



# Introduction: The Past Continuous of Epidemiology

*Heini Hakosalo, Katariina Parhi, and Annukka Sailo*

From early 2020, epidemiological research has been in the public eye like never before, thanks to COVID-19. Epidemiology has been instrumental in recognizing and framing the pandemic, assessing its scale, and shaping the global response. Much to their surprise, epidemiologists have also been drawn into the highly politicized disputes around the pandemic response. But both pandemics and epidemiologists have been around for centuries or, depending on definitions, even for millennia. In its broadest sense, the term epidemiology refers to the systematic effort to

---

H. Hakosalo (✉) · A. Sailo  
University of Oulu, Oulu, Finland  
e-mail: [heini.hakosalo@oulu.fi](mailto:heini.hakosalo@oulu.fi)

A. Sailo  
e-mail: [annukka.sailo@oulu.fi](mailto:annukka.sailo@oulu.fi)

K. Parhi  
Tampere University, Tampere, Finland  
e-mail: [katariina.parhi@tuni.fi](mailto:katariina.parhi@tuni.fi)

understand disease distribution and to make sense of the unequal ways that disease and death treat different groups of people. Epidemiological knowledge has informed public health measures from quarantines to urban sanitation, from meat inspections to cancer screening, from anti-smoking campaigns to mass vaccinations. Beyond such obviously health-related issues, epidemiological prescriptions have exerted more diffuse but profound influence on the way that people in present-day societies interact with each other, trade, travel, and arrange their working and living spaces. It is indeed difficult to imagine industrialized societies without this kind of knowledge and its many applications. Modern epidemiology has been instrumental in teaching us to think about health in terms of lifetime accumulation of risks, the reduction of which is primarily perceived as an individual responsibility. As an object of historical research, epidemiology is an intriguing and undeniably important, but also an elusive phenomenon.

*Historical Explorations of Modern Epidemiology: Patterns, Populations and Pathologies* tackles this phenomenon through the lens of ten case studies. The volume asks how epidemiological knowledge has been produced; what kind of intentions, forces, and interests have shaped the development of the epidemiological field of inquiry; and how epidemiological knowledge has been used—in what way, for instance, has it guided, justified, or undermined public health efforts and policies. Far from making the effort defunct, the fact that the boundaries of the field are somewhat hazy and its disciplinary identity not always clear-cut, makes the effort more worthwhile. In this introductory chapter, we chart the boundaries of epidemiology with reference, first, to adjacent fields of inquiry and, second, to some historical turning points. We then move on to discuss the historiography of epidemiology—which, much like its subject, is extensive but somewhat nebulous—and to shortly outline the contents of the book. As the historiographical review makes clear, book-length studies specifically focused on the history of epidemiology are surprisingly rare. This volume is useful for those seeking a fuller understanding of the development of modern and contemporary medicine. For a practicing epidemiologist, a historical view on the development of their science gives an opportunity to take a step back and see the historicity of present-day practices and beliefs. A look at the history of epidemiology offers exciting examples of creative reasoning and discovery and of the

uses and misuses of medical knowledge. In the last instance, epidemiology, like most forms of medicine, can be seen as part of the very human effort to come to terms with the vulnerable and finite nature of life.

The tense of the book should be thought of as past continuous: we are concerned with the history of the field up to and including the present, with emphasis on the period after the Second World War. The specific forms that epidemiological inquiries have taken are always related to and predicated upon the culture and society of their time. An inquiry into the historical trajectory of epidemiology during the past hundred years is therefore also an exploration of the development of modern societies. Today, epidemiological research shapes health, social and educational policies, as well as clinical practice, and it profoundly influences the way that people perceive, manage, and monitor their everyday life choices and think about disease and health.

## WHAT DO WE STUDY WHEN WE STUDY THE HISTORY OF EPIDEMIOLOGY?

The three terms in the subtitle of the book—patterns, populations, and pathologies—refer to epidemiology’s basic objective, *patterning pathologies on populations*.<sup>1</sup> “Pathologies” is here used as a shorthand not only for diseases but also death, disabilities, disease risks, and even social problems. In contradistinction to many other forms of medical inquiry, epidemiology studies diseases as mass phenomena, on population level. The term “patterning” refers to what epidemiologists do when they seek to define the distribution of pathologies in time and place. In patterning pathologies on populations, epidemiologists contribute to the coproduction of both, participating as they do in the definition of pathologies and the construction of populations.

More concretely, epidemiological practices during the past two hundred years have included things like calculation and statistical analysis of frequencies and incidences of death and disease; disease surveillance

<sup>1</sup> The wording comes close to Nancy Krieger’s definition of epidemiology as “population patterning of health.” Nancy Krieger, *Epidemiology and the People’s Health: Theory and Context* (Oxford: Oxford University Press, 2014 [2011]), 67. For definitions of epidemiology, see Mervyn Susser and Zena Stein, *Eras in Epidemiology: The Evolution of Ideas* (Oxford: Oxford University Press, 2009), 3. There is a helpful list of textbook definitions in Krieger (2014), 34–42.

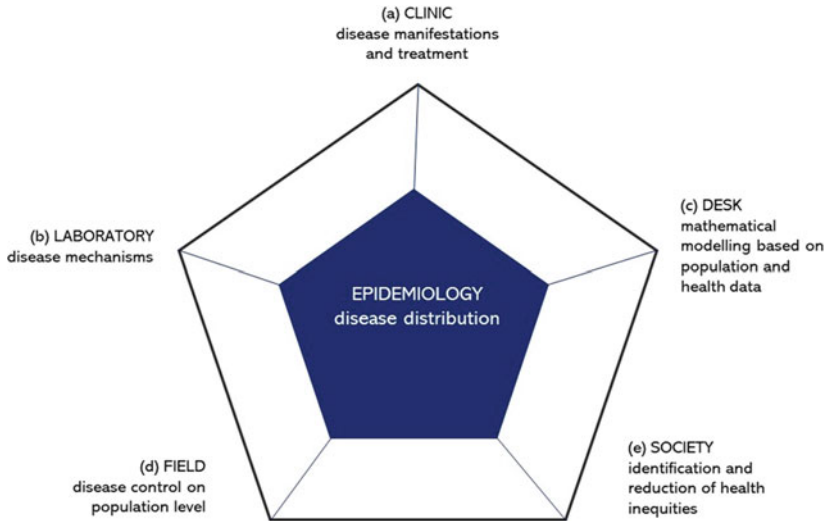
and outbreak investigation; contact-tracing; and assessment of preventive public health and therapeutic measures, for instance vaccination. After the Second World War, epidemiological research has commonly been conducted by means of cohort and case-control studies, with the objectives of linking exposure to outcome and identifying risk factors of disease (or social ills like poverty). The former method compares incidence rates between exposed and unexposed people and the latter compares prior exposure frequencies in sick and well people. Epidemiological research is observational and inductive and has, especially since the early twentieth century, relied heavily on statistical analysis and mathematical modeling.

Beyond such basic traits and definitions, there is much ambiguity. One way to try and define the contours of the field is to trace its boundaries towards neighboring and overlapping fields. In the case of epidemiology, these boundaries have been historically shifting and permeable. The following discussion will focus on five key adjacent fields: clinical research, biomedical research, statistical analysis, public health research, and social medicine. Each field is characterized by its central objective and its “truth spot,” or the place from which it primarily derives its scientific authority.<sup>2</sup> The key features are represented schematically in Fig. 1.1.

