest among cattle in the eighteenth century Kingdom of Sweden.

[27] Radostits and others, pp. 1240, 1265–1266.
[28] Radostits and others, pp. 815–818.

More specifically, the 33 outbreaks of rinderpest could be grouped into eight major events – epizootics. It has also been possible to calculate the total numbers of cattle lost in these epizootics. Many county governors submitted lists of animal deaths to their superiors. Reports of this kind were often made regularly, but the lists for certain periods are not extant. Where reporting is incomplete, the submitted figures were fleshed out by estimating the number of animal deaths based on descriptions of the virulence and the geographic and chronological distribution of the disease.

The reconstruction shows that rinderpest struck the eighteenth century Swedish realm in eight major waves, in which over 350,000 cattle were infected and died of the disease. The number of deaths has been calculated to roughly 25,000 in 1721–1724; 91,000 in 1745–1748; 103,000 in 1749–1752; 200 in 1756; 63,500 in 1762–1765; 60 in 1766–1767; 66,800 in 1767–1769; and 3000 in 1769–1771. Rinderpest affected only areas in southern and central Sweden in the eighteenth century. It never reached any further north than Stockholm. Finland, in other words, was spared the disease, as was northern Sweden. Yet the counties of Malmöhus, Kristianstad, Halland and Blekinge were struck by almost every wave of the disease, and here cattle losses were severe. About 345,700 cattle died in these counties, that is, about 98 percent of the total number.[29]

Malmöhus and Kristianstad counties were struck especially hard. The Swedish historian Carl Gustaf Weibull has, for example, estimated that the livestock in Kristianstad county decreased by half between 1749 and 1751. About 38,000 cattle died in the county during these years and according to Weibull there were only about 36,000 left in 1751. Weibull has also estimated that the number of cattle decreased by half in Malmöhus county between 1767 and 1771. About 43,000 animals died in rinderpest in the county during these years and the total number of cattle amounted, according to Weibull, to about 86,000 at the beginning of 1767.[30]

Although boundary areas between the counties of Kronoberg, Jönköping and Älsvborg were afflicted many times, losses here were fewer. Östergötland, Södermanland and Stockholm counties were affected only between 1749 and 1752, and then only on a small scale.[31]

[29] The reconstruction is based on a complete analysis of the reports by county governors to the Royal Chancery; reports by county governors and medical practitioners to the College of Medicine and Health Commission; and reports by the Board of Trade to the Royal Chancery. Descriptions of disease found in journals and farming literature have been used too. For detailed references and a further discussion about the cattle losses, see Widenberg, *Den stora kreatursdöden*, pp. 102–193.

[30] Weibull, pp. 204–208; Widenberg, *Den stora kreatursdöden*, pp. 166–168, 183–191.

[31] For detailed references, see Widenberg, *Den stora kreatursdöden*, pp. 102–193.

Anthrax distribution in the Kingdom of Sweden

Examination of the source material shows, with one exception, that all outbreaks of disease in the Kingdom of Sweden between 1710 and 1780 – if not caused by rinderpest – were caused by anthrax. Thus anthrax was responsible for 35 of a total of 69 major outbreaks of cattle plague.[32]

Finland was struck especially hard. Three of Finland's four counties (Åbo & Björneborg, Nyland & Tavastehus and Österbotten) were repeatedly afflicted in every decade from the 1730s to the 1770s. Several outbreaks extended over a number of years. One in Österbotten county lasted as long as 15 years, from 1733 to 1747. Other particularly severe, persistent outbreaks occurred in the early 1760s in the counties of Nyland & Tavastehus, Österbotten and Åbo & Björneborg. It would appear that only Kymmenegård & Nyslott county avoided anthrax in the eighteenth century; at any rate, no serious outbreaks are mentioned in official correspondence, journals or medical literature. Outbreaks of anthrax in the Swedish half of the realm were concentrated to Götaland, eastern Svealand and north-eastern Norrland. Generally Swedish outbreaks were less frequent and widespread than those in Finland. Yet outbreaks of anthrax did occur every summer in the early 1760s in parts of the Swedish counties of Östergötland, Gävleborg, Västmanland, Uppsala, Stockholm, Kopparberg and Västerbotten, just as in much of Finland. The worst anthrax years in the Swedish realm were thus the first half of the 1760s, but 1734–1735, 1744–1748, 1750–1759 and 1774–1776 were also bad years in Finland and Sweden alike.[33]

Cattle losses from anthrax were not compiled and reported as regularly as those for rinderpest, so to calculate, or even estimate, the total number of animal deaths is impossible. Yet sporadic figures do show that in parts of the country, individual outbreaks killed thousands of animals, not just cattle but horses, sheep, goats and pigs too.[34]

[32] A single outbreak (in northern Halland county in 1745–1746) has not been diagnosed due to a lack of adequate data. See Widenberg, *Den stora kreatursdöden*, pp. 232–233.

