PART I

THE CONTEXT

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Introduction

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In September 2016 the Conservation Law Foundation (CLF), a regional environmental advocacy group in New England, filed a cutting edge climate change lawsuit in federal district court in Boston against ExxonMobil. CLF's complaint claimed that the fossil fuel giant had failed to adequately prepare its Everett Terminal facility for climate change impacts, including sea level rise and increasingly intense storms, putting the Mystic River at risk for pollution and nearby communities at risk of toxic exposure. One year later, Judge Mark L. Wolf ruled that CLF had standing to sue – meaning CLF's claimed injury was one considered by the law to be a violation of its rights – but only for injuries in the present or "near future." The group did not have standing to sue "for injuries that allegedly will result from rises in sea level, or increases in the severity and frequency of storms and flooding, that will occur in the far future, such as in 2050 or 2100."[1] The decision's implications are clear in one respect: Although CLF could not sue over climate risks projected to manifest later this century, it could sue over pollution that is evidently exceeding the facility's permitted thresholds now or exceedances that are foreseeable in the immediate future. But less clear is whether the court recognized that climate-driven pollution risks will certainly occur in both time frames, or instead wrongly views climate change as a phenomenon that will not manifest in legally significant ways until "the far future."

Judge Wolf was understandably reticent to make his courtroom the place where consideration for climate change could be added to the requirements of existing environmental protection laws – he said he wanted to avoid the case becoming "the Scopes Monkey Trial of the 21st Century."[2] But climate change

[1] Order, *Conservation L. Foundation, Inc.* v. *ExxonMobil Corp.*, C.A. No. 16-11950-MLW, at 2 (D. Mass. Sept. 13, 2017).

[2] Adrianne Appel, *Tone down climate change in suit against Exxon: Judge*, *Bloomberg BNA*, Sept. 12, 2017, https://perma.cc/8824-5253

is not a problem for the future. As the 2017 Atlantic hurricane season made plain, it is a problem now. Just two weeks before Judge Wolf issued his order, Hurricane Harvey struck Houston and its surrounding Harris County, dumping so much rain so quickly that the National Weather Service had to modify the color-coding on its maps to convey the volume of precipitation.[3] Chemical plants and refineries in the area were caught unprepared for the deluge and attendant flooding, and toxic substances were released into the air and flowed from their grounds into the surrounding area and out into the Gulf of Mexico as a result.[4] This storm was the third so-called 500-year storm to strike Houston and Harris County in just three years. It was not caused by climate change per se – coastal storms would strike Houston even if humans were not adding greenhouse gases to the atmosphere – but there is little doubt that climate change amplified it by warming and swelling the waters of the Gulf and warming the air that carried all that rain.[5] The same can be said of Hurricane Irma, which caused catastrophic damage on a number of Caribbean islands, and Hurricane Maria, which devastated Puerto Rico, all within weeks of Harvey. For those engaged in public health protection and management, these scenarios are the new normal.

The extent of the risks climate change poses to public health and the immediacy of the demand for effective policy responses have been well documented by highly visible, prominent bodies, including the Intergovernmental Panel on Climate Change, established as a joint project of the World Meteorological Organization and the United Nations Environment Program and serving as the entity primarily responsible for developing and issuing scientific reports that inform international climate action; the United States Global Change Research Program, a federal program mandated under the Global Change Research Act of 1990 and tasked with developing the National Climate Assessment every five years; and the *Lancet* Commission on Health and Climate Change, an international

[3] National Weather Service, Twitter, Aug. 28, 2017, 7:21 AM, https://perma.cc/7XW4-PZCR ("#Harvey in perspective. So much rain has fallen, we've had to update the color charts on our graphics in order to effectively map it.")

[4] Michael Biesecker and Frank Bajak, *Evidence of Spills at Toxic Site During Floods*, AP, Sept. 17, 2017, https://perma.cc/9GGK-UMA5; *Globs of Mercury Wash up After Harvey*, E&E News Greenwire, Sept. 7, 2017, https://www.eenews.net/greenwire/2017/09/07/stories/1060059977; see also Dena Adler, *Hurricanes' Contaminated Floodwaters Might Crest Next Wave of Climate Change Litigation*, Climate Law Blog, Sept. 19th, 2017, https://perma.cc/Z29V-UYLE (describing other examples of toxic releases).

