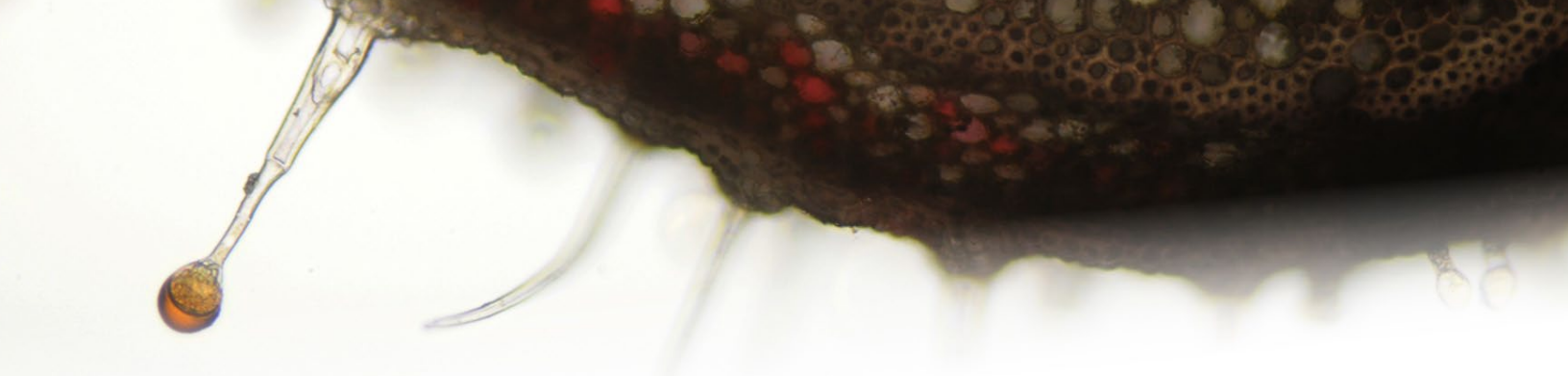

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HISTORY OF MEDICINE: PEER-REVIEWED ARTICLE

Lessons From the Political History of Epidemiology for Divisive Times

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Abstract

Historical precursors of the field we now call epidemiology date back to Hippocrates. Modern epidemiological science, however, developed as domestic and international infectious disease transmission accompanied industrialization, some nations' economic growth, and colonial powers' military expansion and dominance. This article canvasses ways in which modern epidemiology influenced public health innovation from the late 18th century through the mid-19th century. Specifically, this article suggests which lessons can be gleaned from political dimensions of epidemiology's history and applied to orientations to medicine and public health today.

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Start With the Greeks

There are numerous ways to date the history of epidemiology. The term *epidemios* (from *epi* [on] and *demos* [people]) appears in the ancient texts of Hippocrates (c 460-c 370 bce)— notably, in *Epidemics* and *Airs, Waters, Places*.[1] Both texts emphasized the natural—rather than supernatural—nature of disease and described health as a matter of a body in balance with its daily routines and external environment. The texts circulated at a momentous time, as Greek city states were seeking fresh territories through colonial conquest. More than just manuals for individual practitioners, *Epidemics* and *Airs, Waters, Places* were works intended to be of practical, political, and military use to Greek leaders weighing factors for and against the placement of new communities and military outposts.[2] From ancient times, then, the stimulus to collect and collate information about groups of people has transcended the concerns of individual clinicians and their patients; then, as now, politics matter.

In a sense, "politics matter" is an unsurprising and obvious claim to make about disease and society: epidemics threaten much beyond individual health. Overwhelming outbreaks of disease have destabilized militaries, markets, and governing powers, a feature as familiar to the Greeks as to the administrations that ruled through the Age of Imperialism in the 19th century. Recent discussions of "decolonizing" academic research have included this aspect of the history of epidemiology in their remit, and the