[33] This overview is based on a complete analysis of the reports by county governors to the Royal Chancery; reports by county governors and medical practitioners to the College of Medicine and Health Commission; and reports by the Board of Trade to the Royal Chancery. Descriptions of disease found in journals and farming literature have been used too. For a full account of the outbreaks of anthrax, and more detailed references, see Widenberg, *Den stora kreatursdöden*, pp. 195–231.

[34] See, for example, reports from the Österbotten county governor to the Royal Chancery, vol. 14, 12 June 1745, RA; and from the Åbo & Björneborg county governor to the Royal Chancery, vol. 21, 5 January 1775, RA.

Contemporaneous attitudes to cattle plague

The study shows that an interest in cattle diseases and veterinary medicine increased in the early eighteenth century Kingdom of Sweden, in response to the sickness and death of cattle from various infections. Major cattle losses were a scourge on agriculture. They also posed problems for the cattle trade, handicraft industries and the military.[35] Thus cattle plague soon became a question that affected the whole of society. Swedish authorities and medical practitioners tried to get a grip on the situation by drawing on current medical debate elsewhere in Europe. This debate centred on the teachings of classical antiquity relating to disease, infection and diagnosis. Two doctors were constant references. These were Bernardo Ramazzini (1635–1714) and Giovanni Maria Lancisi (1654–1720). They had published their theses in the wake of the ravages of rinderpest in Italy at the beginning of the century.[36]

In the first half of the eighteenth century, authorities and medical practitioners drew no real distinction between the cattle diseases that ravaged the Kingdom of Sweden. All epizootics often simply went by the same name: cattle plague (Swedish: *boskapssjuka*, etc). The same was true for many cattle owners, who often witnessed only a single infectious cattle plague, namely the one that ravaged their own settlement or parish.[37]

However, by the mid-eighteenth century, authorities and medical practitioners were beginning to realize that cattle plague was not a uniform phenomenon across the kingdom. Articles in journals and books, along with reports to the Royal Chancery and medical institutions, showed that outbreaks of disease varied with some regularity in different parts of the country. Thus authorities and medical practitioners increasingly referred to cattle plague in terms of regional variants. This was wholly in line with the topographic mindset and classification systems that characterized eighteenth-century medical convention. Three main domestic variants emerged in general discussion. The disease type that ravaged the Scania

[35] For example reports by the Kristianstad county governor to the Royal Chancery, vol. 3, 19 December 1721, RA.

[36] For example reports to the College of Medicine, E2, vol. 23, p. 352, 13 November 1768, RA. See also Karasszon, pp. 292–294; Wilkinson, *Animals and Disease*, p. 40–44; Spinage, pp. 8, 107–111.

[37] The term *boskapssjuka* is used synonymously with various similar terms such as *fäsjuka*, *kreatursspest*, *kreaturssjuka*, *kreaturspest*, *boskapspest* and *oxpest*. See, for example, 'Kongl. Maj:ts Nådige Förordning, Huru förhållas bör, til förekommande af den på åtskille Orter i Riket upkomne Boskaps-siukan Och Fänads-Pesten', 3 January 1722, and 'Kort och nödig underrättelse, huru then i nästgräntsande orter och Länder gångbara Boskaps Siukan förekommas, samt therest then sig insmyga skulle, botas må', 30 December 1745, Swedish official publications (Stockholm).

region and its vicinity was referred to as 'Scanian cattle plague'. It was considered identical to 'European cattle plague', in other words the disease referred to by Ramizzini and Lancisi, among others. The disease that caused severe outbreaks in eastern central Sweden in the 1760s was called 'Svealand cattle plague'. The variant that plagued Norrland and Finland was deemed a further type. It was termed 'Norrland or Finland cattle plague'. Attitudes to these disease variants differed between medical practitioners. Some considered cattle plague in the kingdom to vary in nature, taking different forms in various parts of the country. The different types, these practitioners maintained, were simply regional variants of one and the same cattle plague. Others thought the situation varied across the kingdom, and that regional variants were in fact separate diseases.[38]

Whatever the case, authorities, medical practitioners and livestock owners noticed that the spread of disease varied across the country. Cattle plague in Scania and its environs, as elsewhere in Europe, was thought to spread via physical contact, in other words directly between animals or indirectly between animals and contaminated objects. The means of infection, interpreted according to classical teachings, was referred to as *contagion* (Latin for touch). Cattle plague in Norrland, Finland and the Svealand region was also thought to spread via physical contact. Yet in these self-same areas it was also believed to occur spontaneously – within cattle themselves – in certain environments, before spreading to other animals. This means of infection was also described according to the teachings of classical antiquity. The medical term used was *miasma* (unclean air in Greek). Vaporous marshy wetlands, given their perceived ability to produce unclean air, were thus thought to pose an acute risk of infection.[39]

