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Beyond Law as a Tool of
Public Health: Vaccines in
Interdisciplinary Sociolegal
and Science Studies

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Abstract

Research on vaccines in the law and social sciences skews heavily toward an instrumentalist approach to knowledge in service of vaccine promotion. Overcoming hesitancy and promoting vaccine acceptance have been major goals, but successful levers for behavioral change remain elusive. Research with constructivist approaches to vaccines from feminist sociology and anthropology has uncovered ethnographic richness to describe how vaccine debates illuminate inequalities in parenting and re-entrench patterns of racism and colonialism. There is considerable potential in science and technology studies approaches that take seriously the materiality and movement of vaccines in networks of production, finance, and global politics, though there are considerable methodological challenges for these research designs. This review charts the lopsided bibliography of law and social science research on vaccines, asking why scholars rarely move away from instrumentalist conceptions of law in the service of public health and, when they do, explaining what theoretical tools enable it.

1. INTRODUCTION: LOPSIDEDNESS IN VACCINE STUDIES

Vaccines are prompted by the state through its laws on a continuum of recommendation, requirement, and coercion. Vaccine requirements serve as gatekeepers to public school admission, receipt of welfare benefits, and entry into the United States for noncitizens. Vaccines are special biological products with significant regulation, subsidy, and legal liability protection. Vaccines are administered to healthy individuals, and although they are very safe overall, some people will be harmed by an adverse reaction. Vaccines benefit the person being vaccinated as well as the wider community, but to secure the wider benefit, a large proportion of the population (sometimes more than 90%) must be vaccinated. In a global pandemic, vaccine production and distribution become tools of diplomacy and state power, tracing and creating patterns of inequality around the world. All these features make vaccines critical objects of study in law and social science, raising questions about the legitimate role of the state and its coercive powers; how to understand resistance; how to regulate and produce these products with such public and private significance; the ethics of injury, consent, and reparation; and the role of nation-states and private enterprise in responding to global pandemics as well as ongoing challenges such as HIV.

I argue that vaccines are a popular topic for academics, but the overall research picture in the law and social sciences is lopsided. It is lopsided because a large amount of work skews along one track, treating law and social science research as useful tools to promote public health goals. Understanding their research as a tool for public health is not a satisfying approach for many social scientists who care about law, however, and other noninstrumental, constructivist social scientists have other stories to tell about vaccines. But publications taking these approaches are far fewer in number. What does this lopsidedness tell us about the shape and possibilities of law and social sciences when the topic is vaccines?

Across a broad swath of what the field of vaccines in law and the social sciences might be, then, we lack examples of scholarship that deeply engages both law and science or biotechnology in constructivist terms and that deeply engages vaccines as the primary site, object, or case. Questions of how to increase the number of people getting vaccinated occupy most social science research on vaccines. There are strong normative legal and policy arguments for the clearly demonstrable benefits of vaccines, with plentiful empirical research offering tips, tools, and insights on how to reduce hesitancy to vaccinate (Dubé et al. 2015a, Jarrett et al. 2015, Morales et al. 2022, Piltch-Loeb & DiClemente 2020). Law becomes a tool to help achieve better nudges, incentives, and requirements, bolstered by improved communication and more attuned community outreach (Barraza et al. 2019, Burris & Anderson 2013). There is less focus on coercion as a problem because the benefits of vaccination overall are so clear under a public health, population-level assessment (but see McCoy 2019, 2020 for a sociological account).

Beyond this popular instrumentalist conception of law as a public health tool, the field quickly divides and narrows. Feminist sociologists and science and technology scholars have moved the hesitancy question into rich ethnographic territory, wrestling with racism, colonialism, and privileged mothering (Charles 2021; Decoteau 2021; Reich 2014, 2018). These projects are generative about vaccines, but questions of law recede. Other scholars turn to more explicitly legal and political ways into the topic of vaccines by analyzing vaccine injury compensation structures in constructivist ways to study the power of the state, expertise, and legal disputing and to understand social movements and mobilization (Barnes & Burke 2015; Decoteau & Underman 2015; Kirkland 2012a, 2016; Underman et al. 2017). Vaccines themselves recede in these works, however. There are clear theoretical frameworks in science and technology studies (STS) to study vaccines and law in other ways—as actants in networks, for example (Cloatre 2018)—but these studies have not been done, perhaps because of access problems or because it is hard to study vaccines and hold

normative endorsement at bay. It is most likely, however, that it is simply challenging to apply a complex, constructivist account of law, vaccines, science, and/or biotechnology simultaneously while also gaining access to rich data that could support a multi-sited, multi-theoretic approach.

