The Hidden Success of a Conspicuous Law: Proposition 65 and the Reduction of Toxic Chemical Exposures

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Newcomers to California could be forgiven for thinking they have crossed into treacherous terrain. By virtue of the state's Proposition 65 right-to-know law, store shelves and public garages everywhere announce, "WARNING: This [product/food/facility] contains chemicals known to the State of California to cause cancer [or reproductive harm]." The proliferation of consumer warnings about toxic exposures in everyday life has made Prop 65 highly controversial, as has the degree to which the law incentivizes citizens to sue businesses for failure to warn. Both features make the law recurrently vulnerable to weakening in Sacramento and preemption in Washington, D.C.

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Against this backdrop—and at a time when Prop 65 faces a live preemption threat in Congress—this Article tells a new story about the law's considerable benefits in reducing exposure to toxic chemicals. Looking beyond Prop 65's known direct effects in prompting warnings and enforcement suits, we use original archival research and qualitative interview data to identify hidden modes by which the law reduces toxic exposures in California and nationwide.

This Article presents evidence of three previously unexplored or under-explained mechanisms of salutary Prop 65 action, in: (1) spurring direct regulation of specific toxic chemicals; (2) seeding broad supplemental chemical regulatory regimes; and (3) disseminating information about toxic chemicals in previously information-poor business-to-business and consumer marketplaces, with transformative effects on commerce. We conclude that assessing these modes of action is necessary to any fair evaluation of the merits of Prop 65.

INTRODUCTION

In a sobering indicator of modern environmental conditions, an American child in 2020 may be less likely to bring a No. 2 pencil to school than an inhaler or an Individualized Education Plan. Decades of federal under-regulation of toxic chemicals have produced a U.S. environmental disease burden in asthma from exposure to air pollution, neurological harm from exposure to lead and pesticides, and other children's health effects that are cumulatively estimated to cost the United States over $76 billion annually.[1] A subset of endocrine-disrupting chemicals found in food, personal care products, and everyday household items is estimated to account for more than $340 billion overall in health costs and lost wages each year,[2] with associated human suffering. In the resulting policy emergency, states have emerged as first responders.

State approaches to controlling toxic exposures include single-chemical bans, children's-product or multisector toxics reduction programs, and chemical ingredient disclosure laws. Among state experiments, California's longstanding Proposition 65 right-to-know law continues to command attention.[3] This arises from the law's novelty and breadth, and also the volume of activity and public controversy it continually generates. Recently, a proposed Prop 65 cancer warning for coffee was widely reported, largely mocked, and then overridden by regulation.[4] A proposed Prop 65 cancer warning for Monsanto's glyphosate herbicide provoked manufacturer litigation in both state and federal court, and a rare public dispute with the U.S. Environmental Protection Agency.[5]

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1. Leonardo Trasande & Yinghua Liu, *Reducing the Staggering Costs of Environmental Disease in Children, Estimated at $76.6 Billion in 2008*, 30 HEALTH AFF. 863, 865 (2011), https://www.healthaffairs.org/doi/pdf/10.1377/hlthaff.2010.1239 (citing 2010 population and cost data as exemplar).

2. Teresa M. Attina et al., *Exposure to Endocrine-Disrupting Chemicals in the USA A Population-Based Disease Burden and Cost Analysis,* 4 LANCET DIABETES & ENDOCRINOLOGY 996, 996 (2016).

3. Proposition 65—the "Safe Drinking Water and Toxics Enforcement Act of 1986," codified in the California Health and Safety Code at sections 25249.5 through 25249.14—is hereinafter and commonly referred to as "Proposition 65" or "Prop 65."

4. *See, e.g.*, Lisa Baertlein, *Cancer Warnings to Be Served Up with Coffee in California,* REUTERS (May 8, 2018) https://www.reuters.com/article/us-california-lawsuit-coffee/cancer-warnings-to-be-served-up-with-coffee-in-california-idUSKBN1I930H (citing ridicule of the warning). *But see* Claudia Polsky, *Are Cancer Warnings for Coffee Junk Science? Or Is Industry Serving a Cup of Spin?,* SACRAMENTO BEE (Apr. 23, 2018), https://www.sacbee.com/opinion/california-forum/article209505509.html. California's lead Prop 65 agency has since exempted coffee from Prop 65 warning requirements. CAL. CODE REGS. tit. 27, § 25704 (2019); *see also* Edvard Pettersson, *Coffee Won't Need Cancer Warning in California After All,* BLOOMBERG (June 3, 2019), https://www.bloomberg.com/news/articles/2019-06-03/coffee-won-t-need-cancer-warning-in-california-after-all. The bitterness of the controversy over coffee warnings exemplifies the public perception that Prop 65 warnings may seem unreasonable as applied to certain products or contexts. *See infra* note 13.

5. Monsanto Co. v. Off. Env't Health Hazard Assessment, 22 Cal. App. 5th 534 (2018) (upholding placement of glyphosate on the Proposition 65 list of chemicals "known to the State" to cause cancer); Nat'l Assn. of Wheat Growers v. Becerra, 468 F. Supp. 1247 (2020) (enjoining the state requirement that businesses warn consumers about glyphosate exposure, on the ground that this constitutes impermissibly

Prop 65 is a uniquely powerful toxics disclosure law, passed by California voters as a ballot initiative and thus bearing few indicia of political compromise. The law aims to protect the public from exposure to toxics,[6] primarily by informing them about which chemicals are harmful and where they lurk. Its central feature is the combination of a state-produced list of chemicals known to cause cancer or reproductive harm[7] (the "Prop 65 list"), with a requirement that one year after listing, businesses warn individuals about significant potential exposures to a listed chemical. The law also broadly deputizes private parties and financially incentivizes them to sue businesses that fail to warn the public about toxic exposures. Additionally, Prop 65 listings automatically trigger warning obligations, making it difficult for businesses to forestall regulation. Finally and importantly, the law allocates litigation burdens of production and persuasion in uniquely plaintiff-empowering ways.[8]

But does Prop 65 actually make the public safer? Much existing scholarship answers in the affirmative, chronicling Prop 65's exposure-reduction benefits through litigation and case settlements. To be sure, these direct effects are significant: Prop 65 has produced more than 5,000 enforcement suits and more than 22,000 sixty-day notice letters signaling a private party's intent to sue unless settlement can be reached.[9] In a typical case, an actual or threatened lawsuit induces a manufacturer's agreement to reformulate a product or change a business practice to reduce or eliminate exposures to a specific toxic chemical, or at minimum, to provide a warning that may enable a consumer to reduce exposure. While these accounts of the potent effect of Prop 65 enforcement suits in prompting marketplace changes are true, they are also incomplete.

This Article argues that existing researchers' litigation-centric frame, while valuable, misses or minimizes the nonobvious or indirect mechanisms through

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compelled speech on a controversial topic, and thus violates the First Amendment); News Release, *EPA Takes Action to Provide Accurate Risk Information to Consumers, Stop False Labeling on Products*, EPA (Aug. 8, 2019), https://www.epa.gov/newsreleases/epa-takes-action-provide-accurate-risk-information-consumers-stop-false-labeling (describing any label representation that glyphosate causes cancer as a "false claim" and an "irresponsible" manifestation of "California's flawed program" for chemical control). The controversy over glyphosate warnings arises from regulated parties' longstanding grievance about the compelled speech that Prop 65 requires in the form of a warning, a grievance that has become judicially tractable as federal courts grow ever more sympathetic to arguments that disclosures or warning requirements impermissibly compel speech under applicable First Amendments standards (a topic beyond the scope of this article). In particular, the Supreme Court's holding in *NIFLA v. Becerra*, 138 S. Ct. 2361 (2018) (invalidating a regulation requiring anti-abortion "crisis pregnancy" clinic to provide patients with notice of their unlicensed status, on the grounds that it unduly burdened the clinics' protected speech) has emboldened companies whose products contain chemicals on the Prop 65 list to mount First Amendment challenges to the warning requirement. The glyphosate case result is their beachhead success.