Combining the culture-historical analyses and the retrospective diagnoses shows that all outbreaks of disease attributed to 'Scanian cattle plague' in the eighteenth century were caused by rinderpest. This explains the similarities that authorities and medical practitioners saw between the disease that ravaged Scania and that on the Continent. It also explains the references to contagion, which was of course the main way in which rinderpest spread. Officials and medical practitioners sometimes experienced difficulties in identifying Scanian cattle plague, in

[38] Haartman, Johan, 'Bref ifrån Åbo dat. den 9 juli', *Inrikes Tidningar*, no. 66, 3 August 1761; *Afhandling om några Farsoter Ibland Hästar och Boskaps Kreatur, som De sist förflutne åren, uti åtskillige Rikets Provincer warit gångbare* (Stockholm, 1766).

[39] For information on contagion and miasma, see Karasszon, pp. 66–7, 325; Bodil E. B. Persson, *Gud verkar med naturliga medel: Pestens härjningar i Skåne 1710–1713* (Lund: Nordic Academic Press, 2006), pp. 24–25, 51; J. N. Hays, *The Burdens of Disease: Epidemics and Human Response in Western history*, 2nd edn (New Brunswick: Rutgers University Press, 2009), p. 109.

the case of particular current outbreaks, yet on a wider theoretical level – aided by international discussion on the subject – they identified it as a specific disease.

Combining the culture-historical and veterinary perspectives also shows that all outbreaks of disease attributed to Norrland and Finland cattle plague, and Svealand cattle plague too, were caused by anthrax. The fact that anthrax lay behind these outbreaks would explain the use of the classical term miasma to characterize the spread of the disease, along with that of contagion. Authorities, medical practitioners and livestock owners noted how symptoms would appear suddenly among cattle that had grazed in certain pastures, often water meadows, before the disease spread to other animals. We know of course that this is the way anthrax usually spreads: grazing cattle first ingest spores from pasture earth, where bacteria may have lain dormant for decades, before the disease passes to other animals. Later, bacteria sometimes return to the ground, in the contaminated blood and other bodily fluids of animal carcasses.[40]

Disease control: aims and development

How then did people in the eighteenth century Sweden and Finland chose to plan and organize the disease control? The study shows that State disease control was organized at various governmental levels. Central government controlled and directed efforts by drawing up general regulations, in among other ways. Provincial doctors, barber surgeons and other medical practitioners reported the national situation to both the government and the medical authorities College of Medicine and the Health Commission. Supervised by county governors, disease control was carried out by public officials in counties, settlements and farms. Livestock owners, breeders, dealers and butchers – and other groups whose interests lay in livestock – would usually follow official regulations, frequently working alongside public officials. Yet these groups often took additional, personal measures to protect their livestock and the economic value therein.

The Crown issued two decrees relating to cattle plague, the first in 1722 and the second in 1750, with various amendments. Both decrees strictly regulated trade in times of plague, stipulating cordons between farms and settlements, decontamination of cattle sheds and equipment, and the careful disposal of carcasses. These measures were thus the central features of State disease control throughout the century.

The study shows that the deciding factor for the design and development of State disease control in the eighteenth century Kingdom of Sweden was twofold:

[40] For a detailed account, see Widenberg, *Den stora kreatursdöden*, pp. 239–267.

partly negotiation between central authorities and local groups affected by disease-control work; and partly the nature of the diseases facing central authorities and other affected parties. Here we must note a significant development. Initially the Swedish government designed disease control mainly according to foreign example. But as the century wore on, disease reports flooding in to the central authorities from all corners of the kingdom began to exert an ever-greater influence. At the same time, increasing consideration was given to the wishes and ideas of public servants, medical practitioners and cattle owners in terms of the development of disease control in various parts of the country. And rural populations and local businesses were treated with ever-more respect regarding the economic consequences of disease control in their areas. This meant the nature of government disease control became increasingly diversified. First, the State *modified regulations* to meet the wishes and complaints of various parties. Second, it initiated and approved many *control methods outside the regulations*, methods aimed at certain disease variants or otherwise requested by local parties. Third, central government, county governors and Crown representatives continually *adapted the practical application of regulations* according to the nature of specific diseases that ravaged particular areas, and according to the demands of influential groups in rural society. This may be illustrated by analysing the form of certain key regulations and activities within State disease control:

Trade ban and the health certificate: The decree of 1722 banned all trade between infected and uninfected counties, including live animals and animal products alike. But this rigid trade law led to a lack of raw materials and foodstuffs, including meat, in towns. Vocal protests by cattle dealers, butchers and tradesmen led to the introduction of a health certificate in the decree of 1750. This new regulation allowed trade with infected counties providing each animal was accompanied by a bill of health, and came from an uninfected area of an otherwise infected county. This, then, was a compromise between conflicting interests – the desire for trade and an effort to reduce the spread of infection.[41]

Disposal of carcasses and the right to obtain meat: The decrees of 1722 and 1750 included detailed instructions for dealing with diseased animal carcasses. Both decrees demanded the immediate burial of all animals that had died or had been destroyed. All forms of obtaining meat were thus forbidden. This rule, requiring the burial of the entire animal, was based on the centuries-old fear that

[41] 'Kongl. Maj:ts Nådige Förordning, Huru förhållas bör', 13 January 1722, and 'Kungl. Maj:ts Förnyade Nådiga Förordning Angående Boskaps siuka och Fänads Päst', 23 March 1750, Swedish official publications, (Stockholm), paragraph 7. For meat requirements see, for example, the report from the Board of Trade to the Royal Chancery, 23 November 1748, RA.

eating meat from sick animals was unhealthy. In summer 1750, though, central government issued an exception from this rule in the form of a royal letter. This gave butchers in Stockholm the right to cut up and sell meat that showed only slight signs of disease. The following year saw the exemption extended to all parts of the kingdom afflicted by cattle plague.[42] One reason for this government exemption was an acute lack of meat in southern Sweden in the late 1740s and early 1750s, largely caused by the ravages of rinderpest in Scania and Småland. Cattle dealers, butchers and consumers complained vehemently, especially in Stockholm. In the ensuing debate on the edibility of meat, many claimed that meat from diseased animals was often of good quality. This domestic debate had influenced the government. In other words the State had felt the impact of the discussions on rinderpest. However, in the mid-1760s the exemption was revoked. This time, though, reports of anthrax were influential. The fact is that anthrax was rife in the Swedish realm in the early 1760s. Although the kingdom had experienced outbreaks of anthrax before, their intensity was particularly acute this time. Anthrax is a zoonosis, meaning it can be transmitted from animals to humans, a frequent occurrence on eighteenth century farms and settlements. Livestock owners and butchers often became infected when skinning and butchering infected carcasses. Reports to this effect flooded in from all corners of the kingdom in the early 1760s. Once again, the risks associated with eating meat from diseased animals became a subject of discussion. The debate influenced the government, which thus decided to revert to the rules of the Crown decrees, which demanded the burial of the entire carcass.[43]

Quarantine, cordons and land use: The quarantine of infected livestock, a provision of both decrees, was a widely practised eighteenth century method of control. The measure was, though, particularly common in southern Sweden. In this part of the country, cordons sanitaires were established around infected farms, and the authorities would often call in the army to keep order. One such cordon, for example, which the Malmöhus county governor set up around some villages outside Malmö in 1767, was patrolled for several months by six hundred soldiers.[44] Given that Scanian cattle plague – rinderpest – was known to spread by direct contact alone, isolating cattle was considered an acceptable method of control. In areas afflicted by anthrax, the authorities and medical practitioners instead encouraged livestock owners to

[42] Register in Home Office archives, B1A, 21 August 1750, 724–725 and 5 February 1751, 146–148, RA.

[43] See, for example, Johan Haartman, 'Fortsättning af Assessoren Hartmans berättelse om Boskapssiukan i Finland', *Inrikes Tidningar*, no. 86, 12 October 1761. For a detailed account, see Widenberg, *Den stora kreatursdöden*, pp. 343–349, 376–381.

[44] Several reports by the Malmöhus county governor to the Royal Chancery, vol. 29, July and August 1767, RA.

keep their animals away from certain types of land, or at least alter its use. It was well known that cattle plague in Finland, and certain parts of Sweden, would sometimes occur spontaneously in animals on certain types of land. Allowing animals to graze in waterlogged areas, inhaling the vapours of marshes and bogs, was regarded as hazardous. The same was true of allowing livestock to drink from stagnant water on grazing land. To control cattle plague in these areas, the authorities and medical practitioners therefore recommended that animals be kept in enclosures. Some took their argument further, recommending land improvement, in other words ditching and draining particularly infectious wetlands.[45] Many of these measures, though, were never implemented.[46]

Slaughter: The royal decrees for controlling cattle plague included regulations for how livestock owners and authorities should dispose of animal carcasses – the rules did not say, though, that sick animals should be put down. Yet slaughter, in various forms, did happen throughout the eighteenth century. Initially livestock owners were sceptical when the authorities suggested destroying sick animals, but the offer of economic compensation soon won them round.[47] It is worth noting that slaughter as a method of control was only discussed and implemented in the case of Scanian cattle plague – rinderpest – and not in relation to Finland and Norrland cattle plague or Svealand cattle plague – anthrax. The authorities and medical practitioners were well aware that the cattle plague in Svealand, Norrland and Finland was spread not only by direct physical contact, but also via contaminated soil, and that these disease variants, in consequence, could not be tackled by the slaughter of animals alone.[48]