Before describing the limitations of existing work and noting what is missing, it is useful to imagine what approaches to the topic of vaccines could be. In our introduction to our recent research handbook on sociolegal studies of medicine and health, Marie-Andrée Jacob and I recommended using theory as Valverde's (2015, p. 4) assemblage-like conceptual architecture, with attention to how something we call a topic (vaccines) scatters around at different scales, jurisdictions, temporalities, and sites of inquiry (Jacob & Kirkland 2020). To begin layering up the assemblage, let us turn to the main sites where vaccines appear in the law: mandates for their use, such as in the military or for schoolchildren, immigrants, and refugees; regulatory and approval structures; injury compensation schemes to handle claims from adverse events related to immunization; payment and funding structures; private–public philanthropy, especially as a way to distribute vaccines in poor countries or to spur development of new vaccines that the market does not otherwise support; and development, profit, and innovation through the patent system. We can think about the scale of vaccines: production batches and shortages, World Health Organization (with nongovernmental organization partners like Gavi) global distribution plans, the challenge of temperature-control requirements and physician's office storage capacity, the material ingredients and components in each dose, inspection and safety regulation, or the absence of vaccines for tropical diseases and the relative abundance of them for diseases more common in the Global North. There is also a scale of absence: the vaccines that do not exist because they are not profitable, because the viruses they target are very tricky, or for reasons known only within private companies and governments.

Jurisdictions for vaccines are most obviously nation-states, who evaluate the safety and efficacy of a product developed by for-profit corporations through licensing and approval boundaries, as well as set priorities (and define contraindications) for distribution to one's own citizens. Vaccines filter down to actual people through a network of other jurisdictions, such as local health departments, school districts, corporations, or nongovernmental organization projects. Markets, global supply chains, researchers, and international pharmaceutical companies have their own reach and jurisdiction. The term jurisdiction is perhaps stretched too far in the case of the move of global capital and investment in vaccines, but we should find a way to capture the flow, absence, and presence of interests in vaccines. These interests shape and are shaped by law in many ways, from regulation to subsidy to mandates for the products. Jurisdiction is also authority to dispense by certain people in certain locations, a variable judgment about how much medical expertise and monitoring are needed, often balanced against considerations of ease of access. When vaccines are recommended for use, who makes those recommendations and how they are communicated, enforced, or met is a question of law, as are the legal mechanisms for compensation for those who experience harm from a vaccine. The jurisdictional and temporal reach of the world's 24 national vaccine injury compensation programs and the global COVID-19 compensation program are politico-legal choices by governments about responsibility for injury. Insistence that vaccines have an appropriate temporality are foundational to debates about their proper legality and regulatory place. COVID-19 vaccines seemed to appear very suddenly, while the hunt for an HIV vaccine or the eradication of polio drags on. The HPV (human papillomavirus) vaccine heralds adolescent sexuality too soon for many parents (Casper & Carpenter 2008), and “too many, too soon” is a foundational objection to the childhood immunization schedule in the United States and elsewhere. These conceptual nudges are my suggestions, not a description of the field. There is one primary approach to studying vaccines in law and social science, and it looks quite different.

2. LAW AS A PUBLIC HEALTH TOOL

A large volume of scholarship in law and social sciences about vaccines regards law as a tool for public health. Social science techniques can help us better understand how to design laws and policies to promote vaccination. Law is a tool for compliance, and social science is a means of understanding problems such as vaccine hesitancy and misinformation. Vaccines are a remarkably effective medical intervention that prevents, rather than treats, illness, and so naturally the impulse is to promote their use as much as possible. Researchers adopting this approach are motivated by the overwhelming evidence that widespread vaccination in a population is a social good that prevents suffering, death, and other costs such as loss of educational and work time due to illness or caregiving. We also know that different policies are associated with different outcomes. For example, more permissive opt-out policies for required childhood vaccines for school entry result in lower vaccination rates in schools and higher rates of vaccine-preventable diseases (Bednarczyk et al. 2019, Hinman et al. 2002).

The law as a public health tool approach conceptualizes law and science as two distinct entities that can helpfully influence one another, primarily by using quantitative methods to measure outcomes under different legal conditions (Burris & Anderson 2013). One recent funded vision for bringing legal scholars together with public health researchers was the Robert Wood Johnson (RWJ) Public Health Law Research Program. RWJ funded 81 grantees with approximately \$13.5 million from 2009 to 2016 as part of a push to improve public health through evidence-based legal interventions, termed legal epidemiology (Burris et al. 2016). The vaccine-related results from the RWJ funding generally model relationships between different laws and policies (a state's childhood immunization exemption process, for example, or what penalties a hospital applies for its staff who refuse a flu vaccine) and vaccination rates or disease incidence rates. The funding model stressed a team science approach based on a public health model, with a scholar holding a Juris Doctor collaborating with Doctor of Medicine- or Master of Public Health-degreed researchers to run the study. As the field-builders described it, "This transdisciplinary model adds scientific practices to the lawyerly functions of normative and doctrinal research, counseling, and representation" (Burris et al. 2016, p. 135).

It is worth backing up to observe that legal research about vaccines is broad and complex unto itself. Before it can become the independent variable in this approach, considerable legal scholarship explains the legal landscape for vaccines (Attwell & Navin 2019, Fernandes et al. 2022, Reiss & Karako-Eyal 2019, Reiss & Weithorn 2015, Weithorn & Reiss 2018), mostly in the US context but also globally (Santos Rutschman 2022). A vaccine law textbook for use in law schools is in its second edition (Abramson et al. 2022), updated for the COVID-19 pandemic and covering topics such as state mandates, private employer mandates, privacy, regulations for testing and approval, rationing, pandemic response, and patent protection. The aim of much of this large body of legal scholarship is to explain the options available for using the law and to argue for legal changes to promote a normative vision of wider vaccination under conditions of equity, justice, and fairness.

