

Vaccination and Pandemics

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Abstract: Vaccines and vaccination are richly explored areas of study within the history of science and medicine, connecting related fields of the history of science and technology, and spanning across subfields such as biomedical sciences, animal studies, colonial and postcolonial history, and the history of global health. Vaccination is a thoroughly political act that is at once an intimate and local issue and a transnational one, with its particular set of politics connecting stakes for the individual and the community. Vaccination also maps on narratives and temporal frameworks of disease with an ultimate goal of ending epidemics. Therefore, the essay takes these three analytical entry points to discuss the historiography of vaccination: the geographical, the political, and the temporal. We argue that through these lenses we can gain a more nuanced understanding of historical narratives we privilege, and in return, this understanding can enable us to explore past and current questions of health inequalities, validation practices, power relations and resistance and vaccine diplomacy.

Since 2020, histories of vaccines and vaccination have come to the forefront of public and scholarly attention with force, for reasons that are too obvious to all of us living through a pandemic. COVID-19 has also highlighted the complex ways in which scientific research, healthcare systems, medical technologies, local and global inequalities, social and cultural contexts, and politics intertwine inextricably with vaccination policies. Vaccination is, and

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always has been an inherently political act, which rests on trust, and scientific and social conventions. It involves the participation of a wide range of actors, from bacteriologists and virologists to state regulators and private companies, and even to children, who are primary subjects of immunization. The act of vaccination invokes ideas of solidarity and the individual's place in a wider biological and social environment, thus reflecting political ideas and/or empire- and nation-building efforts. At the same time, for the same reasons, vaccination can be conceived (and practiced) as a mode of political control and oppression.

Vaccines as medical technologies cannot be divorced from this political process, whether we focus on the details of scientific work or vaccination campaigns. Nor can the political aspects of vaccines be understood without an understanding of the technical and biological aspects of vaccination. The wide range of vaccines and immunization practices has created various challenges, and elicited various conflicts among the immunizers and the immunized. The recognition of these complexities is not new. Most recently, for instance, Mary Brazelton, in a recent essay on immunization in China, has made a case for the integration of history of technology and medical history through vaccines. Meanwhile, Guillaume Lachenal has furthered an STS approach and the integration of anthropological methodology in vaccine history in his award-winning book on Lomidine and sleeping sickness.² In recent decades an extremely rich field of histories of vaccination has emerged, existing in parallel with conventional chronological accounts of vaccine development from Jenner to the cancer vaccines of the 21st century.

The subject of vaccination encompasses too many areas of knowledge to provide an authoritative bibliography, as it touches upon virology, animal studies, microbiology, healthcare systems, environmental histories, social and cultural history, and geopolitics. Due to this complexity, not only in the object of study, but in the multiple fields it encompasses, it is impossible to give a truly comprehensive overview of the extremely rich history of vaccination. In the following essay, we focus on three key points that we think are pertinent to this complex history: the question of geographies of vaccination, the political aspect, with a special focus on the issue of vaccine resistance and acceptance, and finally, the temporalities of diseases, their narrative course and endpoints, as vaccines ultimately aim, or often are communicated as tools of ending disease.

GEOGRAPHIC CONSIDERATIONS

While disease outbreaks and epidemics are local affairs, impacting both local and national scientific and administrative communities, they are also international phenomena. Since infectious diseases disregard borders, they often pose similar challenges to widely differing political and cultural entities. Because of this, vaccine development and implementation have transnational as well as local histories. From the mid-20th century onwards, historians have been moving away from studies of the lone bacteriologist or virologist. More attention is being given to the importance of indigenous practices and the co-construction of what we generally term as "Western" medicine in colonial encounters.

Smallpox inoculation and vaccination is a good example of this move. Smallpox is perhaps the best researched disease in terms of the history of inoculation and vaccination, partly due to

² M. A. Brazelton, "Engineering Health: Technologies of Immunization in China's Wartime Hinterland, 1937-45," *Technology and Culture* 60, no. 2 (2019); Guillaume Lachenal, *The Lomidine Files: The Untold Story of a Medical Disaster in Colonial Africa* (Baltimore: Johns Hopkins University Press, 2017).

its severe impact on societies across the globe, and partly due to the fact that it is thus far the only human disease to have been eradicated. It therefore often serves as a reference point in disease prevention. Recently, smallpox research has begun to focus on variolation, bringing previously ignored actors into the picture. African, Middle Eastern, and Ottoman peoples are now important actors in the narrative, bringing with them an emphasis on questions of race, colonialism, and Orientalism.³ Variolation's North and Latin American history has seen a similar expansion, exploring indigenous knowledges and the establishment of imperial science; the role of enslaved black bodies in the Spanish imperial project and variolation's impact on the trans-Atlantic slave trade; while further new work highlights the politics of smallpox immunization in democratic and colonial political projects and nation-building.⁴ New research has also put the role of women into the picture, as key decision-makers in their children's health and in their adaptation to new preventative practices. Lady Mary Montagu, credited with popularizing variolation in England in the early 18th century, after encountering it in Turkey, is perhaps the best known. The research on her role in the prevention of smallpox is particularly rich.⁵

