CHAPTER 10

Social Construction of Tick-Borne Diseases from the 1950s to the Twenty-First Century: a View from the History of Medicine

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1 Introduction

This chapter examines changes in the public perceptions of tick-borne diseases as a health risk to humans since the 1950s. The topic is approached from the perspective of the history of medicine and health in the Finnish context. As stated in the introduction to this book, the most important tick-borne diseases in Finland are borreliosis (Lyme disease), a bacterial infection affecting the skin, nervous system, joints, and heart, and tick-borne encephalitis (TBE), a viral infectious disease that attacks the central nervous system and can even lead to death.[1] These are emerging infectious diseases that are increasing in number and geographic range. This is mostly because climate change and global warming have allowed ticks to spread further north.[2]

Both TBE and borreliosis are caused by pre-existing pathogens that were previously unknown or very little was known about them. As the previous chapter shows, the role of ticks as vectors of animal diseases had already been established at the end of the nineteenth century,[3] but it was not until the 1950s that Finns came to understand that ticks were also to blame for the mysterious brain inflammation afflicting humans that is known today as TBE.[4] Tick-borne diseases have been seen as an example of new risks generated by technologies and human activities, which Anthony Giddens and Ulrich Beck have argued threaten modern societies.[5] However, the health risk they pose has not always

1 Jukka Hytönen et al., "Puutiainen ja sen levittämät taudit," *Duodecim Terveyskirjasto,* June 9, 2021, https://www.terveyskirjasto.fi/kpp00002.

2 I. Rochlin and A. Toledo, "Emerging Tick-Borne Pathogens of Public Health Importance: A Mini-Review," *Journal of Medical Microbiology* 69, no. 6 (2020), doi:10.1099/jmm.0.001206.

3 See Taina Syrjämaa's chapter in this volume.

4 "Kumlingesjukan är fortfarande ett mysterium," *Hufvudstadsbladet,* December 6, 1950; "Punkit levittävät yhä enemmän sairauksia", *Iltalehti,* July 8, 2019.

5 P. Peretti-Watel, J. Ward, R. Lutaud and V. Seror, "Lyme Disease: Insight from Social Sciences," *Médecine et Maladies Infectieuses* 49 (2019), doi:10.1016/j.medmal.2018.12.005.

been perceived as high as the public currently sees it.[6] Moreover, the public and scientific experts do not necessarily share the same perception of the given risks.[7] For example, according to the Finnish Institute for Health and Welfare, the actual risk of contracting a tick-borne disease in Finland today is lower than the general public fears.[8]

The obvious explanation for the increased fear of tick-borne diseases among the Finns is the proliferation of both ticks and tick-borne diseases.[9] However, this may not be the whole picture, for although diseases are basically biological conditions, our understanding of them is also influenced by social and cultural meanings attached to them.[10] According to Charles E. Rosenberg, disease does not exist as a social phenomenon in some ways until we agree that it does. This process involves perceiving, naming, and responding to it.[11] The mode of historical analysis that views non-biological factors, such as beliefs, economic relationships or societal institutions, influencing our understanding of particular illnesses has been referred to as the social construction of disease.[12]

The purpose of this chapter is to examine, how these kinds of non-biological factors have contributed to making tick-borne diseases appear more frightening from the 1950s up to the early 2000s. The main shaper of public opinion has always been the media and, in earlier decades, newspapers in particular. This chapter analyses the image of tick-borne diseases that has been conveyed to the public by the Finnish newspaper press since the 1950s, and the social factors, ranging from scientific knowledge and individual experience to health policy priorities, which have influenced public risk perceptions and subsequent actions concerning tick-borne diseases.

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6 "Virusten leviämistä tutkitaan Tvärminnessä: Ahvenanmaan puutiainen levittää Kumlinn gentautia," *Helsingin Sanomat*, August 25, 1976.

7 Peretti-Watel et al., "Lyme Disease," 135.

8 Jussi Sane, "Riski saada punkilta tauti on pieni, muttei merkityksetön," *THL Blog,* May 17, 2017, accessed September 21, 2023, https://blogi.thl.fi/riski-saada-punkilta-tauti-on-pieni-muttei-merkitykseton/.

9 See for example Otto Latva's chapter in this volume.

10 Sigrun Olafsdottir, "Social Construction and Health," in *Medical Sociology on the Move: New Directions in Theory*, ed. William C. Cockerham (Dordrecht: Springer, 2013), 43.

11 Charles E. Rosenberg, "Disease in History: Frames and Framers," *The Milbank Quarterly* 67, Supp. 1 (1989): 1–2.

12 Robert Aronowitz, "Framing Disease: An Underappreciated Mechanism for the Social Patterning of Health," *Social Science & Medicine* 67, no. 1 (2008): 2. In later socio-historical scholarship "social construction" has often been replaced by the less programmatically charged metaphor "framing." This is due to the unwanted connotations sometimes associated with constructionist arguments, such as dated cultural relativism and reflexive opposition to biomedicine. See Rosenberg, "Disease in History," 3.

The main source material consists of newspapers digitized by the National Library of Finland. This newspaper collection contains an almost uninterrupted series of newspapers published in Finland from the late 1700s.[13] The electronic archive of *Helsingin Sanomat*, Finland's largest subscription newspaper in terms of circulation, has been utilized for those issues that are missing from the National Library collection (1980–2016).[14] Relevant source material has been located by using search words related to ticks and tick-borne diseases. The research period begins in 1950, when the first news about ticks being able to spread a human disease was published, and extends to the early 2000s, by which time the public debate on tick-borne diseases had begun to take its current form.

2 From a Mystery to a Disease

In 1950 a mysterious illness made the headlines in Finland after it affected eleven people on the small island of Kumlinge in the Åland archipelago. This previously unknown disease, in which those afflicted suffered from a variety of symptoms, including fever, headache, nausea, and a stiff neck, seemed to have appeared out of nowhere.[15] In reality, the first two cases had already been detected in 1942, and by 1950 thirty-nine Åland islanders had contracted the disease.[16] As the cause of the disease was not known, it was named after the place it was first detected; hence Kumlinge disease.[17] Due to the increase in cases in 1950, the disease was initially feared to be something of an epidemic – especially as it caused symptoms similar to polio. The regional doctor in Kumlinge speculated in a newspaper interview in 1953 that the disease could be some kind of new variant or subtype of poliomyelitis,[18] which caused widespread epidemics in western countries, including Finland, at this time.[19]

13 The National Library of Finland, "Search from digital materials."

14 *Helsingin Sanomat*, "Arkisto"; *Helsingin Sanomat*, "HS Aikakone."

15 "Kumlingesjukan är fortfarande ett mysterium"; "Epidemisk magsjuka i Kumlinge," *Hufvudstadsbladet*, December 31, 1950.