First, epidemiological research is closely related to but distinguishable from *clinical medicine* (a), which is concerned with manifestations and treatment of disease. Its truth spot is “the clinic,” i.e., the modern hospital that combines treatment with medical teaching and research. There are many historical points of contact between clinical and epidemiological research. For instance, the early nineteenth-century Parisian teaching hospitals were also the home of pioneering cohort studies. Randomized controlled trials were established as the core element of clinical research after the Second World War, with profound consequences for epidemiology. And the emergence of evidence-based medicine in the 1980s again modified the relationship between clinical medicine and epidemiology.

Second, epidemiology is closely associated with but historically and analytically distinguishable from *biomedical research* (b), an umbrella term for laboratory-based research primarily concerned with the identification of disease mechanisms. The truth spot here is “the laboratory,”

<sup>2</sup> The term has been introduced and employed by Thomas F. Gieryn. See his “City as Truth-Spot: Laboratories and Field-Sites in Urban Studies,” *Social Studies of Science* 36:1 (2006), 5–38, and *Truth-Spots: How Places Make People Believe* (Chicago: University of Chicago Press, 2018).



**Fig. 1.1** Epidemiological field of inquiry and its chief alliances with their key objectives and truth spots

which became crucial for epidemiology with the breakthrough of bacteriology during the last quarter of the nineteenth century.<sup>3</sup> The collaboration between the two fields has taken many forms, including experimental forms. During the past decades, the collaboration has increasingly moved to the molecular level.

Third, *statistical analyses and mathematical modeling* (c) of disease distribution have been crucially important allies of epidemiology since the mid-nineteenth century. William Farr (1807–1883) is often regarded as the central figure in bringing the two together, and further steps towards mathematization were taken at the beginning of the twentieth century by the biometrician Karl Pearson (1857–1936) and his disciples. During the latter part of the twentieth century, advances in computing and information technologies made statistical analysis and mathematical modeling increasingly effective and central as epidemiological tools. Given the theoretical nature of this work, the truth spot related to this edge can be called “the desk” (although “the PC” might be more accurate today).

<sup>3</sup> For an analysis of “epidemiologists’ boundary-making endeavors,” especially towards bacteriologists, see Amsterdamska (2005), 17.

The fourth truth spot is “the field,” the locus of *epidemiological field work* (d), which has historically revolved around various forms of outbreak investigation and case-finding. It has developed in close collaboration with public health and state administration and been aimed at monitoring and controlling disease in populations, for instance by means of identifying and cutting chains of infection.

The fifth adjacent field is closely related to but not identical with epidemiology. Its primary disciplinary manifestation is *social medicine* (c), and its truth spot would have to be “society” as a whole, as it attains to social improvement by means of identifying and leveling health inequalities. Social medicine in its different historical guises indeed seems like a natural ally to epidemiology, given that the latter is concerned with differential distribution of disease and that these differences often coincide with and deepen social and economic divisions. Few would deny that effective health leveling requires political action, but not everyone thinks that epidemiologists themselves should be politically engaged. Some students of population-level pathologies, from Rudolf Virchow (1821–1902) to Johan Mackenbach, have placed investigation into health inequalities and their social, economic, and political causes at the very core of their epidemiological and public health endeavors and been explicit about the social and political implications and obligations of epidemiology.<sup>4</sup> The past decades have also witnessed an increased need to go beyond human societies to embrace the health of non-human animals (“one health”) and to study human health in relation to planetary needs and boundaries (“planetary health”).<sup>5</sup>

Epidemiology, the middle pentagon, should be thought of as a mobile and shape-shifting rather than a static thing. The introduction of fresh innovations, new alliances, and novel goals has involved border negotiations and disputes. The main lines of tension within the field have also changed over time. When one or some of the edges have become

<sup>4</sup> For an interesting discussion on variations of the idea that health is a political issue and medicine and politics are therefore mutually interdependent, see J.P. Mackenbach, “Politics Is Nothing but Medicine at a Larger Scale: Reflections on Public Health’s Biggest Idea,” *Journal of Epidemiology and Community Health* 63:3 (2009), 181–4.

<sup>5</sup> Warwick Anderson and James Dunk, “Planetary Health Histories: Toward New Ecologies of Epidemiology?,” *Isis* 113:4 (2022), 767–88; James H. Dunk, David S. Jones, Anthony Capon, and Warwick H. Anderson, “Human Health on an Ailing Planet—Historical Perspectives on Our Future,” *New England Journal of Medicine* 381:8 (2019), 778–82.

stronger, concerns have been voiced that epidemiology risks being subsumed and losing its independent identity. During the past decades, for instance, there have been stark tensions between the biomedically and the more socially oriented parts of the field. Socially oriented epidemiologists have criticized what they see as too heavy reliance of epidemiology on biomedicine. While these critics would not deny that the adoption of molecular research techniques can offer added precision, explanatory power, prestige, and opportunities for interdisciplinary collaboration, they also stress that the dominance of the biomedical framework risks blinding epidemiologists to health inequities and the social aspects of disease distribution.<sup>6</sup>

Another, perhaps more common way to try and outline the epidemiological field of inquiry is by charting its development. At first sight, the impression of the elusiveness of the field is enforced by the difficulty of fixing a birth date. Historical overviews usually start from Hippocratic texts, and epidemiological *questions* no doubt have ancient origins.<sup>7</sup> But views on the emergence of epidemiology as a *discipline*, or as a distinct field of scientific inquiry, differ widely, ranging from the seventeenth to the latter part of the twentieth century.

According to Nancy Krieger, “The development of epidemiology as a self-defined scientific discipline [...] had its origins in Europe in the seventeenth century,” while Alberto Morabia refers to the “birth of epidemiology in the 18<sup>th</sup> century.” *Encyclopaedia Britannica* states that epidemiology “as a formal science” emerged in the course of the nineteenth century. David Morens, in turn, places “the birth of epidemiology” in Paris in 1819–1832. Krieger—notwithstanding her earlier statement as to the beginnings of epidemiology in the seventeenth century—agrees with Morens that, “By the 1830s, epidemiology had emerged as a self-designated field of inquiry.”<sup>8</sup> Others regard the decades following the

<sup>6</sup> Krieger (2014), viii–ix, 126; Susanne Bauer, “Mining Data, Gathering Variables and Recombining Information: The Flexible Architecture of Epidemiological Studies,” *Studies in History and Philosophy of Science Part C: Studies in History and Philosophy of Biological and Biomedical Sciences* 39:4 (2008), 415–28, here 417.

<sup>7</sup> On ancient Greek views on epidemics, see David M. Morens, “Epidemiology, History of,” in *Encyclopedia of Epidemiology*, ed. by Sarah Boslaugh (Thousand Oaks: Sage, 2008), 318–24.