The equally rich history of smallpox eradication has also seen new directions in the past decades. Erez Manela's important work has integrated Cold War politics and diplomacy into

³ Margot Minardi, "The Boston Inoculation Controversy of 1721-1722: An Incident in the History of Race," *The William and Mary Quarterly* 61, no. 1 (2004); Basil H. Aboul-Enein, Michael W. Ross, and Faisal H. Aboul-Enein, "Smallpox Inoculation and the Ottoman Contribution: A Brief Historiography," *Texas Public Health Journal* 64, no. 1 (2012); Megan Vaughn, "Slavery, Smallpox, and Revolution: 1792 in Île de France (Mauritius)," *Social History of Medicine* 13, no. 3 (2000); Pascal James Imperato and Gavin H. Imperato, "Smallpox Inoculation (Variolation) in East Africa with Special Reference to the Practice among the Boran and Gabra of Northern Kenya," *Journal of Community Health* 39, no. 6 (Dec, 2014).

⁴ Martha Few, "Circulating Smallpox Knowledge: Guatemalan Doctors, Maya Indians and Designing Spain's Smallpox Vaccination Expedition, 1780-1803," *British Journal of the History of Science* 43 (Dec. 2010): 519-37; Ferren Yero, "An Eradication: Empire, Enslaved Children, and the Whitewashing of Vaccine History," *Age of Revolutions* (December 7, 2020), <https://ageofrevolutions.com/2020/12/07/an-eradication-empire-enslaved-children-and-the-whitewashing-of-vaccine-history/>; Andrew M. Wehrman, *The Contagion of Liberty: The Politics of Smallpox in the American Revolution* (Baltimore: Johns Hopkins Press, 2022). Jose G. Rigau-Perez, "The Introduction of Smallpox Vaccine in 1803 and the Adoption of Immunization as a Government Function in Puerto Rico," *The Hispanic American Historical Review* 69, no. 3 (1989): 393-423; Martha Few, "Epidemics, Indigenous Communities, and Public Health in the COVID-19 Era: Views from Smallpox Inoculation Campaigns in Colonial Guatemala," *Journal of Global History* 15, no. 3 (2020): 380-93.

⁵ Genevieve Miller, "Putting Lady Mary in her Place: A Discussion of Historical Causation," *Bulletin of the History of Medicine* 55, no. 1 (1981); Jordan Hall, Anna K. Sagal, and Elizabeth Zold, "Lady Mary Wortley Montagu and the Turkish Embassy Letters: A Survey of Contemporary Criticism," *Literature Compass* 14, no. 10 (2017). Diana Barnes, "The Public Life of a Woman of Wit and Quality: Lady Mary Wortley Montagu and the Vogue for Smallpox Inoculation," *Feminist Studies* 38, no. 2 (2012): 330-362; Daniel J. R. Grey, "'To Bring This Useful Invention into Fashion in England': Mary Wortley Montagu as Medical Expert," in *British Women and the Intellectual World in the Long Eighteenth Century*, ed. Teresa Barnard (London: Routledge, 2015).

the narrative,⁶ while Sanjoy Bhattacharya's work on smallpox eradication from a South Asian perspective has not only made historians rethink the power dynamics involved in vaccination campaigns, but also revealed the importance of regional and local archives in the investigation of international efforts.⁷ Additionally, Paul Greenough's somewhat earlier work demonstrated the violence encoded in practices of global eradication efforts, which had been entirely missing from the triumphalism of previous narratives.⁸

Colonial and post-colonial practices of vaccination can serve as a way to understand the nuances of colonial and post-colonial power relationships, in terms of adaptation, negotiation and resistance. Furthermore, a wider geographical view alerts us to the geographies of diseases, with regional histories of yellow fever, malaria, plague, and cholera prevention mapping onto colonial projects.⁹ While this historiography is dominated by histories of the British Empire, other geographical studies have contributed greatly to this understanding. Examining American colonial practices in the Philippines, Warwick Anderson argued that we need to consider practices of hygiene as modes of control alongside vaccination, in order to gain a full understanding of colonial priorities and practices.¹⁰ Turning to the French empire, Guillaume Lachenal and Aro Velmet have both studied colonial medical missions that intertwined with private pharmaceutical interests.¹¹

⁶ Triumphant narratives of the Global Smallpox Eradication Program have been challenged by prominent scholars, such as Erez Manela, who, in his aptly titled article, "A Pox on Your Narrative," connects the eradication initiative to broader Cold War politics. Erez Manela, "A Pox on Your Narrative: Writing Disease Control into Cold War History," *Diplomatic History* 34, no. 2 (2010); William H. Foege and Milbank Memorial Fund., *House on Fire: The Fight to Eradicate Smallpox*, California/Milbank Books on Health and the Public (Berkeley; New York: University of California Press, 2011).