Inoculation: Inoculation was used to combat rinderpest in many eighteenth century European countries.[49] Yet inoculation was never adopted in the Kingdom of Sweden. This was due to various reasons. One was that many medical practitioners doubted the existence of immunity from cattle plague. This was because their ideas about immunity were based on observations of many different outbreaks of disease in the kingdom. Their observations, in other words, were based not only on outbreaks diagnosed by the present study as rinderpest, but also outbreaks attributable to anthrax – which would explain the medical practitioners' doubts. The few attempts at inoculation in the eighteenth century Swedish realm very probably included anthrax-infected animals too: here I have in mind the unsuc-

45 See, for example, the report by the Österbotten county governor to the Royal Chancery, vol. 15, 17 September 1747, RA.

46 For a detailed account, see Widenberg, *Den stora kreatursdöden*, pp. 321–341, 415–421.

47 See, for example, several reports by the Malmöhus county governor to the Royal Chancery, vol. 29, in April, May, June and July 1767, RA.

48 For a detailed account, see Widenberg, *Den stora kreatursdöden*, pp. 350–369.

49 Huygelen, pp. 182–196; Wilkinson, *Animals and Disease*, pp. 36–37.

cessful experiment by the provincial doctor R.B. Hast in Österbotten county in 1761.[50] Lifelong immunity awaited any animal that recovered from rinderpest and, accordingly, any animal that was successfully inoculated and survived. But anthrax provided no immunity in the same way as rinderpest, and inoculation was thus impossible at this time.[51]

Conclusions: the panorama of disease in relation to previous research

The study provides a comprehensive image of the distribution of rinderpest in the Kingdom of Sweden. It also gives a broad picture of the recurrent incidence of anthrax among cattle in the kingdom in the eighteenth century. This study, in contrast to previous Swedish research, is based on a systematic, retrospective diagnostic procedure, which thereby provides greater validity than previous Swedish regional and local studies. The account of the ravages of rinderpest in the kingdom thus concerns rinderpest alone, not infectious, deadly cattle diseases in general. The same is true for the account of the distribution of anthrax.

However, the study does support numerous findings of previous Swedish research. For example, many of the local history studies of rinderpest in Malmöhus and Kristianstad counties by the historian Carl Gustaf Weibull have been confirmed. The same is true for some of very general claims for the distribution of rinderpest in the kingdom by the veterinary surgeon Ernst Schoug.[52]

But the study refutes many earlier – frequently cited – claims about the incidence of rinderpest and anthrax in the Swedish realm. For example, the claim by the doctor and researcher Otto Hjelt that anthrax broke out in 1745 in Scania, spreading north in 1750 through Östergötland towards Stockholm, could not be supported. Neither could Schoug's claim that rinderpest was rife in the Helsinki area of Finland in the 1740s, and in Västergötland in Sweden in the 1750s. Last but not least, the claim by historian Gustaf Utterström that rinderpest ravaged the Swedish county of Halland in the 1770s was completely disproven.[53]

The results of the study have thus revised much previous Swedish research on eighteenth century cattle diseases. Yet the project has also resolved the question of the uncertain claims about the prevalence of rinderpest and anthrax in the

[50] Report to the Health Commission, E3, vol. 2, 26 August 1761, 468–469, RA.

[51] Some examples of regulations and methods have been discussed here, to shed light on general characteristics and paths of development. Yet disease control in the kingdom in the eighteenth century involved many other regulations and methods – generating involvement, protest, compromise and debate – than those described here. For a detailed account, see Widenberg, *Den stora kreatursdöden*, pp. 278– 432.

[52] Weibull, pp. 199–208; Schoug, pp. 14–24.

[53] Hjelt, pp. 543–550; Schoug, pp. 14–15, 21; Utterström, vol. II, pp. 130, 264.

Swedish realm that have appeared in international research over the years, most recently in *Cattle Plague: A History* by Clive A. Spinage (2003). Spinage claims, for instance, that many accounts of infectious cattle diseases in the eighteenth century Kingdom of Sweden *probably* describe anthrax. He also expresses *doubt* if the kingdom was ever afflicted by rinderpest in the eighteenth century at all.[54]

How, then, do the Swedish outbreaks of rinderpest and anthrax differ from the epizootics elsewhere in Europe? International research on the history of anthrax is by nature quite general, especially where eighteenth century Europe is concerned. Current research does suggest, though, that anthrax affected Europe on a small scale from the days of antiquity onwards,[55] only in the early eighteenth century becoming increasingly infectious, causing ever greater outbreaks as a result. According to the American scholar David M. Morens, the largest epizootic outbreaks of anthrax in Europe occurred in 1712 and, in outbreaks Morens describes as panzootics, in 1757–1763, 1774–1780 and 1786–1793.[56] In this context the periods 1757–1763 and 1774–1780 are particularly interesting, as they show that many of the virulent outbreaks of anthrax that afflicted Sweden and Finland were parts of major European anthrax panzootics.