16 "Lärt och populärt," *Hufvudstadsbladet,* February 12, 1956; Nils Oker-Blom, "Kumlinge Disease: A Meningo-Encephalitis Occurring in the Aaland Islands," *Annales Medicinae Experimentalis et Biologiae Fenniae* 34 (1956): 309–310.

17 "Lärt och populärt"; Oker-Blom, "Kumlinge Disease," 309–310.

18 "Kumlingesjukan är fortfarande ett mysterium"; "Epidemisk magsjuka i Kumlinge"; "Kumlinge-sairaus on lapsihalvauksen tapainen sairaus," *Helsingin Sanomat*, September 10, 1953; "Kumlingesjuka – polioart?," *Hufvudstadsbladet*, September 10, 1953; "Kumlingesjukan avart av barnförlamning," *Ny Tid*, September 10, 1953.

19 Jacob Heller, *The Vaccine Narrative* (Nashville: Vanderbilt University Press, 2008), 3–5.

The true nature of Kumlinge disease was discovered by the virologist Nils Oker-Blom (1919–1995) and his research team from the Department of Virology at the University of Helsinki. Because no children were affected, and the incidence of paralysis was very low, Oker-Blom suspected the disease to be viral encephalitis (inflammation of the brain) spread by ticks,[20] known today as tick-borne encephalitis (TBE). TBE was first recognized and medically described in Austria in 1931 as "meningitis serosa epidemica" of unknown origin.[21] From the early 1930s, an acute central nervous system disease with a high death rate was also recorded in the Far East of the Soviet Union. The first scientific expedition team was sent to the Far-Eastern taiga in 1937 and it elucidated the etiology of this new disease, discovered a previously unknown virus, and determined the vector as being the tick. The second expedition team in 1938 developed an inactivated vaccine against the disease. The Soviet expedition team called the disease "spring epidemic encephalitis" or "tick-borne encephalitis".[22]

Investigating a previously unknown virus was not easy. The work of the Soviet expedition teams was undertaken under basic conditions in the remote taiga, and several team members were infected either through tick bites or while working with the virus in the laboratory. Some even died.[23] The slow accumulation of scientific knowledge is also reflected in the fact that the classification of the virus and its subtypes has varied over time, as have the names of both the disease and the virus. The knowledge gleaned in the 1950s about the disease, which formed the basis of Oker-Blom's work, differs from that of the present day.[24]

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20 Markus Brummer-Korvenkontio, *Virusten ja prionien luonnonhistoriaa: Myyräkuumeesta SARS:iin, Ebolasta AIDS:iin ja arboviruksista lintuinfluenssaan* (Helsinki: Helsinki University Press, 2007), 238.

21 Christian Kunz, "TBE vaccination and the Austrian experience," *Vaccine* 21, no. 1 (2003): 50–51, doi:10.1016/S0264-410X(02)00813-7.

22 Vladimir I. Zlobin, Vanda V. Pogodina and Olaf Kahl, "A Brief History of the Discovery of Tick-Borne Encephalitis Virus in the Late 1930s (Based on Reminiscences of Members of the Expeditions, Their Colleagues, and Relatives)," *Ticks and Tick-Borne Diseases* 8, no. 6 (2017): 813–817, doi:10.1016/j.ttbdis.2017.05.001.

23 Zlobin, Pogodina and Kahl, "A Brief History," 813–817.

24 Today it is known that tick-borne encephalitis virus (TBEV) is a member of the virus genus Flavivirus, which includes approximately eighty species. Most of these viruses are primarily transmitted by infected arthropods (mosquitos or ticks), and therefore classified as arboviruses. In 1962, Clarke proposed the division of TBEV into two subtypes: Russian spring-summer encephalitis (RSSE) and Central European encephalitis (CE or CEE). In 1999, TBEV was segregated into three subtypes according to their primary geographical distribution: European, Siberian, and Far-Eastern (former RSSE), although in recent years additional subtypes have been proposed. Due to geographical, pathogenetic, and environmental peculiarities, Louping ill virus (LIV) is not classified as a subtype, but a related tick-borne flavivirus, although the European subtype of TBEV is closer to LIV than to other

For example, due to the pioneering work of the Soviet researchers, the disease and the virus were initially known as "Russian spring-summer encephalitis" (RSSE).[25] In 1943 it was demonstrated that RSSE had a close antigenic relationship with Louping ill (LI), which is a tick-borne viral disease affecting mainly sheep that had been described in Scotland since the eighteenth century.[26] The first European tick-borne encephalitis virus was isolated in Czechoslovakia in 1948 and in 1950 this Central European encephalitis (CE/CEE) was shown to be closely related to RSSE. In the 1950s RSSE, LI and CEE were understood to form a "Russian spring-summer complex" or "Russian spring-summer encephalitis – Louping ill group".[27]

In the 1950s, Finland was still recovering from the Second World War and a lack of funds made it difficult at first to undertake virological research. Only with the help of grants from the Sigrid Juselius Foundation and the Samfundet Folkhälsan was it possible to initiate the investigation of Kumlinge disease in the summer of 1954.[28] Several medical-biological expeditions were made to Kumlinge Island to collect both blood samples and ticks. The first research results, based among other things on antibody tests, were published in 1956. According to this data, Kumlinge disease seemed to belong to the Russian spring-summer encephalitis – Louping ill group. Further confirmation came from the fact that encephalitides belonging to this group had been detected in the neighboring countries Soviet Union and Sweden.[29] Thus, a fundamentally

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TBEV subtypes in terms of genetic distance. See Andrei A. Deviatkin et al., "TBEV Subtyping in Terms of Genetic Distance," *Viruses* 12, no. 11 (2020), doi:10.3390/v12111240; S.I. Belikov et al., "The Relationship Between the Structure of the Tick-Borne Encephalitis Virus Strains and Their Pathogenic Properties," *PLoS ONE* 9, no. 4 (2014): 1–4, https://doi.org/10.1371/journal.pone.0094946.

25 Paul Heyman et al., "A Clear and Present Danger: Tick-Borne Diseases in Europe," *Expert Review of Anti-Infective Therapy* 8, no. 1 (2010), doi: 10.1586/eri.09.118.

26 William L. Pond, Russ B. Sudie and Joel Warren, "The Russian Spring-Summer Encephalitis and Louping Ill Group of Viruses: Relationship of European and Asiatic Strains of Russian Spring-Summer Encephalitis Viruses and Louping Ill Virus," *The Journal of Infectious Diseases*, vol. 93, no. 3 (1953); C.L. Jeffries et al., "Louping Ill Virus: An Endemic Tick-Borne Disease of Great Britain," *Journal of General Virology* 95, no.5 (2014), doi:10.1099/vir.0.062356-0.

27 Oker-Blom, "Kumlinge Disease," 317; H. Williams and H. Thorburn, "The Serological Response of Sheep to Infection with Louping-Ill Virus," *The Journal of Hygiene* 59, no. 4 (1961); Heyman et al., "A Clear and Present Danger," 33–50.