6. We use the terms "toxics," "toxic chemicals," and "toxicants" interchangeably to denote nonbiological substances that are harmful to human health.

7. We use the phrases "reproductive toxicity" or "reproductive harm" to encompass both reproductive and developmental toxicity, i.e., harm to adult sexual function and fertility, and harm to a developing fetus or embryo, respectively.

8. *See infra,* Subpart I.B (discussing the basic mechanics of Prop 65).

9. ROGER LANE CARRICK ET AL., THE PROPOSITION 65 HANDBOOK 1 (2017).

which Prop 65 enhances public safety. In particular, existing work overlooks Prop 65's significant roles in producing information about toxic chemicals in commerce; propagating information in public and corporate decision-making spaces, where it can inform exposure-reduction efforts (such as through changes in consumers' behavior or manufacturers' product formulation, respectively); and, in many cases, prompting direct regulation of listed chemicals.

Our research, based on legislative and regulatory histories and interviews with corporate actors, reveals Prop 65's surprising influence in nonlitigation and nonwarning domains to reduce exposure to listed chemicals. We show the considerable power of the law to work in hidden ways, by operating horizontally across government sovereigns and vertically through business supply chains and by filling federal regulatory voids with respect to toxic chemicals. Our observations, although qualitative, may help to balance a public discussion of Prop 65 that typically focuses on the law's (more readily quantifiable) effects in producing lawsuits, compliance costs, and large payments to plaintiffs' attorneys. Our empirical work may also, we hope, help to balance recurrent debates about Prop 65's warning requirement. The warning requirement is simultaneously the law's most reviled feature and, as we will show, the source of much of the law's transformative power.

The first among Prop 65's nonobvious modes of action is the law's function as an alarm bell that spurs direct regulation of specific carcinogens or reproductive toxicants. We describe this role as "regulatory triggering." In the case of toxic exposures from heavy metals in jewelry, phthalates in plastic toys, and lead in wheel-balancing weights on cars and trucks, we have identified Prop 65 activity—in the form of chemical listings, the science supporting those listings, and enforcement activity—as clearly causal in the enactment of focused state and federal toxics legislation. Further, we are the first to identify worker-protective impacts of Prop 65 through its influence on occupational safety standard-setting, contrary to the general view that Prop 65 is of little use in addressing workplace exposures.

The second of Prop 65's hidden impacts is the law's function as a foundation for other information-forcing or substantive chemical regulatory schemes. In this incorporation-by-reference role, which we term "regulatory ratcheting," a new regulatory regime references the Prop 65 list, which essentially jump-starts or seeds that regime by populating it with the hundreds of chemicals that Prop 65 has already established as health harmful. This bypasses the otherwise lengthy and contested process of identifying and establishing a list of chemicals of concern. Many state toxics regulatory programs postdating Prop 65's enactment have benefitted from, and continue to use, the Prop 65 list and the science that supports it. We anticipate that New York State's recently enacted law governing toxics in children's products will likewise rely on Prop 65.

The third and most pervasive mode of quiet Prop 65 influence is the law's role in forcing supply chain, marketplace, and design-sector communication about listed chemicals that ultimately reduces their use. Although businesses'

fear of Prop 65 liability has generally been understood to prompt behind-the-curtain changes, we here use both interviews with industry representatives and technical sources to unpack the multifaceted nature of those changes and their drivers. We document many previously undescribed routes through which Prop 65 plays this broad "commerce-transforming" role—a role distinct from any educative role of consumer-facing warnings. We explain how the Prop 65 list enables downstream purchasers to extract ingredient information from reluctant suppliers, ways that supply chains use restricted substances lists to deselect Prop 65 chemicals, and pressures that the Prop 65 list exerts on companies to proactively formulate safer products.

Our goal in publishing these hidden-effects findings is threefold. First, our findings suggest that the scope of the Prop 65 debate should expand to permit a fuller accounting of the law's merits. In light of the current Congress's attempt to preempt Prop 65 wholesale via the cynically named "Accurate Labels Act"[10]—a move that appears part of a broader political agenda to suppress environmental information, as a way to thwart substantive regulation[11]—a fair assessment of Prop 65's impacts is timely. Second, New York State—which, like California, has a consumer market big enough to be of national consequence—has just enacted a toxics law that shares some features with Prop 65.[12] We hope our findings may help inform the approach that proponents of the New York law take to studying and documenting its effects. Third, taking our Prop 65 project as a case study, our findings may inform other academic assessments of information-forcing laws, insofar as our research suggests that the benefits of such laws may often be nonobvious, and thus prone to undercounting.[13]

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10. Accurate Labels Act, H.R. 6044, 116th Cong. (as introduced, March 2, 2020). The stated purpose of the Accurate Labels Act is "to deliver accurate and clear information." *Id.* The word "accurate" is political code for the regulated community's view that labels are improper when they disclose to the public any consumer product risk that is less fully confirmed than the existence of gravity on planet Earth, or risks that are not contextualized in the (inevitably message-dampening) ways industry would prefer. This same position animates industry's newly aggressive First Amendment attacks on disclosure and warning requirements. *See* discussion *supra* note 5; *see also, e.g.*, CTIA v. City of Berkeley, 928 F.3d 832, 847 (9th Cir. 2019) (describing the cell phone industry's characterization of the challenged City mandate, which required retailers to disclose to purchasers the risks of cell phone radiation, as unlawfully compelling "an inflammatory warning about unfounded safety risks").

11. *See* Justin R. Pidot, *Environmental Nihilism*, 10 ARIZ. J. ENV. L. & POL'Y 107, 118 (2019) (describing a current American political trend towards "environmental nihilism," defined as "seeking to suppress information as a means to enervate environmental law"). Pidot posits that information nihilism has arisen in part as deregulatory proponents' response to the hyper-availability of environmental data in the modern age—data likely to suggest objects for new or enhanced regulation. *Id.*

12. S. 501B, 2019 Leg., Reg. Sess., N.Y. ENV'T. CONSERV. § 37 (McKinney 2020) (containing both information-forcing and direct regulatory aspects).

13. This Article is accordingly empirical, descriptive, and conceptual. We have located and explored considerable data not previously mined; proposed a taxonomy for their description; and endeavored to explain their importance. In describing what this Article is, we here note what it is not. Our piece is inherently and intentionally lopsided, in that we have not attempted an assessment of Prop 65's demerits alongside its merits, of the sort that would flow naturally into a legislative reform proposal. Any such proposal would, for example, fully engage critics' recurrent charges that Prop 65 may be unreasonable at "rule" level and frequently appears unreasonable at "site" level. *See* EUGENE BARDACH & ROBERT A.

The Article proceeds in two parts. Part I describes the genesis and key features of Prop 65 and briefly summarizes the law's direct effects via litigation and warning to reduce exposure to toxics. These direct mechanisms are well-chronicled and important, but, we contend, nonexclusive means by which the law protects public health. In Part II, we detail, based on original empirical research, previously unrecognized or undescribed way that Prop 65 reduces toxic exposures through other, indirect means.