It is plainly true, as much of this research aptly demonstrates, that law and policy shape public health outcomes and that it is possible to empirically evaluate what kinds of laws or policies correlate with measurable population health outcomes like concussion rates, overdoses, or vaccine compliance. But it is worth noting what such a conceptualization leaves out. Projects like those described above have no use for entire other fields of social science inquiry about law and legality that do not adopt this instrumentalist "law as lever for public health" conceptualization. This conceptualization subordinates law and the legal to the public health mission, defined within that profession and investigated according to its empirical methods. The site of study for the law is the law school, with its focus on legal doctrine and normative evaluation. There is no need for the

anthropology or sociology of law or the political conception of law and policy from other social science fields because these important but neglected approaches typically disavow instrumentalism in favor of a constructivist, critical approach. Deconstructing, multiplying, or reassembling what the law is beyond doctrine or statutory definition means the tool (the law) disappears as a neatly usable independent variable.

Even though this law as public health tool approach yields some useful conclusions, social scientists within public health have pointed out significant flaws in research conceptualization. Greer et al. (2017, p. 40) argue that public health calls for better data, infused with political will to promote goals such as vaccine uptake, reveal a “weak understanding of politics.” Greer, a political scientist on a school of public health faculty, contrasts the frequent calls for enlightened action based on sufficient political will in public health scholarship with the conceptual tools of political science: analysis of constitutional structures, levels of centralization or decentralization, distribution of political powers, economic and labor structures, interest groups, and partisanship. “Political science should be the translational research of public health,” Greer et al. (2017, p. 43) argue, “because politics is usually what stands between our findings and effective action.”

Consider, for example, the huge number of studies analyzing individual parents’ reasons for vaccine hesitancy in order to change them (Dubé et al. 2015a, Morales et al. 2022, Piltch-Loeb & DiClemente 2020). It was very helpful to learn that many parents have hesitations that conversations with their doctor can allay, whereas ideologically committed anti-vaccinationists will not change their minds, and efforts to convince them will likely backfire (Nyhan et al. 2014). Social media and communications studies confirmed that conspiracy theories about vaccines spread easily in these online environments and that even spending a short amount of time exposed to media misinformation can shift perceptions about vaccines (Dubé et al. 2015b). Once these subdivisions among parents dragging their feet on vaccines became widely published and accepted, a lively debate began among doctors about when to exclude some families from their practices because time spent on them was wasted and they could bring vaccine-preventable diseases into patient waiting rooms (Alexander et al. 2016). Turning away from individual-level conversations meant to convince parents (for which there is no primary care billing code for insurance and thus no monetary compensation for doing so) increased the importance of legal or structural solutions, such as private employer mandates for COVID-19 vaccines and more burdensome school exemption processes. Vaccine policy scholars concluded that making exemptions harder to obtain would help raise vaccination rates among schoolchildren by complicating or removing alternatives (Bednarczyk et al. 2019), and several states changed their laws to remove philosophical objections entirely or created requirements such as completion of an educational module with a public health professional before an exemption would be granted (Barraza et al. 2019).

Though these studies about reasons for vaccine hesitancy continue to be published, the ground is well trod in the United States. The COVID-19 pandemic vaccines and hesitancy outside the United States and Europe, such as in China, are getting research attention using the same descriptive methods (Liu et al. 2021, Yang et al. 2020). Only a few researchers have brought new methods to study the impact and implementation of these laws on the ground, such as in the interactions with hesitant parents and the public health administrators meant to change their minds (Lillvis 2019, Lillvis et al. 2020). Notably, however, an evidence-based set of proven interventions has not come out of the United States-based research to date (Dubé et al. 2015a) [though researchers seem to agree it will take multiple approaches based on respectful interactions (Jarrett et al. 2015)]. Taking up Greer and colleagues’ suggestions, however, we would ask instead, “what shapes the political options” for vaccination, and “what are the political techniques and the strategic landscapes of the political systems in which these political options are played out?” (Greer et al. 2017, p. 41). Political scientists have not shown great interest in studying vaccines in this

way, however, perhaps because health policy is not at the center of the field. Public law scholars in political science have not mobilized a matching conception of law as politically constituted within this admittedly still somewhat instrumentalist view of politics. The social scientists who use qualitative and ethnographic methods have been more likely to study vaccines from sociological and anthropological foundations, though not with a focus on the law.