28 "Lärt och populärt".

29 Oker-Blom, "Kumlinge Disease," 313–317; "Lääkäri saapuu lasten luo saaristoon 'sokerilaivalla'," *Suomen Sosiaalidemokraatti,* July 22, 1956; Hex, "Ihmisiä työnsä ääressä," *Suomen Sosiaalidemokraatti,* December 16, 1956; Pond et al., "The Russian Spring-Summer Encephalitis," 294–300.

new concept of disease had been introduced in Finland – although the exact nature of the disease remained obscure as no virus had been isolated.[30] Thousands of ticks had been collected in Åland, but the problem was that most of them were still virus-free at that time. This was a pity, in Oker-Blom's view, because "the villainous role of the tick was considered proven."[31]

Once Kumlinge disease was identified, it was discovered that it probably also occurred elsewhere, such as in the Turku archipelago nearer to the mainland. This gave the impression that the disease was spreading eastwards.[32] However, the reports about encephalitis cases from hospitals and municipal doctors showed that tick-borne encephalitis might also be common in the Lappeenranta area in Eastern Finland near the border with the Soviet Union. This suggested that TBE might be spreading across the border from the USSR.[33] As long as there was no isolated virus, there was no certainty as to whether the tick-borne encephalitis in Finland was of the eastern ("Russian") or western ("Swedish") type. The distinction was crucial in that the eastern form was known to be much more severe and deadly, with estimated mortality rates of up to 10–30%, whereas the estimated mortality rate of the western form was only 1–2%.[34]

Throughout the 1950s, Kumlinge disease was primarily a concern for health authorities and virologists. It was initially unknown how and with what speed the disease spread, as well as how widespread it had already become. Hence, the severity it posed as a public health threat remained unknown. The press, however, seemed to be less interested in Kumlinge disease itself than in its scientific research. The discovery that the TBE-virus belonged to the group of arthropod-borne viruses (arboviruses) responsible for many dangerous global diseases gave research into Kumlinge disease international significance. For a young nation whose independence had been at stake in the recent war against the Soviet Union, international attention was much sought after and important.[35] In 1958 Oker-Blom received a large grant from the U.S.-based Rockefeller

30 Oker-Blom, "Kumlinge Disease," 317.

31 "Fästing ger sjukdom," *Nya Pressen*, June 25, 1958.

32 Hex, "Ihmisiä työnsä ääressä".

33 "Fästing ger sjukdom"; "Aivotulehdustutkimusta punkkien avulla," *Länsi-Savo*, August 16, 1958; "Punkkiretkikunnat etsivät aivokuumeen aiheuttajaa," *Ilta-Sanomat*, May 30, 1959.

34 "Forskningsunderstöd till Nils Oker-Blom," *Hufvudstadsbladet*, October 31, 1954; "Lärt och populärt"; "Punkkiretkikunnat".

35 Hex,"Ihmisiä työnsä ääressä"; "13 mmk till N. Oker-Bloms virusforskning," *Hufvudstadsbladet*, February 8, 1958; "Punkkien levittämää aivokuumetta tutkitaan," *Helsingin Sanomat*, July 6, 1958.

Foundation to study the viral inflammations of the brain in Finland, which the press interpreted as a sign of international recognition for Finnish virological research.[36]

With the help of this grant, Oker-Blom's team made a scientific expedition to the Lappeenranta area in Eastern Finland in July 1958 in order to investigate the geographical distribution of TBE. Finnish newspapers at the time presented the expedition as a sign that the dangerous Russian spring-summer encephalitis was spreading across the border from USSR into Finland.[37] Finns had historically become accustomed to the fact that serious epidemics, such as smallpox, usually spread to Finland from Russia.[38] Nevertheless, the public was reassured that the further west one went, the milder RSSE seemed to become, that is, the disease was less dangerous in Finland than in the Soviet Union.[39] This observation was proven correct when Oker-Blom's research group finally managed to isolate a tick-borne encephalitis virus (Kumlinge A52) from *Ixodes ricinus* tick in Åland in 1959. In the early 1960s, D.H. Clarke demonstrated that it represented a strain of Central European encephalitis (CE/CEE) and not of RSSE – both of which she classified as the subtypes of the tick-borne encephalitis virus (TBEV).[40]

3 A Multispecies Disease

Initially the knowledge that Kumlinge disease was spread by ticks and that the virus primarily circulated in the animal kingdom, instead of transmitting from one person to another, was presented as being reassuring when discussed in the public domain. It meant that the virus spread slowly and the disease

36 "13 miljoonan apuraha virustutkimuksiin Rockefelleriltä," *Ilta-Sanomat*, February 7, 1958; "Rockefeller-säätiö avustaa Suomen virustutkimusta," *Helsingin Sanomat*, February 8, 1958. See also Downs, "The Rockefeller Foundation Virus Program," *Annu Rev Med* (1982): 7, doi:10.1146/annurev.me.33.020182.000245.

37 "Aivotulehdustutkimusta punkkien avulla"; "Punkkiretkikunnat"; "Venäläinen kevätkesä leviämässä Eurooppaan," *Uusi Suomi*, September 18, 1958.

38 Uuno Winter, "Isosta rokosta ja rokotuksesta," *Terveydenhoitolehti* 24, no. 2 (1912): 19; Ensio Alho, "Onko rokotuspakko poistettava?," *Terveydenhoitolehti* 41, no. 9 (1929): 120–121.

39 "Fästing ger sjukdom"; "Punkkien levittämää aivokuumetta tutkitaan"; "Venäläinen kevätkesä leviämässä Eurooppaan".

40 Delphine H. Clarke, "Further Studies on Antigenic Relationships Among the Viruses of the Group B Tick-borne Complex," *Bulletin of the World Health Organization* 31, no. 1 (1964); Richard Moreland Taylor (ed.), *Catalogue of Arthropod-Borne Viruses of the World: A Collection of Data on Registered Arthropod-Borne Animal Viruses* (U.S. Government Printing Office, 1967), 825–828; Brummer-Korvenkontio, *Virusten ja prionien luonnonhistoriaa*, 238.

occurred only sporadically in areas where infected ticks were abundant. By the mid-1960s, the relatively remote and sparsely-populated areas of Kumlinge and the rest of the Åland Islands, as well as the Turku archipelago and the eastern border region had been identified as the main areas of the outbreak.[41] Hence, most of the Finns seemed to be safe from the disease. Nevertheless, in a newspaper article in 1958 the public was for the first time directly warned about ticks that were able to spread certain kind of encephalitis, and especially city dwellers on vacation in Åland were recommended to avoid thickets and alder forests, where ticks were believed to thrive at the time.[42]

In the 1950s and 1960s, Kumlinge disease was constantly compared to the severe form of tick-borne encephalitis then occurring in the Soviet Union, which made Finnish tick-borne encephalitis appear very mild. The estimated mortality rate was "only" 1–2%, which was about the same as for polio.[43] On the one hand, this reflects an era when generally hazardous communicable diseases, such as polio, tuberculosis and measles, still formed part of everyday life, although their mortality rates had begun to decline in the 1950s with the expanding national vaccination program.[44] On the other hand, evaluating the risk of Kumlinge disease as minor also reflects the health policy of the time, which assessed the risk at the level of the population as a whole. The population losses after the Second World War had given rise to a debate on demographic policy in Finland, in which a large, healthy and productive population was seen as important for the existence of the nation. The severity or danger of diseases was weighed against their demographic significance, that is, the mortality they caused in the productive population.[45]

41 "Lärt och populärt"; "Punkkiretkikunnat etsivät aivokuumeen aiheuttajaa"; Juhani Lyy, "Kumlingen kumma tauti," *Suomen Kuvalehti*, December 5, 1964.