We conclude by describing the challenges we faced in tracing causal pathways of Prop 65's hidden influence, which likely accounts for their obscurity. We suggest that this difficulty likewise impedes understanding the impact of other right-to-know laws that, like Prop 65, lack the reporting requirements or clear metrics necessary for gauging impact. We posit a pragmatic reason to document more fully the benefits of information-forcing laws: in an era disfavoring direct regulation, such laws are the most likely to be enacted. Moreover, with even longstanding right-to-know laws increasingly

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KAGAN, GOING BY THE BOOK: THE PROBLEM OF REGULATORY REASONABLENESS 7 (Transaction Pubs. 2002) (1982) (describing the complaint of "rule-level unreasonableness" as the societal-level critique that a law is economically inefficient in the aggregate, and the complaint of "site-level unreasonableness" as the more granular critique of "particular costs and aggravations imposed by particular enforcement officials on particular institutions and businesses"). A global cost-benefit analysis of Prop 65 at rule level, site level, or both—whether for normative purposes or otherwise—awaits others.

Neither is this a comparative piece that attempts to evaluate the utility of Prop 65's information-forcing scheme against other environmental information-forcing schemes, such as the National Environmental Policy Act (NEPA) or the Emergency Planning and Community Right-to-Know Act (EPCRA) at the federal level, or Massachusetts's Toxic Use Reduction Act (TURA) at the state level. Nor does our piece more than glancingly engage the rich theoretical literature on information forcing as environmental regulatory strategy. *See, e.g.,* Paul R. Kleindorfer & Eric W. Orts, *Information Regulation of Environmental Risks*, 18 RISK ANALYSIS 155 (1988) (describing informational regulation as both a substitute for and complement to traditional environmental regulation); John D. Echeverria & Julie B. Kaplan, *Poisonous Procedural "Reform" In Defense of Environmental Right-to-Know*, 12 KAN. J.L. & PUB. POL'Y 579 (2002) (confirming the value of environmental right-to-know regimes, and dismissing industry's criticisms thereof as largely erroneous or overblown); Daniel C. Esty, *Environmental Protection in the Information Age*, 79 N.Y.U. L. REV. 115 (2004) (identifying lack of information as a critical concern for environmental law and policy, and arguing that information gap-filling is key to environmental progress); *see also* Jonathan M. Fisk, *The Right to Know? State Politics of Fracking Disclosure*, 30 REV. POL'Y RES. 345, 361–63 (2013) (collecting political science literature on information-based environmental regulation). We do, however, discuss specific U.S. information-forcing regulatory regimes briefly where relevant to our Prop 65-focused project.

Finally, our piece is not a comparative assessment of Prop 65's efficacy in relation to the myriad local, state, federal, and international regimes governing toxic chemicals, which range from municipal toxics-control ordinances to the European Union's powerful directive on Registration, Evaluation, Authorization, and Regulation of Chemicals (REACH). These laws take a wide variety of approaches to incentivizing or forcing toxics reduction, encompassing information-only regulation, substantive-only regulation, and many hybrid forms. They also apply at varying stages of commerce: REACH, for example, is primarily a pre-market approval law, where Prop 65 is a post-market law. This difference reflects the significantly greater sway of precautionary thinking in the European Union than in the United States with respect to chemicals regulation. Comparative analysis of these laws, whether to assess their effectiveness in controlling specific toxic chemicals, or for other purposes (such as examining their comparative effects on businesses' decisions about product design), likewise awaits future scholars.

vulnerable to anti-regulatory forces,[14] fair assessments of such laws' benefits are particularly urgent.

I. PROP 65'S DESIGN AND DIRECT EFFECTS

A. Overview of Prop 65

Proposition 65 ("Prop 65") is a nationally unique right-to-know law that aims to use the power of information to protect Californians from exposure to toxic chemicals.[15] The law's centerpiece is its requirement that businesses warn the public when consumer products, processed foods, industrial facilities, workplaces, or other premises create human exposure to any chemical identified as "known to the State"[16] to cause cancer or reproductive harm. Although only exposures above statutorily specified risk levels require warnings, these levels are low enough to bring an enormous number of chemical exposures within the law's ambit.[17] Prop 65 also contains a substantive prohibition on the discharge of listed chemicals to drinking water above certain risk thresholds,[18] although in operation, this has been a comparatively minor feature of the law.[19]

Prop 65 differs from most right-to-know laws in requiring not simply disclosure of, but also an express warning about, exposures to toxic chemicals. Although the statute gives businesses some latitude in crafting the required "clear and reasonable warning,"[20] most use the warning forms pre-approved by the state's Prop 65 administering agency, the Office of Environmental Health

14. The Accurate Labels Act, *supra* note 10, would eviscerate numerous information-forcing environmental health regulations. As presently drafted, the Act would not only preempt Prop 65 wholesale, but would also restrict state and federal agencies' ability to establish or enforce disclosure requirements for any chemicals in and radiation emitted by consumer products—ranging from ingredients in cleaning products to radiation emissions from cell phones—wherever these disclosures are accompanied by a cautionary signal.

15. Kara Christenson, *Interpreting the Purposes of Initiatives Proposition 65*, 40 HASTINGS L.J. 1031, 1065 (1989) (noting that text and context, in the form of the ballot pamphlet, official initiative title, and other contemporaneous sources of Prop 65 information, all point to the law's dual inform-and-protect purposes).

16. "Known" is a Prop 65 term of art that encompasses many chemicals suspected to cause harm in humans that have only been definitively proven to cause disease in animals. *See* AFL-CIO v. Deukmejian, 212 Cal. App. 3d 425, 430 (1989) (holding that OEHHA must list animal carcinogens specified under certain sections of the Labor Code).

17. For reproductive toxicants, the level of risk requiring a warning is set by statute at one one-thousandths of the level producing "no observable effect." CAL. HEALTH & SAFETY CODE § 25249.10(c) (West 2020). For carcinogens, the "no significant risk" level is set by regulation at one in 100,000 excess cases of cancer assuming lifetime exposure at the chemical level in question. CAL. CODE REGS. tit. 27, § 25703(b) (2019).

18. HEALTH & SAFETY § 25249.5.

19. *See* discussion *infra* Subpart II.3.

20. HEALTH & SAFETY § 25249.11(f).

Hazard Assessment (OEHHA), which provide a "safe harbor" from enforcement actions.[21] A typical Prop 65 warning has thus for decades read:

Although recently revised OEHHA regulations require safe harbor warnings to provide both on-label specificity about chemicals posing exposure risks and links to off-label information,[22] the requirements that businesses use the signal word "WARNING," and communicate clearly about "known" toxic risks, remain.

Prop 65's origins explain its uncommon expansiveness and stringency. The law was enacted directly by nearly two-thirds of California voters via ballot initiative in 1986, in part as a populist response to the state's perceived laxity in the face of headline-grabbing instances of toxic contamination of drinking water and other environmental media.[23] The ballot argument in favor of Prop 65 stated: "Nearly every week sees a new toxic catastrophe. Children in Fullerton, Riverside, McFarland, Sacramento, and San Jose have already been exposed to chemicals that may make them sterile or give them cancer"; the ballot measure language included a "finding" that "state government agencies have failed to provide . . . adequate protection."[24] In the pesticide-saturated agricultural community of McFarland, for example, cancer rates in the 1980s were reported as 400 times higher than background levels.[25]

Although Prop 65's proponents never realized their hope that the law would be replicated in other states and ultimately federalized,[26] the law remains highly

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21. As one Prop 65 defense firm advises its clients: "[I]n practice, anyone deviating from the 'approved' format is likely to be challenged by the Bounty Hunter community." Peter McGaw, *Proposition 65 A National Problem*, ARCHER NORRIS NEWSL., 2 (Fall 2002); *see also infra* text accompanying note 38 (explaining the characterization of Prop 65 private enforcers as "bounty hunters").