colonial roots and legacies of the discipline are now broadly known and acknowledged.[3] In focusing on how 19th- and 20th-century international public health practices systematically marginalized Indigenous voices and pathologized racial and cultural difference, recent scholars of decolonialization have offered numerous strategies for a more inclusive, equitable, and robust science.[4,5] Such discussion of the political dimensions of public health and epidemiology, while welcome, have, however, tended to focus on the fields of global health and social epidemiology. A possible unintended consequence of that focus risks obscuring a fundamental character of the discipline: that politics matter always and everywhere when interpreting patterns of health and disease. To engage with distributions of health and disease across any population is to engage with public policy, and, to that extent, the practice of any branch of epidemiology is therefore inherently "political." While there is justifiable concern that public engagement in politics can threaten scientific objectivity,[6] the practice of epidemiology has also been criticized for being too focused on empirical method—possibly to demonstrate its scientific bona fides and create some distance from contentious political issues—which itself raises questions of epidemiology's purpose and disciplinary responsibility to the public.[7] These are issues that epidemiologists have wrestled with for decades and are unlikely to be resolved anytime soon.

This article takes a long historical view of epidemiology to briefly revisit 3 famous contributors to public health from the late 18th through the mid-19th century. As will be shown, there was no one political vision for effecting social progress that was the norm and no "pure" science advocacy free from the presumption of or need for some form of political engagement. The pioneers discussed—Johann Peter Frank (1745-1821), Rudolf Virchow (1821-1902), and John Snow (1813-1858)—all showed a deep commitment to advocating for their science, but, importantly, each also demonstrated how their advocacy was shaped by beliefs and values absorbed from their respective social and political worlds.

Origins of Social Medicine

The application of statistical methods and probabilistic reasoning to problems of public health has roots in the 18th century and the work of Johann Peter Frank, who popularized the notion of "medical police." Frank's mammoth work, *System Einer Vollständigen Medicinischen Polizey* (*A Complete System of Medical Policy*), appeared in 6 volumes, the first of which was published in 1779.[8] A German physician and hygienist, Frank admired contemporary European Enlightenment philosophers and their emphasis on the primacy of human reason over superstition and dogma. The use of census tools and the central collection of vital statistics would, in Frank's view, drive top-down transformation by way of public health and social reform. Like other Enlightenment era thinkers, Frank believed that the inequalities that impeded health also impeded social progress. In a 1790 public lecture titled "The People's Misery: Mother of Diseases,"[9] he laid out the connections between disease, social conditions, and the need for policy-based action on the part of the physician. While later scholars have taken up this lecture title as something of a rallying cry for health equity,[10,11] it is worth noting that the means through which Frank believed social progress would be achieved were far from democratic. A committed mercantilist, Frank was a great believer in a zero-sum game of economic policy through which European nations sought to acquire colonial wealth to enrich themselves abroad while beggaring their neighbors and competitors at home. In Frank's authoritarian and paternalistic vision, populations foreign and domestic represented resources to be protected and made productive for the benefit of the state.[12] Medical police science directed state regulation of food, air, and water and

accompanied other measures intended to promote population growth and military preparedness, such as better education of midwives and improved childhood nutrition.

Along with widespread European political unrest in the 1840s, however, came a particularly brutal test of the medical police system when a devastating plague of typhus broke out in Prussian-administered Upper Silesia (now part of Poland). The acclaimed physician-scientist Rudolf Virchow was dispatched to investigate, and another chapter in the history of epidemiology was begun. Virchow employed extensive field-based observations, interviews, and statistical methods to compile his lengthy report on the epidemic, which he published in 1848.[13] Like Frank's work, Virchow's writing has since become foundational for origin stories about the rise of social medicine, histories that explicitly or implicitly align themselves with left-of-center advocacy regarding equity and the social and economic etiologies of illness in postindustrial society.[14]

It is a modern take and political perspective that arguably would have been quite alien to Virchow himself. Along with much-cited lines in his 1848 report, such as "Medical statistics will be our standard of measurement: we will weigh life for life and see where the dead lie thicker among the workers or among the privileged,"[15] are numerous other comments placing blame on local populations for their own misery.[13] For Virchow, the inferior culture and poor physical constitutions of Polish-speaking people showed just how in need they were of a strong Germanic hand. His firebrand writings and activities advocating for a liberal democracy and against the state machinery were not so much about "the people" as about who should be in control—old regime bureaucrats or new technocrats like himself?[16]