The accounts of the ravages of rinderpest on the European cattle population tally quite well with one another, at least in terms of chronology. The majority of previous scholars maintained that the first major wave of rinderpest outbreaks in Europe occurred in 1710–1722. The 1730s saw only sporadic outbreaks. In 1744 rinderpest returned with full strength. In the mid-1740s the majority of European countries experienced the worst waves of the disease; livestock losses peaked at this time. In the 1750s, 1760s and 1770s further major outbreaks occurred in Europe. Thereafter only minor outbreaks took place. However, in the 1860s and 1870s rinderpest returned with full force in some European countries.[57]

54 Spinage, pp. 86, 133, 160.

55 Blancou, pp. 79–82; George Sternbach, 'The History of Anthrax', *The Journal of Emergency Medicine*, 24, (2002), 463–467. Crossref; Maxime Schwartz, 'Dr. Jekyll and Mr. Hyde: A short history of anthrax', *Molecular Aspects of Medicine*, 30 (2009), 347–355. Crossref

56 David M. Morens, 'Characterizing a "New" Disease: Epizootic and Epidemic Anthrax, 1769–1780', *American Journal of Public Health*, 93 (2003), 886–893. Crossref

57 Hans Kilian, 'Die Bekämpfung der Rinderpest in Mecklenburg-Strelitz (1769–1780)' (doctoral thesis, Tierärztliche Hochschule Berlin, 1934), pp. 1–57; Reinhold A. Dorwart, 'Cattle Disease (Rinderpest?): Prevention and Cure in Brandenburg, 1665–1732', *Agricultural History*, 33 (1959), 79–85; Stähle, 'Verlauf und Verbreitung der Rinderpest', pp. 5–13, 133–138; John Broad, 'Cattle Plague in Eighteenth-Century England', *Agricultural History Review*, 31 (1983), 104–115; Lotte Dombernowsky, 'Ca 1720–1810', in *Det danske landbrugs historie*, ed. by Claus Bjørn and others, 4 vols (Odense: Landbohistorisk Selskab, 1988), II, pp. 211–394 (pp. 234–235); Dunlop and Williams, pp. 277–280; Blancou, pp. 161–191; Spinage, pp. 103–216; Vallat, pp. 51–95; Appuhn, pp. 268–287; Koolmees, p. 22–24, 37;

Various scholars studying the history of rinderpest have used retrospective diagnosis, among them Reinhardt Stähle and François Vallat,[58] but the majority have not analysed the original diagnoses in any detail. They have taken for granted that many names of diseases in historical sources are more or less synonymous with the modern diagnosis of rinderpest, using this as a starting point in their research. However, this approach, in my view, is highly problematic, an opinion I share with many researchers.[59] The present study shows that many of the names of diseases found in historical sources cannot simply be translated as the modern term 'rinderpest'. In the eighteenth century Kingdom of Sweden, outbreaks of disease described in terms of 'cattle plague' (Swedish: *boskapssjuka*, *kreaturssjuka*, *fäsjuka* and similar concepts), were not only rinderpest, but anthrax too.[60]

Conclusions: disease control in relation to previous research

Previous research into the history of veterinary medicine has traditionally viewed the types of disease control that were developed in eighteenth century European states against a background of the ravages of rinderpest. This field of research has regularly described rinderpest as the disease that led to the earliest epizootic legislation, the first centrally organized methods of control, and the earliest government veterinary services in Europe.

Moreover, scholars often maintain that all control methods developed in eighteenth century European countries blighted by rinderpest, took the form of nationally adapted variants of the anti-rinderpest measures drawn up by the Italian doctor Giovanni Maria Lancisi.[61] Over the years, the nature and form of control programmes in various countries have been analysed from this perspective, for example those in France, England, Holland, and the duchies of Schleswig-Holstein, Mecklenburg-Strelitz and Prussia. These national studies confirm that the methods of control, in the spirit of Lancisi, included such measures as trade bans, cordons, the burial of whole carcasses, and various forms of slaughter.[62]

Carsten Porskrog Rasmussen, *Det Sønderjyske Landbrugs Historie 1544–1830* (Aabenraa: Historisk Samfund for Sønderjylland, 2013), pp. 253–257.