22. *New Proposition 65 Warnings*, PROP 65 WARNINGS, https://www.p65warnings.ca.gov/new-proposition-65-warnings (last visited Oct. 2, 2020) (describing new requirements for Prop 65 warnings, effective August 30, 2018). We here focus on pre-2018 warning requirements, as these have shaped business, regulatory, and litigation conduct with respect to Prop 65 for the past several decades.

23. Although not previously noted in literature on the origins of Prop 65, the measure was also a direct attempt to wound incumbent Republican Governor George Deukmejian in the 1986 election: Deukmejian's record on the environment was decent overall, but his record on toxics was particularly weak. Interview with David Roe, primary author of Prop 65 (Mar. 31, 2020) (on file with authors). This political-strategic aspect to Prop 65 failed, as Deukmejian defeated Democratic challenger Tom Bradley in a landslide. *Election History for the State of California Nov. 4, 1986 General Election,* JOINCALIFORNIA, http://www.joincalifornia.com/election/1986-11-04 (last visited Oct. 2, 2020).

24. VOTER INFORMATION GUIDE FOR 1986, GENERAL ELECTION 53-54 (1986), https://repository.uchastings.edu/cgi/viewcontent.cgi?article=1970&context=ca_ballot_props.

25. Christenson, *supra* note 15, at 1065.

26. *See* Michael Freund, *Proposition 65 Enforcement Reducing Lead Emissions in California,* 10 TUL. ENV'T L.J. 333, 359 n.122 (1997) (describing a failed attempt to emulate Prop 65 in Ohio in 1992); *id.* at 359 (expressing "the hope of the author that other states will enact similar statutes, thereby producing enormous health and environmental benefits for the citizens of those states"); W. Kip Viscusi, *Predicting the Effects of Food Cancer Risk Warnings on Consumers*, 43 FOOD DRUG COSM. L.J. 283, 301 (1988) (predicting the emergence of federal regulations governing warnings about food carcinogens).

relevant in the toxic-control realm. Prop 65 fills considerable voids in the face of sparse federal regulation of toxic chemicals.[27] Legislatures, regulatory agencies, and the consumer marketplace actively use both the Prop 65 list and the scientific information produced by the law's operation to control exposures to listed chemicals (as discussed in Part II). Additionally, the potential for at least partial emulation remains live: More than four decades after Prop 65's enactment, the State of New York has just enacted a law with significant similar features.[28] The current Congress's attempt to preempt Prop 65 wholesale via the Accurate Labels Act is also a further (if backhanded) testament to the California law's ongoing national policy relevance.

B. Mechanics of Prop 65

Prop 65 spawned a regulatory scheme that begins with the state's identification and listing of carcinogens and reproductive toxicants subject to the warning requirement and drinking water discharge prohibition. Since 1991, OEHHA has been tasked with producing and updating the Prop 65 list.[29] To date, OEHHA has placed more than 950 chemicals on the Prop 65 list[30] through a combination of statutory listing mechanisms.[31] Although many listings reflect incorporation by reference to the determinations of other expert bodies and agencies, OEHHA has added fifty-six carcinogens and fifty-five reproductive toxicants that were either not listed by any other authoritative body at the time of Prop 65 listing or, with respect to reproductive and developmental toxicants, were listed somewhere else but not identified as having those health impacts.[32] These Prop 65-only listings make OEHHA's work product more than simply a list of lists.

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27. *See generally, e.g.*, Sarah A. Vogel & Jody A. Roberts, *Why the Toxic Substances Control Act Needs an Overhaul, and How to Strengthen Oversight of Chemicals in the Interim,* 30 HEALTH AFF. 898, 900 (2011), https://www.healthaffairs.org/doi/full/10.1377/hlthaff.2011.0211 (describing how under then-existing federal law, "[t]he barriers to both assessing and managing the risks posed by existing chemicals have proven to be nearly insurmountable"). Recent substantial amendments to TSCA have not yet yielded meaningful protections, and there is some skepticism that they ever will. *See* ENV'T DEF. FUND, TOXIC CONSEQUENCES: TRUMP'S ATTACKS ON CHEMICAL SAFETY PUT OUR HEALTH AT RISK (2019), http://blogs.edf.org/health/files/2019/06/EDF_Toxic_Consequences_Report.pdf).

28. S. 501B, *supra* note 12.

29. *See What We Do*, CAL. OFF. ENV'T HEALTH HAZARD ASSESSMENT, https://oehha.ca.gov/about/what-we-do (last visited Oct. 2, 2020).

30. *See The Proposition 65 List,* CAL. OFF. ENV'T HEALTH HAZARD ASSESSMENT, http://oehha.ca.gov/prop65/prop65_list/newlist.html (last visited Oct. 2, 2020). In more than 90 percent of cases, chemicals are uniquely listed as carcinogens or reproductive toxicants, but some chemicals are cross-listed, and in that sense double-counted, because they have both adverse health effects.

31. Prop 65 has five distinct mechanisms for listing chemicals, conceptually collapsible into two: incorporation by reference of chemicals identified by other specified bodies, or listing based on the independent assessment of OEHHA's own expert committees (one for carcinogens and one for developmental/reproductive toxicants). *See How Chemicals Are Added to the Proposition 65 List*, https://oehha.ca.gov/proposition-65/how-chemicals-are-added-proposition-65-list (last visited Oct. 2, 2020).

32. *See infra* note 266 (describing our process for identifying these chemicals).

After listing, OEHHA in many cases additionally specifies a chemical's "safe harbor level," which helps businesses understand the exposure level requiring a warning.[33] To date, OEHHA has developed more than 300 safe harbor levels,[34] and it continues to develop more.[35] Where there is no state-established level, risk levels that trigger a warning often become the subject of battle-of-the-experts testimony in litigation and may ultimately be established through case settlement.

Prop 65 empowers state and local public enforcers, and citizens generally, to enforce its provisions.[36] In addition to broadly deputizing citizens to sue for violations (and conferring universal standing), Prop 65 substantially financially incentivizes them. Prop 65 plaintiffs may not only obtain attorneys' fees as prevailing public-interest parties under background state law[37] but are also entitled to 25 percent of the (often substantial) penalty amount.[38] The state attorney general, district attorney, and other public enforcers have brought many Prop 65 cases of public health significance,[39] but private enforcement has numerically dominated: Public enforcement suits number only in the hundreds, whereas private enforcement suits are in the thousands.[40]

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33. *See infra* Subpart II.3 (discussing safe harbor levels, which are one of the law's most useful features).

34. *What Are Safe Harbor Numbers?,* CAL. OFF. ENV'T HEALTH HAZARD ASSESSMENT, https://www.p65warnings.ca.gov/faq/businesses/what-are-safe-harbor-numbers (last visited Oct. 2, 2020).

35. In 2012, for example, OEHHA announced that within two years, it expected to establish safe harbor levels for more than seventy listed chemicals. *2012 Priority List for the Development of Proposition 65 NSRLs for Carcinogens and MADLs for Chemicals Causing Reproductive Toxicity,* CAL. OFF. ENV'T HEALTH HAZARD ASSESSMENT (Sept. 4, 2012), https://oehha.ca.gov/proposition-65/crnr/2012-priority-list-development-proposition-65-nsrls-carcinogens-and-madls.