<sup>8</sup> Krieger (2014), 38; Alfredo Morabia, ed., *A History of Epidemiologic Methods and Concepts* (Basel: Birkhäuser Verlag, 2004), 6; Morens (2008), 8, 2–3; “Epidemiology,

first wave of cholera in Europe (1831–32) as the crucial period of gestation. Morabia thus notes that epidemiology took its “first steps” between the early 1830s and 1850 in London, where the newly founded London Epidemiological Society “assembled scientists, public health practitioners and physicians to unite their efforts in the fight against ‘epidemics.’”<sup>9</sup> Lisa Wilkinson agrees that “epidemiology came of age” with the founding of the Society in 1850.<sup>10</sup> Mervyn Susser and Zena Stein give William Farr, who was professionally most active in the 1850s and 1860s, “a major role as a founder of epidemiology in its modern analytic form.”<sup>11</sup> Olga Amsterdamska, too, believes that “epidemiology as a scientific study of disease in populations claimed an independent disciplinary status already in the mid-nineteenth century.”<sup>12</sup>

The latter part of the nineteenth century also gets some votes. Historians of Victorian Britain have emphasized that epidemiology went through a process of professional consolidation at that time, turning British epidemiology into “a well-established, practice-oriented field.”<sup>13</sup> According to Jacob Steere-Williams, practices of outbreak investigation were consolidated during the latter part of the nineteenth century, when British epidemiologists also “began to call themselves epidemiologists and started to think in sociological, institutional, and even historical terms about their status as a discipline.”<sup>14</sup> Amsterdamska, in spite of dating the birth of the discipline in the first part of the nineteenth century, also highlights the importance of the interwar period, “when epidemiology was becoming an academic discipline” and was clearly demarcated

Medicine,” in *Encyclopaedia Britannica*, at <https://www.britannica.com/science/epidemiology#ref323516>.

<sup>9</sup> Morabia (2004), 3.

<sup>10</sup> Lisa Wilkinson, “Epidemiology,” in *Companion Encyclopedia of the History of Medicine II*, ed. by W.F. Bynum and Roy Porter (London and New York: Routledge, 1993), 1262–81, here 1262, 1273.

<sup>11</sup> Susser and Stein (2009), 65.

<sup>12</sup> Olga Amsterdamska, “Demarcating Epidemiology,” *Science, Technology & Human Values* 30:1 (2005), 17–51, here 17.

<sup>13</sup> Amsterdamska (2005), 23.

<sup>14</sup> Jacob Steere-Williams, *The Filth Disease: Typhoid Fever and the Practices of Epidemiology in Victorian England* (Rochester, NY: University of Rochester Press, 2020), 7. See also Anne Hardy, *Salmonella Infections, Networks of Knowledge, and Public Health in Britain, 1880–1975* (Oxford: Oxford University Press, 2015).



from other endeavors.<sup>15</sup> It was indeed during this period that the first two chairs, at the London School of Hygiene and Tropical Medicine (1921) and Johns Hopkins Medical School (1927), were founded.<sup>16</sup> But the majority of votes goes to the immediate post-war decades. Luc Berlivet, for instance, asserts that “the contemporary style of epidemiology goes back no further than the late 1940s.”<sup>17</sup> Other historians and epidemiologists, too, think that epidemiology as a full-fledged academic discipline took shape only after the Second World War.<sup>18</sup>

The timing of the emergence of epidemiology is thus something of a muddle. Even one and the same author sometimes provides two different, temporally quite distinct birth dates. One reason for the confusion is no doubt that exact timing was not these authors’ primary concern. Another possible explanation is that they were in fact speaking about different things, not using any shared criteria for a “mature” discipline. Amalgamating their views, and applying the principle of charity, one might say that the first part of the nineteenth century witnessed the appearance of a demand for and some shared guidelines for producing epidemiological knowledge and the latter part of the century saw definite signs of professionalization. While some criteria of an academic discipline were met during the interwar period (chairs and textbooks), the rest (departments, doctoral programs, textbooks, and specialized periodicals) were at evidence first during the post-war decades.

## HISTORIOGRAPHY OF EPIDEMIOLOGY

A Venn diagram of the historical literature relevant for our theme would display a small core element with several larger circles surrounding and partly overlapping it: while surprisingly few studies specifically focus on the history of epidemiology, there are several adjacent clusters of scholarship that are relevant for understanding it. Apart from the few general histories of epidemiology, three major clusters can be distinguished: histories of concepts, theories, techniques, and epistemological issues, often looked through the lens of epidemiological landmark studies; histories of epidemics; and histories of public health and governance.

<sup>15</sup> Amsterdamska (2005), 18.

<sup>16</sup> Krieger (2014), 103; Susser and Stein (2019), 165; Wilkinson (1993), 1276–7.

<sup>17</sup> Berlivet (2005), 41.

<sup>18</sup> MacMahon and Pugh (1970), 5. See also Susser and Stein (2009), 164, 172–3.

There are also some notable absences. Epidemiology, as a distinct theme, is often missing from general histories of medicine. *Companion Encyclopedia of the History of Medicine* contains an entry on epidemiology and the *Encyclopedia of Epidemiology* one on the history of epidemiology,<sup>19</sup> but there is neither a section nor an index term for epidemiology in the encyclopedic *Medicine in the 20th Century* or, perhaps even more surprisingly, in Dorothy Porter's synoptic *Health, Civilization and the State*.<sup>20</sup> One reason for its slight presence in general histories of medicine may be that—notwithstanding well-known foundation stories like that of John Snow and the Broad Street pump—the development of epidemiology does not as easily translate into linear narratives paced with dramatic breakthroughs, discoveries, and innovations as some other branches of medicine. Another reason has already been discussed: it is not always easy to say where epidemiology ends and another field of inquiry begins.

The few book-length general histories of epidemiology have been written by epidemiologists rather than historians. These include, most importantly, Mervyn Susser and Zena Stein's *Eras in Epidemiology: The Evolution of Ideas* and Nancy Krieger's *Epidemiology and the People's Health: Theory and Context*.<sup>21</sup> The former contains what is probably the most well-known periodization of the development of the field. Susser and Stein distinguished three to four periods: the era of sanitary statistics, prior to the 1880s; the era of infectious disease epidemiology, from the 1880s to WWII; and the era of chronic disease epidemiology after WWII. Writing in the 1990s, Susser and Stein believed that the third period was about to end and a new period to start.<sup>22</sup> They regarded their 3–4 historical phases as paradigms in the Kuhnian sense and saw theories as *the* driving force of disciplinary development.<sup>23</sup> Krieger's temporal

<sup>19</sup> Wilkinson (1993); Morens (2008).

<sup>20</sup> Roger Cooter, ed., *Medicine in the Twentieth Century* (Harwood Academic Publishers, 2000); Dorothy Porter, *Health, Civilization, and the State: A History of Public Health from Ancient to Modern Times* (Routledge, 1999); Gert Brieger, "The Historiography of Medicine," 33, cited by Steere-Williams (2020), 113; Hardy (2015), 9.

<sup>21</sup> See also Morabia (2004) and *History of Psychiatric Epidemiology, International Journal of Epidemiology* 43, supplement 1 (2014), ed. by Anne Lovell and Ezra Susser.

<sup>22</sup> Susser and Stein (2009), 70–71, 120, 296, 302, 309, 333. The eras are summed up in tables on pages 304 and 321. The chapters where the model is outlined were originally published as independent articles in 1995–1996 and then included in the book.