3. VACCINES AS A CASE IN QUALITATIVE, ETHNOGRAPHIC, AND POLICY RESEARCH

Instead of mustering law as a tool to improve vaccination rates, other bodies of social science research on vaccines center them as a site of meaning, membership, social movement mobilization, and policy contestation. Scholars achieve this empirical and theoretical leverage by moving beyond conceptions of law as a tool to thoroughly constructivist approaches to law and society and refusing to consider vaccines as simply a self-evidently proper tool in the service of population immunity. Historians have done a heavy lift showing how vaccines have sparked controversy since their earliest forms (Colgrove 2006, Conis 2016, Durbach 2005). Many of the themes of the disagreements remain remarkably stable across eras, at least in the United States and Europe: bodily autonomy, the right to control one's own children and family, judgments of risk and benefit, the proper bounds of expertise, and an empowered middle class with ideas of their own about health. Philosophy and ethics have of course continued to be major sites of discussion of the values of autonomy and the public good in the vaccine context (Goldenberg 2021, Navin 2016). But the scholars best able to plumb the vaccine debates for their broader meanings and ability to reveal sociolegal life in a new way are the qualitative and multi-method researchers in anthropology, STS, sociology, and political science.

They take up vaccines as a “case” (Ragin & Becker 1992) of larger theoretical questions of trust in authority, theories of health and disease, or racism and colonialism. Much of this research moves away from law and into the rich detail of other aspects of social life in ethnographic context, so while law is no longer instrumentally treated, it may not be treated at all. Research on vaccine hesitancy often moves quickly to the rich qualitative data on people's considerations of vaccines, as discussed below, with only a brief description of the legal requirements to vaccinate. Other work stays remarkably close to law, litigation, and rights claiming while eschewing the tool-like approach I describe above. For example, anthropologist Biehl's extensive work on the judicialization of health rights in Brazil focuses on lawsuits for the provision of medicines including vaccines (though not principally focused on vaccines), with close attention to the outcomes of this legalization of health as well as politics and meanings that biotechnologies bring out and problematize (Biehl et al. 2012, 2021).

Much of this work reframes the hesitancy question. Reich's (2018) definitive book *Calling the Shots: Why Parents Reject Vaccines* explains why parents do not vaccinate their children by situating their choices within the larger context of intensive parenting, privileged individual choices about extended breastfeeding and staying home with one's children rather than putting them in a day care, and the pressure on mothers to raise successful children in a competitive world. Instead of the political science framework Greer and colleagues suggest, Reich employs theoretical frameworks from feminist approaches in qualitative sociology of the family and its political economy, gender roles, economic functions, and status hierarchies. Most scholars studying vaccines observed that the problem category of vaccine objectors was mostly women and mothers in the debates over children (though, as I and others have pointed out, their movements tended to be led by wealthy, high-status men, with women leaders playing some significant roles but often deferring to these male “stars”). I have suggested that books with a lot of content about vaccines tend to really

be about something else, and here Reich succeeds in showing how privileged white mothering practices reflect and bolster status hierarchies in a context that promotes an individualistic approach for those who can afford it. The women she studied move around the law, sharing information among themselves about how to write fake religious exemption requests and paying out of pocket to take their children to pediatricians who do not take insurance and can thus spend the time to craft a personalized, delayed vaccine schedule for their children. They are educated and empowered and often homeschool their children, bringing all the personal capital that may have otherwise gone to an employer back home to optimize their children's health and development.

Relatively affluent and white mothers captured scholarly attention for those studying vaccine hesitancy and resistance because they were shown to be the core activists in the US social movements and overrepresented in the non- or slow-vaccinating group. Elaborating the whiteness of the anti-vaccine movement was an important point because it racialized a group whose privilege often allows them to evade the racial implications of their behavior. Those of us writing about anti-vaccine social movements prior to the COVID-19 pandemic emphasized their whiteness; their awkward deployments of outreach to racial minority groups who might share their doubts; and their general right-leaning, health libertarian perspectives (Kirkland 2012b, Reich 2014). Public health researchers and government officials certainly notice and attempt to prioritize and repair the racial disparities in vaccine access and uptake that they detect. Racial inequalities are simultaneously hyper-visible (mostly as a disparity in quantitative work) and undertheorized in the more instrumentalist approaches to research on vaccines.

Feminist, indigenous, and anti-racist approaches to STS have extensively described the ways that subordinated groups must live “at the deadly intersection of medical abandonment and over-exposure,” as Benjamin (2016, p. 971) puts it, or for Nelson (2011), bound in a “dialectic of neglect and surveillance.” Plenty of conceptual tools and nearby sites of analysis show the way, such as Benjamin's (2016) explication of “informed refusal” in sickle cell treatments for African Americans, gene sequencing in South Africa, and genetic ancestry tests for asylum claims by Somali applicants. But the well-documented suspicion of medical experts pushing interventions among racial and ethnic minority groups in the United States, particularly among African Americans, for whom memories and histories of experimentation, torture, and degrading treatment at the hands of medical researchers and doctors go back centuries (Washington 2006), shows how much more work should be done. Starting with histories of racialization, subjugation, and colonialism offers an entirely different way into vaccine debates, requiring rethinking of ideas like “hesitancy” and refusal (Benjamin 2016).