42 "Fästing ger sjukdom".

43 "Punkkiretkikunnat etsivät aivokuumeen aiheuttajaa".

44 Helene Laurent, *Asiantuntijuus, väestöpolitiikka, sota. Lastenneuvoloiden kehittyminen osaksi kunnallista perusterveydenhuoltoa 1904–1955* (Helsinki: Unigrafia, 2017), 270–284. In Finland, vaccination against tuberculosis began in 1941, but even in the 1950s tuberculosis was a common disease among all age groups. However, the number of deaths from the disease fell rapidly, thanks in part to new anti-tuberculosis drugs. Polio vaccination was introduced in Finland in 1957. Initially, many parents were reluctant to use the vaccine, as a manufacturing error in the United States in 1955 had resulted in 260 children being infected with polio. A measles vaccination was not introduced in Finland until 1975. Laurent, *Asiantuntijuus, väestöpolitiikka, sota*, 270–280; The Finnish Institute for Health and Welfare, "Milloin eri rokotukset ovat alkaneet Suomessa?," accessed November 7, 2023, https://thl.fi/fi/aiheet/infektiotaudit-ja-rokotukset/tietoa-rokotuksista/kansallinen-rokotusohjelma/milloin-eri-rokotukset-ovat-alkaneet-suomessa-.

45 Minna Harjula, *Terveyden jäljillä: Suomalainen terveyspolitiikka 1900-luvulla* (Tampere: Tampere University Press, 2007), 55–65.

Moreover, the news coverage of Kumlinge disease at the time was largely based on the opinions of scientific experts. They thought about a risk in terms of probability and severity, rather than in terms of the suffering the disease might cause to an individual.[46] Oker-Blom's team had discerned that even in the risk areas only a small proportion of ticks carried the virus, so the chance of infection was small for someone who had been bitten. The majority of people also had a very mild form of the disease. Indeed, in the 1960s the most severe form of TBE was thought to affect only about 20 people a year.[47] In addition, some researchers were reluctant "to make a big noise" about Kumlinge disease in order to prevent unnecessary panic.[48] As one researcher noted as late as 1976:

> Finnish Kumlinge disease is not very dangerous. Usually, it can be treated within 2–3 weeks in hospital and it leaves no lasting effects. […] Only one in 200 ticks spreads the virus. Around one in four people who are bitten will become ill, the rest will simply get a lifelong vaccination against the disease.[49]

Nevertheless, the very fact that TBE was a zoonosis also raised new questions and concerns. Farmed animals were known to carry the virus even though they often did not have a clinically proven disease. There was a possibility that the virus could be excreted in milk and transmitted to humans, as had happened in Central Europe via unpasteurized goat's milk. In Finland, concern was directed toward dairy cows, for cattle farming still played an important role in the 1950s in the country's economic structure.[50] As the previous chapter in this volume demonstrates, cows were traditionally grazed in woodland pastures, where they could become riddled with a lot of ticks.[51] At the time, however, alimentary TBE infections in Finland could not be proven.[52]

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46 Peretti-Watel et al., "Lyme Disease," 135.

47 "Punkkiretkikunnat"; "Sokeritaudista hypotermiaan," *Helsingin Sanomat*, September 28, 1959; "Möss föda för farliga fästingar," *Hufvudstadsbladet*, August 13, 1961; Lyy, "Kumlingen kumma tauti".

48 "Tutkijat eri mieltä vaarasta," *Uusi Suomi*, April 12, 1980.

49 "Virusten leviämistä tutkitaan Tvärminnessä".

50 Arvo M. Soininen, "Suomen maataloushistorian päälinjat," *Agricultural and Food Science* 38, no. 2 (1966): 103, doi:10.23986/afsci.71655.

51 Erkki Räikkönen, "Ei punkeista tainnut ennen tauteja tulla," *Helsingin Sanomat*, July 5, 2007.

52 "Fästing ger sjukdom"; "Lärt och populärt".

From the 1960s, the public debate expanded from Kumlinge disease to other arthropod-borne diseases. Attention was drawn to how arthropods, such as mosquitoes and ticks, spread dangerous diseases not only in tropical regions, but also in more northerly climes. In Finland, *Uukuniemi* virus had been found in ticks, and mosquitoes had been discovered to spread *Inkoo* virus.[53] Ticks do not travel very long distances on their own, but one of the questions discussed internationally was whether dangerous viral diseases could be carried from one area to another by ticks arriving with migratory birds. In Finland, the number of ticks arriving with migratory birds was estimated to be around 2,300,000 per year. However, on the basis of a random sample, it was concluded that the birds left their African ticks in Central Europe, and brought mainly European castor-bean ticks (*Ixodes ricinus*) to Finland. Nevertheless, it was feared that migratory birds arriving from the area of the Soviet Union, would bring with them taiga ticks (*Ixodes persulcatus*), which spread the dangerous Russian Spring Summer Encephalitis.[54]

From the 1960s ticks and the microbes they carried started to fuse in the public discussion making the former appear more dangerous than previously thought.[55] For example, *Suomen Kuvalehti* magazine reported that one tick carrying the encephalitis virus had a viral concentration high enough to kill 100,000 mice.[56] This made a tick sound like a deadly weapon. Sometimes ticks were even described as "microbial reservoirs" or "syringes loaded with pathogens."[57] In the public debate of the 1990s, a tick bite alone became deemed as being dangerous and was reflected in headlines, such as "a tick bite can be

53 Pekka Nuorteva, "Vaaralliset hyönteiset," *Kansan Uutiset*, November 1, 1966; "Punkeista voi saada aivokuumeenkin," *Helsingin Sanomat*, June 5, 1968; Pekka Saikku, "Hyttyset ja punkit virustautien levittäjinä," *Uusi Suomi,* July 14, 1968. Inkoo virus is one of the world's northernmost and most common arboviruses. It can cause flu-like illness, nausea, vomiting, confusion, stiff neck, headaches, drowsiness and convulsions, especially in children. Most infections are asymptomatic. Maija Rummukainen, "Hyttysten levittämät taudit lisääntyvät," *Lääkärilehti* 75, no. 24–33 (2020), https://www.laakarilehti.fi/tieteessa/katsausartikkeli/hyttysten-levittamat-taudit-lisaantyvat-3289/. In general, Uukuniemi virus has not been considered to be of public health significance. Gustavo Palacios et al., "Characterization of the Uukuniemi virus group (Phlebovirus: Bunyaviridae): evidence for seven distinct species," *Journal of Virology* 87, no. 6 (2013), doi:10.1128/JVI.02719-12.