[5] Kerry Emanuel, Assessing the present and future probability of Hurricane Harvey's rainfall, *PNAS Early Edition*, Oct. 4, 2017, https://perma.cc/XPV3-8VG2; Lisa Friedman and John Schwartz, How Hurricane Harvey became so destructive, N.Y. *Times*, Aug. 28, 2017, https://perma.cc/7WQC-V5TU.

specialist group of academic scientists formed to map climate impacts on public health and policy responses. The *Lancet* Commission's 2015 report concluded that "tackling climate change could be the greatest global health opportunity of this century."[6] It also recommended that governments invest in research to better understand adaptation needs and the public health co-benefits of climate change mitigation; invest in creating public health systems that are themselves resilient in the face of climate change impacts; direct the transition away from coal as a fossil fuel relied on for energy around the world; and develop sustainable and resilient cities.[7]

As the chapters in this book illustrate, these recommendations are valid and important but merely point in the direction of a necessary set of concrete actions. Others have taken the important intermediate step of describing some of the policy goals and tools that should inform those actions,[8] but those further prescriptions for public health-oriented climate action do not say enough about the legal and institutional contexts in which action is to be taken. And those contexts will, of course, shape and limit whatever might be done. This book, whose authors and editors are expert in the law as well as the policy areas considered, spans that remaining gap. It is the first to do so.

This book can be useful in more than one way. Climate change affects public health in ways that are direct (such as through heat and severe storms), indirect (such as through diseases), and mediated through human institutions (such as through food insecurity). In many instances these effects will exacerbate health problems that already disproportionately impact vulnerable populations. In all instances, achieving public health goals in relationship to climate change effects will mean somehow persuading decision makers of their present relevance. In the broader context of public debates over regulations and spending, the fact of dramatic public health impacts arising from these effects can itself be useful. Several researchers, observing the politicization of climate science and climate policy discussions over the past thirty years, have explored the utility of presenting climate-related issues within different frames, such as public health or national security, as a means of overcoming the filters that prevent the simple presentation of valid data or analysis from leading to greater public understanding, much less inspiring

[6] N. Watts et al., Health and climate change: Policy responses to protect public health, 386 *Lancet* 1861–1914, at 1861 (2015); World Health Organization, Climate Change and Human Health: Publications, www.who.int/globalchange/publications/en/ (accessed May 9, 2017).

[7] Ibid.

[8] See, e.g., Barry Levy and Jonathan Patz, *Climate Change and Public Health* (2015); Howard Frumkin et al., *Climate Change: The Public Health Response*, 98 Am. J. Pub. Health. 435 (Mar. 2008).

decisive action.[9] These researchers' results suggest that framing climate change as a public health problem is no panacea for intransigence on climate action,[10] but that it can potentially matter a great deal.[11]

While public buy-in would be valuable and maybe even necessary, it would not be sufficient to prompt effective public health-oriented climate action – the full scope of the public health sector's response to climate change and the implications of climate change for public health law must be more fully articulated as well. There is an emerging consensus, reflected in the chapters collected here, that there are a number of key goals that ought to define public health law and policy in the Anthropocene era. These include fortifying public health infrastructure against climate change impacts, making public health systems more resilient, coupling public health considerations to any and all mainstreaming of climate change adaptation planning, as well as using the public health frame to inform the appropriate degree of mitigation ambition – the acceptable level of climate risk we, as a global community, are willing to endure.

Thus *Climate Change, Public Health, and the Law* serves at least three important purposes: (1) to provide a foundation for further research into and a more engaged discourse on the dynamic interplay between climate change, public health, and the law, at multiple scales of governance and across the spectrum of climate action, from reducing greenhouse gas emissions to preparing for climate change impacts; (2) to inform stakeholders and decision makers seeking to more effectively address the public health impacts arising from climate change about overarching themes, cross-cutting issues, interdependencies, strategies, and techniques at the intersection of climate law and public health policy; and (3) to provide those actors with information that can help frame key arguments about and deliver actual implementation of important climate-oriented measures or policy changes that hold promise for public health outcomes.

[9] See, e.g., Edward W. Maibach et al., Reframing climate change as a public health issue: An exploratory study of public reactions, 10 *BMC Pub. Health* 299 (2010).

[10] Compare S. P. Singh and M. Swanson, How issue frames shape beliefs about the importance of climate change policy across ideological and partisan groups, 12 *PLoS ONE* e0181401 (2017) ("Rather than being unaffected by frames, those on the right and Republicans tend to rate climate change policy as *less* important than their counterparts in the control group when the issue is framed."), with Teresa A. Myers et al., A public health frame arouses hopeful emotions about climate change: A Letter, 113 *Climatic Change* 1105 (2012).