⁷ Sanjoy Bhattacharya, "International Health and the Limits of its Global Influence: Bhutan and the Worldwide Smallpox Eradication Programme," *Medical History* 57, no. 4 (2013), <https://doi.org/10.1017/mdh.2013.63>.

⁸ Paul Greenough, "Intimidation, Coercion and Resistance in the Final Stages of the South Asian Smallpox Eradication Campaign, 1973-1975," *Social Science and Medicine* 41, no. 5 (1995). For representation of the mainstream narrative of smallpox eradication, see Donald A. Henderson, *Smallpox: The Death of a Disease: The Inside Story of Eradicating a Worldwide Killer* (Amherst, NY: Prometheus Books, 2009). William H. Foege and Milbank Memorial Fund., *House on Fire: The Fight to Eradicate Smallpox*, California/Milbank Books on Health and the Public (Berkeley, New York: University of California Press, 2011).

⁹ See for instance Jaime Benchimol, "Yellow Fever Vaccine in Brazil," in *The Politics of Vaccination*, edited by Christine Holmberg, Stuart Blume, and Paul Greenough (Manchester, UK: Manchester University Press, 2017).

Deepak Kumar, "'Colony' under a Microscope: The Medical Works of W.M. Haffkine," *Science, Technology and Society* 4, no. 2 (Sept. 1999): 239-271.

¹⁰ Warwick Anderson, "Immunization and Hygiene in the Colonial Philippines," *Journal of the History of Medicine and Allied Sciences* 62, no. 1 (2007), <https://doi.org/10.1093/jhmas/jrl014>, <https://doi.org/10.1093/jhmas/jrl014>.

¹¹ Lachenal, *The Lomidine Files: The Untold Story of a Medical Disaster in Colonial Africa*; Aro Velmet, *Pasteur's Empire: Bacteriology and Politics in France, its Colonies and the World* (Oxford: Oxford University Press, 2020).

In the Cold War era, studies of vaccination have also become an important way to examine power relationships aligned with—and cutting across—geopolitical and ideological fault lines. Polio vaccine development and vaccination campaigns in the socialist world reveal crucial aspects of the role of clashing ideologies in scientific research and policies in public health, as timelines and physical routes of vaccines map onto the divided Cold War world. At the same time, polio also highlights moments when the ideological or geopolitical concerns of the Cold War recede into the background, and open spaces for cooperation in vaccine development and scientific research.¹² New literature on vaccination and public health in East Asia, especially that of Mary Brazelton and Ruth Rogaski, has produced important insights into vaccines as technologies of nation-building, especially in Maoist China.¹³ Brazilian histories of mass vaccination explore the influential National Immunization Days, underpinned by ideas of universal healthcare and decentralized organization.¹⁴

These unconventional histories have important things to say, but are also relevant to policy-making around modern COVID-19 vaccines. The way the various vaccines have been represented in various political contexts as either prime examples of the benefits of a particular economic structure or as a commitment to political ideologies demonstrate that geopolitics is very much embedded in vaccination despite the official end of the Cold War in the late 20th century. Similarly, the travel routes of vaccines across the globe map onto connections established in the past, often reaching back to networks and connections established in the age of empires or the Cold War. Ultimately, the question of geography raises the questions of which vaccination stories we privilege and why. These questions, in turn, raise other questions that may help us understand problems central to modern discussions of vaccination, namely enquiries regarding validity of vaccine research and implementation, the issue of vaccine diplomacy, and global inequalities in vaccine access.

¹² Saul Benison, "International Medical Cooperation: Dr. Albert Sabin, Live Poliovirus Vaccine and the Soviets," *Bulletin of the History of Medicine* 56, no. Winter (1982); Enrique Beldarraín, "Poliomyelitis and Its Elimination in Cuba: An Historical Overview," *MEDICC Review* 15, no. 2 (2013); Dóra Vargha, *Polio across the Iron Curtain: Hungary's Cold War with an Epidemic*, Global Health Histories (Cambridge, UK; New York: Cambridge University Press, 2018).

¹³ Mary Augusta Brazelton and DeGruyter, *Mass Vaccination: Citizens' Bodies and State Power in Modern China*, Studies of the Weatherhead East Asian Institute, Columbia University (Ithaca, NY: Cornell University Press, 2019); A. Janetta, *The Vaccinators: Smallpox, Medical Knowledge and the 'Opening' of Japan* (Stanford: Stanford University Press, 2007); Ruth Rogaski, "Nature, Annihilation, and Modernity: China's Korean War Germ-Warfare Experience Reconsidered," *The Journal of Asian Studies* 61, no. 2 (2002), <https://doi.org/10.2307/2700295>, <http://www.jstor.org/stable/2700295>; Nianqun Yang, "Disease Prevention, Social Mobilization and Spatial Politics: The Anti Germ-Warfare Incident of 1952 and the 'Patriotic Health Campaign'," *The Chinese Historical Review* 11, no. 2 (09/01/2004), <https://doi.org/10.1080/1547402X.2004.11827202>, <https://doi.org/10.1080/1547402X.2004.11827202>.