58 Stähle, 'Verlauf und Verbreitung der Rinderpest', pp. 5–20; Vallat, pp. 48–50.

59 Brown and Gilfoyle, p. 279.

60 For a full account of the results of the study, see Widenberg, *Den stora kreatursdöden*, pp. 247–267, 439–449.

61 Karasszon, p. 293; Adriano Mantovani and Riccardo Zanetti, 'Giovanni Maria Lancisi. De Bovilla Peste and Stamping Out', *Historia Medicinæ Veterinariæ*, 18 (1993), 97–110 (pp. 97, 101).

62 Kilian, pp. 1–56; Broad 1983, p. 104–115; Wilkinson, *Animals and Disease*, pp. 35–64; Spinage, pp. 219–446; Vallat, pp. 109–290; Hünniger, 'Policing Epizootics', pp. 76–91; Koolmees, pp. 19–41; Hünniger, *Die Viehseuche*, p. 119–210.

Yet the latest research in this field has found significant differences between the control methods that were developed in different eighteenth century European countries. The question of why control programmes took different forms in different states has been a subject of lively debate over the past few years.[63]

Here some scholars argue that the answer lies in the differences in governmental structures and political and economic conditions between states. For example the Australian historian John Fisher draws an important distinction, in terms of the nature of eighteenth- and nineteenth-century control programmes, between European states characterized by authoritarian power, highly regulated bureaucracy, and a traditional agrarian economy, such as France and Prussia on the one hand, and states characterized by devolved central power, less bureaucracy and commercially orientated industry, such as Holland and Great Britain on the other hand. The first type of state, as a rule, developed strict control programmes including bans, restrictions and compulsory measures for livestock owners and merchants. The second type of state showed far less appetite for systematically interfering with private commerce, other activities and the nature of ownership, and as such generally avoided wide-ranging solutions.[64]

Other scholars seek answers in the political culture that characterized the relationship between states and citizens, central power and local society. Here they point out that all European governments – both authoritarian and devolved – were forced to negotiate with citizens in order to implement their measures. The German environmental historian Dominik Hünniger, for example, emphasizes that control measures in the duchy of Schleswig Holstein regularly entailed compromise.[65]

Many arguments from previous research on European disease control are important for our understanding of the present study. The example of Sweden tallies with previous European research in a number of ways. The form of veterinary disease control developed in the Swedish realm in the early 1720s was characterized, for example, by the ravages of rinderpest – as it was elsewhere in Europe. The royal decree of 1722 set the agenda for disease control in practice. It was drawn up at a critical time, when rinderpest had just spread from the Continent to Scania for the first time. European debate on rinderpest influenced the wording of the decree. The control of contagion stood centre stage. Many of the guidelines that Giovanni Maria Lancisi drew up – such as quarantine, trade bans, and the treatment of carcasses – feature in the decree of 1722.[66]

63 See for example Wilkinson, *Animals and Disease*, pp. 35–64; Spinage, pp. 103–160.

64 Fisher, pp. 315–317.

65 Hünniger, *Die Viehseuche*, pp. 9–18, 119–160, 213–215; Hünniger, 'Policing Epizootics', pp. 77–85.

66 'Kongl. Maj:ts Nådige Förordning, Huru förhållas bör', 13 January 1722.

In addition, the argument about various forms of government power can obviously help to explain why the type of disease control that developed in the Swedish realm had its own district nature. The Swedish State, as with France and Prussia, was characterized by strong central power, a developed administration and an agrarian economy. And Swedish disease control, as one might expect, came to be characterized by highly regulated bureaucracy, numerous mandatory measures and far-reaching control.

One of the study's clearest findings, though, is that government disease control was also characterized by negotiation, more specifically by the many compromises between the Swedish State on the one hand, and livestock owners, businesses and other representatives from local society on the other. The compromises sometimes resulted in economic compensations for the latter. As mentioned above, Swedish central government would also alter regulations, and how they were implemented, according to the wishes and complaints of local society. In addition, the State was willing to take action outside the rule book. Thus the prevailing political culture at government level may also help to explain the direction and development of Swedish disease control throughout the century.[67]

Yet the study also shows that eighteenth century government disease control in the Kingdom of Sweden was heavily influenced by the nature of epizootics. The significant influence of rinderpest was previously well known. But unknown until now was the great extent to which anthrax influenced the development of disease control throughout the century. Anthrax, in common with rinderpest, decimated cattle herds. In some areas it was as big a scourge on livestock owners, businesses, authorities and medical practitioners as rinderpest. The fact that cattle diseases could behave differently, infect differently, and progress differently was well known throughout the kingdom in the eighteenth century – even if the *diagnoses* rinderpest and anthrax did not yet exist. This study shows that Swedish authorities and medical practitioners used various contemporaneous terms to define the characteristics of the disease variants they faced, not least the terms 'contagion'