[11] Solange Gould and Linda Rudolph, Challenges and opportunities for advancing work on climate change and public health, 12 *Int'l J. Envtl. Research Pub. Health* 15649 (2015) (quoting description of public health officials speaking of climate-driven risks during a political campaign as "a messenger beyond reproach, with a message beyond reproach").

So much for its uses. As for this book's contents: It offers a kaleidoscopic view of how the law makes sense of and responds to the impacts of climate change on public health. Its thirteen chapters are arranged in four parts. The first part sets out information about legal rights and public health impacts that is basic to the rest. Coeditor Michael Burger sets the legal stage for the chapters that follow with an examination of how climate change's ubiquitous impacts on public health resonate in rights – including the right to health and human rights – and how those rights for individuals implicate duties for governments to take action to address climate change. From the panoply of rights implicated by climate change impacts, Burger distills five types of governmental obligation: procedural, relating to mitigation, relating to adaptation, international cooperation, and the safeguarding of human rights. In addition to these governmental duties, Burger notes that several sources and authorities have also identified private sector obligations to mitigate and adapt to climate change. Having identified sources and types of rights and duties, Burger then discusses a number of lawsuits, like the CLF lawsuit that began this chapter, in which plaintiffs have sought to vindicate one or more rights and to hold governments or corporate actors accountable for the duties arguably assigned to them by international or domestic law. He gives particular attention to the US context, where questions of rights and duties relating to climate change impacts have been the subject of little legislation but heavy doses of litigation. The status of climate-related jurisprudence rooted in constitutional, common law, and statutory theories in the United States is mixed: Partial success at grounding demands for action by the federal government in the Clean Air Act is counterbalanced by struggles to gain purchase on other legal footing. Insofar as these struggles have resulted from the challenge of persuading a court to worry about *future* harms, the steady accumulation of *current* impacts traceable to climate change holds some promise for turning the legal tide.

Jill Krueger and Colleen Healy provide a technical and institutional overview by mapping the connections between climate change and public health, exploring the challenges these connections pose to the public health sector's ability to carry out its core mission, and proposing several cross-cutting law, policy, and practice approaches that should help inform any public health agency's responses to climate change. Their chapter offers a summary of vulnerabilities and exposures to public health-related climate risks, including heat, air pollution and allergens, extreme weather events, infectious disease, food insecurity, and mental health. Subsequent chapters drill down deeper into each of these areas, but here Krueger and Healy offer a comprehensive overview that sets the stage for their discussion of gaps in, strengths of, and next

steps for the public health sector's response. Critically, the authors identify three ways public health practitioners can immediately engage with climate change: incorporating climate change into their existing work; accounting for climate change in long-term public health planning; and bringing their public health expertise, along with the principles of health equity, to bear on specific climate change mitigation and adaptation efforts. Krueger and Healy also offer a multiplicity of analytic and decision-making frameworks that can help shape the integration of climate change response into public health praxis.

The book's second part considers cross-cutting issues that arise both from the public health impacts of climate change and responses to those impacts in key contexts: legal, institutional, and physical. David Vladeck, a former director of the Federal Trade Commission's Consumer Protection Bureau, launches this part by asking the question: *To what extent can governments respond to the public health impacts of climate change by acquiring, using, disseminating, and/or controlling information in a manner intended to influence educate consumers and the public or else to shape public policy?* Vladeck argues that the government has a great deal of discretion when issuing particular public health messages or allocating funding to promote them, though the First Amendment does impose some limits on what the government can require of prospective contractors. He then turns to the issues of information disclosure (and the state of the law on First Amendment limits on government-mandated disclosure) and the role of the government in policing the marketplace for greenwashing and other false or misleading speech. These are issues that, both in relation to climate change and in their own right, are somewhat unsettled, with clear room for further development. To help advance the cause, Vladeck proposes four government initiatives: emissions disclosure requirements for gas-powered consumer products; climate risk disclosure requirements for publicly traded companies; codification of climate disclosures in environmental reviews under the National Environmental Policy Act; and disclosure of government subsidies for fossil fuel companies. The proposals include important caveats, and taken together they cannot fill the entirety of the climate change information gap, but they represent an important set of steps that can be taken now.

