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WHEN A CORPORATION'S DELIBERATE IGNORANCE CAUSES HARM: CHARTING A NEW ROLE FOR TORT LAW

*Wendy Wagner**

The waves of tort litigation hitting large U.S. corporations over the last six decades seem to have settled into a predictable pattern. Although the names change in the complaint line, the story below the caption is generally the same. A giant corporation markets a product that it should reasonably know is unsafe, but it proceeds anyway. The product ultimately causes physical harm to thousands—and sometimes millions—of persons. Some victims sue. The corporation invests enormous resources in fending off the claims. But ultimately, after decades of defensive maneuvers, the corporation is caught red-handed, and a plaintiff wins a handsome verdict. A few more plaintiffs win, class actions form, and the giant corporation settles with nearly all of the class(es) to end the litigation once and for all.[1]

In this repeating storyline, tort law is generally the only institutional tool available in the U.S. to sanction uncontrolled corporate callousness that prioritizes profits over social responsibility.[2] And, in this role, tort law—while not perfect—accomplishes a lot. Slamming cor-

* Richard Dale Endowed Chair, University of Texas School of Law. I am grateful to participants at the Clifford symposium for helpful comments and to Steve Gold and Alexi Lahav for particularly incisive suggestions on subsequent drafts. Many thanks also to Stephan Landsman for inviting me to participate in the Clifford symposium, the students of the DePaul Law Review for excellent editorial work, and Kasia Cristobal and Carson Smith for superb research assistance.

1. This is obviously a caricature, but it seems to generally capture the life cycles experienced in the tobacco and opioid litigation as charted by Nora F. Engstrom & Robert L. Rabin, *Pursuing Public Health Through Litigation*, 73 STAN. L. REV. 285, 338–39, 345 (2021), and as seen in other mass toxic tort cases like DES, *see* NANCY LANGSTON, TOXIC BODIES: HORMONE DISRUPTORS AND THE LEGACY OF DES 159–60 (2010), asbestos, *see* PAUL BRODEUR, OUTRAGEOUS MISCONDUCT: THE ASBESTOS INDUSTRY ON TRIAL (1985) (chronicling asbestos litigation throughout the industry), *see* Vioxx *infra* note 9, and even Bendectin, although the latter had a surprise ending, *see* MICHAEL D. GREEN, BENDECTIN AND BIRTH DEFECTS: THE CHALLENGES OF MASS TOXIC SUBSTANCES LITIGATION 20–22 (1998). *See also* Engstrom & Rabin, *supra*, at 321 (referencing the "rising tide" of litigation in a number of toxic tort settings).

2. *See, e.g.*, Engstrom & Rabin, *supra* note 1, at 308, 335–37 (discussing absence of significant *ex ante* regulation over the specific risks at issue in the tobacco and opioid litigation); Wendy Wagner, *When All Else Fails: Regulating Risky Products Through Tort Litigation*, 95 GEO. L. J. 693, 695, 711 (2007).

porate wrong-doers with multi-million dollar judgments (or settlements) with the resulting bad publicity teaches corporate defendants an unforgettable lesson.[3] Private tort litigation also dredges up valuable internal information buried deep within corporate files that has been concealed even from government regulators.[4] The resulting revelation of this information in turn "catalyzes" long-overdue regulatory and governmental oversight.[5] Tort law forces the defendant-corporations to pay for some of the damage they cause to individuals, which contributes to both retributive and compensatory healing. And, perhaps most important of all, other corporate actors learn that—if they are not careful—they may be next.[6]

Given these substantial institutional contributions, one cannot help but marvel at the important role that private tort law appears to play as a vehicle for advancing corporate accountability. At least in theory, corporations that choose to ignore the public costs of their activities will be publicly shamed and forced to pay the victims of their wrongdoing.

However, evidence emerging over the last few decades is beginning to throw some cold water on the actual significance of tort law's deterrent effects. To be sure, private tort litigation against a few corporate giants has led to their undoing.[7] But in some and perhaps most cases, once wrongful corporations are finally "caught" after decades of lawsuits, the day of reckoning is rarely devastating.[8] In at least a subset of

3. *See, e.g.*, Engstrom & Rabin, *supra* note 1, at 304, 358 (itemizing the reputational fallout from the tobacco industries' publicized deceit disclosed through the litigation); *see generally* ROY SHAPIRA, LAW AND REPUTATION: HOW THE LEGAL SYSTEM SHAPES BEHAVIOR BY PRODUCING INFORMATION (2020) (providing a nuanced discussion of the complex relationship between reputation and legal liability).

4. *See, e.g.*, Wagner, *supra* note 2, at 712–13.

5. Engstrom & Rabin, *supra* note 1, at 350–61 (discussing their "catalyst theory").

6. Indeed, this public, deterrent feature of mass tort litigation has led some to relabel it, derogatorily, as regulatory litigation that stretches the tort system too far. *See, e.g.*, Peter H. Schuck, *The New Judicial Ideology of Tort Law*, *in* NEW DIRECTIONS IN LIABILITY LAW 4, 14 (Walter Olson ed. 1988)*; see also infra* note 152 and accompanying text for a fuller discussion of these concerns.

7. The asbestos litigation, for example, led to the bankruptcy of Bethlehem Steel and Johns Manville. *See, e.g.*, STEPHEN J. CARROLL ET AL., ASBESTOS LITIGATION 152 (2005).

8. In the McDonalds' Liebeck "hot coffee" case (admittedly an outlier on many levels), McDonalds appeared to actually profit from the free publicity and victimization the litigation offered, with the assistance of creative public relations work. After the punitive damage verdict, for example, McDonalds enjoyed a substantial reputational boost in the media, as well as free advertising for its "hot" coffee. *See, e.g.*, Caroline Forell, *McTorts: The Social and Legal Impact of McDonald's Role in Tort Suits*, 24 LOY. CONSUMER L. REV. 105, 140 (2011). And, although McDonald's post-litigation profits cannot be causally linked specifically to the litigation, in the weeks following the Liebeck verdict, McDonalds enjoyed rising stocks. The value of its shares shortly before and after the verdict were as follows:

- Aug. 4, 1994 (two weeks before the verdict issued on Aug. 18, 1994): $13.06

cases, the corporation is able to settle for a fraction of their profit stream[9] (sometimes with substantial contributions from insurers),[10] only to return and repeat risky behaviors again with another product. Well-respected major corporations like DuPont, Merck, and Johnson & Johnson were well aware of the liability-generating risks of certain unsafe products but chose to market them nevertheless.[11] Indeed, the parent company of the former tobacco giant, Philip Morris (Altria), owns a sizable share of Juul, a company that is experiencing tort claims similar to those brought against Philip Morris decades earlier.[12]

In this essay, I argue that a partial explanation for why some corporations seem relatively unphased by the prospect of ominous tort liability is because they enjoy the ability to control the information environment relevant to causation.[13] As long as a corporation can

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• Sept. 1, 1994 (two weeks after the verdict): $14.06

YAHOO! FINANCE, https://finance.yahoo.com/quote/MCD/history?period1=697420800&period2=1072828800&interval=1d&filter=history&frequency=1d&includeAdjustedClose=true (last visited Aug. 29, 2022); *see also* Michael McCann et al., *Java Jive: Geneaology of a Juridical Icon*, 56 U. MIA. L. REV. 113, 134 (2001) (providing the date of the verdict and offering more details about the case).

9. After they announced their massive settlement with the Vioxx plaintiffs for $5 billion, for example, the value of Merck's stock actually increased. This increase was speculated to be a result of a settlement that was substantially lower than expected and in the eyes of some commentators "amounted to little more than a slap on the wrist" for the enormous company. *See* Alex Berenson, *Analysts See Merck Victory in Vioxx Settlement*, N.Y. TIMES (Nov. 10, 2007), https://www.nytimes.com/2007/11/10/business/10merck.html.

10. *See, e.g.*, Richard A. Oppel Jr., *MGM Agrees to Pay Las Vegas Shooting Victims Up to $800 Million*, N.Y. TIMES (Oct. 3, 2019), https://www.nytimes.com/2019/10/03/us/mgm-las-vegas-shooting-settlement.html (discussing how over 90% of the $800 million settlement will be paid by the insurers of the MGM hotel).

11. *See generally* Roy Shapira & Luigi Zingales, *Is Pollution Value-Maximizing? The DuPont Case* (Nat'l Bureau of Econ. Rsch., Working Paper No. 23866, 2017), https://www.nber.org/papers/w23866.pdf (on DuPont); *see also* Tiffany Hsu, *Johnson & Johnson investors reject proposal to end global talc sales*, N.Y. TIMES (Apr. 28, 2022), https://www.nytimes.com/2022/04/28/business/johnson-johnson-baby-powder.html; Jim Giles, *Drug giant Merck accused of deaths cover-up*, NEW SCIENTIST (Apr. 15, 2008), https://www.newscientist.com/article/dn13685-drug-giant-merck-accused-of-deaths-cover-up/amp/; Danny Hakim, *Monsanto Weed Killer Roundup Faces New Doubts on Safety in Unsealed Documents*, N.Y. TIMES (Mar. 14, 2017), https://www.nytimes.com/2017/03/14/business/monsanto-roundup-safety-lawsuit.html.

12. *See* Sheila Kaplan, *Juul Is Fighting to Keep Its E-Cigarettes on the U.S. Market*, N.Y. TIMES (Oct. 12, 2021), https://www.nytimes.com/2021/07/05/health/juul-vaping-fda.html (outlining the litigation against Juul); Matthew Perrone, *Altria says judge has dismissed lawsuit over Juul investment*, ABC NEWS (Feb. 15, 2022), https://abcnews.go.com/Health/wireStory/altria-judge-dismissed-lawsuit-juul-investment-82912123 (discussing Altria's close relationship with Juul).

13. There are of course many other reasons that corporations may be under-deterred by the prospect of tort liability. For example, some corporations are able to reduce the financial impact of tort liability or even evade accountability altogether by selling the activity off, in some cases to a subsidiary with a different name, *see, e.g.*, Shapira & Zingales, *supra* note 11, at 28, or by abusing bankruptcy protections. *See, e.g.*, Lindsey D. Simon, *Bankruptcy Grifters*, 131 YALE L. J. 1154, 1163–64, 1166, 1202–03 (2022). In addition, litigation has become so ubiquitous against many corporations (half are defending at least one class action at any given time), *see, e.g.*,

control the available information about the hazardousness of its activities, the risks of tort law can be discounted or even eliminated entirely since this same information provides the key ingredient required for plaintiffs to file a complaint.[14] Indeed, in some cases, it will be significantly more cost effective for the corporation to invest in tactics that control the information environment rather than give up on a profitable but harmful activity.[15] In such a legal environment, the strategic, irresponsible companies escape liability, while the "good [corporations] die young."[16]

The argument that tort doctrine effectively insulates and even rewards some corporations for obscuring the causal connections between their activities and public harm proceeds in four sections. In the first section, I discuss the ways that corporations sometimes control "the information environment" that feeds the legal system, at least in

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SHAPIRA, *supra* note 3, at 73, that some apparently treat the risks of tort liability as little more than background noise. JERRY L. MASHAW & DAVID L. HARFST, THE STRUGGLE FOR AUTO SAFETY 238, 240–41 (1990) (observing this response in the auto industry based on interviews).

14. This underlying problematic structure permeates not only tort law but other areas of law as well that, in essence, reward corporations for rational ignorance. While it is beyond the scope of this project to make connections to this rich body of work, for starters, *see, e.g.*, Mihailis E. Diamantis, Functional Corporate Knowledge, 61 WM. & MARY L. REV. 319 (2019) (providing a fascinating account of ways that criminal law, and the "knowing" burden for prosecutors, creates a similar perverse incentive for ignorance in the criminal law context); Brandon L. Garrett & Gregory Mitchell, *Testing Compliance*, 83 LAW & CONTEMP. PROBS. 47, 47 (2020) (discussing how corporate incentives to validate a companies' own self-monitoring system leads to a "compliance trap" where "rational ignorance" is preferred over learning that the internal compliance assessment may not be reliable).

15. This is especially true if some of the harms occurred before the company itself came to terms with the significance of the risks, since controlling the information will help limit liabilities for past as well as future harms.

16. *Cf.* Garrett & Mitchell, *supra* note 14, at 50–51 (discussing this same perverse result in the design of internal corporate compliance audits and observing that "corporations with sound compliance programs may be at greater risk of litigation because effective programs should reveal areas of weakness to be exploited by regulators, plaintiff-side lawyers, and whistleblowers."). What might a "good" or ethical corporation do in this particular market of selling chemicals or products with potential latent hazards? They will conduct expensive *ex ante* research that will likely put them at some competitive disadvantage as a result of the unrecouped expense, since these markets are still nondiscriminatory with regard to not only requiring but even believing self-congratulatory accounts of self-testing. If that *ex ante* testing reveals any risks—which it likely will do if the chemicals are at all reactive—this will be fodder for plaintiff attorneys that may even cause these "good" corporations to stick out as ironically *more* culpable as compared to their willfully ignorant competitors. And, once inside the corporate files during discovery—with the complaints enabled by the "good corporation's" transparent, frank testing regime—the plaintiff attorneys will undoubtedly find some human errors in the company's judgments that can be magnified and even misconstrued. Perhaps ironically, because of the bad conduct of so many corporations operating int this public health and environmental space, there will likely be no presumptions of innocence afforded to any corporation, no matter how well-intended and ethical it actually is.

the area of toxic torts.[17] The second section discusses how tort law is not only oblivious to these problems but actively aggravates them by incentivizing corporations to manipulate information instead of ending liability-generating behavior altogether. Tort law is structured to deter corporations from producing products that foreseeably cause harm to individuals, but corporations' privileged role over controlling the information relevant to those claims requires some doctrinal adjustments to ensure that tort goals are effectuated. Several doctrinal adjustments are then proposed in the final two sections.

I. Corporate Control over the Information Environment

Corporate efforts to influence the drafting of laws and regulations that affect their bottom line are now legendary. Substantial investments in campaign finance, vigorous participation in rulemaking and legislative processes, and well-orchestrated litigation campaigns are among the many ways that corporations have enjoyed an out-sized impact on policymaking in the U.S.[18]

But corporate strategies do not end with shaping the content of laws. Corporations also invest in ways to manipulate scientific research that significantly influences what we know about the impacts of their operations on health and the environment.[19] For example, some corporations have funded ends-oriented research to make their activities appear safer than they are. To that end, some corporations have also hired scientists with the singular goal of discrediting third-party research that incriminates their business. Indeed, when the corporations are the main financier of publicly available research on the

17. Shapira & Zingales, *supra* note 11, at 5.

18. *See generally* Jane Mayer, Dark Money: The Hidden History of the Billionaires Behind the Rise of the Radical Right (2017); Lee Drutman, The Business of America is Lobbying: How Corporations Became Politicized and Politics Became More Corporate (2015); The Tobin Project, Preventing Regulatory Capture: Special Interest Influence and How to Limit It (Daniel Carpenter & David A. Moss eds., 2013); Melissa J. Durkee, *Interpretive Entrepreneurs*, 107 Va. L. Rev. 431 (2021) (discussing coordinated litigation campaigns by industry).