36. CAL. HEALTH & SAFETY CODE § 25249.7(c) (empowering the attorney general, district attorneys, and certain city attorneys or prosecutors to enforce the law); *id.* § 25249.7(d) (providing that where no public prosecutor is "diligently prosecuting" an action, "any person" may bring suit "in the public interest" after providing 60 days' advance notice to the alleged violator(s), along with a "certificate of merit" stating that a person with relevant experience or expertise has reviewed the "facts, studies, or other data" underlying the litigation and "believes there is a reasonable and meritorious basis for the private action").

37. CAL. CIV. PROC. CODE § 1021.5 (establishing attorneys' fees eligibility for, *inter alia*, private plaintiffs whose litigation victory confers a "significant public benefit").

38. HEALTH & SAFETY § 25249.12(b). The remainder of the penalty goes to OEHHA. *Id.* Section 25249.7(b) states that Prop 65 penalties can be up to $2500 per violation, which the attorney general and other plaintiffs argue can mean a single case of exposure without warning. CAL. OFF. ATT'Y GEN., PROPOSITION 65 OUTLINE 12 (2012) (on file with authors). Although many private Prop 65 plaintiffs are impelled by a desire to further the law's toxics-reduction goals, the motivating effect of the potential penalty share is undeniable. Indeed, in cases where litigators with little toxics expertise and unaffiliated with any environmental nonprofit group bring Prop 65 actions over comparatively health-trivial violations, the pecuniary motive often appears to dominate. In the low-nuance contexts of litigation and stakeholder politics, the defense bar and the law's critics thus often use the pejorative term "bounty hunter" to stigmatize all private Prop 65 enforcers. *See generally* Anthony T. Caso, *Bounty Hunters and the Public Interest—A Study of California Proposition 65*, 13 ENGAGE: J. FEDERALIST SOC'Y PRAC. GROUPS 68 (2012).

39. *See infra* Subpart I.1 (discussing some of these cases).

40. CARRICK, *supra* note 9, at 1 (collecting enforcement statistics).

C. Prop 65 in Operation

Prop 65 has generated considerable activity since enactment, as businesses either provide consumer warnings or reform products or processes to obviate the need to warn. These activities in many cases occur through quiet compliance, and in others, as a result of actual or threatened enforcement. According to the author of one Prop 65 treatise, private Prop 65 actions have affected 47,000 businesses, which collectively have spent "perhaps a total of $1 billion . . . in product reformulations, process changes, and other business expenses incurred to achieve Prop 65 compliance, either through preventive compliance or lawsuit-mandated changes."[41]

Prop 65 compliance activity has in turn generated significant controversy. As toxic exposure warnings have proliferated—on product labels and hang-tags, on shelf displays, at points of sale, on the walls of premises (such as parking garages and apartment buildings), and on product websites—both the law's critics and its supporters have expressed concern about the problem of over-warning.[42] As private Prop 65 enforcers have multiplied and made considerable sums, concern about "bounty hunters" exercising little enforcement discretion has likewise mounted.[43] While over-warning and private plaintiffs' selection of litigation targets may raise legitimate policy concerns,[44] their dominance in public debate over Prop 65 threatens to obscure a more basic question: Has Prop 65 advanced its public health goals?

Determining the degree to which Prop 65 has protected the public from toxic exposures is daunting, even leaving aside whether it has done so in a reasonable manner and at reasonable cost. The law encompasses hundreds of chemicals that it has affected to varying degrees in dozens or even hundreds of products (and in some cases affected not at all); there are typically other regulatory and market drivers concurrent with the operation of Prop 65 that make it hard to tease out causation even where use of a particular toxic chemical has decreased over time; and much regulatory compliance occurs invisibly, making

41. *Id.* at 2–3. Carrick's $1 billion cost estimate is unsourced, and may or may not be ballpark-accurate. Unfortunately, but understandably, no other author has offered a competing or more clearly substantiated number, presumably because of the near-impossibility of obtaining compliance-cost information from the vast number of companies subject to Prop 65. Regardless of its accuracy, publication of the "$1 billion" compliance figure in one of the few handbooks on Prop 65 may influence public perceptions of the law.

42. *See, e.g.*, Jeffrey B. Margulies, *A Perspective on the First 20 Years of Proposition 65*, 17 ENV'T L. NEWS 17, 18 (2008) (arguing that "Proposition 65's automaton warning requirement does not enable true 'choice,'" and that warnings should be issued in far fewer circumstances than the law requires); David B. Fischer, *Proposition 65 Warnings at 30—Time for a Different Approach*, 11 J. BUS. & TECH. L. 131, 147–48 (2016) (stating that Prop 65 warnings "alarm rather than inform," and asserting that the law has failed in its purpose of "providing information to individuals"); Clifford Rechtschaffen, *The Warning Game Evaluating Warnings under California's Proposition 65,* 23 ECOLOGY L.Q. 303, 342–43 (1996) (recommending many ways to improve the Prop 65 warning regime, some of which OEHHA has since adopted).

43. Fischer, *supra* note 42 (decrying Prop 65 as a "bonanza for private lawyers").

44. *See* discussion *supra* note 41; *infra* note 48 and accompanying text.

it generally unclear whether and why a company has decided, for example, to eschew or reduce a Prop 65 chemical in a particular product's formulation. Further, even settlements with injunctive provisions requiring business practices aimed at reducing Prop 65 chemicals rarely produce publicly accessible documentation regarding implementation and results.

Additionally, because Prop 65 often influences businesses' conduct on a nationwide basis (especially where it affects consumer products sold in interstate commerce),[45] discerning the law's effects is rarely as simple as comparing California to national data on chemicals in products, people, or the environment.[46] Compounding these problems, the law has no clear metrics for measuring progress in toxics reduction and no reporting provisions that are well-tailored to generating data on changes resulting from the law's implementation.

This backdrop of deficient data has made it easy for the law's critics to emphasize the downsides of highly visible public warnings and the perceived unfairness of readily countable monetary awards to private plaintiffs, while downplaying public health gains, which are complicated to discern and quantify. Supporters of the law have responded by producing detailed case studies of Prop 65 lawsuits that triggered product reformulation and emissions reduction with respect to particular chemicals or in a specific industry sphere. These narratives and counter-narratives have periodic reiterations in academic literature and trade publications, sometimes prompted by a Prop 65 anniversary.[47] These same modes of attack and rehabilitation recur in legislative testimony about Prop 65 whenever the law is threatened with state dilution or federal preemption.

45. In this way, Prop 65 demonstrates what has been domestically termed "the California Effect," and in an European Union context, "the Brussels Effect": up-regulation in the direction of jurisdictions with more stringent standards. *See* DAVID VOGEL, TRADING UP: CONSUMER AND ENVIRONMENTAL REGULATION IN A GLOBAL ECONOMY 6 (1995) (describing "the critical role of powerful and wealthy 'green' jurisdictions"—like California, in the U.S. context—"in promoting a regulatory 'race to the top' among their trading partners"); ANU BRADFORD, THE BRUSSELS EFFECT: HOW THE EUROPEAN UNION RULES THE WORLD xiv (2020) (arguing that the European Union has "highly penetrating power to unilaterally transform global markets . . . through its ability to set standards" that govern business conduct). Key preconditions for a jurisdiction's ability to exert upward regulatory effect, and avoid a race to the bottom that rewards laxity, include the "size and attractiveness" of its market. BRADFORD, THE BRUSSELS EFFECT at 2.