¹⁴ José G. Temporão, "Brazil's National Immunization Program: Origins and Development," *Historia, ciencias, saude Manguinhos* 10, suppl. 2 (2003): 601-17, <http://europepmc.org/abstract/MED/14964303>; André L. V. de Campos, Dilene R. do Nascimento, and Eduardo Maranhão, "The History of Polio in Brazil and Its Control through Immunization," *Historia, ciencias, saude—Manguinhos* 10, no. Suppl 2 (2003), <http://europepmc.org/abstract/MED/14969238>; Baptiste Baylac-Paouly, "Confronting an Emergency: The Vaccination Campaign Against Meningitis in Brazil (1974–1975)," *Social History of Medicine* 34, no. 2 (2019), <https://doi.org/10.1093/shm/hkz120>, <https://doi.org/10.1093/shm/hkz120>.

VACCINATION POLITICS AND RESISTANCE

Historically, vaccination has been tied to the creation of public health institutions and, at a higher level, state and empire building. This inherently political nature of vaccination campaigns manifests itself particularly dramatically in public controversies around vaccines and resistance against vaccination. Historians have challenged understandings of vaccine resistance as a phenomenon based on ignorance of science by seeking to understand anti-vaccine movements in the context of the changing relationship between institutions of government and society.

Disputes around vaccination, and in particular compulsory vaccination, have a long legacy, with the beginnings of anti-vaccination movements dating back to the introduction of smallpox vaccination in the early 19th century. An early example of mandatory vaccination of infants was the 1853 law in Great Britain. Several European states followed suit. Germany, for instance enforced vaccination in 1873.¹⁵ In the US as well, compulsory vaccination laws were enacted in some cities and states in the course of the nineteenth century. As historians have pointed out, vaccination has not just been implemented through mandates and compulsion, but also through persuasion, governmental incentives, and the incorporation of vaccination into routine pediatric care.¹⁶

Anti-vaccination movements have since their inception been met with criticism. These criticisms included objections of a sanitary, religious, scientific, or political nature. Several studies have interpreted vaccine resistance as a reaction to the increased power and control exerted over individuals by the state.¹⁷ James Colgrove, who has studied US anti-vaccine movements since the 19th century, argues that opposition to vaccination was based on the linked claims that it was dangerous and that to enforce it legally was an unacceptable invasion of personal liberty.¹⁸ In his study on vaccine controversies in New York and Pennsylvania in

¹⁵ British anti-vaccinationists won a significant victory in 1898, when the government added a "conscience clause" that excused parents who believed that vaccination would harm their children's health, a provision that was expanded in a 1907 act.

¹⁶ Cf. as an exemplary study which looks at the manifold measures public authorities took against diphtheria in New York: Evelyn Hammonds, *Childhood's Deadly Scourge* (Baltimore: Johns Hopkins University Press, 1999), cf. also: Minna Stern, Alexandra and Howard Markel, eds. *Formative Years: Children's Health in the United States, 1880–2000* (Ann Arbor: University of Michigan Press, 2002); Elena Conis and Jonathan Kuo, "Historical Origins of the Personal Belief Exemption to Vaccination Mandates," *Journal of the History of Medicine and Allied Sciences* 76, no. 2 (2021): 167–190.

¹⁷ On the increased power and intervention of the state in epidemics, see Michael Willrich, "'The Least Vaccinated of Any Civilized Country': Personal Liberty and Public Health in the Progressive Era," *Journal of Policy History* 20, no. 1 (2008): 76–93. Use of Foucauldian terminology, *i.e.* Claudia Huerkamp, "The History of Smallpox Vaccination in Germany: A First Step in the Medicalization of the General Public," *Journal of Contemporary History* 20, no. 4 (1985).

¹⁸J. Colgrove, "Between Persuasion and Compulsion: Smallpox Control in Brooklyn and New York, 1894–1902," *Bulletin of the History of Medicine* 78, no. 2 (Summer 2004), <https://doi.org/10.1353/bhm.2004.0062>; and James Keith Colgrove, *State of Immunity: The Politics of Vaccination in Twentieth-Century America*, California/Milbank Books on Health and the Public (Berkeley; New York: University of California Press, 2006); see also older studies on US anti-vaccinationists: Judith W. Leavitt, "Politics and Public Health: Smallpox in

the 1910s and 1920s, he characterizes them as a negotiation over “the role elite knowledge and scientific expertise should play in a rapidly changing democratic society.”¹⁹ Nadja Durbach, who has studied resistance against compulsory vaccination laws in England, differentiates between alternative healers, middle class liberal reformers, whose skepticism was largely based on a fear of the infringement of individualism, and working-class protest against what was perceived as coercive class legislation.²⁰