Epidemiology and Industrial Sanitation

Virchow's microscopic work and theories of cellular pathology place him in the vanguard of a scientific approach to medicine that would finally replace millennia of Hippocratic theories. Nonetheless, so committed was Virchow to the environmental regulation of public health that to the end of his life he remained an avowed "contingent contagionist" and germ theory skeptic.[17] In other words, Virchow argued that some diseases—like typhus—which were thought to be contagious were, in fact, generated by environmental filth—especially bad airs or "miasma"—leaving individuals weakened by poverty and poor social and living conditions the most susceptible to illness and death. By way of contrast, the British physician John Snow argued against miasmatic disease spread and aimed to show that some contagious illnesses did have a single cause and one that would produce illness regardless of the constitutional health of individuals in the affected population.

As a founding member of the London Epidemiological Society, Snow likely would have inevitably been drawn to the study of cholera during the outbreak of 1854.[18] How to control the disease was *the* urgent administrative and public health question of the day. An earlier outbreak of the disease in 1848-1849 had provoked Parliament to action, including by ordering private water companies supplying water from the city's River Thames to shift their intake locations upstream of the location where much of the city's sewage was dumped.[18] In his brilliant South London water study, Snow compiled statistical tables that looked at case counts in different London districts, along with the names of private companies and from where they drew their water supply.[18] While Snow went to great lengths to control for variables other than water source in his comparisons, recent historians have shown that contemporary critics of Snow had

reasonable grounds to question how well his districts and subdistricts did, in fact, compare.[19]

Snow's other major work on the Broad Street pump (located within Soho, an area of London close to his own neighborhood) was similarly purposed to find persuasive evidence for his belief that cholera was a waterborne disease. In that instance, he used not statistical tables but a dot map showing the incidence of cholera cases by their proximity to the pump.[20] Once again, the stiff opposition Snow faced is not adequately accounted for by the notion that his critics were ignorant or reactionary. It was a time of great peril and uncertainty, and too many aspects of Snow's work seemed (in the view of his critics) not to disallow miasmatic transmission alongside or instead of waterborne transmission. Snow's successful use of his map in getting the local authorities in Soho to remove the handle of the Broad Street pump was then as much an act of skillful negotiation and political persuasion as it was a self-evident scientific sweep of his doubters.[20]

Snow was not a politically active physician in the manner called for by Frank or Virchow, but his work shows his deep engagement with the same stark political realities of industrializing cities and the role that public agencies and policy might have in managing population health. For its part, the British government commissioned a wide-ranging report on the potential links between poor sanitation and epidemic disease and placed the prominent lawyer and social reformer Edwin Chadwick (1800-1890) in charge of it. His 1842 report, *The Sanitary Conditions of the Labouring Population*, profoundly influenced the passage of the Public Health Act 6 years later.[21] Chadwick's belief in miasmatic theory was deeply bound with his perceived need for wide-reaching legislation to transform the sanitary infrastructure of Britain and, with it, the health of a nation.[22] Although more suspicious of large-scale government bureaucracy than the Germans, British adherents of miasmatic theory did nonetheless worry about the potential for Snow's work to undermine new public health infrastructure and hard-won sanitary reforms. Snow, for his part, went some way to ease concerns (as evidenced by his success in getting the Broad Street pump shut down) as he continued to pursue the science. In the end, the great transformations of public health in Britain were owing to the work of both sanitarian miasmatists like Chadwick and proto-germ theorists like Snow.

Epidemiology as Political Science?

In a world of intense political polarization that is still reeling from the COVID-19 pandemic, history offers a reminder that we have endured calamitous times before. An awareness of political context and a willingness to engage with political influence would seem desirable for the ethical, professional conduct of epidemiological practice. Political partisanship on the part of the practitioner is neither necessary nor sufficient as a replacement for political awareness, but, I argue, neither is denial that there exists a political dimension to the science of epidemiology at all.

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