54 Pekka Nuorteva, "Muuttolinnut tautien levittäjinä," *Uuden Suomen Viikkolehti*, June 7, 1964; "Punkeista voi saada aivokuumeenkin"; Saikku, "Hyttyset ja punkit".

55 "Punkki vaarallisten tautien levittäjänä," *Helsingin Sanomat,* July 9, 1960; Urpo Iivarinen, "Tunnettuja suomalaisia tiedemiehiä XXIX," *Maaseudun Tulevaisuus*, December 10, 1964.

56 Lyy, "Kumlingen kumma tauti".

57 Nuorteva, "Muuttolinnut tautien levittäjinä"; Tom Ståhlberg, Anssi Junnila ja Erkki Leppäkoski, *Apua! Punkki ja sen levittämät taudit* (Turku: Arkipelagia-seura, 1994), 17.

dangerous" or "a tick can bite you sick."[58] Interestingly, the Finnish Literary Society's survey on ticks (2019) also contains a few responses that mention a poisonous tick bite.[59]

4 Lyme Borreliosis Enters the Scene

In 1964, a Finnish professor of dermatology and venereology mentioned in a newspaper interview how a tick bite could result in a skin infection. This was a reddening ring starting around the tick bite and expanding month by month as the center healed at the same time.[60] The medical name for the rash was *erythema chronicum migrans*, and until the 1980s it was sometimes mentioned in newspaper articles as a disease that could follow a tick bite in addition to tick-borne encephalitis.[61] It was only in 1986 that a doctor in a medical column of the *Länsi-Savo* newspaper linked this ring-shaped skin infection with meningitis, nerve and joint pain and myocarditis and disclosed to the public that it was called Lyme disease. He thought the ring-shaped rash was a relatively common phenomenon in Finland, but Lyme disease itself was rare, with only a few cases having been diagnosed.[62]

However, recent research (2020) based on a subset of historical serum samples collected by the Finnish Institute for Health and Welfare between 1968–1972 has shown that the proportion of antibody-positive people for Lyme borreliosis was considerably higher in Finland in the late 1960s and early 1970s than in 2011. Borreliosis has therefore been a common infection in Finland for at least half a century.[63] The problem was that symptoms of borreliosis were not recognized until U.S. researchers diagnosed it as a separate condition for the first time in the mid-1970s in Lyme, Connecticut. At first, it was mistaken for juvenile rheumatoid arthritis. The identification of the pathogen as

58 "Puutiaisen purema aiheuttaa pysyviä oireita yli 200 suomalaiselle," *Helsingin Sanomat* April 14, 1990; Niina Lempiäinen, "Punkin purema voi olla vaarallinen," *Länsi-Savo*, August 16, 1990; Kati Marjakangas, "Jos metsään haluat mennä nyt…," *Apu*, June 16, 1995.

59 Finnish Literature Society, Questionnaire 2019, "Punkit tulevat," SKS 015, 018, 092b.

60 Iivarinen, "Tunnettuja suomalaisia tiedemiehiä XXIX".

61 Nuorteva, "Vaaralliset hyönteiset"; "Pakeneminen ei auta, vain karkote pelottaa hyttysiä," *Helsingin Sanomat*, July 5, 1974; Pirkko Kolbe, "Pieni itikka voi olla paha peto," *Helsingin Sanomat*, June 13, 1979.

62 "Kysy lääkäriltä," *Länsi-Savo*, May 24, 1986.

63 J. Cuellar et al., "Seroprevalence of Lyme Borreliosis in Finland 50 Years Ago," *Clin Microbiol Infect.* 26, no. 5 (2020), doi:10.1016/j.cmi.2019.10.003.

a spirochete (*Borrelia burgdorferi*) was made by Willy Burgdorfer and his team of researchers in 1981.[64]

As a matter of fact, the cutaneous manifestation of Lyme disease, erythema chronicum migrans (ECM) was already described by the Swedish dermatologist Arvid Afzelius (1857–1923) in 1910, and the Austrian dermato-venereologist Benjamin Lipschütz (1878–1931) in 1913. By 1955, clinical and epidemiological evidence showed that ECM was caused by a penicillin-susceptible bacterial agent transmitted by the *Ixodes ricinus* tick. But as ECM had earlier been studied by European dermatologists and "Lyme arthritis" later by U.S. rheumatologists, it was only after prospective studies that the U.S. investigators acknowledged that ECM and the subsequent rheumatological and neurological abnormalities were all related to *Borrelia burgdorferi* infection and were all manifestations of the same disease.[65]

In the late 1980s and early 1990s, it became clear that there were many more cases of borreliosis in Finland than had initially been thought. By the late 1990s the estimated number of cases had already risen to 2000–3000 per year.[66] Ticks carrying the causative pathogens of borreliosis started to be found almost everywhere in Finland except Lapland,[67] including the Helsinki metropolitan area, where about a fifth of Finns live.[68] In 1999, borreliosis was even referred to in the media as a new Finnish common disease (*kansantauti*).[69] Scientific experts tried to reassure the public that the proliferation of cases had more to do with improved diagnostics and increased public awareness than with the increase of the disease itself. Thus, there should be no cause for alarm

64 Robert A. Aronowitz, "Lyme Disease: The Social Construction of a New Disease and Its Social Consequences," *The Milbank Quarterly* 69, no. 1 (1991): 83–92.

65 Aronowitz, "Lyme Disease," 83–92; Franc Strle, Gerold Stanek and Klemen Strle, "Lyme Borreliosis: The European Perspective," in *Lyme Disease: An Evidence-Based Approach*, 2nd ed., ed. John J. Halperin (Wallingford & Boston, MA: CABI, 2018), 105–107.

66 Klaus A. Järvinen, "Kotoiset puutiaiset voivat levittää sairautta," *Etelä-Suomen Sanomat*, July 4, 1988; "Punkki aiheuttaa vuosittain tuhansia borrelioositartuntoja," *Etelä-Suomen Sanomat*, May 9, 1996.

67 Tiina Ylitalo, "Outojen vaivojen takana voikin olla punkinpurema," *Etelä-Suomen Sanomat*, March 23, 1997; Hannele Tulonen, "Punkkipuhelin valistaa, jos puutiainen puraisee pyhinä," *Helsingin Sanomat*, June 19, 1998; Mervi Turunen, "Punkit taas liikkeellä," *Helsingin Sanomat*, July 7, 1999.