19. Academics are now beginning to trace more general ways that corporations exert control over this amorphous information environment, and these preliminary mapping efforts reveal that the forms of information control involve many, diverse permutations, including strategies used by corporations to collect and use personal data. *See, e.g.*, Amy Kapczynski, *The Law of Informational Capitalism*, 129 Yale L. J. 1460 (2019) (book review) (mapping out various legally-enabled methods of information capitalism, a more recent set of activities that are at least indirectly connected to the kinds of information control discussed here). We are also learning that these corporate mechanisms of information control are inextricably intertwined with legal rights and tools, many of which the corporations actively shape and influence. *Id.* Corporations, for example, have gradually secured much broader legal definitions of "trade secret," which allows them to shroud their activities in greater secrecy. *Id.*

safety of their activities, their investments pay off since that research provides the primary, and sometimes the only, evidence available to evaluate whether public restrictions on a particular corporate activity are necessary.[20]

The strategies used by corporations to control scientific understanding are consequential for tort law. If corporations can manipulate research regarding the safety of their products and activities, they can also blunt the reach of liability rules. Shapira and Zingales, for example, note that once options to directly control information are factored into a corporation's internal cost-benefit analysis, the "threat of legal liability [does] not act as a sufficient deterrent." Rather, company executives can count "on their ability to minimize the probability" of being caught or "delay the damages by decades" simply by manipulating the scientific information that informs the legal system.[21]

In this part, I provide an overview of the main techniques corporations have at their disposal to control and distort scientific information that informs public policy in the area of toxics regulation.[22] Indeed, in

20. *See, e.g.*, Ivory *infra* note 28 and accompanying text.

21. Shapira & Zingales, *supra* note 11, at 3.

22. Throughout this Article, I consider most of these mechanisms of distortion and control to equate to what I later label "deliberate ignorance" because they create incomplete and distorted understandings of hazards in the public domain. The actual definition of "deliberate ignorance" appears to be narrower, however. It is defined as "'the conscious individual or collective choice not to seek or use information.'" Eyal Zamir & Roi Yair, *Deliberate Ignorance and the Law*, Hebrew Univ. Jerusalem Legal Rsch. Paper No. 19–13, Jun. 25, 2019, at 2, https://ssrn.com/abstract=3406635 (citing Ralph Hertwig and Christoph Engel 2016). For purposes of this Article, I would thus broaden the definition by inserting "reliable" in front of the word information. So, in this Article, deliberate ignorance is the "conscious individual or collective choice not to seek or use [reliable] information." *See also infra* notes 126 and 135 and accompanying text. Note, too, that deliberate ignorance encompasses more information-control mechanisms than "willful blindness," which only seeks to avoid learning information and not also distorting what is known. *See, e.g.*, Zamir & Yair, *supra*, at 3, 5.

The litmus test for what constitutes a distortion, in turn, rests on a mainstream scientific consensus that when information is created in ends-oriented ways by affected sponsors who retain some control over the research, the research is inherently untrustworthy. *See, e.g.*, SHELDON KRIMSKY, SCIENCE IN THE PRIVATE INTEREST 125–40 (2003). For example, the Journal of the American Medical Association (JAMA) requires as a condition to publication that:

> [f]or all reports (regardless of funding source) containing original data, at least 1 named author (eg, the principal investigator), must indicate that she or he "had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Instructions for Authors, Data Access and Responsibility, JAMA NETWORK, https://jamanetwork.com/journals/jamanetworkopen/pages/instructions-for-authors#SecDataAccess,Responsibility,andAnalysis (last visited Feb. 21, 2023). *See also* Drummond Rennie et al., *When Authorship Fails: A Proposal to Make Contributors Accountable*, 278 JAMA 579 (1997); Anna Wilde Mathews, *Ghost Story: At Medical Journals, Writers Paid by Industry Play Big Role; Articles Appear Under Name Of Academic Researchers, But They Often Get Help; J&J Receives a Positive 'Spin*,' WALL ST. J. ONLINE (Dec. 13, 2005), https://

this public health space, academics have reconstructed a veritable playbook of strategies used by corporations to successfully manipulate scientific evidence.[23] The first and perhaps most insidious set of strategies involves the production of unreliable, ends-oriented scientific research. The second set of tactics involves various forms of damage control that corporations develop in response to incriminating third-party scientific research. The third strategy creates the illusion of scientific consensus on corporate-sponsored, ends-oriented research. Each strategy is discussed in turn.

A. Produce Unreliable, Ends-oriented Information

To downplay the risks of their products or activities, industry sponsors can commission the production of ends-oriented research in ways carefully crafted to make their products or activities appear significantly less harmful when compared to independently conducted research.[24] For example, sponsors can insist that the commissioned

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www.workcompcentral.com/pdf/2005/misc/WSJ121305.pdf. At the very least, this sponsored research must be rigorously peer reviewed and potentially replicated. *See generally* NAOMI ORESKES, WHY TRUST SCIENCE? (2021). Oreskes summarizes an extensive line of important work that reaches this conclusion. *See also* HELEN E. LONGINO, SCIENCE AS SOCIAL KNOWLEDGE: VALUES AND OBJECTIVITY IN SCIENTIFIC INQUIRY 80 (1990) (underscoring role of critical and diverse scrutiny in science).

To keep the analysis simple, then, the examples provided tend to be straightforward because of blatant fraud and/or unscientific practices being used in ends-oriented ways that the mainstream scientific community would characterize as untrustworthy. For more discussion of these criteria, *see, e.g.*, KRIMSKY, *supra*; Bennett Holman & Kevin Elliott, *The promise and perils of industry-funded science*, 13 PHIL. COMPASS (2018); Marcus R. Munafo et al., *A manifesto for reproducible science*, 1 NATURE HUM. BEHAV. 1, 1–3 (2017) (arguing for the greater adoption of key measures that can ensure scientific robustness, particularly through disclosing conflicts of interest).

23. For an excellent, recent synthesis of much of this literature, *see* Tess Legg et al., *The Science for Profit Model—How and why corporations influence science and the use of science in policy and practice*, 16 PLoS ONE (2021), available at https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0253272.

24. The utilization of this playbook by specific industries has also been traced in award-winning detail in a number of books. Stanton Glantz traced the science-bending shenanigans of the tobacco industry. THE CIGARETTE PAPERS (Stanton A. Glantz et al. eds., 1998). Gerald Markowitz and David Rosner wrote about the lead industry's use of this playbook. DECEIT AND DENIAL: THE DEADLY POLITICS OF INDUSTRIAL POLLUTION (2002). Paul Brodeur described the playbook as it relates to the asbestos industry. OUTRAGEOUS MISCONDUCT: THE ASBESTOS INDUSTRY ON TRIAL (1985). *See also* Legg et al., *supra* note 23 (tracing out the playbook used by industrial sectors); *see also* THOMAS O. MCGARITY & WENDY E. WAGNER, BENDING SCIENCE: HOW SPECIAL INTERESTS CORRUPT PUBLIC HEALTH RESEARCH (2008); DAVID MICHAELS, DOUBT IS THEIR PRODUCT: HOW INDUSTRY'S ASSAULT ON SCIENCE THREATENS YOUR HEALTH (2008); DAVID MICHAELS, THE TRIUMPH OF DOUBT (2020); NAOMI ORESKES & ERIC M. CONWAY, MERCHANTS OF DOUBT: HOW A HANDFUL OF SCIENTISTS OBSCURED THE TRUTH ON ISSUES FROM TOBACCO SMOKE TO GLOBAL WARMING (2010). If anything is clear from this large body of work, it is that the same, time-tested strategies are used by a number of different indus-

research be designed with biased hypotheses and methods specifically selected to predetermine the findings. The sponsor can also control how the data is interpreted and whether findings are made public. To maintain control, sponsors use nondisclosure clauses and may also cherry-pick those scientists whose work falls in line with the sponsors' preferred outcome.[25] Sponsors even hire ghostwriters to publish multiple, redundant articles in an effort to increase the dissemination of and citation count for a particularly beneficial finding.[26]

Although the precise nature and extent of industry sponsorship of research is kept secret, it does appear to impact scientific understanding. For example, a robust "funding effect" in the biomedical literature reveals a statistically significant correlation between sponsored research and a favorable outcome as compared to parallel research conducted by independent researchers.[27] Indeed, in manufacturing settings, where the primary supply of research dollars come from industry, much if not all of the publicly available research on a product or industrial activity may be comprised of industry-sponsored research. For example, in the case of a controversial herbicide, Atrazine, over fifty percent of the 6,611 studies of the herbicide's health and environmental risks were funded by the manufacturer.[28] Moreover, industry sponsors will also form entire academic journals specifically to give their own sponsored research an air of legitimacy by obscuring evidence of sponsorship.[29]

In response to these challenges, editors of science journals have imposed increasingly aggressive disclosures on authors while scientists continue to propose additional oversight mechanisms to ensure the trustworthiness of published research.[30] Even philosophers and his-

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tries to distort the underlying scientific evidence regarding the hazards of their activities and products.

25. Scientists who have considered violating the terms of these "gag" clauses can face claims brought by the company for damages can run into the billions of dollars. *See, e.g.*, MCGARITY & WAGNER, *supra* note 24, at 87–89.

26. *See, e.g.*, *id.* at chs. 4–5 (documenting these techniques in detail); *see also* Legg et al., *supra* note 23. Anna Wilde Mathews, *Ghost Story*: *At Medical Journals, Writers Paid by Industry Play Big Role; Articles Appear Under Name Of Academic Researchers, But They Often Get Help; J&J Receives a Positive 'Spin'*, WALL ST. J. ONLINE (Dec. 13, 2005), https://www.workcompcentral.com/pdf/2005/misc/WSJ121305.pdf.

27. *See, e.g.*, Justin E. Bekelman et al., *Scope and Impact of Financial Conflicts of Interest in Biomedical Research*, 289 JAMA 454 (2003).

28. *See* Danielle Ivory, *EPA Relies on Industry-Backed Studies to Assess Health Risks of Widely Used Herbicide*, SCI. AM. (July 28, 2010), www.scientificamerican.com/article/epa-atrazine-herbicide/?print=true.

29. *See, e.g.*, MCGARITY & WAGNER, *supra* note 24, at 201–02.

30. *See, e.g.*, Munafo et al., *supra* note 22, at 1–3 (arguing for the greater adoption of key measures that can ensure scientific robustness, particularly through disclosing conflicts of inter-

torians of science are rising to the challenge of imagining ways to better assess the reliability of industry science.[31]

B. Attack Incriminating Research

Corporations have also devised a series of well-honed strategies to undermine the scientific credibility of incriminating third-party research and to throw "doubt" on unwelcome findings.[32] These strategies, often facilitated unwittingly by the law, include commissioning critical letters to the editor (again, using nondisclosure contracts), filing harassing open records requests and third-party subpoenas against researchers, and bringing scientific misconduct charges or qui tam cases alleging scientific fraud.[33] Industry sponsors summon a variety of legal tools to effectuate these attacks. For example, the lead industry lodged a non-meritorious claim of scientific misconduct against a researcher who discovered significant correlations between lead exposure and reduced IQ.[34] Phillip Morris also harassed and attempted to discredit an academic researcher whose studies exposed their marketing campaigns for targeting young children. The tobacco giant filed third-party subpoenas and state public-record requests against the researcher (who was employed at a state university), requesting all data and research records, including the children subject's confidential information.[35]

While the scientific "truth" may ultimately emerge despite these tactics, a number of attack strategies have at least raised doubt for years, buying the company time.[36] At the very least, decades-long campaigns in suppressing the truth can allow a company to earn handsome profits. Vigorous strategies to discredit third-party research sometimes also keep scientists from investigating industry activities in

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est); *Recommendations*, INT'L COMM. MED. J. ED. (May, 2022), https://www.icmje.org/recommendations/.

31. *See, e.g.*, Holman & Elliott, *supra* note 22.

32. *See generally* MICHAELS, DOUBT IS THEIR PRODUCT: HOW INDUSTRY'S ASSAULT ON SCIENCE THREATENS YOUR HEALTH, *supra* note 24.

33. *See, e.g.*, MCGARITY & WAGNER, *supra* note 24, at chs. 6–7; Legg et al., *supra* note 23; ORESKES & CONWAY, *supra* note 24. Many of these tactics were pioneered by the tobacco industry, but all have been embellished over the decades by dozens of other industries who have deployed them. *See, e.g.*, MCGARITY & WAGNER, *supra* note 24, at 21–22.

34. *See, e.g.*, Herbert L. Needleman, *Salem Comes to the National Institutes of Health: Notes from Inside the Crucible of Scientific Integrity*, 90 PEDIATRICS 977, 978, 980 (1992).

35. Paul M. Fischer, *Science and Subpoenas: When Do the Courts Become Instruments of Manipulation?*, 59 LAW & CONTEMP. PROBS. 159, 159–62 (1996).

36. *See, e.g.*, MICHAELS, DOUBT IS THEIR PRODUCT: HOW INDUSTRY'S ASSAULT ON SCIENCE THREATENS YOUR HEALTH, *supra* note 24; MICHAELS, THE TRIUMPH OF DOUBT, *supra* note 24; ORESKES & CONWAY, *supra* note 24.

the first place. As Donald Kennedy, the former Editor-in-Chief of Science, observed:

> Many [scientists] are wary of work that may find use in some regulatory proceeding. They wonder whether the data underlying their findings may be subject to examination and reinterpretation, perhaps with some "spin" supplied by the revisionists. They know that charges of research misconduct could arise from hostile access to their scientific work. They know they are vulnerable to personal attack from those whose interests may be adversely affected by the product of their research.[37]

C. Manipulate the Appearance of Scientific Consensus

Corporations have also periodically invested in trying to create the appearance of a scientific consensus to reinforce their self-serving research. For example, industry sponsors can select a panel of sympathetic experts to produce "consensus reports."[38] The hand-picked scientific participants are not necessarily representative of the larger community and may not even be respected. Ideally, corporations will publish their "consensus reports," but, at the very least, the reports are often shared with the media to create the illusion that the science is settled on a particular topic. Even informal assemblies of experts can afford the patina of an emerging consensus.

Industry can also insinuate itself in the selection of members of governmental scientific panels. The use of science advisory panels is standard practice in regulatory agencies; there are hundreds of them in place at any given time.[39] Yet the selection of the members and even the decision to create them are decisions that rest with political officials rather than agency career staff.[40] Through successful lobbying, industry has helped facilitate the "stacking" of some science advisory panels with a disproportionate number of industry members in order to produce skewed summaries of the prevailing scientific consensus.[41]

To provide yet another false signal of a favorable consensus, industry can commission biased scientific books and review articles that purport to synthesize and summarize the literature.[42] Some industries

37. Donald Kennedy, *prologue* to RENA STEINZOR & WENDY WAGNER, RESCUING SCIENCE FROM POLITICS at xxiii (2006).

38. MCGARITY & WAGNER, *supra* note 24, at 189–99.

39. *Id*. at 181–89; *see also* Thomas McGarity & Wendy Wagner, *Deregulation Using Stealth Science Strategies*, 68 DUKE L. J. 1719, 1801–03 (2019).

40. *See* McGarity & Wagner, *supra* note 39.

41. *See, e.g*., Robert Steinbrook, *Science, Politics, and Federal Advisory Committees*, 350 NEW ENG. J. MED. 1454, 1454–56 (2004) (criticizing the George W. Bush administration for stacking science advisory committees).