<sup>23</sup> E.g., Susser and Stein (2009), 16–17, 22, 163. They see no great difference between Kuhnian paradigms and Fleck's thought styles/communities, thus diverging from the original definitions of these concepts.

scope is similar, starting from Hippocrates and extending to the time of writing. Both books are also heavily focused on British and US developments. Krieger, too, saw theoretical thinking as the motor of scientific development and the thing that gives each period its distinct character. Again like Susser and Stein, she had firm views about the present shortcomings and the preferable future course of the discipline. Krieger, a social epidemiologist, was highly critical of that mix of biomedical and lifestyle perspectives that she saw as dominating current epidemiology.<sup>24</sup> She wanted to see epidemiology move away from risk factor epidemiology towards a multilevel approach more sensitive to health inequalities.<sup>25</sup>

Historians have usually preferred a more temporally and geographically restricted focus, perhaps because it allows them to investigate in more detail the interconnections between epidemiological knowledge-making and the historically specific social context. The second significant cluster of historical research revolves around the landmark studies of the post-WWII years. These include the randomized controlled trials (RCT) directed by Austin Bradford Hill (1897–1991) under the auspices of the British Medical Research Council to assess the efficacy of the new chemotherapeutic tuberculosis drugs (UK 1946); the National Survey of Health and Development, the first national birth cohort study (UK 1946); the series of studies that explored the link between lung cancer and smoking, conducted in Britain and the US in the 1950s; and the Framingham Heart Study (US 1948). These studies have been extensively studied by historians and are also frequently revisited by practicing epidemiologists.

Landmark studies are regarded as such not only because they delivered important results but also because they introduced methodological innovations and new constitutive concepts. RCT, while not a specifically epidemiological method, has been extremely important for epidemiology both as a tool and as a yardstick, a standard against which epidemiological study designs are often measured.<sup>26</sup> The 1950s tobacco-cancer

<sup>24</sup> Krieger (2014), vii, 3, 30–31, 34 passim.

<sup>25</sup> Krieger (2014), 97.

<sup>26</sup> On the emergence and application of RCT, see e.g., Harry Marks, *The Progress of Experiment: Science and Therapeutic Reform in the United States, 1900–1990* (Cambridge: Cambridge University Press, 1997); Iain Chalmers, “Statistical Theory Was Not the Reason That Randomization Was Used in the British Research Council’s Clinical Trial of Streptomycin for Pulmonary Tuberculosis,” in *Body Counts: Medical Quantification in Historical and Sociological Perspectives*, ed. by Gérard Jorland, Annick Opinel and

studies, mainly using cohort and case-control methods, were crucial for the development of a new understanding of causality and for the disciplinary identity and status of epidemiology. As Mark Parascandola puts it, “the debate over tobacco and lung cancer provided a crucial test for the discipline of epidemiology.”<sup>27</sup> In the present volume, Nicolas Brault (Chapter 3) shows that the nature of epidemiological causality was still very much an issue in the 1970s.

Post-war cohort studies, especially the Framingham Heart Study, center-staged the concept of differential risk, first introduced in print in 1961.<sup>28</sup> The position of the Framingham Study in the history of post-WWII epidemiology is not unlike that of John Snow’s studies on cholera in the mid-nineteenth century: it is regarded as a turning point in both practice and reasoning. The concept of risk forced epidemiologists to rethink the nature of epidemiological inference. “Risk,” being non-necessary and non-sufficient but still statistically significant, was a new kind of causal factor. The Framingham Study dealt with multiple risk factors, whereas the tobacco-cancer studies focused on the role of one, and the former therefore added complexity to epidemiological explanations. Investigations into the emergence of “risk factor epidemiology” has allowed historians and STS scholars not only to observe a major reconfiguration of epistemological reasoning but also to discuss its repercussions for the relationships between clinical, experimental, and epidemiological research.<sup>29</sup>

George Weisz (Montreal: McGill-Queen’s University Press, 2005), 309–34. On the 1950s tobacco-cancer debates, see Mark Parascandola, “Epidemiology in Transition: Tobacco and Lung Cancer in the 1950s,” in Jorland, Opinel and Weisz (2005), 226–48.

<sup>27</sup> Parascandola (2005), 226. See also Mark Parascandola, “Scepticism, Statistical Methods, and the Cigarette: A Historical Analysis of a Methodological Debate,” *Perspectives in Biology and Medicine* 47:2 (2004), 244–61; A.M. Brandt, “The Cigarette, Risk, and American Culture,” *Daedalus* 119:4 (1990), 155–76.

<sup>28</sup> W.B. Kannel, T.R. Dawber, A. Kagan, N. Revotskie, and J. Stokes, “Factors of Risk in the Development of Coronary Heart Disease—Six-Year Follow-Up Experience. The Framingham Study,” *Annals of Internal Medicine* 55 (1961), 33–50; Luc Berlivet, “Association and Causation: The Debate on Scientific Status of Risk Factor Epidemiology, 1947–c. 1965,” in *Making Health Policy: Networks in Research Policy After 1945*, ed. by Virginia Berridge (Amsterdam: Rodopi, 2005), 43–74.

<sup>29</sup> William G. Rothstein, *Public Health and the Risk Factor* (Rochester: University of Rochester Press, 2003); Robert A. Aronowitz, *Making Sense of Illness: Science, Society, and Disease* (Cambridge: Cambridge University Press, 1998); William G. Rothstein, *The Coronary Heart Disease Pandemic in the Twentieth Century: Emergence and Decline in*

Population-level research relies heavily on counting, and studies on the history of calculation and quantification are indeed an important subgroup of the second cluster of scholarship. Studies like Theodor Porter's *The Rise of Statistical Thinking, 1820–1900* and *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life*, Ian Hacking's *The Taming of Chance*, and Alain Desrosières' *The Politics of Large Numbers: A History of Statistical Reasoning*, as well as the edited volumes *The Road to Medical Statistics* (2002), *Body Counts: Medical Quantification in Historical and Sociological Perspectives* (2005) and *Accounting for Health* (2021)<sup>30</sup> have asked how people—especially ill and dead people—have been categorized and counted and how the resulting figures have been interpreted and made use of both in epidemiological research and in administrative and clinical practices. There is a close connection between statistical and health administration, as the state has been a major player in the development of population bills and statistics, registration, and record-keeping.

*Advanced Countries* (London: Taylor & Francis, 2018). On the history of the notion of risk and risk factor epidemiology, see also Élodie Giroux, “Enquête de cohorte et analyse multivariée: une analyse épistémologique et historique du rôle fondateur de l'étude de Framingham,” *Revue d'épidémiologie et santé publique* 56:3 (2008), 177–88; “The Framingham Study and the Constitution of a Restrictive Concept of Risk Factor,” *Social History of Medicine* 26:1 (2012), 94–112; Luc Berlivet (2005); Gerald M. Oppenheimer, “Profiling Risk: The Emergence of Coronary Heart Disease Epidemiology in the United States (1947–70),” *International Journal of Epidemiology* 35 (2006), 720–30; “Becoming the Framingham Study 1947–1950,” *American Journal of Public Health* 95:4 (2005), 602–10; Robert Aronowitz, “The Framingham Heart Study and the Emergence of Risk Factor Approach to Coronary Heart Disease,” *Revue d'histoire des sciences* 64:2 (2011), 263–95; Sejal S. Patel, “Methods and Management: NIH Administrators, Federal Oversight, and the Framingham Heart Study,” *Bulletin of the History of Medicine* 86:1 (2012), 94–121.