Charles (2021) turns a feminist, postcolonial lens on biomedicine in Barbados in *Suspicion: Vaccines, Hesitancy, and the Affective Politics of Protection in Barbados*. Reframing hesitancy as a long legacy of suspicion that predates the HPV vaccine, Charles (2021, pp. 16–17) argues that suspicion “travels in time to intimately connect to these racialized histories and reaches forward to attach to devices like the HPV vaccine.” Decoteau's (2021) book *The Western Disease: Contesting Autism in the Somali Diaspora* also squarely confronts the role of vaccines as colonial objects in the lived experiences of Somali refugees living in the United States as their children become diagnosed with autism at higher rates. For these families, autism is a Western disease that they encounter and understand to be the result of the American lifestyle, food, and vaccines that are thrust upon them as they make their lives as Black immigrants in a racist society. The Somali refugees were well aware of American anti-Black racism in the healthcare system and in our histories of medical experimentation, knowledge shared in their networks in the refugee camps and within their communities in Minneapolis and Toronto, and their experiences of exclusion continued in their new homes. Decoteau shows how the mainstream portrayal of the Somalis hesitant to vaccinate (usually only hesitating over the measles–mumps–rubella, or MMR, vaccine) as duped by prominent

anti-vaxxers such as Dr. Andrew Wakefield is insulting and backward. These families sought out alternative information and invited these leaders, not the other way around.

Feminist scholars writing about these mothers have taken distinctly different critical approaches to them from the mostly male doctors and public health scholars, who have written about them in a narrow register ranging from frustration to open contempt. The difference here is whether the scholar is primarily trying to understand and explain social structures and their effects, one of which is a behavior or attitude in its social and political context, or whether he is trying to change a behavior. One might say it is necessary to fully understand a behavior before one can try to change it. But the rich qualitative work on non-vaccinators (or suspicious vaccinators or refusers) should not be read as simply more elaborated wayfinding to the levers to change behavior. Because their approach leads elsewhere—to racism and colonialism, to white privilege, to stark systemic inequalities—these feminist works will not supply tools of law and policy that can be applied to individuals making vaccine choices.

If anti-vaccine mobilization in the first part of this century in the United States makes sense from a perspective of neoliberal mothering and personal risk management (as Reich tells it) and of suspicion of biomedicine, racism, and colonialism (as Charles and Decoteau tell it), then the COVID-19 pandemic and the emergent vaccine opposition must be seen as upending the gender and political scripts for vaccine opposition and tethering them to different sources of meaning and motivation. Mobilization against COVID-19 vaccines had a much more masculinist framing, merging with gun rights and resistance against governmental authority (Cowan et al. 2021). The fact that COVID-19 did not harm children nearly as much as it harmed adults (in stark contrast to many other diseases) meant that child- and mothering-related frames receded. COVID-19 restrictions touched everyone, with dramatic effects on the economy, travel, personal living situations, and much more. And that was simply for those who lived. The United States has the highest per capita death rate from COVID-19 among wealthy nations by far, and as of March 2023, more than one million are dead in the pandemic (Cent. Dis. Control Prev. 2020). The US nationwide vaccination rate is a moving target depending on how one defines “vaccinated,” but as of March 2023, 81% of the population had received at least one dose (Cent. Dis. Control Prev. 2020).

I have pointed out that research on vaccine suspicion and refusal departs quickly from the law and moves into non-legally focused ethnographic elaboration of the meanings of refusal as richly constituted in community and history. Research in the social sciences on vaccine injury compensation schemes also uses vaccines as a site or a case in a non-instrumentalist approach to law, politics, and policy (Barnes & Burke 2015, Kirkland 2016). This work leverages a more direct connection to law and policy, though sociologists have also mined vaccine compensation proceedings for insights about the courtroom construction of knowledge and non-knowledge (Decoteau & Underman 2015) and the framing of worthwhile victims as embodying appropriate bodily suffering (Underman et al. 2017). Vaccine injury compensation structures are a distant second to hesitancy as a site of inquiry, but these two topic areas dominate the non-instrumentalist approach to vaccines in law and social science.

Barnes & Burke (2015), political scientists interested in the relationships between courts, litigation, politics, and policy, developed a multi-method comparative case study design of injury compensation schemes to study variation between adversarial legalism (product liability, medical malpractice, and securities fraud) and bureaucratic legalism (Social Security disability insurance, the black lung program, and longshore workers’ program). The vaccine injury compensation court is their middle case, exemplifying changes between higher adversarialism (the lawsuit-driven approach that the court displaced by providing a liability shield and pulling all claims into itself) and a more bureaucratic alternative (compensations based on an injury table with no need to prove negligence or fault). Their focus is not the vaccines themselves but rather the ways that different

policy structures promote different ways of problem solving, disputing, and deciding on resource distributions (i.e., politics).

In *Vaccine Court* (Kirkland 2016), I combined a sociolegal argument about the place of law in managing social problems with an STS approach to questions of scientific evidence in court, while normatively supporting vaccines and immunization programs but resisting an instrumentalist bent. It was tricky business. I argued that vaccine injury problems are complex and are appropriately managed with a blend of science, law, and politics that, although deeply structurally imperfect, comes up with a good answer most of the time (meaning ethically, politically, and intellectually defensible). My analysis emphasized a greater degree of adversarialism than Barnes & Burke (2015) found, perhaps because my interview and observation methods uncovered a lot of disputing at the vaccine court that did not appear under its officially “no-fault” compensatory structure. Other extant research on vaccine injury compensation structures is descriptive and normatively evaluative (e.g., Crum et al. 2021, Demasi 2022, Mungwira et al. 2020, Thompson et al. 2020, Winter et al. 2019).