42. MCGARITY & WAGNER, *supra* note 24, at 199–201.

even create their own journals or insinuate themselves in the editorial board in the hopes of exerting control over publication decisions.[43]

II. Tort Law meets Corporate Control of Scientific Information

From a high altitude, tort law would seem well-situated to counteract and deter corporate control over information. Tort law sends a simple, clear message to wrongdoers: if you behave negligently (or worse) in ways that harm one or more persons, you must pay the damages to make the victim whole. Tort law is also adversarial. Plaintiffs are generally represented by attorneys who are highly motivated to locate and publicize evidence of corporate trickery and deceit. However, at the ground level, tort law not only fails to engage meaningfully with this corporate control of information, but it tacitly rewards these perverse behaviors. Recall that in a conventional tort case the plaintiff must generally prove both "general causation" (that the product actually is capable of causing the harm) and "specific causation" (that the product actually caused the harm to the victim).[44] There are a few minor exceptions to these burdens of proof, but legal responsibility on the victim to at least prove "general causation" is universal.[45] Victims are thus left to their own devices to establish scientific causal connections between a corporation's activities and resulting latent harms, even for novel hazards where the defendant's failure to test was unmistakably wrongful.[46]

The liability burden in torts thus presents corporations with a conspicuous alternative to tort compliance: simply invest in controlling the relevant information and reduce the chance of getting caught.[47] As long as tort liability can be minimized or even avoided altogether, this

43. *Id*. at 200–02.

44. *See, e.g*., In re Agent Orange Prod. Liab. Litig., 611 F. Supp. 1223, 1261–62 (E.D.N.Y. 1985); Restatement (Third) of Torts § 28 cmt. c(4) (Am. L. Inst. 2010).

45. Restatement (Third) of Torts § 28 cmt. c(3) (Am. L. Inst. 2010).

46. *See generally* Margaret A. Berger, *Eliminating General Causation: Notes towards a New Theory of Justice and Toxic Torts*, 97 Colum. L. Rev. 2117 (1997) *and* Wendy E. Wagner, *Choosing Ignorance in the Manufacture of Toxic Products*, 82 Cornell L. Rev. 796 (1997) (noting these heavy burdens on plaintiffs). By contrast, acute hazards—given the timing—are much easier to track down and learn about. Testing for acute hazards is also less costly. So, for this Article, the focus is on long-term or latent hazards that materialize a sufficient period of time (which could even be a few months) to make it difficult for plaintiff to learn about and document causation.

47. Once a corporation appreciates that one of their products sold on the market does present latent risks, the *ex ante* probability of being discovered times the predicted tort sanctions makes it significantly less expensive for the corporation to dig in one's heels and exert control over information than to abandon a lucrative product or activity. *See infra* Part II (discussing this).

strategy will often be the least costly.[48] Indeed, even after some evidence emerges regarding a corporation's unreasonable hazards and the litigation commences, control of the underlying information by the corporation continues to be a viable strategy to postpone costly liability—often by decades.[49]

In this part, I explore grounded evidence that some corporations engage in sequential stages of "information control" throughout the course of tort litigation. Since most of the research on corporate control of information explores only the area of public health and environmental protection, industries operating in that space are the focus of this analysis. However, these techniques may also occur more broadly outside toxic torts.[50]

A. Control Ex Ante

Before a complaint is filed, a corporation's strategy to avoid tort liability for latent hazards is a simple one—ensure that there is no internal adverse information about a product or activity, or if the information does exist, ensure it never sees the light of day. As long as the information can be kept private, plaintiffs will likely not even be aware that they are victims, much less have the evidence in hand to establish this fact.

1. Steadfastly Maintain Ignorance

In corporate sectors like the chemical, pesticide, and chemical-based products industries, there is considerable opportunity for corporations to consider and choose this alternate path of ignorance because there are few (to no) regulatory requirements governing

48. *See, e.g.*, Heidi Li Feldman, *Science and Uncertainty in Mass Exposure Litigation,* 74 TEX. L. REV. 1, 41 (1995) (observing that the plaintiffs' burden of proof in toxic tort cases may create incentives for defendants to forego clarifying uncertainties in causation). *Cf.* Diamantis, *supra* note 14, at 327–31 (observing this same perverse effect with respect to corporations' "mixed incentives to know things" occurring with respect to criminal law's requirements of "knowing" behavior and discussing limitations of current doctrines that tend to make the situation worse, such as respondeat superior and the collective knowledge doctrine).

49. This effective suppression of damaging information also helps deplete the pool of future plaintiffs since the nature of the actual harms the product causes can be expansive in ways victims never discover. Indeed, unsuspecting victims exposed to a novel hazard will not even know to document their exposures since they will not be on notice until much later (if at all) that the product was in fact hazardous. The Agent Orange veterans are an illustration of the challenges victims face when they are not tracking their exposure to a toxic substance. *See*, *e.g.*, In re Agent Orange Prod. Liab. Litig., 611 F. Supp. 1223, 1262 (E.D.N.Y. 1985) ("The veterans' exposure to Agent Orange, even were we to grant full force to their inadequate affidavits, was . . . attenuated.").

50. *See infra* Part IV.

chemicals.[51] Thus, while there are over 60,000 chemicals sold in commerce,[52] the vast majority fall into the effectively untested category with regard to long-term safety.[53] Indeed, there is not even a requirement that manufacturers conduct a simple literature search on a chemical's safety prior to registering it with the EPA.[54] Given the absence of meaningful regulatory oversight, chemical manufacturers can generally seize early and lasting control over the information environment in this unregulated space, in part by avoiding testing altogether.

By contrast, if a corporation does conduct voluntary testing on an existing chemical, and the findings are inconclusive or potentially incriminating, the company is setting itself up for the possibility of more vigorous regulation and potential tort liability. Professor Sanders observes that the ability of corporations to benefit from conducting in-house research on latent hazards is generally a "lose-lose proposition." "If they showed an effect, the studies would be used against the company," and if they did not, "[a]ny slight technical flaw in the de-

51. *See, e.g.*, WENDY WAGNER, INCOMPREHENSIBLE!: A STUDY OF HOW OUR LEGAL SYSTEM ENCOURAGES INCOMPREHENSIBILITY, WHY IT MATTERS, AND WHAT WE CAN DO ABOUT IT ch. 5C (2019); 40 C.F.R. §§ 720.45(a), 720.50(a)–(b) (2019) (listing the information required for new chemicals, which includes only "known" information about hazards); Chem. Mfrs. Ass'n v. EPA, 859 F.2d 977, 984 (D.C. Cir. 1988) (holding that under Section 4 of TSCA, to require testing of an untested chemical, EPA must establish "a solid 'basis for concern' [on the chemical] by accumulating enough information to demonstrate a more-than-theoretical basis for suspecting that an 'unreasonable risk' was involved in the use of the chemical.").

52. *See, e.g.*, Zhanyun Wang et al., *Toward a Global Understanding of Chemical Pollution: A First Comprehensive Analysis of National and Regional Chemical Inventories*, 54 ENV'T SCI. TECHN. 2575, 2578 (2020).

53. *See, e.g.*, Wendy Wagner & Steve Gold, *Legal obstacles to toxic chemical research*, 375 SCI. 138 (2022). Asbestos, DES, tobacco, leaded paint, and several other products are clear exceptions to this rule. Yet it is important to note that the public information and persuasive epidemiological research we now take for granted was not available to the early plaintiffs bringing these cases. Rather the plaintiffs faced exactly the same hurdles of attempting to trace their harms to products or pollutants for which most of the information was privately held by the actor itself. *See* THE CIGARETTE PAPERS, *supra* note 24. *See also* DECEIT AND DENIAL: THE DEADLY POLITICS OF INDUSTRIAL POLLUTION, *supra* note 24.

54. In 1984, the National Academies of Science conducted a study concluding that there was no information available to assess health or environmental toxicity for more than 80% of the nearly 50,000 chemicals sold in commerce. *See* NATIONAL RESEARCH COUNCIL, TOXICITY TESTING: STRATEGIES TO DETERMINE NEEDS AND PRIORITIES 119, 151–63 (1984). More recent replications of the study for high-production chemicals still find the vast majority of chemicals are so lacking in toxicity data that a basic risk assessment is not possible. ENVIRONMENTAL DEFENSE FUND, TOXIC IGNORANCE: THE CONTINUING ABSENCE OF BASIC HEALTH TESTING FOR TOP-SELLING CHEMICALS IN THE UNITED STATES (1997); Environmental Protection Agency, Office of Pollution Prevention and Toxics, *What Do We Really Know about the Safety of High Production Volume Chemicals?* 22 CHEM. REGUL. REP. 261 (1998).

sign or execution of the experiment would be exploited by plaintiffs to undermine [the defendant's] findings."[55]

Manufacturers also enjoy distinct advantages in conducting safety research of their products relative to researchers on the outside, allowing manufacturers to retain substantial control over this information environment. More than 20% (and until recently it was more than one-third) of all chemicals in the U.S. are classified as trade secrets.[56] Except for a handful of regulators and the company itself, no one even knows that the chemicals exist.[57] Even when chemical structures are made public, most, if not all, of the in-house information about how and where the chemical is used (and even who the manufacturer is) is still protected as a "trade secret."[58]

In addition to these secrecy barriers, manufacturers enjoy other types of advantages over external scientists in conducting research on the latent hazards of their products, such as superior expertise, resources, and access to internal information. The biggest advantage, however, is likely one of resources. Academics understand that conducting research on novel chemicals—which usually amounts to little more than trial-and-error toxicity testing—is generally not tenure-worthy work.[59] Conducting this research on the toxicity of chemically or biologically-based substances and products can be quite costly. When academics do conduct this research, it is often because they were hired under contract by the manufacturers (using nondisclosure agreements).[60] And, as discussed in the next section, those few researchers who have documented unexpected hazards of widely used

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55. *See* Joseph Sanders, *The Bendectin Litigation: A Case Study in the Life Cycle of Mass Torts*, 43 HASTINGS L. J. 301, 337 (1992).

56. Historically, EPA honored a company's claim of "trade secret" automatically, with no questions asked. Even in light of 2016 amendments to the chemical regulation statute that requires manufacturers to provide some upfront justification for classifying information as trade secrets, EPA appears to defer heavily to a manufacturer's claim that substantial competitive harm will result from the disclosure of internal information on a chemical. *See, e.g.*, Steve C. Gold & Wendy E. Wagner, *Filling gaps in science exposes gaps in chemical regulation*, 368 SCI. 1066, 1067–68 (2020).

57. *Id.* at 1067.

58. *Id.* Thus an academic scientist, for example, may ultimately—with perseverance and sufficient FOIA efforts—be able to obtain toxicity information on file with the EPA for registered chemicals. But they will likely find that obtaining information on how the chemical is used, by who, where, and in what amounts are all classified as CBI. This means, in turn, that will be nearly impossible to trace the possible adverse environmental and health effects since this processing information may be classified and hidden from view.

59. MCGARITY & WAGNER, *supra* note 24, at 47.

60. *See, e.g.*, Goldie Blumenstyk, *The Price of Research: A Berkeley scientist says a corporate sponsor tried to bury his unwelcome findings and then buy his silence*, CHRON. HIGHER EDUC. (Oct. 31, 2003), https://www.chronicle.com/article/the-price-of-research/.

chemicals and products may find themselves targets of corporate harassment.

The corporation's ability to suppress damaging information in-house reinforces its ability to maintain public ignorance. Federal law generally requires companies to submit to regulators any information of adverse effects on chemicals or licensed products discovered post-market.[61] But some of the reporting rules for adverse effects are drafted in ways that provide companies with considerable discretion to determine what constitutes a significant adverse effect.[62] Moreover, enforcement of this law is almost impossible without internal whistleblowers, and the vigorous use of nondisclosure agreements provides a corporation with a legal means to keep employees from sharing damaging internal information with the outside world.[63] Cultural "schema" acculturated within a corporation might reinforce the tendency of internal researchers and managers to discount adverse information on lucrative products, brushing off preliminary red flags of toxicity.[64] Corporations can also craft internal policies designed to ensure that damaging information is not recorded in the first place. DuPont actually trained employees on how to avoid creating a paper trail on the adverse effects of C8, for example.[65]

2. Produce Unreliable, Distorting Information and Attack Incriminating Third-Party Research

Manufacturers of chemicals that are not trade-secret protected sometimes go further to produce ends-oriented research designed to downplay the risks of a product or activity—taking an offensive posture rather than the defensive posture of simply maintaining ignorance. As discussed *supra*, this strategy involves the commissioning of ends-oriented research through a variety of techniques that have been used with considerable success. At base, then, it is not unusual to find some chemicals or products that are completely untested for latent

61. Wendy Wagner & David Michaels, *Equal Treatment for Regulatory Science: Extending the Controls Governing the Quality of Public Research to Private Research*, 30 AM. J. L. & MED. 119, 126–28 (2004).

62. *Id*.

63. *See, e.g*., MCGARITY & WAGNER, *supra* note 24, at 112–13 (discussing industry's use of these agreements). The successful use of these agreements to obscure information is on thrilling display in the "Dropout" Hulu series, which documents the travails of Theranos and the lengths it went to suppress damaging internal information.

64. *See, e.g*., Dennis A. Gioia, *Pinto Fires and Personal Ethics: A Script Analysis of Missed Opportunities*, 11 J. BUS. ETHICS 379 (1992); Shapira & Zingales, *supra* note 11, at 46 (reproducing internal DuPont 1984 memo discounting the risks of C8).

65. Shapira & Zingales, *supra* note 11, at 18 (citing Learner); *see also id*. at 31 (elaborating on these policies).

hazards. Even for products for which there is some testing, a substantial portion of the relevant research was sponsored by the manufacturer, often through nondisclosure contracts.[66]

Before litigation commences, corporations can also invest in damage-control efforts to undermine the credibility of third-party research that incriminates their activities and products by harassing third-party researchers with the goal of delaying or even terminating their research.[67] For example, the tobacco industry hired a stable of researchers to write editorials that critiqued studies demonstrating causal links between tobacco use, second-hand smoke, and lung cancers.[68] Some corporations have contacted journal editors when they learn a damaging study is in the publication pipeline, and at least a few corporations have halted publication through this back-door effort.[69] Again, even when these efforts at damage-control prove effective only for a few decades, throwing doubt on third-party research still postpones the day of reckoning, allowing significant financial returns in the interim.

B. Control During the Litigation

Once litigation has commenced and discovery is underway, a corporation's ability to control the information environment is more limited.[70] However, even at this stage, a corporation can sometimes retain control of damaging information through the use of sealed settlements, protective orders, and other legally-endorsed methods.[71] For example, if a plaintiff acquires damning evidence about a product through discovery, the company can and sometimes does settle the case with the proviso that the plaintiff agree to seal the information in

66. *See supra* Section I.

67. *See supra* Section I.B.

68. *See, e.g.*, MCGARITY & WAGNER, *supra* note 24, at 130.

69. *See, e.g.*, *id*. at 140–41.

70. Corporations have, however, violated discovery by withholding or misclassifying internal documents. *See*, *e.g.*, Christine Hatfield, *The Privilege Doctrines - Are They Just Another Discovery Tool Utilized by the Tobacco Industry to Conceal Damaging Information?*, 16 PACE L. REV. 525 (1996) (reviewing decades of tobacco industry tactics to avoid producing for discovery).