46. One exception to this is the Environmental Defense Fund's (EDF) illuminating comparison of California and national chemical release data for the 1986–1996 period, an interval conveniently constituting the first decade of operation of both Prop 65 and the national Toxics Release Inventory (TRI) created by the Emergency Planning and Community Right to Know Act (EPCRA) of 1986. EDF's analysis showed that California emissions of Prop-65-listed chemicals required to be reported under EPCRA—and only that subset of TRI chemicals—dropped considerably more than nationwide emissions of the same chemicals, providing proof positive of Prop 65's deterrent effects. David Roe, *Little Labs Lost An Invisible Success Story,* 15 GREEN BAG 2d 275, 283–84 (2012). No subsequent analysis of TRI versus Prop 65 chemical release data has, to our knowledge, been published.

47. *See, e.g.*, *Two Decades of Prop 65 How's It Working (or Not)?*, 17 ENV'T L. NEWS (2018) (topical issue).

We do not here attempt to survey the voluminous and diverse scholarship about the merits and demerits of Prop 65 *in toto*.[48] We instead confine our summary to commentaries describing the law's effectiveness in reducing toxics exposures, as a prelude to discussing missing or under-developed themes in the literature on the law's public health contributions.

1. Litigation-Induced Exposure Reduction

Prop 65 litigation has been widely documented to reduce human exposure to listed chemicals by forcing reformulation of consumer products, process changes that reduce the presence of Prop 65 chemicals in food, adoption of air emissions controls at industrial facilities, and, to a lesser extent, reduction of toxic discharges to drinking water. Prop 65 enforcement actions with respect to lead in particular—the subject of more than 5,800 notices of violation to date[49]—demonstrate the power of Prop 65 litigation, settlements, and consent judgments to reduce some of the most harmful chemical exposures that federal law permits.[50] Commentators have noted Prop 65's effects across decades in

48. Literature critical of Prop 65 takes many forms. *See, e.g.*, Margulies, *supra* note 42, at 18 (arguing that "litigation is no way to regulate," and that the law produces "more unfairness and wasted resources than should be necessary" to further its laudable goals); Lisa L. Halko, *California's Attorney General Acknowledges Prop 65 Abuse*, 25 ANDREWS TOXIC TORTS LITIG. REP. 12, at *2 (West 2007) (stating that the law may be too easily abused to exact monetary settlements from litigation-averse retailers, even where they lack the requisite knowledge of product composition that is a predicate for liability.; Caso, *supra* note 38, at 71 (asserting that private plaintiffs, not content with their share of civil penalties, "have switched their focus to requiring payments directly to themselves or another organization 'in lieu' of paying a civil penalty," resulting in "[diversion] of civil penalties from the state treasury to the private accounts of environmental groups"), and at 69 (contending that the law over-incentivizes litigation and thereby encourages unwarranted suits, because bringing Prop 65 litigation is "absurdly easy" (quoting *Consumer Def. Grp. v. Rental Hous. Indus. Members*, 137 Cal. App. 4th 1185 (2006)); McGaw, *supra* note 21, at 3 (arguing that Prop 65 warnings do not distinguish significant from insignificant risks); Fischer, *supra* note 42, at 150–51 (stating that the law is today unnecessary and should sunset, in light of manufacturer responsiveness to consumer demands for green products and ingredient transparency). Fischer further argues that Prop 65's warning requirement violates the First Amendment. *Id.*

Prop 65 literature also includes nuanced treatments that express overall support for Prop 65, but identify many ways that its text or implementation could be improved. *See, e.g.*, William S. Pease, *Identifying Chemical Hazards for Regulation The Scientific Basis and Regulatory Scope of California's Proposition 65 List of Carcinogens and Reproductive Toxicants*, 3 RISK 127 (1992) (suggesting, *inter alia,* improvements to the scientific evidence used to support Prop 65 listings, and ways to make the law more precautionary by enhancing the state's ability to identify chemicals suspected but not yet "known" to be toxic); Rechtschaffen, *supra* note 42, at 342–43 (recommending ways to improve the Prop 65 warning regime). Prop 65 literature also includes commentary on the possibilities and limits of postmarket laws to advance precautionary policy. *See* Carl Cranor, *Information Generation and Use under Proposition 65 Model Provisions for Other Postmarket Laws?*, 83 IND. L.J. 609, 610 (2008).

49. 60-Day Notice Search Results for Lead, CAL. DEP'T JUST., https://oag.ca.gov/prop65/60-day-notice-search (within "Chemical" search criteria box, scroll down and select "Lead"; then select "search") (last accessed Oct. 2, 2020). This figure does not include the many attorney general and other public enforcement actions involving lead exposure.

50. The banning of lead in gasoline, paint, and food-can solder in the United States has revealed consumer products as an important residual source of lead exposure. In 2006, a study by Los Angeles public health officials revealed that among young children presenting with acute lead poisoning, 34 percent had been exposed to lead in household objects. *Death of a Child after Ingestion of a Metallic*

reducing lead exposure from product and food sources as diverse as brass faucets, hair dye, and calcium supplements.[51] Prop 65 continues to reveal (and apply pressure to reduce) lead in products as varied as ceramic baking dishes, the vinyl of children's bounce houses, and artificial turf.[52]

Prop 65 cases related to facilities' failure to warn adjacent or downwind residents about air emissions of lead have likewise produced dramatic exposure reductions. These include elimination of or reductions in lead emitted from a brass and iron foundry; a facility manufacturing an oxidized form of lead for industrial uses; a lead smelter; multiple battery manufacturing and recycling plants; an aluminum recycler; and a glass recycler.[53] Prop 65 private enforcer Michael Freund reports that consent judgments in the 1993-97 period alone resulted in "the elimination of hundreds of thousands of lead exposures that would otherwise still exist," in many cases because the emissions were otherwise permissible under federal, state, and local air pollution laws.[54]

Prop 65 has also engendered substantial consumer product reformulation for chemicals other than lead, by reducing or eliminating toxic solvents in nail polish, auto paints, coatings, and adhesives;[55] arsenic in wooden playground equipment;[56] and formaldehyde emissions from portable classrooms.[57] Air toxics litigation under Prop 65 has likewise successfully reduced communities' exposure to chloroform, methylene chloride, ethylene oxide, perchloroethylene, and hexavalent chromium from industrial operations, demonstrably reducing

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Charm—Minnesota, 2006, MORBIDITY & MORTALITY WKLY. REP. (Mar. 23, 2006), https://www.cdc.gov/mmwr/preview/mmwrhtml/mm55d323a1.htm (citing Los Angeles Childhood Lead Poisoning Prevention Program data).

51. *See* Clifford Rechtschaffen, *How to Reduce Lead Exposures with One Simple Statute The Experience of Proposition 65*, 29 ENV'T L. REP. 10,581, 10,582 (1999) (noting technology-forcing and exposure-reducing effects of Proposition 65 enforcement actions involving plumbing, water meters, ceramicware, calcium supplements, wine bottle foil capsules, and more); Clifford Rechtschaffen & Patrick Williams, *The Continued Success of Proposition 65 in Reducing Toxic Exposures*, 35 ENV'T L. REP. 10,850, 10,850 (2005) (describing Prop 65 success in triggering reformulations of products including raincoats, CD carrying cases, bicycle handlebars, electrical tape, galvanized pipe, brass keys, medicines, and personal care products).