These social science works on vaccine injury compensation together show how it is possible to open the evaluative lens wider than vaccines and immunization programs themselves and thus to reach broader problems central to social science disciplines, such as how to channel disputes and remedy harms when some harms cannot be avoided and how to understand the effects of handling them through some institutional arrangements rather than others (Greer et al. 2017). Both the strands I pull together here—sociological and anthropological work reframing the hesitancy question and sociolegal policy studies of vaccine injury compensation structures—take a constructivist approach to law and eschew an instrumentalist view of vaccines, but they are not in scholarly conversation with each other.

4. VACCINES AS SOCIO-TECHNICAL OBJECTS IN NETWORKS OF LAW

STS is yet another obvious interdisciplinary approach for researching the law and social sciences of vaccines. Yet, STS work on vaccines is not nearly as common as one might think, either, given its surface-level fit. Study of vaccines in the law fits within the large body of scholarship interrogating the relationship between law and science (Cloatre & Pickersgill 2020, Cole & Bertenthal 2017, Jasanoff 1995, Silbey 2008, van Wichelen & de Leeuw 2022), though vaccines are barely mentioned in major scholarly reviews and foundational works. Much of the ethnographic work I describe above takes a distinctly feminist STS approach to vaccines, and Leach & Fairhead’s (2007) *Vaccine Anxieties: Global Science, Child Health and Society* was an early example. An STS perspective would, as they describe it, “force one to ask how the biomedical perspectives that drive and justify vaccination programmes arose, how they have become authoritative, and what broader social and political agendas might underlie and be supported by them” (Leach & Fairhead 2007, p. 24). Few scholars have followed their path and focused on vaccines and law in an STS framework. What could explain this curious near-absence of STS-inflected research on vaccines, then, and what kinds of work could flourish under STS frameworks? How could research on vaccines in law and science maintain full constructivist complexity for the law as well as science? In this section, I propose to reflect on the relative absence of research as a way of seeing current limitations and how they might be overcome by future research.

Law in a law-and-STS approach is supposed to be as thoroughly constructivist as science: an achievement of power, professional agreements and expertise, institutional structures, and histories that obscures these features through ideas such as *stare decisis* (adherence to precedent) and a professional path laden with barriers and boundaries, for example. Cloatre & Pickersgill (2020,

p. 82), reflecting on limitations in scholarship on the relationship between law and science, point out that scholars often fail to be sufficiently critical in appraising both law and science. They emphasize that it is more likely for legal scholars to defer to science as a coherent, authoritative structure, that is, for “legal scholarship [to] assume[] that new scientific discoveries can straightforwardly be embraced by the law and transform its practice, or that law can simply superimpose itself over them” (p. 82). This approach defines much of what I have termed the invocation of law as a tool of public health above. I would argue, however, that it is equally difficult to avoid fixing the law while approaching science as constructed. My section heading here calls vaccines socio-technical objects in networks of law, but it is also true that laws are materials (in documents, for example) and vaccines are known through networks of laws. My point is that putting vaccines and law together in a social science-based STS approach would involve using some of the primary theoretical tools on both simultaneously. Perhaps it has not been done because it would be quite challenging to do so, and it is much more likely that one aspect would be held as fixed while the other would be traced, deconstructed, and scrutinized.

One strategy would be to study vaccines in a law-and-STS tradition by, as one fellow scholar advised me early in my research, “following the vaccine through the network.” What my colleague meant was to research vaccines using actor-network theory (ANT), the STS approach that one of its primary founders, Bruno Latour (2011), counts as the field’s proudest contribution. Latour (2011, p. 799) explains his concept of a network as “what takes any substance that had seemed at first self-contained (that’s what the word means after all) and transforms it into what it needs to subsist through a complex ecology of tributaries, allies, accomplices, and helpers.” A vaccine is a material object, but what are all the human and nonhuman attributes that bring it into being, material, digital, intellectual, legal, and so on? “To paraphrase Latour,” as Beisel (2020, p. 253) explains in her “ANT-inspired” case study of malaria vaccine development,

understanding malaria vaccines requires us to follow the parasite to the Gates Foundation’s offices in Seattle, GlaxoSmithKline’s development labs in Belgium and the vaccine trial sites in Ghana, as well as neighbouring towns that do not benefit from the trial infrastructure, and, finally, to closely attend to the ecological dynamics in which parasite bodies are implicated.

In ANT terms, a vaccine is a material and also an actant, or something with agency alongside ideas and people (Ceruleo 2009). (So is law in this view, but note that the initial account of a path predetermines what one will see in the “following.”)