71. *See, e.g.*, Engstrom & Rabin, *supra* note 1, at 314 (discussing a sealed settlement between Purdue and a class action of 5,000 individuals in the opioid litigation).

exchange for an attractive bonus payment.[72] Sealed settlements can even be structured in ways that do not require the court's approval.[73]

Corporations (as well as the plaintiffs' bar) can also finance "litigation-related science" commissioned specifically to influence the course of the litigation.[74] However, since the research is produced in a heated adversarial setting in which the opposition is often financing similar ends-oriented research, this body of ends-oriented work generally does not appear as influential in swaying fact-finders about the relevant facts.[75]

Companies can also engage in more general types of information warfare throughout the course of litigation. For example, both the tobacco and opioid industries overpowered plaintiffs for decades by financing aggressive discovery tactics, like inundating their opponents with mounds of superfluous documents and discovery requests to throw them off the scent.[76] Engstrom and Rabin also discuss how both sets of corporate defendants in the tobacco and opioid litigation distracted from their own culpability by focusing attention on the victims' carelessness in using or misusing the product.[77]

C. Ex Post Control

After the initial round of litigation has concluded, some corporations will continue sponsoring ends-oriented studies and mounting vigorous attacks on third-party research.[78] This post-litigation information-control effort is useful because it can still influence the political and regulatory process, the market, and even keep future litigation risks in check.[79] Corporate funding of ends-oriented meta analyses

72. *See generally* McGarity & Wagner, *supra* note 24, at 121–23. Elizabeth Burch and Alexandra Lahav methodically document the various ways that "public" information arising in litigation proceedings can be kept secret. *See generally* Elizabeth C. Burch & Alexandra D. Lahav, Information for the Common Good in Mass Torts, 70 DePaul L. Rev. 345 (2022). Disturbingly, this suppression is often beneficial to all of the parties, including judges. *See id*. Indeed, Burch and Lahav identify what appears to be a "default rule in favor of privacy of discovery information" in use by the courts. *See id.* at 389. *See also* Gustavo Ribeiro, *[Marked Confidential]: Negative Externalities of Discovery Secrecy*, 100 Den. L. Rev. 171 (2022).

73. McGarity & Wagner, *supra* note 24, at 123.

74. *See, e.g*., William L. Anderson et al., *Daubert's Backwash: Litigation-Generated Science*, 34 U. Mich. J. L. Reform 619, 630–31 (2001); Mark R. Patterson, *Conflicts of Interest in Scientific Expert Testimony*, 40 Wm. & Mary L. Rev. 1313, 1364 (1999).

75. Daubert v. Merrell Dow Pharms., Inc., 43 F.3d 1311, 1317 (9th Cir. 1995).

76. Engstrom & Rabin, *supra* note 1, at 296 n.45, 348–49.

77. *Id.* at 347–48.

78. *See generally* Michaels, Doubt is Their Product: How Industry's Assault on Science Threatens Your Health, *supra* note 24; Oreskes & Conway, *supra* note 24.

79. *See generally* Michaels, Doubt is Their Product: How Industry's Assault on Science Threatens Your Health, *supra* note 24; Oreskes & Conway, *supra* note 24.

that synthesize multiple studies is a particularly convenient way to tip the information environment in a more favorable direction at this late stage.[80]

After litigation, some corporations also deploy public-relations firms to place a more positive spin on adverse information disclosed during the trial process.[81] Some of these PR strategies attempt to persuade the public that the corporation is a victim itself and that juries or other fact-finders are incompetent or biased.[82] (The McDonald hot coffee case offers a good example of this strategy).[83] Other PR efforts focus on casting doubt on the scientific accuracy of the verdicts or academic research.[84]

Broad-scale, information-intensive attacks have also been sponsored by industry groups in an effort to undermine the legitimacy of tort law itself. Haltom and McCann document the ways that industry has attempted to influence public opinion by portraying tort litigation as out of control and excessively plaintiff-friendly, even though empirical evidence establishes the opposite.[85] Industry has commissioned similar work to discredit the fact-finders' ability to assess scientific evidence and causation.[86] Industry-funded analyst, Peter Huber, published a book sensationalizing the unreliable science introduced and relied upon by juries in tort litigation.[87] Steve Milloy was also hired by industry to publicly discredit—through blogs, papers, books, and a podcast—the credibility of established scientific arguments raised against industry, including the existence of climate change.[88]

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80. *See, e.g.*, MCGARITY & WAGNER, *supra* note 24, at 201 (itemizing tobacco's financing of meta-analyses of research on the adverse health effects of environmental tobacco smoke).

81. *See id*. at 208–18.

82. *See, e.g.*, Engstrom & Rabin, *supra* note 1, at 347–48.

83. *See supra* note 8 (on stocks).

84. MICHAELS, DOUBT IS THEIR PRODUCT: HOW INDUSTRY'S ASSAULT ON SCIENCE THREATENS YOUR HEALTH *supra* note 24, at 9.

85. WILLIAM HALTOM & MICHAEL MCCANN, DISTORTING THE LAW: POLITICS, MEDIA, AND THE LITIGATION CRISIS (2004).

86. Note that while the empirical research does suggest fact-finders regularly face difficulties processing statistical evidence, this research also provides reasons for optimism about the scientific competence of both judges and juries more generally. *See, e.g.*, Shari S. Diamond & Jessica M. Salerno, *Empirical Analysis of Juries in Tort Cases*, RSCH. HANDBOOK ECON. TORTS 414, 422–23 (2015); Neil Vidmar, *Expert Evidence, the Adversary System, and the Jury*, 95 AM. J. PUB. HEALTH S137, S138–39 (2005).

87. PETER HUBER, GALILEO'S REVENGE: JUNK SCIENCE IN THE COURTROOM (1991).

88. STEVEN J. MILLOY, JUNK SCIENCE JUDO: SELF-DEFENSE AGAINST HEALTH SCARES AND SCAMS (2001).

D. Cumulative Implications

Shapira and Zingales provide a case study of how these information control techniques are used in practice by tracing DuPont's internal decision to continue the manufacture of a highly profitable chemical used in Teflon (C8), despite internal evidence that the chemical might be toxic.[89] Drawing on internal documents, Shapira and Zingales locate the points at which managers consciously decided to proceed with C8, despite warnings from the company's lawyers that proceeding to market the products could lead to substantial tort liability.[90] Shapira and Zingales calculate that, at the time DuPont made its decision, the probability the C8 hazard would be discovered and lead to significant liability was likely less than 19%, discounted still further by the inevitable time lag preceding such a discovery.[91] The authors conclude that based on these *ex ante* analyses "it was very reasonable for DuPont's executives to take the risk" since it "was ex-ante optimal for DuPont's shareholders."[92] Indeed, even if DuPont's efforts to control information were ultimately exposed, the delay would still make the decision more profitable than abandoning production. Specifically, the profits from C8-based products totaled about $1.1 billion over the three decades of secrecy, while the predicted liability—discounted over these same three decades—amounted to about $100 million.[93] The fact the board members presiding over the decision at the time would be long

89. *See* Shapira & Zingales, *supra* note 11; *see also* Alexandra D. Lahav, *The Knowledge Remedy*, 98 TEX. L. REV. 1361, 1372–75 (2020) (discussing these techniques used by Monsanto in the Roundup litigation).

90. Shapira & Zingales, *supra* note 11 at 2, 7; *see also id.* at 49 (reproducing a 2000 internal email from DuPont's inhouse lawyers warning of the liability risks associated with continued C8 production).

91. *Id.* at 17–20. Adding to Shapira's and Zingales' factors is the fact the tort system is badly underutilized at a general level, reducing the probability of lawsuits even being brought if the damaging information were made public. DAVID M. ENGEL, THE MYTH OF THE LITIGIOUS SOCIETY: WHY WE DON'T SUE 5 (2016).

92. Shapira & Zingales, *supra* note 11, at 3.

93. *Id.* at 16–17. The authors are worth quoting in full on this point:

> [In the DuPont C8 analysis] if the only choice is between producing and not producing, shareholders will find it optimal to produce and pollute. In fact, if they produce and pollute they expect to receive $1.1 B in profits and if caught they will have to pay fines that (at present value) are only $100M. So, even if eventually they are caught, they are happy to do it, as long as this event is sufficiently distant in the future. Remember that the first [public] detection was in 1997 and as of early 2017 the bulk of money has still not been paid. Thus, DuPont's shareholders greatly benefitted from the ability of the company to delay damages payments.

Id.

gone if and when the hazards of C8 were made public only further contributed to a "see no evil" approach to decision-making.[94]

The result of DuPont's "rational calculus" to control the information environment surrounding C8, then, was the long-term and highly profitable use of a chemical that now turns out to be highly toxic and dispersed into numerous drinking water supplies and navigable waters.[95] And, although the company (now DuPont's subsidiary, Chemours) currently faces a cascade of private and public litigation for the damage done by C8 through environmental exposures,[96] Shapira and Zingales demonstrate how this ill-begotten fate is attributable largely to the unforeseeable misfortune of being sued by a particularly creative attorney.[97]

III. What to Do?

While tort law may be hailed as a legal hero by bringing corporations to justice once incriminating scientific information finally surfaces, tort law also bears significant blame for the interim decades of ignorance that often precede these legal victories. Indeed, we may never know how many corporations remain successful in escaping tort liability for widespread physical harms simply because they are so skilled at controlling the relevant scientific information.[98]

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94. *Id.* Partly this is also due to the time lag between use and discovery. This time lag may have also primed the CEOs to a more risk tolerant posture. Indeed, Shapira and Zingales take note of the fact that despite the bad publicity surrounding DuPont in view of this internal decision, none of the CEOs or board members who engaged in the decision were hauled out by name or publicly chastised. *Id*. at 23–24. The obituary of one, for example, celebrated the board members as an environmental leader who "shut down the chemical giant's production of chemicals suspected of destroying the ozone layer." *Id*. at 24. On the other side of the balance sheet, Shapira and Zingales observe that "[f]or these [same] managers, dropping C8 or investing in abatement would have come with some immediate, clear costs in terms of reduced income." *Id.* at 25.

95. *Id*. at 8 (concluding that "DuPont's decision, it seems, was a case of 'rational wrongdoing': a decision that maximizes shareholder value ex ante, even though it is socially inefficient.").

96. *See, e.g*., Thomas A. Bloomfield et al., *PFAS Litigation: Emerging Trends for the Latest Emerging Contaminant*, 36 Nat. Res. & Env't 9, 10 (2021).

97. Nathaniel Rich, *The Lawyer Who Became DuPont's Worst Nightmare*, N.Y. Times Mag. (Jan. 6, 2016), https://www.nytimes.com/2016/01/10/magazine/the-lawyer-who-became-duponts-worst-nightmare.html.

98. For example, even when evidence of certain harms (e.g., cancer) caused by a corporate activity or product ultimately does surface through third party research, other types of harms (e.g., reproductive impacts) can still be suppressed or ignored by the manufacturer following these same strategies. Most chemical products do not in fact cause a single harm, but multiple harms, only a few of which are ever firmly documented by scientists within the victims' lifetime. For example, PFAS chemicals (of which there are now at least 3,000 variations) not only cause various cancers but are also implicated as a factor in causing a host of generic reproductive and neurological harms that are only now being studied by scientists. *See, e.g*., Toxicological Effects of Perfluoroalkyl and Polyfluoroalkyl Substances (Jamie C. DeWitt ed. 2015).

If the analysis of the perverse effects of tort law on corporate behavior is correct so far, then tort law is in dire need of readjustment. But over the last few decades, commenters have been stumped in charting a path forward. There have been dozens of proposals, dating back to the 1980s, to tweak the causal burden of proof in one way or another to address these asymmetries in expertise and information between corporations and victims, but each of the proposals seems to suffer from the same fatal flaw of allowing for too much uncontrolled, potentially abusive litigation to be brought by the plaintiffs' bar.[99] At the same time, many of the proposals do not engage with the underlying problem of the corporations' control over the information environment; information-control strategies can still be used by corporations to block legal accountability, even with lower burdens of proof.

However, at long last, the impasse has been broken with Alexandra Lahav's ingenious article, *The Knowledge Remedy*.[100] Rather than focus solely on burden-of-proof requirements in tort doctrines, Lahav suggests we focus instead on the remedies afforded in these difficult cases. Specifically, she proposes formalizing the availability of a new tort remedy that requires the defendant to produce "knowledge" on the nature of its hazard, an innovative requirement that she shows is already in use.[101] In her reformed world, victims exposed to a hazardous chemical would be armed with an additional, injunctive-styled cause of action that requires defendants to rectify unreasonable (and preventable) uncertainties about the hazards of their products. This knowledge remedy then informs (either positively or potentially negatively) plaintiffs' ongoing case for medical monitoring and physical injuries.

In this final section, I trace how Lahav's proposal might provide a way through these stubborn doctrinal challenges and offer a friendly amendment, which endeavors to enhance her proposal's ability to counteract corporate control over information. The first subsection provides added support that tort law needs reform for this particular

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Similarly, a number of endocrine-disrupting chemicals are linked both to reproductive harms, like infertility, as well as difficult-to-pinpoint neurological harms. *See, e.g.*, M. Kajta & A.K. Wójtowicz, *Impact of endocrine-disrupting chemicals on neural development and the onset of neurological disorders*, 65 PHARMACOLOGICAL REP. 1632, 1633 (2013). Yet for plaintiffs, documenting these additional harms (e.g., a reduction in IQ) as well as tying them back to past exposures is nearly impossible.

99. *See, e.g.*, David Rosenberg, *The Causal Connection in Mass Exposure Cases: A "Public Law" Vision of the Tort System*, 97 HARV. L. REV. 849 (1984); Berger, *supra* note 46; Wagner, *supra* note 46.

100. *See, e.g.*, Lahav, *supra* note 89.

101. *Id.*

structural flaw, at least in the area of toxic torts. The second subsection presents a slightly modified approach to the knowledge remedy and spotlights its benefits. The final subsection anticipates challenges with the proposal.

A. Holding Corporations Accountable for Causing Latent Harm

At a general level and regardless of whether one adopts civil recourse, corrective justice, or "other-regarding" theories for tort law, the underlying thrust of tort law is to hold wrongful defendants responsible for remedying private harms caused by their behavior. If the risks imposed on a plaintiff create physical harm or even just cast a significant "pall" or "cloud" over that plaintiff's future security and well-being, and if those harms result from unreasonable or even intentional corporate decisions, then, as a normative matter, the case seems to fit comfortably within tort law.[102] This conclusion is even stronger when the corporate defendant is "substantially certain" that unwarned persons (including the plaintiff) will be significantly exposed to its likely hazardous (but still untested) substance in ways that are likely to be offensive.[103]

The imposition of tort liability is arguably even more compelling when the defendant enjoys superior resources and expertise and yet uses those advantages to the detriment of hapless victims. Indeed, tort law evinces an undercurrent of multiple, overlapping doctrines that cumulatively suggest a slightly higher standard for corporate wrongdoing in these settings. For example, products liability was initially founded in part on the idea "that responsibility be fixed wherever it will most effectively reduce the hazards to life and health [and i]t is evident that the manufacturer can anticipate hazards and guard against the recurrence of others, as the public cannot."[104] And even in

102. *See, e.g.*, Benjamin C. Zipursky & John C.P. Goldberg, Unrealized Torts, 88 VA. L. REV. 1625, 1694 (2002) (concluding that the plaintiff's "interest in being free from a certain kind of threat of disease" is on par with other emotional distress harms); *id.* at 1692 (discussing the legitimacy of this type of interference-in-a-right based type of harm and its antecedents in defamation, nuisance, and false imprisonment).

103. Plaintiff will need to establish that defendant had "substantial certainty" that physical contact to the potentially hazardous chemical/activity would inevitably occur for some individuals. *See, e.g.*, RESTATEMENT (THIRD) OF TORTS §1. But except for that showing, as long as plaintiff is aware of and troubled by being exposed to this unconsented-to risk, the battery claim would seem novel, but nevertheless plausible. (Note that both battery and trespass claims have in fact been raised in this kind of case already). *See* Complaint, Tennant v. DuPont, No. 6:99-0488 (S.D.W. Va. June 11, 1999) (alleging trespass); Complaint, Hardwick v. 3M Co., 589 F. Supp. 3d 832 (S.D. Ohio Mar. 7, 2022) (No. 2:18-CV-1185) (second count of relief is battery). For property invasions, plaintiffs might have a parallel claim of trespass as well.