Various questions of power are thus central to questions of vaccine compliance, and vaccination has become a useful lens through which we can investigate colonial relations, and the long-term trajectories of certain vaccine resistance movements. Vaccine resistance in the colonial context has been explored extensively regarding India, where British authorities started campaigns against smallpox around 1800. Vaccination campaigns were often met with indifference or rejection, yet historians have pointed out that reasons for this cannot be reduced to one cause.²¹ David Arnold’s “Colonizing the Body” mentions practical reasons for low vaccination rates, such as lack of access, and ineffective and potentially harmful vaccines. He also characterizes vaccines as “a site of conflict between malevolent British intent and something Indian, something sacred, that was under threat of violation and destruction.” Niels Brimnes argues that Arnold’s contention is also relevant for the twentieth century, when the Indian elite was concerned with building an Indian nation, linking the opposition to vaccines to the ideal of preserving national integrity and cultural distinctiveness against international intervention.²² Bhattacharya, Harrison and Worboys de-emphasize the importance of cultural and religious opposition to vaccination, warning against Orientalist images of Indian society. Instead, they locate the reasons for low vaccine uptake in disputes and power relationships within government agencies. Another example for the historiographical recognition of the

Milwaukee, 1894–1895,” *Bulletin of the History of Medicine* 50, no. 4 (1976), <http://www.jstor.org/stable/44450375>; M. Kaufman, “The American Anti-Vaccinationists and Their Arguments,” *Bulletin of the History of Medicine* 41, no. 5 (Sept–Oct 1967).

¹⁹ James Colgrove, “‘Science in a Democracy’: The Contested Status of Vaccination in the Progressive Era and the 1920s,” *Isis* 96 (07/01/ 2005), <https://doi.org/10.1086/431531>; Nadja Durbach, Daniel J. Walkowitz, *Bodily Matters: The Anti-Vaccination Movement in England, 1853–1907*, Radical Perspectives (Durham, NC: Duke University Press, 2004).

²⁰ Nadja Durbach, and Daniel J. Walkowitz, *Bodily Matters: The Anti-Vaccination Movement in England, 1853–1907*, Radical Perspectives (Durham, NC: Duke University Press, 2004); Nadja Durbach, “‘They Might as Well Brand Us’: Working-Class Resistance to Compulsory Vaccination in Victorian England,” *Social History of Medicine* 13, no. 1 (2000), <https://doi.org/10.1093/shm/13.1.45>, <https://doi.org/10.1093/shm/13.1.45>. On British anti-vaccinationism see: D. Porter and R. Porter, “The Politics of Prevention: Anti-Vaccinationism and Public Health in Nineteenth-Century England,” *Medical History* 32, no. 3 (1988), <https://doi.org/10.1017/s0025727300048225>.

²¹ Sanjoy Bhattacharya, Mark Harrison, and Michael Worboys, *Fractured States: Smallpox, Public Health and Vaccination Policy in British India 1800–1947*, New Perspectives in South Asian History (New Delhi: Orient Longman, 2005); David Arnold, *Colonizing the Body: State Medicine and Epidemic Disease in Nineteenth-Century India*, 197–8, 221–3, 143–4 (Berkeley: University of California Press, 1993).

²² Niels Brimnes, “Fallacy, Sacrilege, Betrayal and Conspiracy: The Cultural Construction of Opposition to Immunization in India,” in Stuart S. Blume, Paul Greenough, and Christine Holmberg, *The Politics of Vaccination: A Global History* (Manchester, UK: Manchester University Press, 2017).

manifold reasons for anti-vaccine resistance in the Global South is the historiography coming out of the 1904 Revolta de Vacina. This was an armed rebellion against the mandatory smallpox vaccination in Rio de Janeiro. The upheaval was a result of complex circumstances and involved diverse actors, ranging from positivist-inspired generals over students to marginalized black, working-class communities who expressed their discontent against the elite's project of Europeanizing Rio de Janeiro.²³

Towards the end of the 20th century, disputes over vaccination returned to the public stage, with concerns over childhood immunization attracting widespread attention. In the mid-1970s, an international controversy erupted over the safety and efficacy of diphtheria, tetanus, and pertussis (DTP) vaccines.²⁴ In the late 1990s, concern over a link between the MMR vaccine and autism was fueled by corresponding claims by British doctor Andrew Wakefield.²⁵ In 2005, the licensing of the HPV vaccine for the prevention of cervical cancer in women provoked religious and moral opposition against the state mandating protection against a sexually-transmitted illness in the United States.²⁶ Elena Conis and Gareth Millward have written studies of ongoing public discourse on the introduction of key vaccines in the US and UK in the postwar era. Conis argues that whilst the acceptance of vaccination has been different for different vaccines and different historical situations, it consistently reflected prevailing cultural attitudes toward technology, state power, and the disease itself. She argues that while modern vaccine skeptics were still motivated by religion, concerns over safety and a belief in unfettered individual liberty, a novelty in late 20th century anti-vaccine movements is the influence of critiques from New Left social movements focused on political and social hegemonies which they saw embodied in vaccination.