<sup>30</sup> Alain Desrosières, *The Politics of Large Numbers: A History of Statistical Reasoning* (Cambridge, MA: Harvard University Press, 1998); Ian Hacking, *The Taming of Chance* (Cambridge: Cambridge University Press, 1990); Theodore M. Porter, *The Rise of Statistical Thinking, 1820–1900* (Princeton: Princeton University Press, 1986); Theodore M. Porter, *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life* (Princeton: Princeton University Press, 1995); *The Road to Medical Statistics* (Amsterdam: Rodopi, 2002), ed. by Eileen Magnello and Anne Hardy. See also George Weisz, “From Clinical Counting to Evidence-Based Medicine,” in Jorland, Opinel and Weisz (2005), 377–93; Theodore M. Porter, “Life Insurance, Medical Testing, and the Management of Mortality,” in *Biographies of Scientific Objects*, ed. by Lorraine Daston (Chicago: University of Chicago Press, 1999), 226–46.

STS scholars have conducted research on issues that, even if not primarily epidemiological, are nevertheless highly relevant for understanding epidemiological knowledge-making. To take one example, G.C. Bowker and Susan Leigh Star's *Sorting Things Out: Classification and Its Consequences* explores how categories—including epidemiological categories—result from continuous negotiations and compromises and how they render some things visible and others invisible.<sup>31</sup> Particularly since the 1980s, the huge increase in the capacities of data storage and processing techniques has given rise to vast repositories of varied health data. Epidemiology has played a major role in generating, making use of, and legitimizing such data collections. While historical studies tend to terminate prior to the 1980s digital revolution, STS scholars have produced a host of useful studies on more recent data practices. These studies tackle, for instance, the uses and abuses of the big biomedical data and the ethical and technical complexities involved in disease registration, in repurposing cohort data and in depositing biomedical legacy samples in biobanks, as well as the implications of the European General Data Protection Regulation (GDPR) (2018) for health research.<sup>32</sup> Sociologist Susanne Bauer's work is particularly useful for understanding

<sup>31</sup> G.C. Bowker and Susan Leigh Star, *Sorting Things Out: Classification and Its Consequences* (Cambridge, MA: MIT Press, 1999). On the establishment of global health communication infrastructures, see also Heidi Tworek, "Communicable Disease: Information, Health, and Globalization in the Interwar Period," *The American Historical Review* 124:3 (2019): 813–42.

<sup>32</sup> E.g., Robert Mitchell and Catherine Waldby, "National Biobanks: Clinical Labor, Risk Production, and the Creation of Biovalue," *Science, Technology, & Human Values* 35:3 (2010), 330–55; Marjut Salokannel, Heta Tarkkala, and Karoliina Snell, "Legacy Samples in Finnish Biobanks. Social and Legal Issues Related to the Transfer of Old Sample Collections into Biobanks," *Human Genetics* 138:11–12 (2019), 1287–99; Aaro Tupasela, Karoliina Snell, and J.A. Cañada, "Constructing Populations in Biobanking," *Life Sciences, Society and Policy* 11:5 (2015), 1–18; Alison Cool, "Impossible, Unknowable, Accountable: Dramas and Dilemmas of Data Law," *Social Studies of Science* 49:4 (2019), 503–30; David Armstrong, "The Social Life of Data Points: Antecedents of Digital Technologies," *Social Studies of Science* 49:1 (2019), 102–17; Soraya de Chadarevian and Theodore M. Porter, "Histories of Data and the Database (special Issue)," *Historical Studies in the Natural Sciences* 48:5 (2018); Sabina Leonelli, *Biomedical Knowledge Production in the Age of Big Data*. Analysis conducted on behalf of the Swiss Science and Innovation Council SSIC (Schweizerische Eidgenossenschaft, 2017); M. Rückenstein and N.D. Schüll, "The Datafication of Health," *Annual Review of Anthropology* 46 (2017), 261–78; K. Hoyer, S. Bauer, and M. Pickersgill, "Datafication and Accountability in Public Health: Introduction to a Special Issue," *Social Studies of Science* 49:4 (2019), 459–75.

the co-construction of administrative infrastructures and epidemiological knowledge in the Nordic countries.<sup>33</sup>

Historical practices of epidemiological representation range from narrative to numerical, from schematic to photographic. Anne Hardy has stressed the strong narrative tradition of epidemiology: “The working epidemiologists of the late nineteenth century and of the first half of the twentieth were trained in a tradition which prized the art of storytelling.”<sup>34</sup> Jacob Steere-William agrees, while also drawing attention to the role of statistical charts as the fundamental form of visual representation in late nineteenth-century field epidemiology.<sup>35</sup> The development and uses of epidemiological maps is the topic of Tom Koch’s *Disease Maps*,<sup>36</sup> and Lukas Engelmann discusses maps and other forms of visualization in his *Mapping AIDS: Visual Histories of an Enduring Epidemic*.<sup>37</sup> A temporally extensive look at forms of visual representations of epidemic diseases is provided by *Plague Image and Imagination from Medieval to Modern Times*, edited by Christos Lynteris, who has studied the representation of epidemics, and the epidemiologist, in his other works as well.<sup>38</sup> In this volume, Lukas Engelmann applies tools of visual analysis to the COVID-19 pandemic (Chapter 11).

Turning to the third cluster of scholarship, histories of epidemics, we meet an embarrassment of riches. Many studies on epidemics, while not specifically targeting epidemiological knowledge-making, touch upon all

<sup>33</sup> Susanne Bauer, “Danish Population Registries, the ‘Scandinavian Laboratory,’ and the ‘Epidemiologist’s Dream,’” *Science in Context* 27:2 (2014), 187–213; Bauer (2008); and Susanne Bauer, “Modeling Population Health: Reflections on the Performativity of Epidemiological Techniques in the Age of Genomics,” *Medical Anthropology Quarterly* 27:4 (2013), 510–30.

<sup>34</sup> Hardy (2015), 17.

<sup>35</sup> Steere-Williams (2020), 16–17.

<sup>36</sup> Tom Koch, *Disease Maps: Epidemics on the Ground* (Chicago and London: University of Chicago Press, 2011).

<sup>37</sup> Lukas Engelmann, *Mapping AIDS: Visual Histories of an Enduring Epidemic* (Cambridge: Cambridge University Press, 2018).

<sup>38</sup> *Plague Image and Imagination from Medieval to Modern Times*, ed. by Christos Lynteris (London: Palgrave Macmillan, 2021); Christos Lynteris, “The Epidemiologist as Culture Hero: Visualizing Humanity in the Age of ‘the Next Pandemic,’” *Visual Anthropology* 29:1 (2016), 36–53; Christos Lynteris, *Human Extinction and the Pandemic Imaginary* (Routledge, 2020); Christos Lynteris, *Visual Plague: The Emergence of Epidemic Photography* (Cambridge, MA: MIT Press, 2022).

the three edges of the triangle *disease—control measures—epidemiological knowledge*. Not surprisingly, the history of epidemics has shown a strong preference for contagious disease outbreaks, which are dramatic, high-impact events with relatively clear spatial and temporal boundaries and obvious and often wide-ranging social repercussions. Histories of epidemics that shed light on the interaction between disease, epidemiological knowledge-production, and public health measures include, to name just a few, Anne Hardy's *The Epidemic Streets: Infectious Diseases and the Rise of Preventative Medicine, 1856–1900* and *Salmonella Infections, Networks of Knowledge, and Public Health in Britain, 1880–1975*, William Coleman's *Yellow Fever in the North: The Methods of Early Epidemiology*, François Delaporte's *The History of Yellow Fever*, and Jacob Steere-Williams's *The Filth Disease: Typhoid Fever and the Practices of Epidemiology in Victorian England*.<sup>39</sup> Charles Rosenberg discusses the construction of epidemic outbreak narratives in his seminal “What is an epidemic?”. The paper was written in 1989, during the early years of the HIV/AIDS epidemic, and has been a standard reference point also during the COVID-19 pandemic, particularly in the US.<sup>40</sup> Priscilla Wald's *Contagious: Cultures, Carriers, and the Outbreak Narrative* is a more recent and extensive analysis of the forms and variations of “outbreak narratives,” or tales of disease emergence, and an argument for their cultural and political significance.