68 Katri Himma, "Punkkia kärsästä kiinni," *Suomen Kuvalehti*, July 25, 1997; Juha Junttila and Miikka Peltomaa, "Punkki on kavala salamatkustaja," *Helsingin Sanomat*, July 13, 1998.

69 "TV1," *Helsingin Sanomat*, August 10, 1999.

or panic.[70] However, these attempts were not successful in preventing the tick scare of the 1990s.[71]

5 Symptoms Remain the Same – the Disease Becomes More Frightening

As tick-borne diseases are basically biological conditions, the symptoms and danger of the diseases have remained unchanged from the 1950s to the early 2000s. What has changed, however, is the perception of how serious and frightening the diseases are and how they are described at different times. For instance, in the 1950s Kumlinge disease was not considered dangerous because very few people contracted the severe form of the disease or died from it.[72] However, at the beginning of the 2000s, scientific experts considered tick-borne encephalitis to be more dangerous than borreliosis because TBE could cause paralysis and leave permanent after-effects. Moreover, about 1% of those infected died from the disease.[73] This partly reflected a refinement of the clinical picture of TBE, but it was also a result of a new focus on the harm that the disease caused to the individual instead of society as a whole. It reflects the change in health policy thinking that took place in the 1970s, when views that emphasized the interests of the nation started to decrease, while individualistic perspectives emphasizing the citizen became more common.[74]

The change in health policy thinking was also reflected in the news coverage of tick-borne diseases, which from the 1970s began to present TBE from an increasingly individual perspective that drew attention to the painful and devastating experiences of patients.[75] A growing trend in the 1990s involved

70 Lempiäinen, "Punkin purema"; Päivi Repo, "Puutiaistaudit eivät ole lisääntyneet," *Helsingin Sanomat*, August 24, 1992; Anna Paljakka, "Todellinen punkki kesä," *Helsingin Sanomat*, July 10, 1994; Pyry Lapintie, "Borrelioosirokotteen tehosta tietoja loppuvuonna," *Helsingin Sanomat*, November 17, 1995.

71 Juhani Partanen, "Seuraava potilas," *Länsi-Savo*, July 27, 1992; Riitta-Eliisa Laine, "Punkin pelko on uusi ilmiö," *Helsingin Sanomat*, July 26, 1994; Repo, "Puutiaistaudit eivät ole lisääntyneet".

72 "Punkkiretkikunnat".

73 Maria Annala, "Kostea sää voi aiheuttaa pahan punkkikesän," *Helsingin Sanomat*, June 23, 2004; Pyry Lapintie, "Ennusteet lupaavat jälleen ennätyksellistä punkkikesää," *Helsingin Sanomat*, June 24, 2005.

74 Minna Harjula, *Hoitoonpääsyn hierarkiat: Terveyskansalaisuus ja terveyspalvelut Suomessa 1900-luvulla* (Tampere: Tampere University Press, 2015), 245.

75 Maija-Liisa Peltonen, "Punkista voi saada aivotulehduksen," *Helsingin Sanomat*, August 1, 1979.

patients telling horror stories about the suffering they had endured from borreliosis. For example, a man with an exceptionally bad case of Lyme disease reported that he had been almost immobilized at the height of his illness. The disease destroyed retinal cells in his eyes and left him with permanent deterioration of hearing and a much poorer sense of balance.[76] Reports of personal tragedies increased the public's fear of tick-borne diseases, because the impact of a given piece of information on risk perception depends on how it is presented. For instance, striking personal stories have a greater impact on an audience than the more "objective" pieces of information disseminated by health authorities.[77]

Aronowitz, in his study on Lyme borreliosis, has drawn attention to how newspaper accounts of Lyme disease are typically very straightforward, thereby leaving the risk of serious symptoms unqualified. Instead of describing severe symptoms as occurring rarely or in a minority of patients, the media usually gives extensive coverage to more worrisome features of the disease, for a new and serious disease is a better selling point.[78] Accordingly, the Finnish newspaper *Helsingin Sanomat* presented a rather gloomy picture of tick-borne diseases in 2007:

> Two tick-borne diseases, Lyme disease and tick-borne encephalitis, can cause meningitis, heart problems, paralysis, eye inflammation, arthritis, permanent tremors, memory loss, loss of balance, profound fatigue, and concentration problems even years after infection. Tick-borne encephalitis can lead to death. There is no cure when bitten by a tick carrying tick-borne encephalitis. The vaccination must be given before the tick bites. There is no vaccine for Lyme disease, only antibiotics taken afterwards are effective.[79]

Personal stories drew the readers' attention to the fact that even if the risk of being infected by a tick bite was relatively small in Finland, the consequences for the infected individual could be tragic. This was highlighted in the 1990s by Ilkka Vartiovaara (1946–2010), a doctor who presumably contracted Lyme borreliosis from a tick bite during a business trip to Canada in 1987. As borreliosis was not yet known in Finland at the time, his treatment was delayed.

76 "Puutiaisen purema"; Katri Hannele Broman, "Kroonisesti sairaalla heikko sosiaaliturva," *Helsingin Sanomat*, July 6, 2008.

77 Peretti-Watel et al., "Lyme Disease," 135–136.

78 Aronowitz, "Lyme Disease," 97.

79 Mari Manninen, "Varoitus punkkiratsiasta," *Helsingin Sanomat*, 22 April, 2007.

Consequently, the pain caused by the disease became chronic and left him unable to work. Vartiovaara used his own suffering as an example of how important it was to identify borreliosis in a timely manner when it was still easily treatable with antibiotics. He suggested that there may have been tens of thousands of people with Lyme disease in Finland who felt they were ill, but who were deprived of medical treatment because their ailments and disease could not be defined.[80]

Vartiovaara's experience drew attention to medical uncertainty, which was able to create a sense of health risk or crisis even if borreliosis from a medical point of view appeared to be a mild and non-fatal disease.[81] The public debate in the 1990s demonstrated how medical knowledge about borreliosis had increased so rapidly that not all doctors had kept up and recognized the disease. In particular, it was difficult to identify the symptoms of advanced Lyme disease, which were similar to many other diseases, such as rheumatism, multiple sclerosis, neuropathic pain, facial nerve strokes and cardiac arrhythmias. Therefore, borreliosis was called "the great imitator." Even antibody tests did not necessarily confirm the presence of borreliosis in the body.[82]

6 Russian Roulette

Although it was generally known that only some ticks carried pathogens, the problem was that one could not observe this on the surface of the tick. Contracting the disease was like playing Russian roulette, which meant that every tick attached to the skin was a potential threat.[83] Tick-borne diseases present an example of an invisible risk, which can only be understood with scientific tools, such as serological tests. The invisible nature of these risks contributes to the volatility and proliferation of risk perceptions.[84] In Finland this

80 Kipsimies (pseudonym), "Tasa-arvoa kuuroutumiseen!," *Helsingin Sanomat,* July 17, 1990; "Lymen taudin vankina," *Suomen Kuvalehti*, May 19, 1995; "Miksi juuri minä?" *Apu*, February 21, 1997; Ylitalo, "Outojen vaivojen takana"; "Ilkka Vartiovaara," *Helsingin Sanomat*, April 10, 2010.