104. Escola v. Coca Cola Bottling, 24 Cal.2d 453, 462 (1944) (J. Traynor, concurring).

the abandonment of strict liability standards, the state-of-the-art defense in some states similarly expects manufacturers and producers to go beyond what average manufacturers do and instead to base decisions on cutting-edge research.[105] Even in negligence cases, courts have long held defendants with superior knowledge to a higher standard based on those with similar levels of expertise.[106] And, when this expert corporate activity involves a nontrivial risk of a mass disaster capable of inflicting widespread public harm, a basic due-care analysis makes it clear that defendants should exert higher levels of caution to protect against these foreseeable risks.[107] Even jury research reveals that jurors tend to hold corporations to higher standards in negligence cases due to their superior expertise and capabilities.[108]

The apparent inclination of courts (and jurors) to place slightly higher levels of responsibility on corporations that enjoy informational advantages over plaintiffs is further reinforced by longstanding doctrinal innovations in tort law that endeavor to deter "recurring misses."[109] In these settings, courts have periodically adjusted a plaintiff's burden to avoid injustice arising from defendant's information asymmetries, even when the defendant is not a corporation.[110] Without such an adjustment, defendants would not only escape responsibility for recurring wrongful behaviors that inflict inevitable harm on

105. *See, e.g.*, RESTATEMENT (THIRD) OF TORTS § 2 cmt. d (AM. L. INST. 1998) (noting that some states require manufacturers to demonstrate that they used the "safest existing technology" or "cutting edge technology" to avail themselves of the state of the art defense).

106. *See, e.g.*, RESTATEMENT (THIRD) OF TORTS § 12 (AM. L. INST. 2010). (observing that actors with "knowledge that exceed those possessed by most others . . . are circumstances to be taken into account in determining whether the actor has behaved as a reasonably careful person.").

107. This is based on a straightforward Hand formula analysis that factors in the magnitude of harm. *See* United States v. Carroll Towing, Co., 159 F.2d 169, 173 (2d Cir. 1947).

108. *See, e.g.*, Shari S. Diamond & Jessica M. Salerno, *Empirical analysis of juries in tort cases*, RSCH. HANDBOOK ECON. TORTS 414, 424–25 (2013).

109. These recurring misses can occur, for example, when wrongful behavior causes individual injuries, but the resulting claims nevertheless lie outside the reach of tort liability because defendant enjoys asymmetrical access to the evidence plaintiff needs to establish his/her case. Levmore actually defined the term, which he created, a bit more broadly to also apply to recurring wrongful acts that fall under the preponderance-of-the-evidence requirement for a variety of different reasons. *See* Saul Levmore, *Probabilistic Recoveries, Restitution, and Recurring Wrongs*, 19 J. LEGAL STUD. 691, 692 (1990) (defining a "recurring miss" as the class of cases that "involves wrongful conduct that is not likely to be linked under a preponderance-of-the-evidence rule with the injury that it sometimes causes.").

110. *See infra* note 111 and accompanying text.

individuals,[111] but they would be able to profit from controlling the incriminating evidence.[112]

Finally, it is not only the deterrence goal of tort law, but also its remedial purpose—such as making wronged victims whole—that runs in favor of some type of remedy for victims in cases where corporations unreasonably (or knowingly) expose persons to presumptively dangerous hazards without the victims' knowledge.[113] The victims of exposure to preventable hazards are destined to live in uncertainty for decades or more about the consequences.[114] They experience the turmoil of having their physical security infringed by a suspected hazard that a corporation declined to investigate. They may also find it necessary to seek out additional medical care and may suffer suspicious injuries that cannot be decisively linked to that hazard due to the lack of reliable research. Indeed, the primary argument that corporations can credibly raise to defend against these harms is that plaintiffs suffer no injury because the corporation successfully kept the fact of the hazards from them. But, of course, accepting this absurd defense would afford corporations cart blanche to inflict continuous mass public disasters on the public without accountability so long as the corporation keeps the facts of the hazards under wraps.

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111. The doctrinal adjustments that endeavor to counteract "recurring misses" are precisely the kind of problem that triggered doctrinal adjustments like res ipsa loquitur. In Byrne v. Boadle, presiding judge, Baron Pollock, observed that "[a] barrel could not roll out of a warehouse without some negligence, and to say that a plaintiff who is injured by it must call witnesses from the warehouse to prove negligence seems to me preposterous." Byrne v. Boadle, 159 Eng. Rep. 299, 301 (1863). But resolving this conflict is also an undercurrent to the adjusted doctrines emerging in other cases. Judge Calabresi's well-intended effort to adjust causation rules in Zuchowicz is an example. *See, e.g.*, Zuchowicz v. United States, 140 F.3d 381 (2d Cir. 1998). Plaintiff was prescribed a drug prescription overdose that ultimately killed her. Although the defendant doctor was clearly negligent, plaintiff had no direct way of establishing that the overdose caused her death because there was no human evidence to establish the consequences of such a high overdose. Given in part defendant's superior knowledge of the potential hazard relative to plaintiff, the burden to disprove causation in such a case properly rested on defendant, according to Judge Calabresi. *Id.* at 390 ("To say that [the defendant's drug] caused [the plaintiff's] injuries is only half the story, however. In order for the causation requirement to be met, a trier of fact must be able to determine . . . that the defendant's *negligence* was responsible for the injury.").

112. Levmore, *supra* note 109, at 706 (observing sets of recurring cases where "the preponderance rule will systematically 'miss' ongoing instances of antisocial behavior that it should deter."); *id.* at 705, 721. Lahav also discusses the use of "knowledge" types of remedies in select sets of cases involving significant information asymmetries, which include accounting, medical monitoring, and civil rights compliance. *See, e.g.*, Lahav, *supra* note 89, at 1375–84.

113. *See, e.g.*, CARL F. CRANOR, TOXIC TORTS: SCIENCE, LAW AND THE POSSIBILITY OF JUSTICE (2018).

114. Zipursky & Goldberg, *supra* note 102, at 1694 ("A person who is wrongly subjected to a significant threat of a serious disease has been harmed in very important respects. A cloud has been placed over her life, and one can imagine that cloud of impending death intruding on her life significantly.").

B. Reforming Tort Law

If tort law's normative goals reinforce the need to ensure the law places some responsibility on corporations for creating preventable hazards in unreasonable or even intentional ways, then how can we adjust tort law to reach that goal without imposing excessive administrative expenses, transaction costs, or opening the door to abusive litigation?[115] Alexandra Lahav's knowledge remedy offers a hopeful approach. Her injunctive-styled remedy simply forces the defendant to produce reliable research that documents the safety of its product to ensure safety. In her words, the knowledge remedy forces the defendant to produce new "knowledge or information that did not previously exist"[116] rather than to "compensate the plaintiff [directly] for her injuries."[117]

Lahav introduces the knowledge remedy by situating it within the existing precedent and related literature, which reveals that it is not so novel after all.[118] She discusses, for example, some of the doctrinal predecessors already in place for this type of remedial relief.[119] She

115. As Levmore's analysis makes clear, for example, these recurring miss types of problems are difficult to solve systematically by simply adjusting burdens of proof. *See, e.g.*, Levmore, *supra* note 109, at 708–09 (advocating a more refined approach than flipping the burden of proof to defendant). Judge Calabresi later backtracked in a subsequent case and significantly narrowed the circumstances under which the causation burden would shift to defendants. *See, e.g.*, Williams v. Utica Coll. Syracuse Univ., 453 F.3d 112, 120–22 (2d Cir. 2006) (significantly narrowing the causation test propounded in Zuchowicz). Other recurring miss cases discussed in Levmore's analysis suffer from the same challenges. Yet the fact that these doctrinal problems are challenging for courts does not mean they fall outside tort law and instead lie exclusively within public law.

116. Moreover, "this payment comes in the form of paying money to an independent entity for a specific work product." Lahav, *supra* note 89, at 1386.

117. *Id.* The knowledge remedy she imagines is broad and encompasses a wide-ranging set of remedies that include not only the topic of interest here—generating reliable scientific research on general causation—but also medical monitoring, emissions monitoring, accounting, and other sources of information relevant to plaintiff's case. *See, e.g.*, *id*. at 1385.

118. *See generally id.* at 1384–1404.

119. Lahav identifies several illustrative cases that involved this kind of knowledge remedy in the past. For example, she discusses a court discovery order dating back to the 1960's in Oregon—triggered by the defendant company's own fraudulent behavior—requiring the defendant firm to finance plaintiffs' investigation of alternative pollution abatement systems capable of reducing defendant's excessive pollution. *Id.* at 1370–72 (citing Kysar unpublished). With this funding in hand, plaintiffs identified a feasible abatement option that the company itself had refused to investigate. *Id*. at 1371. The case then settled, with the company agreeing to lower pollution levels. *Id*. at 1371–72. An even more creative example—and of more direct relevance to this project—occurred in an interim settlement of a class action against DuPont, in which DuPont agreed to finance a widescale study of the health effects of C8 using blood levels and exposures of the community living in a West Virginia town. *Id*. at 1365, 1368–70; *see also* Shapira & Zingales, *supra* note 11, at 7 (also discussing this settlement). DuPont also agreed to finance medical monitoring of the plaintiffs if general causation was established based on the first study, which it was. Lahav, *supra* note 89, at 1368; *see also* Complaint, Hardwick v. 3M Co., 589 F.

also discusses the equitable nature of the remedy, ultimately leaving its use to the judge's discretion, which provides a safety valve on its deployment in litigation.[120] And finally, she anticipates concerns that

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Supp. 3d 832 (S.D. Ohio Mar. 7, 2022) (No. 2:18-CV-1185). There are at least a few other tort class actions that appear to also be utilizing a type of knowledge remedy in the complaint as well, or something close to it. A search through the National Association of Attorneys General Multistate Litigation and Settlements database yielded some of the following key terms revealing "knowledge" type remedies in recent settlements:

* "(4) Share clinical trial data under the Yale University Open Data Access Project" (in 7/23/21 settlement involving Johnson and Johnson);

* "(1) Establish a centralized independent clearinghouse to provide all three distributors and state regulators with aggregated data and analytics about where drugs are going and how often, eliminating blind spots in the current systems used by distributors; (2) Use data-driven systems to detect suspicious opioid orders from customer pharmacies." (in 7/23/21 settlement involving Cardinal Health etc.). *About Multistate Litigation and Settlements*, NAT'L ASS'N ATTORNEYS GEN., https://www.naag.org/news-resources/research-data/multistate-settlements-database/ (last visited Feb. 8, 2023).

There are other scattered settlements reported in the environmental and public health arena that appear to involve similar, knowledge-styled remedies, including:

* funds for local governments to "monitor the health of local water sources" with respect to PCB contamination," Jef Feeley, *Bayer's $648 Million Toxic PCB Accord Wins Initial Approval*, BL (Mar. 15, 2022), https://www.bloomberglaw.com/bloomberglawnews/environment-and-energy/X6HC57QO000000?bna_news_filter=environment-and-energy#jcite;

* financing an independent scientific panel to make recommendations for certain remedies, including targeted air and water monitoring of contaminated community; the monitoring is also financed by the settlement and the injunctive relief is supervised by NRDC, *see NRDC et al. v. County of Dickson et al.*, NAT'L RES. DEF. COUNCIL (Mar. 31, 2022), https://www.nrdc.org/court-battles/nrdc-et-v-county-dickson-et;

* financing a science panel to study the evidence and issue a definitive finding as to whether or not Roundup causes cancer in a proposed settlement resolving a large class action; since the panel's finding would be preclusive of all claims, the settlement is controversial and (I believe) still not final. *See* Ronald V. Miller, Jr., *Monsanto Roundup Lawsuit Update*, LAWSUIT INFO. CTR. (Oct. 4, 2022), https://www.lawsuit-information-center.com/roundup-mdl-judge-question-10-billion-settlement-proposal.html.

120. Lahav, *supra* note 89, at 1386. There may be other complementary ways to frame the remedy that end up in roughly the same place. Rather than frame the appropriate remedy as an injunctive-styled "knowledge" remedy with restorative benefits, for example, it could be framed as a restitution-based remedy that requires defendant to pay for the unjust enrichment earned from foregoing testing expenses (and we can assume for simplicity these are simply testing costs and do not include undeserved sales). This restitution-based remedy would then finance testing after-the-fact and draw on Levmore's proposal for a restitution-styled remedy in "recurring miss" cases. Levmore, *supra* note 109, at 720–21.

Another option, which is even more attenuated, treats the lack of information on general causation as a variant of the spoilation of evidence. *See, e.g.*, Sweet v. Sisters of Providence, 895 P.2d 484, 491–92 (Alaska 1995) (holding that missing medical records that result from negligence or intentional acts of defendant and that impair the ability of plaintiff to prove a prima facie case create a rebuttable presumption shifting the burden of proof for negligence and cause to defendant); *see also id.* at 491 (citing cases creating similar presumptions). In a spoilation remedy, the defendant typically pays the monetary damages that plaintiff suffers as a result of lack of access to the destroyed documents. Here, the defendant's payouts would consist of forcing the defendant to re-create the lost information as an injunctive matter.

might arise with respect to the remedy itself, such as enforcing the injunction, and offers convincing responses.[121]

However, one significant limitation of Lahav's proposal is that it offers only a new remedy, not a new claim.[122] Plaintiffs will still need to gather sufficient scientific evidence to file a complaint while defendants will continue to reap legal rewards from controlling the information environment. While the new knowledge remedy should thus be useful to medical monitoring and related claims—even when evidence of causation is not supported by much human-based data—it offers little assistance in most other settings where corporations suppress or refrain from testing.[123] As long as the plaintiffs' burden remains unchanged, then plaintiffs will find it difficult to bring cases, while the corporations that manipulate the relevant information will enjoy effective immunity.

In this subsection I offer a friendly amendment to Lahav's important idea. Rather than treat the injunctive relief for "knowledge" as merely a new remedy for existing claims, I propose a distinct new claim called "deliberate ignorance" that is then redressed solely by the "knowledge remedy." The claim I propose arguably already exists in

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Each of these remedial approaches has costs and minuses, but cumulatively they help underscore that this particular stubborn problem in the tort system has sufficient doctrinal and precedential antecedents to place the deliberate ignorance claims within the bounds of private tort law.

121. *See, e.g.*, Lahav, *supra* note 89, at 1386, 1397–1402.

122. *See generally id.* Under her version of the knowledge remedy, plaintiffs would be presumptively entitled to the remedy (although since it is equitable in nature, the final decision rests in the courts' discretion, *see, e.g.*, *id*. at 1385, 1398–99), if the plaintiffs establish that they suffered exposure to defendant's potentially hazardous activity/product that threatens their future health, but the extent of their future injuries remains uncertain. She discusses the remedy's value in particular when plaintiff has shown some harm but is unable "to meet their burden of proof as a result of information asymmetries ordinarily (but not always) caused by the defendant's misconduct." *Id.* at 1385. This seems to imply that the elements to file a complaint are undisturbed, although if discovery reveals that plaintiffs suffer barriers to proof at trial, the knowledge remedy provides the needed relief at this stage. *See also* John Goldberg, *Remedies as a Remedy for Uncertainty*, JOTWELL (Nov. 4, 2020), https://torts.jotwell.com/remedies-as-a-remedy-for-uncertainty (similarly concluding that Lahav's great idea might be better framed as a new claim rather than a generally-available remedy).