The history of non-communicable diseases is less well covered but hardly neglected. George Weisz's *Chronic Disease in the Twentieth Century: A History* charts the emergence of chronic disease as a major public health problem in the US, with comparative chapters on Britain and France. The history of cancer and cancer research, particularly in

<sup>39</sup> Anne Hardy, *The Epidemic Streets: Infectious Diseases and the Rise of Preventative Medicine, 1856–1900* (Oxford: Clarendon Press, 1993); William Coleman, *Yellow Fever in the North: The Methods of Early Epidemiology* (Madison: University of Wisconsin Press, 1987); François Delaporte, *The History of Yellow Fever: An Essay on the Birth of Tropical Medicine* (Cambridge, MA: MIT Press, 1991); Steere-Williams (2020); Naomi Rogers, *Dirt and Disease: Polio before FDR* (New Brunswick: Rutgers University Press, 1992); Dora Vargha, *Polio Across the Iron Curtain: Hungary's Cold War with an Epidemic* (Cambridge: Cambridge University Press, 2018); Lukas Engelmann and Christos Lynteris, *Sulphuric Utopias: The History of Maritime Fumigation* (Cambridge, MA: MIT Press, 2020).

<sup>40</sup> Charles E. Rosenberg, “What Is an Epidemic? AIDS in Historical Perspective,” *Daedalus* 118:2 (1989), 1–17.



the US context, has interested several historians. Robin Wolfe Scheffler's *A Contagious Cause: The American Hunt for Cancer Viruses and the Rise of Molecular Medicine* sheds light both on the disease and on the broader category of chronic disease. There is also a growing body of research on "the obesity epidemic," obesity being an example of a condition that has evolved from a non-pathological (although often negative) trait into a risk factor and further into a disease with epidemic, even pandemic proportions.<sup>41</sup> Chronic diseases were long studied as a first-world problem, but this imbalance has been addressed lately by publications like *Epidemiological Change and Chronic Disease in Sub-Saharan Africa: Social and Historical Perspectives*, edited by Megan Vaughan, Kafui Adjaye-Gbewonyo, and Marissa Mika, *Improvising Medicine: An African Oncology Ward in an Emerging Cancer Epidemic* by Julie Livingston and *Travelling with Sugar: Chronicles of a Global Epidemic* by Amy Moran-Thomas.<sup>42</sup>

Several chapters in this volume also start from specific disease or disease groups. Heini Hakosalo (Chapter 2) discusses mid-twentieth-century tuberculosis research as a test ground for later chronic disease approaches, Jan Kuhanen and Markku Hokkanen (Chapter 8) trace the history of epidemiological research into sexually transmitted infections in Africa, and Mona Mannevuola (Chapter 10) investigates the way that a social problem, unemployment, was framed in quasi-medical terms in Finland in the 2010s.

<sup>41</sup> E.g., Nicolas Rasmussen, "Downsizing Obesity: On Ancel Keys, the Origins of BMI, and the Neglect of Excess Weight as a Health Hazard in the United States from the 1950s to 1970s," *Journal of the History of the Behavioral Sciences* 55:4 (2019), 299–318; Laura Dawes, *Childhood Obesity in America: Biography of an Epidemic* (Harvard, MA: Harvard University Press, 2014); Frank B. Hu's "Introduction to Obesity Epidemiology," in *Obesity Epidemiology*, ed. by Frank Hu (Oxford: Oxford University Press, 2008: 5–14), also includes a concise discussion on the history of epidemiological research into obesity.

<sup>42</sup> George Weisz, *Chronic Disease in the Twentieth Century: A History* (Baltimore: Johns Hopkins University Press, 2014); Robin Wolfe Scheffler, *A Contagious Cause: The American Hunt for Cancer Viruses and the Rise of Molecular Medicine* (Chicago: University of Chicago Press, 2020); Megan Vaughan, Kafui Adjaye-Gbewonyo, and Marissa Mika, eds., *Epidemiological Change and Chronic Disease in Sub-Saharan Africa: Social and Historical Perspectives* (London: University College London Press, 2021); Julie Livingston, *Improvising Medicine: An African Oncology Ward in an Emerging Cancer Epidemic* (Durham, NC: Duke University Press, 2012).

The fourth cluster of scholarship are histories of public health and the politics of epidemiology. Epidemiological questions, state administration, and politics have been closely linked from the eighteenth century onwards. Public health administration is a well-studied field, especially as concerns Britain. Only a few examples can be named here. Erwin Ackerknecht's 1948 paper on the nineteenth-century debates on contagion and quarantine is a classic case study on the entanglements of disease, medicine, and political and economic interests.<sup>43</sup> Anne Hardy's work, which often moves at the intersection of public health and epidemiology, has already been mentioned. Graham Mooney's *Intrusive Interventions: Public Health, Domestic Space, and Infectious Disease Surveillance in England, 1840–1914* looks at the ways in which health education, surveillance, and monitoring influenced everyday life and the domestic sphere. Alison Bashford's *Quarantine: Local and Global Histories* offers a global long-term perspective on quarantine as a way to control disease. Virginia Berridge's *Marketing Health* focuses on the way that the risks of smoking found their way into the new public health discourse in the latter part of the twentieth century, and shows that not only health care workers and the state but also pharmaceutical and tobacco industries had a stake in the discourse.<sup>44</sup> Peder Clark has explored the formation of "health citizenship," or the relationship between the individual and the state in matters of health, in post-war Britain, showing how social values and political trends of the British class society were reflected in epidemiological research and public health. The role of epidemiological research in shaping health citizenship is also addressed in *Placing the Public in Public Health in Post-War Britain*, edited by Clark and others.<sup>45</sup>

<sup>43</sup> Erwin H. Ackerknecht, "Anticontagionism between 1821 and 1867," *Bulletin of the History of Medicine* 22:5 (1948), 562–93.

<sup>44</sup> Graham Mooney, *Intrusive Interventions: Public Health, Domestic Space, and Infectious Disease Surveillance in England, 1840–1914* (Woodbridge: Boydell & Brewer, 2015); Alison Bashford, *Quarantine: Local and Global Histories* (London: Palgrave Macmillan, 2016); Virginia Berridge, *Marketing Health: Smoking and the Discourse of Public Health in Britain, 1945–2000* (Oxford: Oxford University Press, 2007); Virginia Berridge, "Science and Policy: The Case of Post-War British Smoking Policy," in *Ashes to Ashes: The History of Smoking and Health*, ed. by S. Lock, L.A. Reynolds and E.M. Tanser (Amsterdam: Rodopi, 1998), 143–63; Ilana Löwy and J. Krige, eds., *Images of Disease: Science, Public Policy and Health in Post-War Europe* (Luxemburg: Office for Official Publications of the European Communities, 2011), 53–72.