81 Peretti-Watel et al., "Lyme Disease," 134–135.

82 Järvinen, "Kotoiset puutiaiset"; Lempiäinen, "Punkin purema"; Seija Lamberg, "Punkkien hyökkäys," *Suomen Kuvalehti*, May 19, 1995; Kirsi Vuorinen, "Borrelioosista selkeät ohjeet," *Helsingin Sanomat*, August 8, 1995; Ylitalo, "Outojen vaivojen takana"; Himma, "Punkkia kärsästä kiinni".

83 Jorma Rotko, "Punkkikauhua," *Helsingin Sanomat*, August 23, 1987; Paljakka, "Todellinen punkki kesä"; Himma, "Punkkia kärsästä kiinni".

84 Peretti-Watel et al., "Lyme Disease" (2019): 134.

uncertainty gave rise to the phenomenon of going for a course of antibiotics after a tick bite "just in case".[85]

The search for a sense of security from the antibiotic treatments taken to be on the safe side was not strange in the sense that newspapers had for a long time repeated the simplistic narrative that early-stage Lyme disease was "very easily" and "completely" cured with a couple of weeks of antibiotics. Even in the late stages, a slightly longer course of intravenous antibiotics was presented as a sure cure. In some early-stage news reports, an "antibiotic shot" was recommended even in doubtful cases,[86] but as this was not recommended from a medical point of view, the public was later advised that a mere tick bite without any symptoms suggestive of Lyme disease was not a reason to prescribe antibiotics.[87]

In the early 2000s, tick-borne encephalitis re-entered the headlines because it seemed to be spreading rapidly to new areas, such as the Helsinki archipelago. Moreover, cases caused by the more dangerous Siberian subtype of the TBE virus had been detected in the Kokkola region on the west coast.[88] In 2005, the number of serious cases of TBE was estimated to have tripled in a decade and the number of Lyme disease infections had also doubled. This time the increase was estimated to be real and not just due to improved diagnostics and increased testing.[89] Renewed concern about tick-borne encephalitis was reflected in increased interest in TBE vaccinations.

An Austrian TBE vaccine had been used in Finland since 1979. As TBE was only sporadic in certain high-risk areas, the vaccine was not intended to provide herd protection, but was a "personalised vaccine", that people living or

85 Rotko, "Punkkikauhua"; Paljakka, "Todellinen punkki kesä"; Laine, "Punkin pelko"; Juhani Partanen, "Seuraava potilas," *Länsi-Savo*, June 12, 1995; Päivi Repo, "Borrelioosiin sairastuu vuodessa parisen tuhatta," *Helsingin Sanomat*, August 9, 1995; Himma, "Punkkia kärsästä kiinni".

86 Järvinen, "Kotoiset puutiaiset"; "Puutiaisen purema"; Laine, "Punkin pelko"; Lamberg, "Punkkien hyökkäys"; "Kymmeniä borrelioositapauksia vuosittain," *Pargas Kungörelser*, August 17, 1995; "Punkki rakastaa kosteaa eikä pelkää viluakaan," *Etelä-Suomen Sanomat*, July 23, 1996; Annala, "Kostea sää".

87 Partanen, "Seuraava potilas" (1995); Repo, "Borrelioosiin sairastuu"; Himma, "Punkkia kärsästä kiinni".

88 Päivi Repo, "Punkkien levittämä aivotulehdus leviää nopeasti Suomessa," *Helsingin Sanomat*, June 20, 2001; Minna Pölkki, "Kumlingen tautia havaittiin Kokkolassa," *Helsingin Sanomat*, June 18, 2003; Tapani Tikkakoski et al., "Kuolemaan johtanut puutiaisaivokuume," *Lääketieteellinen Aikakauskirja Duodecim* 127, no. 10 (2011).

89 Päivi Repo, "Ahvenanmaalaisille suunnitellaan rokotusta puutiaisaivokuumetta vastaan," *Helsingin Sanomat*, January 12, 2004; Marjut Lindberg, "Borrelioosin voi saada citypunkistakin," *Helsingin Sanomat*, May 3, 2004; Lapintie, "Ennusteet lupaavat".

vacationing in high-risk areas could purchase to protect themselves.[90] It was described in newspapers as a "cheap life insurance" despite the high price.[91] As the highest incidence of tick-borne encephalitis in Finland, relative to the population, was found in Åland, the local residents began to be offered free TBE vaccinations as part of the national vaccination program from 2006.[92] The same year, a private medical center, Saaristolääkärit, based in the Turku archipelago, launched an ongoing "tick bus" operation bringing TBE vaccinations close to people, in town squares and in front of shopping malls. In the first year, around 8,500 people purchased the vaccine.[93]

In the spring of 2007, the media reported that vaccines against tick-borne encephalitis were running out in Finland due to high demand. During that year, a total of about 15,000 people had received the TBE vaccine in both Helsinki and the Turku region. The problem was that people who did not need the vaccine had also taken it.[94] The phenomenon sparked a lively public debate. Health professionals thought that the fear of tick-borne encephalitis was disproportionate and that people's protection against ticks had already gone too far. An editorial in *Helsingin Sanomat* even referred to "tick hysteria".[95]

Obviously the TBE vaccine was seen as a risk-reducing practice or product, intended to provide safety, reassurance, fear reduction, and control over

90 As a personalized vaccine, TBE vaccine is comparable to the vaccines against Lyme borreliosis. See Robert A. Aronowitz, "The Rise and Fall of the Lyme Disease Vaccines: A Cautionary Tale for Risk Interventions in American Medicine and Public Health," *The Milbank Quarterly* 90, no. 2 (2012): 251, 271.

91 Riitta Kallioinen, "Pistoista oireet lievenevät," *Etelä-Suomen Sanomat*, July 3, 1979; "Tutkijat eri mieltä vaarasta"; Laaksonen, "Kumlingen tauti – vaara veneilijälle"; "Punkista voi saada vaarallisen taudin," *Maaseudun Tulevaisuus*, July 1, 1993; Lapintie, "Ennusteet lupaavat"; Pyry Lapintie, "Punkkibussin rokotuksiin jonotettiin Turun torilla," *Helsingin Sanomat*, May 31, 2006.

92 Repo, "Ahvenanmaalaisille suunnitellaan rokotusta"; Lapintie, "Ennusteet lupaavat"; Pyry Lapintie, "Punkit kiusaavat huhtikuusta lokakuuhun," *Helsingin Sanomat*, May 31, 2006; Peter Wahlberg et al., "TBE på Åland 1959–2005 – Kumlingesjukan," *Finska Läkaresällskapets Handlingar* 166, no. 1 (2006): 61.