The risk of increased exposure to existing and new infectious diseases due to climate change raises a different information quandary than Vladeck's: how to adapt existing institutions and processes to surveil the population and manage the information obtained in ways that effectively address the potential for contagion. Jason Smith and Chandra Ganesh provide a unique introduction to this question, describing the history and scope of public health surveillance in the United States and identifying legal and policy challenges that the public

health community must face to stave off the threats posed by climate change. As a practical matter, there are data issues and silo effects to deal with: climate change projections are often developed by one set of actors, who are not well-coordinated with public health departments. As a consequence, the data may be of a type that is not geared toward public health practitioners, may not be immediately available to them, and may be managed by agencies with different goals or located in entirely different jurisdictions (or at different scales of government). Interestingly, Smith and Ganesh challenge the notion that preparedness is the most appropriate model with which to grapple with climate change and public health problems, and posit that practitioners may need to develop a more dynamic set of solutions that can endure the long haul between the present and whenever it is that society gets a grip on climate change.

Climate change triggers the need to produce, gather, disclose, and manage a variety of information types, including direct and indirect risks that greenhouse gas emissions and climate impacts present to businesses, communities, and individuals. It also produces the need to respond to that information. In Chapter 6, co-editor Justin Gundlach and Jennifer Klein describe how climate change ripples through the built environment to impact public health, and how governments and other actors go about the process of adapting to those impacts as they become aware of them. The process and substance of adaptation may seem both familiar and relatively intuitive to those already steeped in the practice, but to those new to the space it can appear overwhelming. This chapter offers an on-ramp, with clear-eyed descriptions of how and what happens in adaptation planning and a universe of resources in the notes for those wanting or needing to go deeper. The chapter also offers an important legal lens, exploring the legal claims that could be brought against governments and private actors both for enacting adaptation measures later found to have deleterious effects and failing to adapt to known risks. The authors detail the universe of takings and negligence claims and defenses in a way that will clarify the situation for the experienced attorney but that can also be understood by the non-lawyers among us.

The third part of the book focuses on particular impacts and sectors where those impacts are felt, and also considers the responses those impacts prompt – or ought to prompt. It begins with heat, which, as Sara Hoverter points out, is typically the first deleterious effect that comes to mind when thinking of climate change, and is the cause of severe direct and indirect impacts on public health. Despite being both obvious and harmful, heat is not an easy problem to address. Hoverter's chapter maps the sprawling and diverse array of laws, institutions, programs, assets, communities, and individuals somehow

touched by the public health impacts of heat waves and hotter average temperatures. In sketching that map, Hoverter highlights its fragmentary nature and notes the problems this fragmentation creates for coordinating responses among government agencies, the private sector, community organizations, and individuals in ways that can achieve public health goals. She also points out a number of duties rooted in state constitutions that seem likely to make state governments not only responsible for addressing the risks posed by heat to public health but also potentially liable legally for harms resulting from a failure to address those risks to an adequate degree. It is uncertain whether and how these duties might motivate efforts to better integrate consideration of and responses to heat, but pressure to do so is sure to increase as temperatures and the intensity, frequency, and duration of heat waves rise.

If heat is the first thing that comes to mind when thinking of climate change (the state of affairs formerly known as "global warming"), sea level rise and extreme storms are a close second. Robin Kundis Craig performs a feat similar to Hoverter in her explication of the interrelated public health effects of climate change impacts in the coastal zone. The submersion of populated coastal areas, storm-related flooding and disasters, and the bleaching of coral reefs are high visibility, high impact consequences of climate change; but Craig layers into her survey other dangers, such as the risk of toxic contamination, the loss of water supply from saltwater intrusion, and disease. Taken together, Craig's portrait presents a situation of extraordinary public health risk to coastal areas and demands an innovative set of responses. For her part, Craig recommends a cross-sectoral, "multivalent" approach, one that infuses preparedness to projected impacts not only into disaster risk reduction strategies and emergency preparedness but also into construction standards and siting requirements for critical public infrastructure and industrial facilities, building codes, and remediation standards for contaminated sites. Her call for coordination among laws – disease control and prevention, natural resources, land use, pollution control, water, food, and fisheries management – as well as among actors, resonates with much of the material collected in this book, and highlights the recurrent theme that these new challenges require thinking and acting laterally across sectors and issues.

Climate change is already altering ecosystems, and with them the pathways through which infectious diseases find their way to human hosts. As these changes become still more pronounced, so too will their consequences for public health. Lindsay Wiley describes these changes and consequences, but observes also that the resulting need for integrated responses across policy areas is made especially difficult by key features of the public health field. These include its increasing orientation to health care, as well as the