52. *See, e.g.*, 60-Day Notice of Violation from Audrey Donaldson to HaynesBesco Group, LLC and Tractor Supply Company, Notice No. 2019-01742 (Sept. 10, 2019) (alleging presence of and exposure to lead exterior decorations of ceramic backing dishes); 60-Day Notice of Violation from Center for Environmental Health to Adventure Bounce, Inc. et al., Notice No. 2010-00619 (Nov. 11, 2010) (lead from vinyl inflatable play structures); 60-Day Notice of Violation from Los Angeles Unified School District to Forever Green Athletic Fields, Inc., Notice No. 2010-00040 (Jan. 22, 2010) (lead in artificial turf). These notices are available on the California Office of the Attorney General's 60-Day Notice Search website: https://oag.ca.gov/prop65/60-day-notice-search.

53. *See* Freund, *supra* note 26, at 345–59 (summarizing cases and settlements). Although the author does not provide the number of exposed individuals affected by every air case settlement, he identifies certain settlements as dramatically benefitting thousands, tens of thousands, and in one case more than 200,000 persons. *Id.* Unlike in consumer product cases, however, these reductions were facility specific.

54. *Id.* at 334–35.

55. *Id.* at 342–43.

56. Rechtschaffen & Williams, *supra* note 51, at 10,853.

57. *Id.* at 10,850.

volumes of emissions.[58] Cases directed at individual facilities may even cause a company to assess its operations for compliance on a statewide basis, as is reported to have happened with Dow Chemical.[59]

In recent years, private and public Prop 65 enforcers have brought actions that have successfully reduced diesel emissions from trucks,[60] idling school buses,[61] and port operations.[62] These achievements are particularly important, insofar as diesel emissions are so health consequential. In California alone, diesel emissions account for roughly 70 percent of the cancer risk from exposure to air toxics, implicated in an excess of 520 cancers (over the course of a lifetime) per million state residents.[63] And although formally beyond the scope of Prop 65's concerns, diesel emissions in California caused over 10,000 cardiopulmonary fatalities in the most recent decade for which data are available,[64] demonstrating

58. Freund, *supra* note 26, at 344–45; *see also* Michael Freund, *The History of Reducing Toxic Air Emissions and Exposures in California through Proposition 65 Enforcement,* 21 ENV'T L. NEWS 18 (2012); William S. Pease, *Chemical Hazards and the Public's Right to Know,* 33 ENV'T. 12, 18–19 (1991) (describing the significant role of Prop 65 litigation in reducing emissions of carcinogenic ethylene oxide in community airsheds by 66 percent from 1987 to 1991, "the largest reduction of a high-volume chemical listed under Proposition 65").

59. Cranor, *supra* note 48*,* at 615 n.35.

60. In the late 1990s, the California attorney general and private plaintiffs sued and settled with grocery chain distribution centers that were polluting downwind communities with emissions from diesel trucks. They obtained grocery chains' emissions-reduction commitments to limit truck idling times and to swap out diesel trucks and yard machinery for equipment using cleaner fuels. Rechtschaffen & Williams, *supra* note 51, at 10,855–56. The attorney general stated that this settlement was "likely to produce the largest fleet of heavy-duty natural gas trucks in the nation." Press Release, CAL. OFF. ATT'Y GEN., Attorney General Lockyer, Environmental Groups Announce Ground-Breaking Proposition 65 Settlement with Major Grocery Chains over Diesel Pollution (Apr. 27, 2000), https://oag.ca.gov/news/press-releases/attorney-general-lockyer-environmental-groups-announce-ground-breaking.

61. From 2006 to 2009, private Prop 65 plaintiffs sued nine school bus operators for failure to warn that idling buses exceeded Prop 65 diesel exposure levels. The case settlements required emissions-reduction retrofits and fleet modernization through purchase of cleaner replacement buses. *See generally*, Stipulated Judgment: Michael's Transportation Service, Inc., Env't L. Found. v. Atlantic Express of L.A., Inc*.,* No. BC 401484 (L.A. Super. Ct., Feb. 25, 2009), *available at* https://oag.ca.gov/system/files/prop65/settlements/2008-00345S962.pdf.

62. In 2011, following earlier private party litigation against the Port of Los Angeles, the attorney general brought transformative litigation against port operators in Los Angeles and Long Beach. The resulting settlement required defendants to, among other things, electrify yard tractors, cranes, and ships while in port; replace diesel-powered equipment with gas-powered equipment; install diesel exhaust recovery and filtration systems; and help fund the Clean Trucks Program in Los Angeles. *See* Press Release, Cal. Off. Att'y Gen., Attorney General Kamala D. Harris Announces Settlement over Diesel Engine Exhaust in Long Beach and Los Angeles (Aug. 15, 2011), *available at* https://www.oag.ca.gov/news/press-releases/attorney-general-kamala-d-harris-announces-settlement-over-diesel-engine-exhaust.

63. *Overview Diesel Exhaust and Health*, CAL. AIR RES. BD., https://ww2.arb.ca.gov/resources/overview-diesel-exhaust-and-health (last visited Oct. 3, 2020). Diesel emissions are also responsible for substantial noncancer health effects, such as cardiopulmonary deaths and asthma-related hospital visits. *Id.*

64. Megan Schwarzman et al., *Sector-Based Policies to Reduce Diesel Emissions*, SCIENCE (forthcoming Mar. 2021) (using CARB data to estimate 11,695 cardiopulmonary fatalities in California from diesel particulate matter in the 2005-2014 period).

the often substantial health co-benefits of the law.[65] Prop 65 diesel-reduction successes show the law's ongoing value and versatility in filling regulatory white space to control toxic exposures.

In all cases described, Prop 65 litigation has spurred the development of new technology, materials, or practices, inducing companies to reduce exposure to below levels of significance.[66] Even if the effects from enforcement actions have been far from comprehensive,[67] Prop 65 has at least selectively rendered facilities, foods, and consumer products safer than before. In so doing, it has shown the broad utility of the law in addressing risks that are otherwise insufficiently regulated at the local, state, or federal level.

2. Warning-Induced Exposure Reduction

Where companies are unable or unwilling to reduce exposures to Prop 65 chemicals below significance levels, the law requires them to issue consumer warnings that may empower a consumer to change personal behavior to reduce risk. There may well be downsides to the perceived pervasiveness of Prop 65 warnings in some contexts. But there are unquestionably instances in which particular warnings are salient to consumers and promote personal autonomy vis-à-vis risk acceptance—the familiar concept of prior informed consent. As an experienced former public enforcer of Prop 65 explains:

> "Nobody pays attention to warnings." We've all heard that, but it just isn't true at that level of generality. Nobody pays much attention to a generic sign on the front door of an office building advertising that toxic chemicals may be present. People pay a lot of attention to warnings that children's jewelry contains lead, which is why costume jewelry companies will reduce the lead in the product rather than give a warning. People pay attention to warnings about food and personal care products. It doesn't mean that they will always stop using the products, and it shouldn't. People's preference about risk varies, so some people will use warnings to change behavior, and some won't . . . . This simply reflects reality, not a problem created by Proposition 65.[68]

Further, how consumers respond to warnings depends not only on subjective risk tolerance but also on options in the marketplace. When provided an array of choices, a purchaser may, for example, reject a water bottle carrying a warning about the hormone-disrupting chemical bisphenol A (BPA) in favor of one that is "BPA-free." Encountering a warning about fish containing mercury, a consumer may choose a species low in mercury over the swordfish or

65. The term "co-benefits" is typically used to refer to additional societal benefits of a regulation beyond its intended object(s).

66. *See generally* Rechtschaffen, *How to Reduce Lead Exposures*, *supra* note 51.

67. *See* CARRICK, *supra* note 9, at 4 (describing phthalate plasticizers and heavy metals as the most frequently noticed chemicals in recent years, and noting the perennial abundance of enforcement actions related to lead).