My opening set of recommendations for using Valverde’s conceptual approach has linkages to an ANT approach (Levi & Valverde 2008), both starting from dissolving previously taken-for-granted boundaries around a topic and opening up inquiry into all the ways and locations for it to appear. Beisel’s analysis about the malaria vaccine that does not exist is a telling example, however. She describes the tracing of the parasite that one might do but does not do it in this handbook chapter format, conceding that a reader might ask,

Is this really ANT, or an ANT-inspired sensibility? Where are the nonhuman actants? Where are the heterogeneous assemblages? So far, this sounds pretty much like an established STS analysis of science as culture (and economy). Where is a hybrid analysis of following the virus (or in my case, the parasite) as Latour suggested it? (Beisel 2020, p. 250)

The advice boils down to “weaving unlikely stories together” and to “tracing these complex and heterogeneous assemblages of science, economy and ecology” (p. 253), much like Jacob and I suggested (Jacob & Kirkland 2020). Beisel (2020, p. 250, emphasis in original) concludes her discussion of malaria vaccine challenges by saying that an ANT-inspired approach asks, “What kinds of projects and health infrastructures do *not* receive funding and attention due to grand

approaches like malaria vaccine development?” These are excellent questions, though at this level of dissipation they could have come from many critical social science approaches. Proliferating actants to follow (viruses, legal documents, vaccines) tends to broaden the scale of the inquiry, that is, perhaps explaining why one would end up, as so many scholars in this area do, combining and assembling and inevitably choosing where to focus analytically.

Law and social science scholars have explicated the use of ANT for sociolegal research (Cloatre 2018, Levi & Valverde 2008, Riles 2005) and applied it elsewhere, suggesting how it might be done for vaccines. For example, in *Current Flow: The Electrification of Palestine*, Shamir (2013) uses an ANT framework to demonstrate how an electrical grid is a political actor. Shamir’s study of electrification in 1920s Palestine would be an excellent sociohistorical model for an ANT approach to vaccines (production, distribution, resources, and enabling effects) that would frame them as material objects and social-political actors who reflect but also provoke resource distributions and networks. Riles’s books on the networks of governmental and activist organizers working on documents for the 1995 Women’s Conference in Beijing (Riles 2000) and tracing the legal infrastructure of global financial regulation (Riles 2011) show how one might assemble a study of the networks, documents, and lower-level regulatory actions that create what we call vaccine availability (globally or at one site). Riles’s approach suggests a way to use ANT or to be inspired by it for a focus on the law part of law and vaccines. Vaccine Information Statements (the paper sheet from the Centers for Disease Control required to be given to everyone in the United States when receiving a vaccine), package inserts (the product labeling that must report all adverse events from clinical trials), the advisory committee memos and recommendations, the regulations about production and storage: All of these are legal objects going beyond formal court pronouncements that are both data in the traditional sense and actants in an ANT-inspired framework.

It is worth noting that STS shares with the law and society tradition a tendency to celebrate the underdog. People from outside officially sanctioned knowledge networks have been shown to also contribute to scientific and legal knowledge, and explaining these dynamics has been foundational to arguments about what law really is, how expertise works, and how boundaries around knowledge and facts can shift (Epstein 1998). The clear scientific benefit of vaccination not only drives a dominant conception of law as a tool for public health but also looms over the constructivist approaches to the law and social science of vaccines. Like evidence for human-driven climate change, treating the benefits of vaccines as distant, contested, or unimportant in one’s analysis would be very hard to pull off. Anti-vaccine activists, like climate change denialists and right-wing conspiracy theorists, work for political goals that may be significantly less appealing to many academic researchers than others speaking from below, such as breast cancer activists (Klawiter 2008, Parthasarathy 2010). The risk that scholarly critique could be mobilized to destabilize immunization programs is well worth considering, especially when it is hard to communicate nuance or control how one’s research may be used. Most scholars discussed above have picked their way through this tricky terrain by fairly explaining the perspectives of those they believe to be ultimately mistaken while also showing how and why we end up with the institutional arrangements we have and how they could be improved. Topics that skirt questions of vaccine harms and that do not center lay expertise would be more likely to avoid this tangle, and as I suggest above, these are also the most original areas (though likely because there are more obstacles to doing these projects).

While there is not yet a model for applying Shamir’s model of electrification to vaccines in local, national, or global networks, there is also very little political science, economics, or sociology that centers vaccines or the law of vaccines in political economy beyond a global health security approach (Gostin 2021). The COVID-19 pandemic is likely to spark interest in many researchers in the study of pandemics, including vaccines. The editors of a volume on the politics of the

coronavirus pandemic echo my observations here about the lopsidedness and fragmentation of the research landscape and its challenges, pointing out that “an interdisciplinary inquiry into the political economy of vaccines will have to combine research in politics, economics, and health policy that runs on very different tracks” (Greer et al. 2021, p. 633). One way forward here would be to enter the global health conversation with STS tools as Beisel suggests, selecting from Greer’s different tracks of disciplinary expertise and creating assemblages of the possible given limitations on research access. Questions of equitable access and the dynamics of “vaccine nationalism,” or the impulse of nations to keep and use vaccines only within their own borders (Greer et al. 2021, p. 631), would be critical. Vaccines present an intriguing way to study many features of middle-income countries, where vaccine development and production are vigorous. How did the COVID-19 pandemic shape and change processes for market approval, technology transfer agreements, risk management, and patent registration in and between countries, and what are the implications for political economy? This path contains its own critique, however. It is very difficult to gain sufficient expertise in law, the sociolegal construction of law, one or two fields in which to ground a scholarly conversation and maintain an academic career, and a sophisticated STS (or feminist, or postcolonial, or some combination) theoretical tool kit applied to multiple cases or sites while also gaining access to research materials and locations where vaccines are produced and travel.