<sup>45</sup> Peder Clark, "'Problems of Today and Tomorrow': Prevention and the National Health Service in the 1970s," *Social History of Medicine* 33:3 (2020), 981–1000; Peder

The power and politics of epidemiology have interested STS scholars, too. A source of inspiration has been the critical tradition of Michel Foucault,<sup>46</sup> which stresses the less benevolent aspects of counting, surveilling, and monitoring people's health, seen as forms of "biopower" or as expressions of "governmentality." The latter notion has been elaborated on by Nikolas Rose,<sup>47</sup> among others, while another British sociologist, David Armstrong, has critically scrutinized practices of data-production and "surveillance medicine," chronic disease surveillance, and risk-factor modification in many of his publications, starting with *Political Anatomy of the Body: Medical Knowledge in Britain in the Twentieth Century*.<sup>48</sup> The notion of population, so central to epidemiology, has been dissected by Armstrong in several papers and by the historian and STS and gender scholar Michelle Murphy in her influential *The Economization of Life*.<sup>49</sup>

The colonial roots and ingrained colonialism of epidemiological expertise have been discussed and debated a lot in recent years, often in the context of global organizations and global networks of expertise and business. An example is Rohan Deb Roy's *Malarial Subjects: Empire, Medicine and Nonhumans in British India, 1820–1909*, a history of the

Clark, "What Else Can You Expect from Class-Ridden Britain?: The Whitehall Studies and Health Inequalities, 1968 to c.2010," *Contemporary British History* 35:2 (2021), 235–57; Alex Mold, Peder Clark, Gareth Millward and Daisy Payling, *Placing the Public in Public Health in Post-War Britain, 1948–2012* (London: Palgrave Macmillan, 2019).

<sup>46</sup> Michel Foucault, *The Birth of the Clinic: An Archaeology of Medical Perception* (London: Tavistock, 1973); Michel Foucault, *Security, Territory, Population: Lectures at the Collège de France, 1977–1978* (New York: Palgrave Macmillan, 2010). B. Curtis, "Foucault on Governmentality and Population: The Impossible Discovery," *Canadian Journal of Sociology/Cahiers Canadiens de Sociologie* 27:4 (2002), 505–33.

<sup>47</sup> Nikolas Rose, "Calculable Minds and Manageable Individuals," *History of the Human Sciences* 1:2 (1988), 179–200; Nikolas Rose, *Governing the Soul: The Shaping of the Private Self* (London: Free Association Books, 1999); Nikolas Rose and C. Novas, "Biological Citizenship," in *Global Assemblages: Technologies, Politics and Ethics as Anthropological Problems*, ed. by A. Ong and S.J. Collier (Oxford: Blackwell, 2008), 439–63.

<sup>48</sup> David Armstrong, *Political Anatomy of the Body: Medical Knowledge in Britain in the Twentieth Century* (Cambridge: Cambridge University Press, 1983); David Armstrong, "The Rise of Surveillance Medicine," *Sociology of Health and Illness* 17:3 (1995), 393–404.

<sup>49</sup> David Armstrong, "Clinical Prediction and the Idea of a Population," *Social Studies of Science* 47:2 (2017), 288–99; "Rise and Fall of the (Social) Group," *Social Studies of Science* 52:4 (2022), 618–34; Michelle Murphy, *The Economization of Life* (Durham and London: Duke University Press, 2017).

pandemic and of colonial medical and epidemiological practices of study and control. Eugene Richardson, a physician and anthropologist with extensive experience of working in Africa and Asia, has criticized public health and epidemiological reasoning and practices for upholding rather than effectively undermining the ubiquitous and persistent global health inequities in his *Epidemic Illusions: On the Coloniality of Global Public Health*. In a conscious effort to decolonize its own history, a recent report looks at the colonial history of the London School of Hygiene and Tropical Medicine, an institution that has been central both to British and colonial public health research and to historical research into British and colonial public health.<sup>50</sup> History of psychiatric epidemiology, too, is increasingly often discussed from a global perspective.<sup>51</sup>

As difficult as it is to sum up such a large and heterogenous historiography, we will end our review with three general observations. First, notwithstanding the few cross-disciplinary publications, the three groups with the greatest interest in the history of epidemiology—historians, epidemiologists, STS scholars—have taken relatively little notice of each other, with few cross-references across disciplinary boundaries. Generally speaking, epidemiologists have been primarily interested in pioneers and basic concepts, seeing theoretical advancement as the driving force of disciplinary development, while historians have been more likely to look at changing practices of knowledge-gathering and knowledge-making in historically specific social and political contexts. Second, the historiography of epidemiology is temporally and geographically uneven. The two most thoroughly researched contexts are mid- and late nineteenth-century Britain on the one hand and the post-WWII decade in Britain and the US on the other hand. Because historians have seldom moved beyond

<sup>50</sup> Rohan Deb Roy, *Malarial Subjects, Empire, Medicine and Nonhumans in British India, 1820–1909* (Cambridge: Cambridge University Press, 2017); Eugene Richardson, *Epidemic Illusions: On the Coloniality of Global Public Health* (Cambridge, MA: MIT Press, 2020); Lioba A. Hirsch and Rebecca Martin, *LSHTM and Colonialism: A Report on the Colonial History of the London School of Hygiene & Tropical Medicine (1899–c. 1960)* (London: LSHTM, 2022).

<sup>51</sup> Harry Yi-Jui Wu, *Mad by the Millions: Mental Disorders and the Early Years of the World Health Organization* (Cambridge, MA: MIT Press, 2021); Anne M. Lovell and Gerald M. Oppenheimer, eds., *Reimagining Psychiatric Epidemiology in a Global Frame: Toward a Social and Conceptual History* (Rochester, NY: University of Rochester Press, 2022).

the 1980s, the historical implications of the digital revolution for epidemiology are still largely unexplored—a lacuna to an extent compensated for by the rich STS scholarship on health data practices. Third, research into history of epidemiology is heavily focused on Anglo-American developments. Although British and US developments have indeed been central for modern epidemiology, there are plenty of other, divergent national trajectories to explore.

Indeed, one objective of *Historical Explorations of Modern Epidemiology: Patterns, Populations and Pathologies* is to add to the temporal, geographical, and cultural diversity of the historiography of epidemiology. Its cases deal with developments also outside the major Euro American centers, from Central and East Africa to the Circumpolar North. The Nordic countries, whose contribution to late twentieth- and twenty-first-century epidemiology has been distinctive and significant, are particularly well represented in the volume. The volume draws attention to the diversity of epidemiological activities and agents. We will meet not only self-identified epidemiologists with specialist training but also medical practitioners addressing epidemiological questions, colonialists, administrators, policymakers, health campaigners, and members of the “populations” studied by epidemiologists. Temporally, the contributions range from the interwar period to the present, with the focus on post-WWII developments. Being a collection of case studies, the volume does not aspire to a comprehensive view of post-war epidemiology. Rather, it highlights the diversity, range, and impact of epidemiological research during this period.

## BOOK OUTLINE

The volume tackles its key question—how epidemiological knowledge has been made and how it has been used—through ten cases, in three parts. The cases in the first part, *Patterns*, demonstrate how the uneven distribution of disease in populations has been observed, explained, and modeled. The second part, *Populations*, asks how populations have been constructed in epidemiological research and how the latter has created populations by calculating and categorizing people in terms of time and space but also in terms of age, sex, ethnicity, and living conditions. The third part, *Pathologies*, explores the role of epidemiology in defining and representing pathological phenomena.