Gareth Millward's study on vaccination and the public in Britain since the Second World War argues that vaccination crises—specifically pertussis and MMR—show that the public did not lose trust in vaccines per se. For the public, faith in vaccination relied upon the moral and political authority of the scientific and administrative communities. Such authority could be dented not just because of issues directly related to vaccination, but also in the aftermath of the thalidomide or BSE crises, or during major political debates about the viability and future of the

²³ Henrique Cukierman, "The Vaccine Revolt of 1904, Rio de Janeiro, Brazil," in *Oxford Research Encyclopedia of Latin American History* (Oxford: Oxford University Press, 2021); Sidney Chalhoub, *Cidade febril: Cortiços e epidemias na corte imperial* (Sao Paulo: Companhia das Letras, 1996).

²⁴ J. P. Baker, "The Pertussis Vaccine Controversy in Great Britain, 1974-1986," *Vaccine* 21, no. 25-26 (Sept. 8, 2003).

²⁵ Scholars such as Mark Largent, Bernice Hausman and Elena Conis have complicated the correlation between Wakefield's work, MMR and autism concerns, pointing to broader vaccine-related anxieties and cultural struggles over the authority for parents, for which the Wakefield debate became a cultural proxy, cf. Mark Largent, *Vaccine: The Debate in Modern America* (Baltimore: Johns Hopkins University Press, 2012); Elena Conis, *Vaccine Nation: America's Changing Relationship with Immunization* (Chicago; London: University of Chicago Press, 2015), see also: Bernice Hausman, *Anti/Vax: Reframing the Vaccination Controversy* (Ithaca: Cornell University Press, 2019); Heather MacDougall and Laurence Monnais, "Vaccinating in the Age of Apathy: Measles Vaccination in Canada, 1963-1998," *Canadian Medical Association Journal* 190 (13) (April, 2018): E399-E401.

²⁶Keith Wailoo *et al.*, eds., *Three Shots at Prevention: The HPV Vaccine and the Politics of Medicine's Simple Solutions* (Baltimore: Johns Hopkins University Press, 2010).

welfare state.²⁷ A similar point is made by Andrea Stöckl and Anna Smajdor, who situate the British MMR controversy within the broader historical context of public debates over science and government policy in the years 1998–2003, arguing for the impact of public distrust in science, research and medicine because of other incidents such as the Alder Hey scandal, as well as Tony Blair's private decision regarding the vaccination of his children.²⁸ Putting trust in vaccines into an international context, Stuart Blume argues that globalization and healthcare deficiencies are eroding faith in the institutions producing and providing vaccines.²⁹ He problematizes the work of governments and non-governmental organizations in richer nations providing vaccines to post-colonial regions rather than materially improving economic and political conditions, and argues for more democratic oversight of the private and public organizations who provide vaccinations to and on behalf of the public.

The changing and varied reasons and motivations for opposing vaccinations, which become evident in historical studies, showcase how the acceptance of medical interventions relates to broader societal issues. Individual decisions about immunization involve weighing risks and benefits. One interpretation of the causes and results of vaccination resistance, proposed chiefly in scientific scholarship and popular writings on vaccine resistance, is that more importance is attached to vaccine risks as the diseases prevented by vaccines disappear.³⁰ Yet the perception of the risks posed by vaccines and their target infections are constructed in far more complicated ways, as scholars such as Elena Conis emphasize. Nonetheless, perhaps the different proximities of disease are one factor which explains the strength of anti-vaccine movements in the industrialized democracies and the apparent lack of such movements in the Global South, although this aspect is underexplored in English-language historiography. Other reasons could also be invoked to explain this imbalance, namely, a routinization of vaccination as a public health measure even against diseases that are already under control, or have disappeared from countries in the South.

Current debates around COVID-19 vaccine hesitancy underline the pertinence of the historical exploration of the issue of vaccine resistance.³¹ At the same time, responses to the current pandemic have shown that large parts of the public have embraced vaccines as a crucial public health tool, and have even challenged the state to fulfill its legal obligation to protect public health. While the historiography concerning the late twentieth and twenty-first centuries has emphasized vaccination resistance, as Elena Conis argues, the study of pro-vaccination movements would certainly be a fruitful field for further research.

²⁷ Gareth Millward, "Vaccinating Britain: Mass Vaccination and the Public Since the Second World War," in *Social Histories of Medicine* (Manchester, UK: Manchester University Press, 2019).

²⁸ Andrea Stockl and Anna Smajdor, "The MMR Debate in the United Kingdom," in *The Politics of Vaccination: A Global History* (Manchester, UK: Manchester University Press, 2017); Blume, Greenough, and Holmberg, *The Politics of Vaccination: A Global History*.

²⁹Stuart S. Blume, *Immunization: How Vaccines Became Controversial* (London: Reaktion Books, 2021).

³⁰ Arthur Allen, *Vaccine: The Controversial Story of Medicine's Greatest Lifesaver* (New York: W.W. Norton, 2007).