123. Lahav suggests, for example, that the knowledge remedy will allow plaintiffs to prove general causation for untested chemicals, Lahav, *supra* note 89, at 1364, 1392–93, but it is not clear how plaintiffs then support their allegations of general causation in the complaint. Nor is it clear the point at which plaintiffs have sufficiently "proved" this causation to be entitled to the knowledge remedy, which in turn provides still more evidence of general causation.

It seems that it only when some reliable research is publicly available that claimants would only have sufficient evidence to allege general causation in a complaint when some reliable research is already available connecting the defendant to the hazard. As long as the plaintiffs' burden remains unchanged, corporations will continue to be motivated to control information on causation.

some attenuated forms.[124] But since the claim's appearance is limited to a few cases and remains idiosyncratic, I propose a more cohesive claim. After sketching the basic structure for this new claim in the first subsection, I then trace out the benefits. In the final section I then engage in troubleshooting to anticipate and address concerns.

1. The Basics of a "Deliberate Ignorance" Claim

In a "deliberate ignorance" claim, plaintiff would be allowed to allege that he/she suffers future uncertainty regarding his/her health as a result of defendant's careless (and potentially deliberate) refusal to assess the long-term safety of its activity/product. Rather than attempt to compensate plaintiff for difficult-to-evaluate emotional harms and finance open-ended medical monitoring, the remedy would stand alone and simply require defendant to finance an independent scientific evaluation (approved by the court) of the potential risks of the product to plaintiff(s). If the research from this remedy reveals a significant risk, the plaintiffs might then be entitled to demand subsequent relief through a second cause of action that alleges medical monitoring and/or physical injuries.[125]

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124. For example, at least one state recognizes a separate "duty to test" claim, which is not subsumed within the "duty to warn" claim. Fraser v. Wyeth, Inc., 992 F. Supp. 2d 68, 84–85 (D. Conn. 2014). At least in theory, the existence of this independent claim leaves open the possibility that plaintiffs could allege various damages (e.g., reasonable emotional and psychic harm and medical monitoring) caused by defendants' violation of this duty without establishing that the under-tested product was in fact dangerous. And in the Netherlands, a trial court in Amsterdam required KLM to monitor the quality of the air in the cockpit and cabin for a potentially dangerous—but apparently incompletely characterized—nerve agent found in engine oil based on a pilot's allegation that he was consistently exposed to the chemical and suffered adverse effects. *See* Hein Hernkamp, *'Toxic' cabin air: Partial legal victory for sick KLM pilot*, MINERVA ADVOCATEN, https://www.kernkamp.nl/en/blog/toxic-cabin-air-partial-legal-victory-for-sick-klm-pilot/ (last visited Feb. 15, 2023). And, of course, Rob Billott crafted a settlement in the early PFOS litigation against DuPont that follows the parameters of the deliberate ignorance claim proposed here. *See, e.g.*, Lahav, *supra* note 89, at 1368; *see also* Hardwick v. 3M Co., 589 F. Supp. 3d 832 (S.D. Ohio Mar. 7, 2022) (No. 2:18-CV-1185); *see also* Lahav, *supra* note 89, at 1386, 1397–1402. Thus, perhaps Lahav is correct and all that is needed is added clarification about the remedy. But as the analysis in this section shows, the patchy and incomplete features of the existing doctrinal landscape provide limited guidance in what exactly the claim is or should be. A more coherent approach to understanding the core claim—specifically, identifying when the knowledge remedy will engage—seems in order.

125. *Cf.* Lahav, *supra* note 89, at 1390–92 (discussing the tiered nature of the litigation under her knowledge remedy, which forms the basic template for the deliberate ignorance claim sketched here, and concluding that preclusion for the damages claim is complex but should not be a problem).

The specific elements required to establish the deliberate ignorance claim would be as follows:[126]

> the Creation of a Preventable (Latent), Material Risk of Harm to Plaintiff
> by a Wrongful Act committed by a Company with Resources/Expertise to Conduct the Research
> that Causes Plaintiff Ongoing Harm as a Result of Significant Exposure

As the nature of this claim suggests, a plaintiff's case will no longer turn on causal evidence—that is what the defendant is being forced to generate through the remedy. However, the first element will require plaintiff to identify a material risk of harm, which may require some expert affidavits in support. The claim also requires that plaintiff experience significant exposure and demonstrate some level of harm.

Each element is discussed more fully below, followed by a proposed affirmative defense.

A Preventable, Material Risk

Plaintiff would first need to provide scientific evidence that the defendant's substance/activity raises a credible risk that it is capable of causing death or serious injury in the future based on the likely routes of exposure. Since it is imperative that plaintiff *not* be required to prove that the product or pollutant is scientifically established to be a hazard, it will be important to ensure that claimants can proceed with some evidence that reasonably triggers scientific suspicion that an activity is dangerous without requiring elaborate evidence to that effect.

As one possibility for what might constitute sufficient evidence on this element, the EPA has historically used "structure-activity" relationships (SAR) between a chemical structure and its chemical family to predict and prioritize the potential risks of untested chemicals. This SAR analysis offers a primitive but now well-established analog-styled method that provides valuable scientific insights on the hazardous

126. A potential jury instruction, modeled after willful ignorance in criminal law and discussed *infra* notes 135 and accompanying text, could read something like this:

> You may find that the defendant acted with deliberate ignorance if you find by a preponderance of evidence that the defendant should have suspected that the inculpatory proposition was potentially true with resultant, significant costs to the health of exposed persons, but deliberately [or carelessly or recklessly] refrained from investigating those suspicions because the defendant hoped to avoid liability, wanted to continue receiving the benefits of a suspected activity, or had some other highly unjustified motive.

See, e.g., Alexander F. Sarch, *Willful Ignorance, Culpability, and the Criminal Law*, 88 ST. JOHN'S L. REV. 1023, 1101 (2014) (providing proposed jury instructions for criminal liability from which this draft instruction is drawn).

propensities of untested chemicals.[127] Plaintiff should be able to support his/her complaint with an expert report concluding that, based on the SAR and the expected routes of exposure, the substance/activity poses a potential material risk with the potential to cause long-term, serious health or environmental consequences to those exposed (which include the plaintiff).[128]

Specific classes of chemicals, like PFAS, have also been singled out by distinguished scientific organizations, like the National Academies of Sciences, as both risky and in need of further research.[129] Groups of academic scientists have even developed prioritization methods for triaging the long list of untested chemicals in an effort to identify those chemicals that likely present the greatest potential risks to human health.[130] Both these assessment methods and the chemicals identified as a result will be useful in determining material risks. The most difficult cases—occurring when an untested chemical does not fall into established SAR or suspect chemical family or has not been singled out in the literature as potentially risky based on exposure and other factors—will need to be assessed on a case-by-case basis and should be treated more conservatively.

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127. *See, e.g.*, Tala Henry, *U.S. EPA Use of QSAR and Category Approaches in Profiling Hazards of Industrial Chemicals*, U.S. ENV'T PROT. AGENCY (Jun. 11, 2008), www.epa.gov/sites/production/files/2014-08/documents/usepa_use_of_qsar_and_category_approaches_jun08.pdf.

128. For this particular element, there could even be a presumption that if the substance falls into one of the "red-flagged" chemical structures based on its SAR (as well as any other information that might be available to plaintiff), the defendant must convince the court why the substance/activity is not risky based on existing, publicly available information.

As discussed in Section IV, *infra*, this claim could potentially be expanded to address deliberate ignorance by corporations in settings beyond latent hazards and toxic torts. Airplanes that appear to face higher crash rates or drugs that lead to unexpected addictions might also be amenable to use of the claim. In these settings, the plaintiff would be required to use publicly available information to allege that the available research is badly incomplete, but nevertheless suggestive of a material risk that the corporation has wrongfully ignored or even distorted. Plaintiffs would also need to prove exposure and harm. In these cases, the harm might include physical harms since the primary obstacle for plaintiff could involve causally linking the harms to defendant's under-analyzed product.

129. *See, e.g.*, NATIONAL ACADEMIES OF SCIENCES, GUIDANCE ON PFAS EXPOSURE, TESTING, AND CLINICAL FOLLOW-UP (2022). As a result, plaintiffs should be able to establish a "material risk" following significant exposures to a particular PFAS simply by virtue of the fact that that chemical belongs to the PFAS family and presented risks of significant exposure, even if little to no scientific information beyond the chemical structure is publicly available regarding its toxicity. Thus, for example, when a plaintiff discovers significant environmental exposures to a previously undiscovered PFAS that are traced to a company's emission stacks, the plaintiff should be able to make out the "material risk" element in a claim against the company.

130. *See, e.g.*, Edo D. Pellizzari et al., *Identifying and Prioritizing Chemicals with Uncertain Burden of Exposure: Opportunities for Biomonitoring and Health-Related Research*, *in* 127 ENVIRONMENTAL HEALTH PERSPECTIVES 126001-1, 126001-2, 126001-3 (2019) (using exposure data, along with other information, to cull out 150 higher-priority chemicals for more immediate testing from a much longer list).

If plaintiff ultimately satisfies her burden and establishes that a substance/activity produced by defendant presents a material risk of causing significant harm and the defendant has done little to nothing (the next element) to evaluate and protect against these risks, the defendant must explain why its inaction was nevertheless scientifically justified in order to escape liability for reasonable testing. Defendant's rebuttal could include evidence that the plaintiff's assessment of "material risk" is erroneous based on publicly available scientific information or that the probability of expected human exposure was insignificant, but defendant will not be allowed to draw on information that was not publicly available at the time the complaint was filed.

Wrongful Conduct by an Expert Company

The plaintiff must also establish that in the face of this material risk, the defendant behaved unreasonably.[131] This element requires both a well-financed expert defendant and evidence that the corporation behaved wrongfully.

First, the defendant who created and disseminated (including potentially by polluting) the substance must be equipped with the asymmetrical information, expertise, and technical capacity to perform the necessary testing. As such, a viable defendant will generally only be a corporation, company, or partnership that manufactured the substance, not an individual. Retailers and contractors using the chemical also would generally not be viable defendants if they can establish that they lack this superior expertise and information about the material risk.

Second, plaintiff must show that this expert defendant did not research the risks and/or made deliberate decisions to avoid or distort evidence of the latent risk of its product when there was a scientifically credible reason to believe that the substance presented a material risk to persons as a result of foreseeable exposures.[132] Plaintiff should have little difficulty establishing that at least minimal diligence is expected of a company when it manufactures (and creates) reactive chemicals with widespread routes of exposure.[133] And, of course, the

131. If the chemical is well-studied and that research reveals significant risks, then the deliberate ignorance claim would add nothing to the plaintiff's case. The plaintiff would instead seek out a traditional medical monitoring claim or perhaps even a compensatory claim if there are resulting physical injuries.

132. *See, e.g.*, Zipursky & Goldberg, *supra* note 102, at 1677 (using the term "substantial risk" as an appropriate predicate for liability).

133. The factual assumption above again is that there was a scientifically credible reason to believe that the product might be significantly hazardous to public health or the environment and the expert defendant will be held to the level of an expert in this situation.

more a defendant distorts and conceals incriminating information, the more "careless" or "other-disregarding" its conduct would appear to the fact-finder. Moreover, since the defendants in these hypothetical cases will be companies with both expertise and resources to conduct necessary research, they will be held against an expert standard in assessing the reasonableness of their conduct.[134]

As discussed below, it is possible that an even narrower construction of wrongful conduct may be appropriate, for example by requiring plaintiff to prove that defendant acted recklessly or with "callous disregard" by producing or releasing a material that involved significant risks of public exposure without first undertaking a responsible assessment.[135] In fact, as long as knowledge of a material risk can be imputed as a result of the company's expert position and superior testing capacities, a reckless standard may not differ that much from a negligence-based standard.

That Causes Plaintiff Ongoing Harm as a result of Significant Exposure

The final element requires evidence of actual significant contact between the substance and the plaintiff victim to establish specific causation and resulting harm.[136] Plaintiff's exposures need not be quantified since records will often be nonexistent, but some good faith showing

134. *See* RESTATEMENT (THIRD) OF TORTS § 12 (AM. L. INST. 2010) (higher standard).

135. Within the criminal context, willful ignorance in fact requires a similar type of showing, although this is based on ex post evidence that the hazard in fact transpired. Specifically, willful ignorance is generally established when a defendant is: "(1) having suspicions about the fact of which knowledge is required and (2) deliberately refraining from investigating the matter, the defendant also must (3) have had a particular motive for remaining in ignorance: namely, to preserve a defense in the event of prosecution." Sarch, *supra* note 126, at 1025. Accordingly, "willful ignorance involves the breach of a *duty of reasonable investigation*, ... The seriousness of one's breach of the duty of reasonable investigation, in turn, depends on a range of factors, including how easily the defendant might have investigated and his reasons for not investigating." *Id.* at 1029.

136. Although the types of evidence suggested in this subsection for a "deliberate ignorance" claim seem modest enough that the demands are unlikely to impede most deserving plaintiffs from bringing suit, Yehuda Adar and Ronen Perry have argued that the harm element should be abandoned altogether as a prerequisite to bringing a tort claim. Their argument stems in part from the fact that requiring proof of "harm" helps insulate wrongdoers from accountability in ways that dovetail with the challenges associated with causation discussed in this article. For example, the authors argue that:

> [b]y adhering to the harm requirement, the legal system ignores the legitimate claims of the wronged against the wrongdoer. By insisting on the suffering of actual harm, it deprives right-holders of the power to confront negligent actors whose conduct has risks—or is still risking—their protected interests. . . . The traditional position [requiring harm] conveys the problematic normative message that people are free to negligently endanger the protected interests of others, as long as no injury is caused.

of significant exposures will be necessary, ideally involving repeated exposures to the substance over time at moderate to high concentrations. Courts could also require scientific evidence of exposure, including medical testimony of elevated levels of the toxic substance found in plaintiff's blood, urine, or body tissues and/or documentation of symptoms consistent with exposure.[137] Additionally, the plaintiff must in no way have contributed to the exposure or resulting risk.

The basic harm from this individualized exposure is the invasion of plaintiff's interest in the security of his/her health, which places a "cloud" or threat over the future.[138] The plaintiff's injuries—in the abstract—include both the potential costs of future medical oversight as well as the distress of living with the uncertainty of contracting a serious illness at some point in the future.[139] This indignity could encompass significant fear and obsessive neuroses about health or it may simply consist of outrage or even annoyance at being exposed to defendant's untested hazard.[140] Although courts generally refuse to

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Yehuda Adar & Ronen Perry, *Negligence without Harm*, 111 GEO. L. J. 187, 209 (2022). It is not clear from Adar and Perry's account, however, how the causation element would work if there is not some kind of evidence linking defendant's wrongful act to plaintiff's condition.

137. As discussed in *supra* note 124, a trial court in Amsterdam required KLM to monitor the quality of the air in its airplanes for a toxic chemical found in engine oil based, in part, on evidence submitted by the pilot that the chemical was found in his blood and urine, which he alleged had caused serious health harms. *See* Amsterdam Court Case Number C/13/54794 (Sept. 18, 2013) (available at Section 2.4 in the facts at https://uitspraken.rechtspraak.nl/#!/details?id=ECLI:NL:RBAMS:2013:5980).