[67] In this aspect, the result of this study also tallies with previous Nordic research. Here I have in mind the research project 'Central Power and Local Society in the 18th Century' in the 1970s and 1980s. Several studies in this project highlighted the importance of negotiations and compromises in the relationship between the central power in and the local societies in the Nordic countries. See, for example, Birgitta Ericsson and Ann-Marie Petersson, 'Centralmakt och lokalsamhälle på 1700-talet. Presentation av ett internordiskt forskningsprojekt', *Historisk Tidskrift* [99,]1 (1979), 24–31; Kalle Bäck, 'Bondeopposition och bondeinflytande under frihetstiden: Centralmakten och östgötaböndernas reaktioner i näringspolitiska frågor' (doctoral thesis, Stockholms universitet, 1984); Harald Gustafsson, *Mellan kung och allmoge: Ämbetsmän, beslutsprocess och inflytande på 1700-talets Island*, Stockholm studies in history, 33 (Stockholm: Almqvist & Wiksell international, 1985). For a more detailed discussion, see Widenberg, *Den stora kreatursdöden*, pp. 450–463.

and 'miasma'. The study also shows that the State adapted the regulations, and how they were applied in practice, according to the nature of a current disease. Both chronological and geographic variations within State disease control may be attributed to the prevalence of various diseases within the Swedish realm.

At times and in places where rinderpest was at its height, disease control focused on preventing contagion between animals. Thus trade was closely monitored, cordons were erected between settlements, and slaughter was implemented to cull disease-bearing animals. The emergence of immunity in recovering livestock, which became a source of fascination, led to inoculation being promoted as a feasible method of control. By law, infected carcasses had to be disposed of, but at times when meat was scarce, some degree of collection from the carcasses of sick animals was allowed.

At times and in places where anthrax was at its height, disease control focused not only on preventing contagion between animals, but also on preventing outbreaks on particular types of land. Certain measures, such as slaughter, were regarded as meaningless because they did nothing about infected soil. In addition certain activities were regarded as hazardous, such as obtaining meat from diseased carcasses. Moreover, doubts about immunity contributed to inoculation generally being dismissed as a control method in the Kingdom of Sweden.

The actual panorama of disease in the Swedish realm thus goes a long way to explain the form and development of eighteenth century State disease control. But it also explains why it developed a certain national character, which contrasted with disease control in other countries. For example, slaughter was never prescribed by royal decree; nor was it generally practised in the Kingdom of Sweden, as it was elsewhere.[68] In addition, inoculation never became widespread in the kingdom, despite its popularity as a method of control in the rest of Europe.[69] Moreover, much of the medical debate in the Swedish realm focused on grazing routines, improving land and avoiding soil-based infection.[70]

Implications for future study

In this study, veterinary perspectives and cultural-historical perspectives have been combined. This has yielded important results. The exceptionally common claim among historians of veterinary medicine throughout the twentieth century – that rinderpest was pivotal in shaping national epizootic legislation and disease

[68] Wilkinson, *Animals and Disease*, pp. 42, 52–53, 58–59; Spinage, pp. 109–114, 127–131; Fisher, pp. 314–316.

[69] Huygelen, pp. 182–196.

[70] For a more detailed discussion, see Widenberg, *Den stora kreatursdöden*, pp. 450–463.

control in eighteenth century Europe – should be revised in the case of Sweden.[71] Here anthrax played a key role too. Both rinderpest and anthrax fell under the eighteenth century term 'cattle plague' (Swedish: *boskapssjuka* and similar concepts), and this was the disease that government control had in its sights.

A text analytical method of retrospective diagnosis was presented in this article, but as earlier research has shown historical diseases can be diagnosed in many ways. The most suitable method must be determined by the research question, the source material and the historical context. However, the importance of using some form of retrospective diagnosis cannot be emphasised strongly enough in this article. First and foremost, this involves strengthening the validity of research, ensuring that research that purports to examine a particular cattle disease is actually about that specific disease and not about contagious and lethal cattle diseases in general. But it is also a matter of reconstructing the medical situation and the agrarian challenges that the people in the past confronted. It is more precisely a matter of enabling the closer study of various cattle diseases in the past in order to gain deeper understanding of the animals' suffering, the human reactions and the impact on agrarian society.

The results of the study have important theoretical and methodological implications for international research. In all probability, closer veterinary analyses of specific contexts in other European countries – including a wider use of retrospective diagnosis – will reveal that a greater number of infectious, deadly diseases than simply rinderpest severely ravaged cattle in the eighteenth century. And it is likely that culture-historical studies of human conceptions and reactions will show that more cattle diseases than just rinderpest helped to shape the nature of disease control in other European countries.

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[71] This claim appears, for example, in Wilkinson, *Animals and Disease*, 35–38, and Dunlop and Williams, 277–281.