³¹ See for instance Seilesh Kadambari and Samantha Vanderslott, "Lessons about COVID-19 Vaccine Hesitancy among Minority Ethnic People in the UK," *The Lancet Infectious Diseases* 21, no. 9 (2021), [https://doi.org/10.1016/S1473-3099\(21\)00404-7](https://doi.org/10.1016/S1473-3099(21)00404-7), [https://doi.org/10.1016/S1473-3099\(21\)00404-7](https://doi.org/10.1016/S1473-3099(21)00404-7).

TEMPORALITIES OF VACCINATION

“At the beginning of the twenty-first century, the triumph of vaccination seems self-evident and secure,” wrote Andrea Rusnock in an edited volume published in 2008.³² Rusnock had, of course, good reasons for this argument, as she placed what had seemed to be an established and stable part of biomedical life into historical context to explore the evaluation of the first vaccine in the late 18th and early 19th century. Although perhaps in need of a slightly different framing—one that questions the stability of technologies such as vaccines over time—Rusnock’s work has gained new purchase in the last couple of years: it has become ever more important to gain an understanding of how vaccines’ integration into public health practices and systems is challenged and negotiated, and how evidence, to which we hold ideas of success or failure, are historically produced. Therefore, not only a geographical, but also a temporal expansion of knowledge production regarding vaccines and vaccination is crucial in gaining a more thorough understanding of how disease prevention works when surrounded by scientific uncertainties. As the histories of vaccine uptake show, the endpoint is rarely the licensing or widespread use of a vaccine, and the determination of success of certain vaccines can change over time.

The eradication of disease through vaccines had already emerged as an idea in the 19th century, and became intertwined with colonial projects from the early 20th century onwards, as Nancy Stepan’s work on eradication has demonstrated.³³ Cold War narratives surrounding contagion,³⁴ combined with the promise of “magic bullet” vaccines, took hold in the imagination of the public, and also in the imaginations of policy makers in public health. The introduction of widespread vaccination in national health programs contributed to the radical drop in case numbers of previous childhood killers, and these diseases mostly disappeared from public consciousness and medical training. Vaccinations as the imagined goal of public health campaigns has also informed much historical scholarship. Most histories of polio vaccines rarely go beyond the licensing of the Salk and Sabin vaccines in the United States³⁵ in the 1950s and early 60s, and most histories of diphtheria end with the introduction of vaccination in the late 1920s and 30s.³⁶

Recently, there has been a general reassessment of narratives concerning epidemics, which significantly impacts the way we think about vaccination and which charts new pathways for research. New approaches are needed for piecing together histories of epidemics and vaccinations. These must deal with the long shadow thrown by Andrew Wakefield and his

³² Andrea Rusnock, “Making Sense of Vaccination circa 1800,” in *Crafting Immunity: Working Histories of Clinical Immunology*, eds. Kenton Kroger, Jennifer Keelan, and Pauline M. H. Mazumdar, *The History of Medicine in Context* (Aldershot, UK: Ashgate, 2008): 17.

³³ Stepan, Nancy Leys, *Eradication: Ridding the World of Diseases Forever?* (London: Reaktion Books, 2011).

³⁴ Priscilla Wald, *Contagious: Cultures, Carriers, and the Outbreak Narrative* (Durham, NC: Duke University Press, 2008).

³⁵ David M. Oshinsky, *Polio: An American Story* (Oxford; New York: Oxford University Press, 2005); Jane S. Smith, *Patenting the Sun: Polio and the Salk Vaccine* (New York: Morrow, 1990).

³⁶ See, for instance, Evelyn Maxine Hammonds, *Childhood’s Deadly Scourge: The Campaign to Control Diphtheria in New York City, 1880-1930* (Baltimore: Johns Hopkins University Press, 1999); Claire Hooker and Alison Bashford, “Diphtheria and Australian Public Health: Bacteriology and Its Complex Applications, c. 1890–1930.” *Medical History* 46, no. 1 (2002): 41–64.

theory connecting autism with vaccination, and its impact on vaccine resistance; with the everlasting polio eradication campaign that has spanned three and a half decades now; with moral considerations around the use of the HPV vaccine, and most prominently, with the COVID-19 pandemic itself, and its heated debates around the continued use of prophylactic measures. The above examples reveal that endpoints, whether they involve the systemic stabilization of prophylactic measures, the disappearance of a disease from everyday life, or its eradication, are far from being final, or definable points at all. The ending of an epidemic or endemic disease has emerged as the scholarly focus of several interdisciplinary research groups, where historians often take the lead. In 2020, the *Bulletin of the History of Medicine* had a special issue, titled “Reimagining Epidemics,” that collects essays from a range of scholars to reflect on the representation of epidemics as presented by Charles Rosenberg in 1988, along with Rosenberg’s response to the scholars’ critiques.³⁷ Along similar lines, Erica Charters and Kristin Heitman explored epidemic temporalities and endpoints in a historiographical essay in *Centaurus*, which is to be followed by a special issue on the subject. Charters and Heitman are collecting interdisciplinary conversations to further investigate endings.³⁸ The “Lifetimes” interdisciplinary research project based at the University of Oslo, led by Helge Jordheim, and a sub-project titled “Lifetimes of Epidemics in Europe and the Middle East” has been exploring temporalities of health and medicine through theoretical and historical approaches.³⁹ The reconsideration of timelines and epidemic narratives becomes particularly important in the discussion of the history of vaccines and vaccination, since they are often presented as the means of ending disease.⁴⁰