138. *See* Zipursky & Goldberg, *supra* note 102, at 1694. Drawing from Goldberg and Zipursky's concept of "realized" harms, a plaintiff's exposure to a significant risk of harm by defendant still creates a doctrinally-satisfying type of future injury claim provided the injunctive-based remedy fits the future, contingent nature of the harm. *See id.* at 1677 (arguing that "circumstances that interfere with the plaintiff's interest in being free from the pall associated with being at substantial risk of a serious illness may be held responsible for the emotional distress experienced by the plaintiff."). Leading adverse precedent, like Metro N. v. Buckley, 521 U.S. 424 (1997), can be distinguished because of the estimated low level of future risk in Buckley, where the future risks of harm from the plaintiff's significant asbestos exposure were estimated to be 1–5%. *See* Zipursky & Goldberg, *supra* note 102, at 1695, 1701 (noting this important factual feature to the Court's decision). This estimate was made possible precisely because asbestos has been rigorously researched over decades. *See Buckley*, 521 U.S. at 427. By contrast, in most untested but risky chemical cases, plaintiff cannot determine whether the future risk is substantial or minor. Equally important, the very wrongful act of defendant supplies the reason plaintiff cannot quantify the risk, but instead must live under this ominous "cloud" of uncertainty.

139. *See, e.g.*, Zipursky & Goldberg, *supra* note 102, at 1694 (concluding that the plaintiff's "interest in being free from a certain kind of threat of disease" is on par with other emotional distress harms); *id*. at 1692 (discussing the legitimacy of this type of interference-in-a-right based type of harm and its antecedents in defamation, nuisance, and false imprisonment); *see also* Margaret A. Berger & Aaron D. Twerski, *Uncertainty and Informed Choice: Unmasking Daubert*, 104 MICH. L. REV. 257 (2005).

140. As a result, the requisite for evidence of plaintiff harm would largely duplicate the showing of offensive contact and accompanying indignity required of plaintiffs in battery cases. To be extra conservative, the requirements for this allegation could even be raised higher to require

award damages for distress and outrage at being subjected to uncertain future serious injuries,[141] in deliberative ignorance claims, the plaintiffs would not receive any direct compensation for their injuries. Consequently, the need to pinpoint the precise nature of plaintiffs' harms and draw bright lines on which harms are redressable seems unnecessary as long as a plaintiff can allege some personal injury.[142]

Affirmative Defenses

Consistent with tort law, defendants will continue to be able to avail themselves of a variety of affirmative defenses in these claims. Since some plaintiffs will likely allege negligence, product and warning defects, and possibly even battery (as well as the new "deliberative ignorance" claim), manufacturers will use a grab bag of defenses available under these different types of claims.

To provide defendants with added predictability in defending against this new remedy, a "state of the art" defense should be made available in all claims that seek out the knowledge remedy, even if the pleadings go beyond the "deliberate ignorance" claim proposed here. This state-of-the-art defense would place the burden on the defendant to establish that, at the very least, its own internal assessment and post-market monitoring efforts met or exceeded the best practices of an expert manufacturer in that same business.[143]

This kind of uniform defense to the deliberate ignorance claim will provide a predictable exit to the litigation for defendants that have conducted a reasonable investigation of the hazardous properties of their chemicals and help protect against abusive claiming. Additionally, manufacturers that do follow best practices will find it to their advantage to advertise that fact in order to stave off liability. This, in turn, will improve functioning of the market and even regulatory oversight as a result of the enhanced information sharing.

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plaintiffs to show documented "severe" (emotional) harm as a result of the exposure, although this does not seem necessary. *See* Zipursky & Goldberg, *supra* note 102, at 1686 (using the term "severe" distress as an appropriate predicate for liability).

141. *See, e.g.*, *Buckley*, 521 U.S. at 432, 434–35, 444.

142. In a sense, this conception of "injury" overlaps with the Constitutional standard for injury required for standing. *See, e.g.*, Friends of the Earth, Inc. v. Laidlaw Env't Servs., Inc., 528 U.S. 167, 183–84 (2000) (holding that plaintiffs' affidavits and testimony established that they had "reasonable concerns about the effects of [the defendant's water pollution] discharges, [which in turn] directly affected [their] recreational, aesthetic, and economic interests.").

143. *See, e.g.*, Wagner, *supra* note 46, at 838–39 (providing a justification for a unified state of the art defense in toxic torts). A higher standard could also be used, such as requiring the manufacturer to demonstrate that they tested according to the best practices currently available. *See* RESTATEMENT (THIRD) OF TORTS § 12 (AM. L. INST. 2010) (higher standard).

2. Benefits

Tort law currently excuses many corporations that expose the public to untested hazards if the corporation suppresses and distorts the relevant evidence. A deliberate ignorance claim should help turn these perverse incentives around. Most importantly, the deliberate ignorance claim overcomes the deficiencies of *ex post*, monetary damages by forcing companies to do rigorous testing at the earliest indication of a potentially significant hazard. The defendant can no longer count on delays of decades before the hazard is discovered. Nor can the company successfully control the information governing that material risk since they will now be forced to fund the "truth" in a scientifically rigorous way, even while the resulting scientific discoveries might be self-incriminating in terms of future liability and regulation.[144]

By outing the corporation earlier and counteracting its ability to control the information environment, the deliberate ignorance claim seems capable of making significant strides in advancing corporate accountability. Rational corporations in this reformed legal system should now find it in their interest to conduct rigorous testing in advance. They may also learn that controlling information in underhanded ways is no longer a recipe for success since their tactics are less likely to immunize them from litigation and might even be discovered by plaintiffs and used against them.

As a result, in this reformed world, good corporations will at long last enjoy lucrative rewards for investigating the toxicity of their chemicals. Corporations that employ state-of-the-art testing for latent hazards should be able to swiftly avail themselves of the state-of-the-art defense, fending off deliberative ignorance claims while at the same time publicizing a dossier that showcases the positive attributes of their products relative to competitors (or at least relative to laggards that avoid this testing). By contrast, "bad" corporations will be distinguished in the market and regulatory world by their silence regarding the long-term safety of their chemicals. That silence may also dampen interest from savvy investors, creditors, retailers, and govern-

144. Rob Billott emphasizes this feature as particularly important:

> That's why, through our class-action settlement for the affected communities in West Virginia and Ohio, we asked to have an independent science panel resolve the basic legal question of whether PFOA can cause disease in humans and at what levels. And scientists have thoroughly answered this question, such that the company can no longer dispute it as to these people and litigate it forever. It was one of the few times that has ever happened in a court settlement.

Tracy Frisch, *Something In The Water: Robert Billott On Corporate Greed And Chemical Contamination*, SUN (Mar. 2022), https://www.thesunmagazine.org/issues/555/something-in-the-water.

mental and corporate customers, while serving as a red flag to regulators.

Successful deliberative ignorance claims will also lead to the production of much-needed scientific research on the hazards of widely-used substances. The research generated by the DuPont PFAS knowledge remedy, for example, contributed to scientific understanding of the human risks of PFAS exposure.[145] And the resulting scientific information has set into motion a veritable tidal wave of additional litigation, regulation, and industry changes positioned to phase out these lethal substances.[146]

The information arising from deliberate ignorance claims, coupled with changed corporate behavior for some manufacturers, should also catalyze the political process, leading to the passage of more protective public laws and regulations. In a "divide and conquer" sort of way, corporate front-movers will find themselves benefitting financially from these new tort-imposed incentives for long-term safety testing, and they may become active proponents of legislative reforms that codify and elaborate on these testing requirements. The remaining "laggards" opposed to testing requirements will not only be depleted in number and resources but will be deprived of some of their most impactful arguments, like the doomsday prediction that regulatory testing requirements will devastate the industry and/or lead to dire economic disruptions.

Plaintiffs who are victimized by defendant's untested hazards will also receive needed relief.[147] The deliberate ignorance claim will shed light on the nature and extent of individual risks much sooner after exposure, hopefully staving off some preventable injuries, death, and the emotional harm associated with living in dread. This court-ordered, subsequent research might reveal that the plaintiff has little to worry about or, on the other hand, reveal that plaintiff will require continuous medical oversight to protect against a looming terminal disease.[148] Either way, this form of relief does a vastly better job re-

145. *See, e.g.*, *PFAS Chemicals, and You*, SCI. FRIDAY (Nov. 1, 2019), https://www.sciencefriday.com/segments/pfas-dupont-lawsuit-robert-bilott/.

146. *See, e.g.*, Mark P. Nevitt & Robert V. Percival, *Can Environmental Law Solve the 'Forever Chemical' Problem?*, 57 WAKE FOREST L. REV. 239, 242, 253–54, 270–71 (2022).

147. *See also* Lahav, *supra* note 89, at 1393–94 (discussing public good features of the knowledge remedy).

148. The public spillovers that result from plaintiff's protagonist role in forcing a large corporation to test chemicals also adds resiliency benefits to the individualized remedy since the plaintiff may perceive the end result—the aggregate of his/her outcome coupled with the public benefits—may even make his/her life better than it was before. Erik Encarnacion, *Resilience, Retribution, and Punitive Damages*, 100 TEX. L. REV. 1025, 1058–59 (2022).

storing the plaintiff to his/her *ex ante* position, particularly in comparison to a compensatory award.[149] In some ways, this form of relief also resembles a kind of injunctive-based disgorgement of profits or restitution by returning the "stolen" item to the victims through the enlightenment of testing, thus providing retributive value as well.[150] As the protagonist against defendant's wrongful conduct, plaintiff may even enjoy an added resiliency-type of benefit from knowing that his/her claim advanced societal welfare.[151]

C. Troubleshooting

A "deliberate ignorance" claim also presents some challenges, a few of which are considered here. First and foremost, skeptics might argue that public law is still vastly better able—and will be less tortured—in addressing these untested hazards as compared with tort law.[152] Unlike the tort system, the regulatory system has a much greater capacity for scientific analysis and research; operates in a more inquisitorial mode, rather than an adversarial one; involves more fine-grained decisions about social costs versus benefits; involves democratically accountable decisionmakers, as well as a small army of government scientific experts; and offers a vastly greater range of institutional tools for addressing chemical risk problems, including providing *ex ante* protections.

However, there are several problems with leaving the corporate control of information problem only to public law, which as noted earlier, has itself long been deficient in requiring premarket testing and oversight for chemical safety.[153] Perhaps most importantly, tort law is one of the critical contributors to the current state of political paralysis; we will likely not be able to reform public law without fixing tort

149. *See, e.g.*, Erik Encarnacion, *Two Standards of Repair: Restoration and Resilience*, 2 OXFORD STUD. PRIV. L. THEORY 1, 5–6, 10 (forthcoming) (discussing the concept of "restorative repair" in tort remedies).

150. Indeed, in arguing for "negligence without harm," Adar and Perry propose that instead of proof of harm, courts could institute a "disgorgement" remedy. These "[d]isgorgement damages will normally be assessed on the defendant's saved expenses on untaken precautions." Adar & Perry, *supra* note 136, at 233. *Cf.* Encarnacion, *supra* note 148, at Part IIC (discussing the retributive values associated with plaintiffs allowed to proceed against their injurers who acted with ill will by claiming and keeping punitive damages).

151. *See* Encarnacion, *supra* note 148, at Part IIC.

152. *See, e.g.*, ERNEST J. WEINRIB, THE IDEA OF PRIVATE LAW (rev. ed. 2012); ARTHUR RIPSTEIN, PRIVATE WRONGS (2016); Peter H. Schuck, *The New Judicial Ideology of Tort Law*, *in* NEW DIRECTIONS IN LIABILITY LAW 4, 14 (Walter Olson ed. 1988); Peter H. Schuck, *Benched: The Pros and Cons of Having Judges Make the Law*, WASH. MONTHLY, Dec. 2000, at 39.

153. *See* WAGNER, *supra* note 51.

law first.[154] As long as corporations are spared tort liability for ignorance and yet litigation is triggered by scientific testing, rational corporations will vigorously lobby against any legislation that would require them to conduct this kind of investigative safety research.[155] Mandated testing opens a Pandora's Box of future litigation risks for corporations and exposes them to potential bankrupting tort liability. And that helps explain why corporations have vigorously fended off public testing requirements in virtually all product areas involving latent hazards over five decades.[156]

If, by contrast, tort law actually imposed responsibility on defendants for their deliberate ignorance of latent hazards, then the manufacturers' political opposition would likely soften. Indeed, the chemical lobby might make a mad dash to Congress to seek out some type of regulatory premarket testing requirement in return for preempting tort liability.[157] To argue that this set of problems is exclusive to public law ignores the critical interactions between tort law and regulation.

There are also practical concerns that might be raised about the proposed deliberate ignorance claim. One initial worry is whether the claim will be sufficiently constrained by the elements of liability to protect against abusive litigation. If the corporate behaviors described above are generally true, then the extent of the resulting litigation could become expansive. This worry is not hypothetical either. The *Hardwick* case in Ohio involves claims against PFAS manufacturers that not only seek the formation a science panel consistent with the knowledge remedy, but also seek medical monitoring damages for potentially millions of persons in the state exposed to the defendants' PFAS.[158]

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154. I've made this argument in several different articles over the years. *See, e.g.*, Wagner, *supra* note 2; Wendy Wagner, *Commons Ignorance: The Failure of Environmental Law to Produce Needed Information on Health and the Environment*, 53 DUKE L. REV. 1619 (2004); Wendy Wagner, *Using Competition-Based Regulation to Bridge the Toxics Data Gap*, 83 IND. L. J. 629 (2008).

155. Lauren Richter et al., *Producing Ignorance Through Regulatory Structure: The Case of Per- and Polyfluoroalkyl Substances (PFAS)*, 64 SOCIO. PERSP. 631 (2020).

156. *See supra* Part II.A.1. As noted previously, only pesticides and drugs require pre-market testing. For all other chemicals and chemical products, including the full range of consumer products, the manufacturer at most only needs to divulge to the regulator what is "known" to the company regarding the potential toxicity of its product.

157. When state legislatures began to require pre-testing and engaged in greater regulation of suspect classes of chemicals, the manufacturers in fact did exactly this. The preemption of state law is now codified into law in the Lautenberg Amendments. *See, e.g.*, 15 U.S.C. § 2607.

158. *See, e.g.*, Maya Earls, *Ohio PFAS Medical Monitoring Dispute 'One to Watch,' Lawyers Say*, BL(Apr. 11, 2022), https://news.bloomberglaw.com/litigation/ohio-pfas-medical-monitoring-dispute-one-to-watch-lawyers-say (discussing Hardwick case).

Yet this concern is not fatal. Beyond the fact that the equitable remedy is discretionary in nature,[159] there are several additional ways that the deliberate ignorance claim could be narrowed to protect against floodgate problems.[160] One, mentioned already, is to raise the bar for wrongful conduct from negligence to recklessness or even higher by, for example, requiring that plaintiff produce evidence that the defendant was on constructive notice that its activity was potentially dangerous and yet did nothing. A second method for limiting claimants could treat the deliberate ignorance claim as a variation of battery. The necessary physical contact could involve more than just "significant" exposure, by requiring plaintiffs to provide actual evidence of physical contact (for example by producing evidence of defendant's offending substance in substantial quantities in plaintiffs' tissues or blood). Of course, the downside of too many added burdens on plaintiffs is that these burdens will end up precluding the most valuable uses of the new claim and foreclose too many victims. Indeed, there are reasons to worry that the deliberate ignorance claim, since it provides only knowledge and not damages, may be under-utilized by victims, particularly if there are not strong incentives for attorneys to bring the claim.[161] Walking this fine line will likely require some trial-and-error adjustments, which fortunately is familiar ground for courts deciding common law cases.[162]

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159. *See supra* note 122 and accompanying text.