The first empirical chapter (Chapter 2) is Heini Hakosalo's "Patterning Tuberculosis: Interwar Tuberculosis Research as a Bridge between Infectious and Risk Factor Epidemiology." It argues that pre-WWII tuberculosis research functioned as a crucially important test ground for concepts and methods that would later become elemental for post-WWII risk-factor epidemiology. The chapter is also a reminder that different diseases have the potential to steer epidemiological research in different directions. Tuberculosis, being a public health priority, had a lot of steering power. The disease acquired the role of a "bridging condition" not only because it was both infectious and chronic, but also because of its other qualities. The empirical examples discussed in the chapter derive from the US and the Nordic countries, and the chapter stresses the transnational character of interwar epidemiological concerns and practices.

In Chapter 3, "The Case–Control Method on Trial: The 'Bermuda Summit Peace Conference' (1978)," Nicolas Brault offers a well-focused analysis of methodological and epistemological tensions in epidemiological thought and practice in the 1970s, using the discussions and debates of a specific epidemiological conference as the starting point. The Bermuda conference brought together a group of prominent epidemiologists ostensibly to discuss the use and misuse of the case–control method. Brault shows how disagreements about seemingly technical issues relating to the method were grounded in and fueled by the interests of the pharmaceutical industry and also by constitutive theoretical and epistemological issues with long historical roots. What was at stake was not only the scientific value of the case–control method but also the scientific value of observational epidemiological studies more generally.

Katariina Parhi's contribution (Chapter 4), "The Coexistent Temporalities: Multilayered Ethics in Birth Cohort Studies," delves into the history of a long-term birth cohort study, Northern Finland Birth Cohorts (NFBC 1966, 1986). The Finnish study was in some respects modeled on the famous British national birth cohort studies (1946, 1958). During its 57 years of existence, NFBC's social and research environment has undergone many changes. Parhi focuses on one of them, the changing ethical guidelines and legal precepts that steer cohort studies. Using interviews with cohort investigators as her main source material, Parhi shows how they have navigated the temporally multilayered ethical and legal requirements constraining the use of their equally multilayered cohort data. Parhi's chapter offers a rare glimpse on the everyday choices facing

cohort scientists, and also contributes to the history of epidemiological research ethics.

The second part, “Populations,” opens with Paul Weindling’s “The Oxford Nutrition Survey (1941–1950): Its Rise and Fall under Hugh Sinclair” (Chapter 5). The chapter focuses on a series of innovative cohort and community studies conducted by the biochemist Hugh Sinclair in mid-twentieth-century Oxford. Weindling provides an intriguing view on the objectives and methods of this little-known researcher, asking why Sinclair’s studies, despite their initial scientific and policy influence, ultimately proved a dead end, leaving Sinclair in possession of a mass of valuable, underused data, but without a solid institutional base. The case offers an opportunity to look at a methodologically exceptionally dynamic period from a novel angle and to ask why some research projects, however innovative and promising, nevertheless fail.

Ida Al Fakir’s contribution, “Spotlighted or Hidden in Plain Sight: Consequences of the Post-War Ban on Ethnic Registration in Sweden” (Chapter 6), examines how Swedish population and health researchers and administrators dealt with the controversial issue of registering (or not) the ethnic and racial background of citizens in 1945–1985. Al Fakir discusses the long history of categorizing ethnic minorities and the ways in which administrators and epidemiologists have dealt with the ethical complexities and practical difficulties involved in the official policy of non-registration. Nordic administrative practices are usually considered as exceptionally conducive to epidemiological research, but, as Al Fakir shows, things can be more complicated on the grassroots level of practical research. The chapter relates to a topical broader issue: the potential of health data practices to both undermine and enforce racial and ethnic categories.

In Chapter 7, “Risk Factor Epidemiology Viewed from Below: Lay Reception of the North Karelia Project (Finland) in the 1970s and early 1980s,” Mikko Jauho deals with a large, well-known community intervention study conducted in a region that was known for its exceptionally high incidence and prevalence of cardiovascular disease. The North Karelia Project can be regarded as a successor of the Framingham Heart Study and the Seven Countries Study. With the help of his unique source material—writings produced by the local people in response to the intervention—Jauho discloses the tensions between the objectives and practices of the investigators on the one hand and the expectations and health beliefs of the participants on the other hand. One lesson drawn by

Jauho is that the designers of community interventions neglect the participant voices and viewpoints at their own peril. The chapter also shows how epidemiological concepts and perceptions travel from scientific spaces to local communities, not always without friction.

Jan Kuhanen's and Markku Hokkanen's chapter (Chapter 8) "From Colonial Medicine to Global Health: Epidemiologies of Sexually Transmitted Infections in East and Central Africa" takes us from the Global North to the Global South. It provides a critical long-term view on research into sexually transmitted diseases in Africa, revealing how lingering colonial practices and mindset influenced the way that the African HIV/AIDS epidemic was framed and tackled, and sometimes overlooked. In the colonial framework, intensive public health and disease control methods were often based on questionable data, produced by means of imported medical techniques and concepts, without sufficient attention to local conditions. Hokkanen and Kuhanen argue that the long history of flawed disease control efforts contributed to the failures of AIDS control in Africa in the 1980s.

The third part, "Pathologies," opens with Jennifer Fraser's "Light Pollution: Auroral Displays, Environmental Carcinogens and Epidemiological Imaginings of Inuit Cancer" (Chapter 9). The chapter brings together Inuit people, the Arctic environment, celestial health hazards, and a physician with original ideas and epidemiological ambition. Dr Otto Schaefer proposed that aurora borealis had cancer-causing properties that explained the high prevalence of so-called "Inuit cancer" in the high north. Fraser's skillful analysis shows how this seemingly outlandish notion drew from current trends in atmospheric physics, atomic energy, and environmental sciences. Her chapter also alerts us to the cultural and political factors behind the selective attention that atmospheric health hazards have received in the Arctic.

In Chapter 10, "Scientizied Politics: The Finnish Basic Income Trial as a Quest for Experimental Truth," Mona Manneuvuo discusses an instance where RCT was used as a social policy and planning tool. The Finnish Basic Income Trial (2017–2018) was framed as something novel and groundbreaking, but, as Manneuvuo shows, it can in fact be seen as a recent example of the long-established tradition of social engineering, i.e., the effort to rationalize policies by means of science. The trial, which was initially conceived by a private think tank inspired by behavioral economics and the nudge theory, was executed by state administration, welcomed by politicians on left and right, and enthusiastically covered



by the media, only to end with inconclusive results. Mannevu explores the historical roots of the ideas that informed the experiment and critically discusses the dangers of recasting RCT as a universal tool for designing evidence-based policies.

In Chapter 11, “Virus-Imagery: A Short History of Pandemic Misrepresentation, HIV to COVID-19,” Lukas Engelmann reminds us that visualization is not just about illustrating but also about constructing epidemiological knowledge. The chapter asks how a particular image of the SARS-Cov-2 virus became “the official and unofficial portrait of the COVID-19 pandemic,” discussing it against the backdrop of the long history of virus visualization. Engelmann compares the visualization of the present pandemic with the images that circulated during the AIDS pandemic in the 1980s and 1990s. He argues that diagrammatic virus visualizations, in all their effectiveness and clarity, are poor representations of the pandemic, being unrelated to the realities with which epidemiologists and patients struggle. Engelmann’s analysis is a significant contribution to the history of epidemiological representation and a topical call for more accurate and multilevel ways of modeling and representing epidemics.

**Open Access** This chapter is licensed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter’s Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter’s Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