The reexamination of the “ending of disease” is equally important. While the successful eradication of smallpox has been central in creating expectations that vaccines will bring definitive endings, the rejection of this narrative constitutes some particularly exciting work. Catherine Kudlick pioneered the critique of epidemic dramaturgies, through the lens of

³⁷ Jeremy A. Greene, Mary E. Fissell, Randall M. Packard, James A. Schafer, Jr., eds., *Special Issue: Reimagining Epidemics*, *Bulletin of the History of Medicine* 94, no. 4. (2020).

³⁸ Erica Charters and Kristin Heitman, “How Epidemics End,” *Centaurus* 63, no. 1 (2021), <https://doi.org/https://doi.org/10.1111/1600-0498.12370>, <https://onlinelibrary.wiley.com/doi/abs/10.1111/1600-0498.12370>; “How Epidemics End: A Multidisciplinary Project,” Oxford University, 2022, accessed February 1, 2022, <https://www.history.ox.ac.uk/how-epidemics-end-a-multidisciplinary-project#tab-2858801>.

³⁹ “Lifetimes of Epidemics in Europe and the Middle East,” University of Oslo, 2022, accessed February 1, 2022. Part of “Lifetimes,” 2022, accessed February 1, 2022, <https://temporalities.no/>; “Lifetimes of Epidemics in Europe and the Middle East,” University of Oslo, 2022, accessed February 1, 2022.

⁴⁰ For recent studies reflecting on the end of COVID-19 and vaccination, see for instance Jacob Steere-Williams, “Endemic Fatalism and Why It Won’t Resolve COVID-19,” Chris Pak ed. *BMJ Medical Humanities Blog*, *BMJ* (February 8, 2022), <https://blogs.bmj.com/medical-humanities/2022/02/08/endemic-fatalism-and-why-it-wont-resolve-covid-19/>; Stephanie Desmon, “Ending the Pandemic and Vaccine Resistance: Modern Questions, Long History. An interview with Graham Mooney and Jeremy Greene,” *Johns Hopkins Bloomberg School of Public Health* (March 30, 2021), <https://publichealth.jhu.edu/2021/ending-the-pandemic-and-vaccine-resistance-modern-questions-long-history>.

disability history, in her work on smallpox, pockmarks, and blindness.⁴¹ New work on smallpox-eradication in China has demonstrated how politically-charged the determination of the end of a disease can be, when certification of eradication and secretive state practices collide.⁴² Focusing on materialities through the history of science and technology, Joanna Radin has argued that smallpox has not ended with eradication. It is, like the Cold War, suspended, residing in a frozen state in the back of freezers of the two former Cold War superpowers.⁴³ These works signal that there is a need for reconsideration in how we think about endings of epidemics and the tools with which we are working towards that goal, placing medical technologies, such as vaccines in a critical light, along with the expectations that they engender.

As we remarked in the beginning of this essay, a comprehensive view on the historiography is impossible in this format, first and foremost because vaccines and vaccination touch upon a myriad of social, political, economic, and cultural issues. It inescapably brings forth questions of power, inequality, medical authority, individual and shared responsibility, scientific knowledge production and contestation, trust, ideas of biological and political citizenship, and non-human histories. Furthermore, the biological and technological specificities of various vaccines tend to set forth slightly different avenues of analysis. We have not touched on vaccine research, or vaccines for HIV and Ebola, each of which has an important history of its own. Nor have we considered vaccine-production, or vaccines that have a history of failure or relatively low efficiency. No doubt, a whole Isis CB series could be organized around vaccines alone, one that would be growing by the day, as new and exciting research explores the entanglements and boundaries of this pivotal medical technology.

⁴¹ Catherine Kudlick, "Smallpox, Disability and Survival: Rewriting Paradigms from a New Epidemic Script," in *Disability Histories*, eds. Susan Burch and Michael Rembis (Urbana; Chicago; Springfield: University of Illinois Press, 2014).

⁴² Lu Chen, "China in the Worldwide Eradication of Smallpox, 1900-1985: Recovering and Democratizing Histories of International Health," (PhD diss., University of York, 2021).

⁴³ Joanna Radin, "Never Ending Stories: Narrating Frozen Evidence of Infectious Epidemics Past," *Somatosphere* (June 22, 2016), <http://somatosphere.net/2016/never-ending-stories-narrating-frozen-evidence-of-infectious-epidemics-past.html/>.

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