160. Although it will not prevent the filing of abusive claims, it is also worth remembering that since the claim is equitable in nature, courts retain discretion regarding whether to grant relief. Procedural adjustments could also be made to reign in the incentives for plaintiffs to file the cases, such as requiring all settlements of this particular claim to be approved by the court to ensure that the settlement monies are spent on knowledge-generation only. Court-imposed limits on contingency fee arrangements might also be necessary, allowing the reimbursement of attorney fees only at a reasonable billing rate and not on a pro rata basis. *Cf.* Russell Yankwitt & Anxhela Mile, *Drafting Contingency Free Agreements for Non-Monetary Victories*, N.Y. L. J. (Sept. 16, 2021), https://www.law.com/newyorklawjournal/2021/09/16/drafting-contingency-fee-agreements-for-non-monetary-victories/?slreturn=20220230091525.

161. For example, if contingency or court-ordered attorneys' fees are not available for purely injunctive claims, then it is not clear who will serve as counsel to these cases outside perhaps a few law school clinics. Moreover, from the individual plaintiffs' standpoint, victims may not be sufficiently vindicated by gaining "knowledge" to take on the personal cost of bringing a lawsuit. Indeed, with the tort system already badly under-utilized, *see, e.g.*, ENGEL, *supra* note 91; Michael J. Saks, *Do We Really Know Anything about the Behavior of the Tort Litigation System–And Why Not?*, 140 U. PA. L. REV. 1147 (1992), one can imagine that even if some victims are made aware of the potentially life-threatening risks to their own health, the absence of a damages remedy may discourage them from pursing these claims. However, if the deliberate ignorance claim is sorely underutilized, then it will bring few benefits to individual plaintiffs or the tort system more generally.

162. *See generally* Guido Calabresi & Spencer Smith, *On Tort Law's Dualisms*, 135 HARV. L. REV. 184, 188 (2022) (discussing this feature of common law decision-making).

Lahav also discusses how the knowledge remedy creates new challenges for judges since judges will need to oversee potentially complex remedial decisions that require them to determine when the mandated testing is both sufficient and conducted in a rigorous way.[163] Again, this challenge does not appear to be hopeless. The PFAS settlement provides a valuable template that will help mitigate these concerns,[164] and, ideally, a National Academies of Sciences panel or similar entity could advise on how to structure these remedial claims in different settings.

Yet another challenge arises from the fact that, in truth, most victims of this deliberate ignorance will never be aware that their physical integrity has in fact been compromised by defendant's wrongful act. However, even though the claim is inevitably incomplete in its reach, it will still make progress in providing some redress for plaintiffs who are otherwise without recourse because of the lack of robust evidence on general causation. One setting where the claim might be used, for example, is in industrial corridors or neighborhoods that are adjacent to volatile pollution that remain unexplained and uncharacterized with regard to the resulting health hazards.[165] Consumers or even workers who are significantly exposed to a risky-seeming product or hazard will also be able to use the deliberate ignorance claim.[166] Usually, these victims are tipped off to the potential riskiness because they suffer adverse health effects following significant and prolonged exposures to a suspicious but untested chemical.[167]

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163. *See also* Lahav, *supra* note 89, at 1402–03 (discussing these challenges).

164. *See id*.

165. We are learning—through tort litigation that postdates these exposures by decades—that some of these emissions are extremely dangerous, even if allowed under regulatory law. For example, facilities that sterilize equipment with ethylene oxide are a particularly stark example of these past high emissions that led to significant harms in ways that could have been prevented with research. Kiah Collier & Maya Miller, *A Plant That Sterilizes Medical Equipment Spew Cancer-Causing Pollution on Tens of Thousands of Schoolchildren*, ProPublica (Dec. 27, 2021), https://www.propublica.org/article/a-plant-that-sterilizes-medical-equipment-spews-cancer-causing-pollution-on-tens-of-thousands-of-schoolchildren. Ensuring there is some research on these hazards earlier, through a knowledge remedy, could save many lives. *See also* Max Blau & Lylla Younes, *The Dirty Secret of America's Clean Dishes*, ProPublica (Dec. 20, 2021), https://www.propublica.org/article/the-dirty-secret-of-americas-clean-dishes (describing contamination from BASF facility).

166. Lahav also provides excellent examples of the potential application of the knowledge remedy throughout her paper. *See, e.g.*, Lahav, *supra* note 89, at 1365–66 (discussing the use of the knowledge remedy in the Round-up litigation).

167. *See, e.g.*, Keith Cunningham-Parmeter, *A Poisoned Field: Farmworkers, Pesticide Exposure, and Tort Recovery in an Era of Regulatory Failure*, 28 N.Y.U. Rev. L. & Soc. Change 431, 444, 460, 491 (2004); Stephanie Armour, *Is butter flavoring ruining popcorn workers' lungs?*, USA Today (June 20, 2002), https://plus.lexis.com/api/permalink/a68806a4-21ca-449e-a103-69035050cd1d/?context=1530671.

Finally, there is also a potential practical impediment to the courts' adoption of the deliberative ignorance claim that could arise from organized industry opposition itself. This pressure could be exerted through more obvious political pathways—such as during state judicial elections and through the state legislative processes that seek to overturn novel tort doctrines—or through more sinister paths, such as by exerting undue influence over the ALI's Restatement deliberations. With respect to the latter, less obvious route, Laposata and colleagues have documented the tobacco industry's influence on the ALI and the development of the tort law Restatement.[168] Jeffrey Stempel has also traced excessive industry influence on various other Restatement projects.[169] If the ALI is vulnerable to industry influence, then the deliberate ignorance claim certainly faces a lower chance of ultimately being accepted by the courts to the extent that courts continue to rely on the ALI for guidance.

IV. Beyond Toxic Torts

This Article has explored the use of the knowledge-remedy only in toxic torts, but there are likely other settings in which large corporate (or even governmental actors) control information in ways that undermine legal accountability. Consider, for example, parallel challenges

168. *See, e.g.*, Elizabeth Laposata et al., *Tobacco Industry Influence on the American Law Institute's Restatements of Torts and Implications for Its Conflict of Interest Policies*, 98 Iowa L. Rev. 1 (2012) (offering a troubling account of the tobacco industry's influence over the ALI). The ALI responded to the criticisms, Roberta Cooper Ramo & Lance Liebman, *The ALI's Response to the Center for Tobacco Control Research & Education*, 98 Iowa L. Rev. Bull. 1 (2012), but Laposata et al., and others have concluded that the responses provide insufficient assurance against corporate lobbying. *See, e.g.*, Keith N. Hylton, *Lobbying and the Restatement of Torts*, JOTWELL (Apr. 3, 2013), https://torts.jotwell.com/lobbying-and-the-restatement-of-torts/ ("[Laposata et. al.,] are right that the Restatement process is vulnerable to outside influence, much more so than are courts, and that this is a serious problem.").

169. *See, e.g.*, Jeffrey W. Stempel, *How to Make A Dead Armadillo: Consumer Contracts and the Perils of Compromise*, 32 Loy. Consumer L. Rev. 605, 614 (2020); *see also* Jeffrey W. Stempel, *From Quiet to Confrontational to (Potentially) Quiescent: The Path of the ALI Liability Insurance Restatement*, 50 Fall Brief 10, 11 (2020) (discussing the industry-led effort to actively influence the drafting of the RLLI). Thus, industry-organized voting campaigns among members of the ALI have been executed alongside lobbying campaigns in the state legislatures on a slew of other ALI products as well. Jeffrey W. Stempel, *Hard Battles over Soft Law: The Troubling Implications of Insurance Industry Attacks on the American Law Institute Restatement of the Law of Liability Insurance*, 69 Clev. St. L. Rev. 605, 623–27 (2021) (describing corporate campaigns to influence the outcome over the following ALI products: the *Principles of Corporate Governance*, the *Restatement of Law Governing Lawyers*, the *Restatement (Third) of Torts: Liability for Physical and Emotional Harm*, the *Restatement of Consumer Contracts*, and the *Restatement of Data Privacy*.)

of information control arising in consumer privacy,[170] public safety,[171] advertisement and marketing,[172] environmental harms,[173] and financial markets.[174] Some variant of the knowledge remedy may provide a useful antidote in these problem areas as well. Indeed, there are a few signs that the knowledge remedy is already being used as a tool in at least some recent tort litigation that does not fit the toxic tort template. In a large class action against Equifax alleging a data breach, for example, the defendant agreed to a settlement that included providing settlors with free credit-monitoring services for a minimum period of two years to protect against future data breaches.[175] In a settlement of state litigation against opioid distributors, the defendants agreed to "[e]stablish a centralized independent clearinghouse to provide all three distributors and state regulators with aggregated data and analytics about where drugs are going and how often, eliminating blind spots in the current systems used by distributors" and also to "[u]se data-driven systems to detect suspicious opioid orders from customer pharmacies."[176]

The basic concept of forcing corporations to produce reliable knowledge as a way to advance corporate accountability may also prove useful outside of the tort setting. Within the regulatory sphere, one of the core problems in public health and regulation has been placing responsibility on corporations to reliably assess the nature of the harms they may be causing the public.[177] With few exceptions, this

170. *See, e.g.*, Kapczynski, *supra* note 19. For a small window into one of the many challenges arising in this area, *see* Neil Richards, *The GDPR as Privacy Pretext and the Problem of Co-Opting Pr*ivacy, 73 HASTINGS L. J. 1511, 1531, 1535, 1537–38 (2022).

171. *See, e.g.*, *Boeing Charged with 737 Max Fraud Conspiracy and Agrees to Pay over $2.5 Billion*, U.S. DEP'T JUST. (Jan. 7, 2021), https://www.justice.gov/opa/pr/boeing-charged-737-max-fraud-conspiracy-and-agrees-pay-over-25-billion (describing industry coverup of internal safety information).

172. Yonathan A. Arbel & Roy Shapira, *Theory of the Nudnik: The Future of Consumer Activism and What We Can Do to Stop it*, 73 VAND. L. REV. 929 (2020); Lauren E. Willis, *Deception by Design*, 34 HARV. J. L. & TECH. 115 (2020).

173. *See supra* note 24 and accompanying text.

174. For one of the many permutations of asymmetrical information in financial regulation, *see, e.g.*, Hannah Albarazi, *DuPont Spinoff Must Face Investors' Enviro Liabilities Suit*, LAW360 (Feb. 24, 2022), https://www.law360.com/articles/1468129/dupont-spinoff-must-face-investors-enviro-liabilities-suit.

175. *Yahoo! Inc. Customer Data Breach Security Breach Litigation Settlement: United States District Court Northern District of California San Jose Division Case No. 5:16-MD-02752-LHK*, https://yahoodatabreachsettlement.com/ (last visited Feb. 8, 2023).

176. *Multistate Settlements Database*, NAT'L ASS'N ATTORNEYS GEN., https://www.naag.org/news-resources/research-data/multistate-settlements-database/ (last visited Feb. 8, 2023) (in 7/23/21 settlement involving Cardinal Health etc.).

177. *See, e.g.*, Wagner, *supra* note 46.

burden is placed on society at large and the regulator in particular.[178] The concept of a "deliberate ignorance" mandate may provide a template for parallel legislative requirements, allowing regulators to locate and triage particularly egregious and worrisome examples of corporate ignorance in settings that have the potential for largescale public harm.[179] Depending on its contours, citizens could even be empowered to enforce the legislative mandate through citizen suits. The concept of a knowledge remedy might even be extended to apply against the federal government itself. Although the trigger for a viable claim would require further analysis, the core idea would be to craft a citizen right of action that demands that the government produce new knowledge on activities that appear likely to be causing widespread public harm. For example, the FBI's Terrorist Screening Center's "No Fly List" leads to human rights violations that can be long-lasting, with limited to few remedies.[180] A knowledge remedy would demand that the government produce an assessment of the nature and severity of these harms and why they occur. OSHA has promulgated a few workplace standards to protect workers from toxic substances, but

178. *Id*.

179. The specific elements for this type of regulatory claim must be carefully crafted, but in essence a regulator would need to make out a showing of a corporation's unreasonable and preventable ignorance regarding a potentially credible risk that, at current release levels, could significantly endanger public health or the environment. There is a similar constructed claims for injunctive relief for hazardous waste sites, *see, e.g*, 42 U.S.C. § 6972(a)(1)(B) (allowing any person to file a civil action "against any person . . . who has contributed or who is contributing to the past or present handling, storage, treatment, transportation, or disposal of any solid or hazardous waste which may present an imminent and substantial endangerment to health or the environment."). The courts generally provide a relatively generous interpretation of the level of risk needed for an "imminent and substantial endangerment." *See, e.g.*, Interfaith Cmty. Org. v. Honeywell Int'l, Inc., 399 F.3d 248, 260 (3d Cir. 2005). While some of these testing authorities already exist within complex regulatory statutes, they tend to be substantially underutilized outside the drug and pesticide arena. For example, the Toxic Substances Control Act (TSCA) authorizes that EPA can require manufacturers to conduct tests of individual chemicals, but these provisions are encumbered with impediments to EPA's use of this authority and thus this authority has only been used to require tests on less than 200 (out of 62,000) chemicals. *See, e.g.*, U.S. Gov't Accountability Off., GAO-05-458, Chemical Regulation: Options Exist to Improve EPA's Ability to Assess Health Risks And Manage Its Chemical Review Program 18 (2005); U.S. Gen. Acct. Off., GAO/RCED-94-103, Toxic Substances Control Act: Legislative Changes Could Make the Act More Effective 45–46 (1994) (discussing the lack of testing required of existing chemicals and reporting that "[a]ccording to EPA officials, the agency has not used its authority to require more testing, largely because it must undergo a lengthy and costly rule-making process."). Regulators would of course supervise the research and synthesis to ensure it is rigorous, conducted expediently, and made public.

180. *See, e.g.*, *U.S. Government Watchlisting: Unfair Process and Devastating Consequences*, Am. Civ. Liberties Union, https://www.aclu.org/other/us-government-watchlisting-unfair-process-and-devastating-consequences?redirect=national-security/us-government-watchlisting-unfair-process-and-devastating-consequences (last visited Feb. 15, 2023).

most of the standards are outdated.[181] A knowledge remedy could enable workers to demand that OSHA conduct a comprehensive assessment of the extent of the latent hazards that remain unregulated within a particular, high-risk sector of industrial activity. In these and likely many other settings, the capability of citizens to not only acquire the information the government has collected through FOIA, but to force the government to do needed-yet-avoided research on potentially significant harms could be transformative.[182] Again, since these remedies are injunctive in nature, when and whether they go too far is filtered not only through the elements of liability but also through the courts' equitable discretion.[183]

V. Conclusion

Forcing knowledge in settings of deliberate ignorance is a critical step to holding corporations accountable. If these powerful actors can control the information environment, then they can escape legal accountability.

However, tort law is currently structured in ways that not only insulate, but actually reward corporate control of information, at least in the field of toxic torts. To hold these large institutional actors accountable for the harms they cause, tort law must be adjusted to provide victims with tools that pry out the "truth." These tools must not only be able to require corporations to disclose what they know, but to rigorously investigate what they deliberatively do not know (or may be intentionally distorting) about the widespread social harms they might be causing. In this Article, I embellish on Lahav's "knowledge remedy" to suggest one way that tort law may be able to begin to overcome the problematic misalignment between liability rules and corporate responsibility.

181. *See, e.g.*, David Michaels & Jordan Barab, *The Occupational Safety and Health Administration at 50: Protecting Workers in a Changing Economy*, 110 Am. J. Pub. Health 631, 631–32, 634 (2020).

182. There are significant parallels to the National Environmental Policy Act in terms of demanding new evaluative information from the government in assessing the costs and benefits of its programs. *See, e.g.*, 42 U.S.C. § 4332.

183. *See supra* note 122 and accompanying text.