5. CONCLUSION: RESEARCH DYNAMICS IN HIGH RELIEF

Vaccines in the law and social sciences throw some research dynamics into high relief. First, they showcase the overwhelming urge (and one could add, the clear need) to use law as a tool for public health when the right goal is perfectly clear. Increasing vaccination rates is the answer, and specific configurations of laws can help to achieve that. What is the effect, though, on fields of scholarly inquiry, patterns of grant and foundation funding, and publication and careers when the things that are given and the things that are levers are so predetermined? One outcome is that combining legal doctrine and public health research could box out other social science research fields that eschew the “law as a tool for public health” model. It could also make other approaches seem suspect, including those that do not center vaccines as benevolent but instead hold their meaning open for evaluation.

Second, when vaccines are taken as a site of deep and contested cultural meanings, they become a “case” of a broader phenomenon, with all the attendant research challenges in political science and sociology of doing “a case study.” What are vaccines a case of? Are they worthy of a research design themselves, or are they part of another story, such as racism and exclusion in the treatment of Somali refugees to the United States (Decoteau 2021)? Successful projects have been large-scale, multiyear, and comparative and have drawn on extensive ethnographic or interview data. Formal legal arrangements are a starting point, quickly left behind. Vaccines become the tool to make the scholarly intervention: into disputes over evidence and expertise, the effects of lawsuits, the deployment of neoliberal motherhood, or global governance struggles. Although these projects show the value of using vaccines as a case or provocation, they lead out to intervene in other scholarly conversations and do not add up to a social science body of knowledge that progresses to greater sociolegal understandings about vaccines or the law of vaccines in particular.

The third and final research dynamic that vaccines throw into high relief are the methodological and theoretical challenges in executing an interdisciplinary, constructivist project that is equally sophisticated about law and vaccines. Researchers lack easy access to many of the sites and sources of data that they need to study vaccines in the law and social sciences, quantitatively or qualitatively. Greer points out that the COVID-19 crisis revealed how severe our data and access

problems are. What can be known at all is first and foremost a law and social science problem because, as he argues, “data are endogenous to the political process because the collection and coding of data of any kind are political decisions” (Greer 2022, p. 35). We have no comprehensive national vaccine registry in the United States because we lack national healthcare, because of federalism, because of opposition to tracking, and because of incompatible data systems, to name just a few reasons. Bureaucratic erasures like this one are also a political choice, built into legal structures and processes. Many areas of research share this challenge, of course. Vaccines are pharmaceutical technologies produced by private corporations or by governments around the world, none of which are inclined to share access to their networks, deliberations, or processes with scholars. China’s COVID-19 “vaccine diplomacy” and the role of vaccines in geopolitics would be a fascinating focus for future research, but scholars can observe only effects of hidden decisions there and elsewhere. Not all the reasons for lack of data are regrettable or suspicious; medical privacy also plays a big role. The point is, nonetheless, that one would simply be blocked in trying to follow a vaccine through the network (or executing most other research methods, too). A solution could be to develop the methodological and theoretical framework in a conceptually ideal way and then confront data and access challenges, building reflection on those obstacles into the account of knowledge (assuming, of course, that there are still enough data to meet substantial research goals).

Despite concerted efforts for the past couple of decades, social scientists were not able to devise good legal solutions to vaccine hesitancy using standard disciplinary tools as we confronted the COVID-19 pandemic, which seemed to make everything everywhere worse. Vaccine mistrust is part of a perhaps overwhelming problem for democracies today, where we are seeing global shifts toward authoritarianism and rule by misinformation and lies. More surveys about why people do not vaccinate seem inadequate for the moment. Given all these challenges and tricky research terrains, what is a social scientist interested in vaccines to do? The first step would be to take stock of one’s research goals and select which ongoing conversation and set of beliefs about the role of law fit best. How important is the law in the study, and what is the conceptualization of law? If the goal is to explicate new legal puzzles around vaccines and immunization policy and to work with scientists and public health researchers to improve health, then joining a team of lawyers, epidemiologists, and public health communications scholars would be an excellent path. The challenge will be to find something that has not been studied exhaustively and to intervene effectively.

From a vantage point within a social science field like sociology, STS, political science, or anthropology, vaccines are likely to be a case, a site, an actant in a network, or perhaps the provocation for a social movement. Keeping questions about law at the center will be a central challenge for the research design and theoretical framework but is a path to greater originality. Designing a project that can be completed given data and time constraints will limit junior scholars more than those whose career position affords more risks. Law and social science work on vaccines has ample room to expand globally; transnationally; or focused on critical locations such as China, India, and Brazil (major vaccine manufacturing countries), particularly for scholars with the language ability to analyze legal and government documents and to perform qualitative work in communities or through access to elite sites. Taking this pandemic moment seriously requires untangling the relationships between vaccines, political power, and legality that shape the many layers of vaccines’ existences and the worlds they help bring into being.

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