93 Nils-Eric Backman, "Puutiaisaivokuumeen uskotaan leviävän," *Helsingin Sanomat*, April 19, 2006; "Punkkibussi starttaa ensi perjantaina," *Pargas Kungörelser*, April 20, 2006; Lapintie, "Punkkibussin rokotuksiin jonotettiin".

94 Timo Siukonen, "Punkkirokotteet loppumassa Suomestakin," *Helsingin Sanomat*, May 5, 2007; "Nyt kannatta syynätä ihoa tarkkaan," *Etelä-Suomen Sanomat*, May 21, 2007; "Punkkihysteria levisi Suomeen," *Helsingin Sanomat*, June 30, 2007; Salla Tuomola, "Kansanterveyslaitos paheksuu rokotebussien markkinointia," *Turun Sanomat*, November 13, 2007.

95 Timo Rautava, "Punkki iskee iholle," *Helsingin Sanomat*, June 4, 2007; "Punkkihysteria levisi Suomeen"; Päivi Repo, "Vain kuusi sai alkuvuonna puutiaisaivokuumeen," Helsingin Sanomat, July 29, 2007.

uncertainty.[96] For vaccine manufacturers and distributors, this was a selling point, while at the individual level, a vaccination brought relief for an individual who felt liberated from the responsibility of having to constantly monitor his/her body, environment and behavior for ticks.[97] However, according to a later survey by the Finnish Institute of Health and Welfare (THL), it was unclear to the public what the TBE vaccine was effective against. Many assumed that it also provided protection against Lyme borreliosis or prevented ticks from attaching themselves to human skin. The public also estimated the risk of tick-borne encephalitis to be up to ten times higher than it actually was. According to a THL official, public perceptions may have been confused by the fact that the TBE vaccine was referred to in the media and popular language simply as the "tick vaccine."[98]

According to Jacob Heller, Western culture has long viewed vaccines as simple and versatile tools for contending with all kinds of as-yet-unforeseen public health problems. He argues that this kind of strong cultural acceptance of vaccines is maintained by so-called vaccine narratives, that is, success stories about selfless physician-researchers inventing cheap, safe, and effective vaccines that rescue us from dreaded infectious diseases. These narratives elide and overwhelm contradictions and simplify our understanding of vaccines so that we can more easily make sense of the whole.[99]

The Finnish TBE vaccine narrative started in the 1950s, when researchers reassured the public that if Kumlinge disease proved to be highly contagious, the population could be vaccinated against it. The fact that a vaccine suitable for protecting the whole population was not yet available in Finland in the 1950s or 1960s was not seen as a problem, as it was considered perfectly feasible to develop a vaccine if necessary.[100] In the mid-1990s, the vaccine narrative was extended to borreliosis. News coverage reported optimistically that although there was not yet a vaccine against Lyme disease, several vaccines were being developed in both the USA and Europe,[101] and one was even tested

96 Aronowitz, "Lyme Disease Vaccines," 270.

97 Lapintie, "Punkkibussin rokotuksiin jonotettiin"; "Punkkihysteria levisi Suomeen".

98 Henna Mäkelä, "Puutiaisaivotulehdus ja borrelioosi, kumpi olikaan kumpi?" *THL Blog*, March 16, 2021, accessed November 14, 2023, https://blogi.thl.fi/puutiaisaivotulehdus-ja-borrelioosi-kumpi-olikaan-kumpi/.

99 Heller, *The Vaccine Narrative*, 1–2, 5, 8.

100 Hex, "Ihmisiä työnsä ääressä"; "Fästing ger sjukdom"; "Möss föda för farliga fästingar"; "Punkkiretkikunnat"; Lyy, "Kumlingen kumma tauti".

101 "Punkinpuremaan kannattaa suhtautua vakavasti," *Etelä-Suomen Sanomat*, July 21, 1994; Lamberg, "Punkkien hyökkäys"; Lapintie, "Borrelioosirokotteen tehosta tietoja loppuvuonna".

on humans in the Åland Islands in 1996.[102] Ultimately, no Lyme disease vaccine was launched on the market. This was mainly down to economic reasons.[103] Nonetheless, news coverage of it might well have obscured the public's understanding of what the vaccine on the market was for.

7 Conclusion

The Finnish social debate on tick-borne diseases highlights several factors that have influenced the risk perceptions of both experts and the public. Scientific knowledge of tick-borne diseases has been of great importance. It eased experts' concerns about the public health threat posed by the new and mysterious Kumlinge disease in the 1950s. On the other hand, increased awareness of tick-borne encephalitis as zoonosis raised new concerns among researchers about other arboviruses that could be spread by ticks and mosquitoes in northern regions. The public has perhaps been most influenced by studies on the increase in the number of infected ticks and their spread to new areas, and by the knowledge of the increase in tick-borne diseases, which in the 1990s and early 2000s led to an outright tick scare.

Changes in disease spectrum, as well as in the health policy emphases and perceptions of health and illness have also played a role. Health policy in the 1950s and 1960s focused on the lethality of the disease, in relation to which Kumlinge disease was not seen as being very dangerous. In terms of its disease pattern, it was "no more severe" than polio, the other common disease of the era. However, as part of the Western trend towards individualization, the pain and damage that the disease caused to the individual began to be emphasized in notions of health and illness from the 1970s. With the disappearance of dangerous infectious diseases, the suffering caused by illness was no longer seen as a natural part of life, which made the severe forms of Lyme disease and TBE seem frightening.

The level of risk perceived by the public has also been influenced by the way in which tick-borne diseases have been reported in the press. The emphasis on the worrisome features of the tick-borne diseases and the personal accounts of

102 Merja Räihä, "Ahvenanmaalla testataan rokotetta borrelioosiin," *Helsingin Sanomat*, July 18, 1995; "Ahvenanmaan lääkärit borrealia [sic.] -rokotteen koekaniineiksi," *Etelä-Suomen Sanomat*, December 5, 1995; "Borrelioosia torjutaan rokotteilla Ahvenanmaalla," *Helsingin Sanomat*, April 3, 1996.

103 In the United States the vaccines against borreliosis faced market challenges because Lyme disease was geographically limited, treatable with antibiotics, non-deadly, and preventable by other means. There was also a fear of harmful side effects and lawsuits. Aronowitz, "Lyme Disease Vaccines," 250–251, 267–270.

people with severe forms of the disease has probably contributed to the fear of tick-borne diseases. They have drawn the audience's attention to the fact that even if the risk of being infected by a tick bite might be relatively small, the consequences for the infected individual could be tragic. Experts and the press have sought to allay public concern by highlighting how tick-borne encephalitis can be prevented by vaccination and Lyme disease can be treated with antibiotics. These simplified narratives provide fear reduction and control of uncertainty, but can sometimes lead to exaggerations, such as the 2007 tick vaccine enthusiasm.

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