68. Edward G. Weil, *Ten Things I Think I've Learned about Proposition 65*, 17 ENV'T L. NEWS 13 (2008).

tilefish that Prop 65 labeling indicates contain the most. In both cases, Prop 65 has advanced its exposure-reduction purpose.

Contrary to critics' assertions, however, consumer-facing warnings were never meant to be the law's main mode of action. The warning requirement was primarily intended, instead, to prompt businesses to design safer products and processes, reducing risk before the consumer even sees a warning.[69] As one commentator explains: Although Prop 65 warnings may fairly be considered a "disaster" from an "information economics perspective" in that they are too prevalent and often substantively uninformative, the warning regime "seems to have had some success" when seen as "consciousness-raising," with businesses the real intended audience.[70] In such an analysis, whether hazard warning information is substantively useful—and whether consumers are even able to process it effectively[71]—may be largely irrelevant to achievement of the law's objectives: As long as fear of having to warn (or of litigation over failure to warn) sufficiently motivates businesses to deselect Prop 65 chemicals, the law has advanced its health-protection goals.[72]

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69. Roe, *supra* note 46, at 276 (describing realization of the intended "judo leverage" of Prop 65, whereby it produces only "a few warning placards" yet "has quietly driven cancer- and birth-defect-causing chemicals out of thousands of everyday consumer products").

70. Michael Barsa, Note, *California's Proposition 65 and the Limits of Information Economics*, 49 STAN. L. REV. 1223, 1235, 1238 (1997). Although there is apparent tension between the notions that warnings are everywhere, and that businesses go to considerable lengths to avoid warnings, a walk down any grocery or big box store aisle confirms that Prop 65 warnings are actually on a very small fraction of products, foods, and premises. It thus appears that even if many companies take behind-the-scenes actions to avoid warnings, it does not require many residual warnings in the marketplace to unsettle consumers, to make them feel "over-warned," or both. This may be because of the intensity of the signal a Prop 65 warning provides, and/or because a warning unsettles consumer expectations that products/foods/facilities in the marketplace are tolerably safe or else would not be made available. Both the vehemence with which the food industry in particular has fought Prop 65 enforcement cases and the intensity with which it has lobbied for preemption of the law bolster this intuition.

71. *See generally* Wesley A. Magat et al., *Consumer Processing of Hazard Warning Information*, 1 J. RISK & UNCERTAINTY 201 (1988) (questioning the utility of consumer-facing hazard warnings because of, *inter alia,* limitations in human capacity to process information).

72. In this regard, Prop 65's warning scheme can sometimes act as a form of "regulation by shaming," in which some of a law's general deterrence value stems from its use as a vehicle for publicizing violations without directly prosecuting them. *See generally* Matthew S. Johnson, *Regulation by Shaming Deterrence Effects of Publicizing Violations of Workplace Safety and Health Laws,* 110 AM. ECON. REV. 1866 (2020) (finding that the Occupational Safety and Health Administration's (OSHA) issuance of press releases about certain facilities' violation of workplace safety and health regulations prompted other facilities to improve their regulatory compliance substantially). Prop 65 clearly (and more powerfully) acts as a general deterrent, however, because of the fear of liability it creates.

The presumption that the elimination of a Prop 65 chemical is health promoting is admittedly an oversimplification. Where elimination of a chemical outright is not possible, industry's incentive under Prop 65 is simply to substitute unlisted chemicals for listed chemicals, whether or not the substitutes are demonstrably safe. Legitimate concern about serial substitution of unsafe chemistries, which has emerged with increasing force in the past two decades, is difficult to address directly under Prop 65's scheme. Problematic substitutions are, however, increasingly addressed in Prop 65 settlements (which may constrain reformulation pathways) and frequently considered under more holistic chemicals management regimes. *See infra* Subpart II.4.

Our research confirms that Prop 65's warning requirement and the litigation risk created by the law's broad enforcement scheme have combined to motivate substantial changes in business practices behind the curtain. It additionally reveals that Prop 65 has directly influenced toxics statutes and regulations in ways that have not to date been described.

II. PROP 65'S HIDDEN ROLES IN REDUCING TOXICS EXPOSURE

The well-chronicled direct effects of Prop 65 in prompting consumer product and industrial process changes, reducing air emissions, and generating sometimes-salient consumer warnings, are important but only partial aspects of the law's public health success. Our research reveals three additional, indirect ways that Prop 65 reduces chemical exposure. These under-recognized mechanisms are the direct result of neither litigation nor consumer self-protection in response to warnings.

We have found that the listing of Prop 65 chemicals (including the scientific analysis that OEHHA performs in support of listings) and the attention that litigation brings to certain chemical risks have (1) spurred direct regulation ("regulatory triggering"); (2) prompted incorporation-by-reference of the Prop 65 list into other regulatory schemes in ways that greatly magnify the law's power and reach ("regulatory ratcheting"); and (3) induced fundamental changes in the ways businesses operate to reduce use of known-toxic chemicals and indeed to make toxics reduction an aspirational principle for entire business sectors ("commerce transforming"). We describe these effects in turn.

A. Regulatory Triggering: Prop 65 Prompts Direct Chemicals Regulation

In the early years of Prop 65's operation, commenters noted the law's potential to spur direct regulation of listed chemicals,[73] which we term "regulatory triggering." As the examples below illustrate, Prop 65 has indeed over time increased command-and-control regulation of specific chemicals. It has prompted new laws governing toxic chemicals in consumer products, such as heavy metals in jewelry and phthalates in plastic toys; it has prompted new laws that reduce lead contamination of drinking water sources; and it has helped to modernize occupational safety standards for chemicals posing workplace risks. These nonlitigation pathways of Prop 65 causal influence—as a result of Prop 65 chemical listings and the science that supports them, and legislative

73. Writing in 1991, William Pease observed that "right-to-know programs can reflect either an 'exit' or 'voice' strategy," and that in addition to facilitating self-protection ("exit"), Prop 65 could enable the public to assert "voice" through, for example, "demanding more stringent emissions controls." Pease, *supra* note 58, at 19. At the time of his writing, however, the voice strategy appears to have been unrealized. *Id.*

mimicry of standards embodied in Prop 65 settlements—have not to date been explored in any depth in the literature.[74]

1. Prop 65 Litigation Spurs Restrictions on Toxic Metals in Jewelry

In 2006, a Minneapolis four-year-old died after swallowing a Reebok-brand promotional charm on his sneaker.[75] The cause was not choking, but lead poisoning: Among the pernicious commercial applications of lead is its use in jewelry as a cheap substitute for materials like silver, gold, and platinum. Children typically ingest the lead in jewelry through repeated hand-to-mouth contact and direct mouthing, as children frequently suck on jewelry, even if they seldom swallow it.[76] Until recently, however,—and until Prop 65 exerted regulatory pressure—there was no federal or state safety standard governing this dangerous source of lead exposure.

In the same year as the tragic death in Minnesota, California enacted groundbreaking legislation to prohibit lead in jewelry as a direct result of Prop 65 litigation that focused state legislative attention on the problem. Prop 65's citizen enforcement scheme generated widespread marketplace surveillance of lead in jewelry, and in 2004,[77] the Office of the California Attorney General and two environmental nonprofits sued several major jewelry retailers for selling lead-containing jewelry without providing a Prop 65 warning.[78] In 2006, the litigation concluded in a consent judgment binding more than 100 manufacturers, distributors, and retailers to reduce lead in jewelry below the Prop 65 safe harbor level.[79]

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74. Prop 65's author does, however, note that Prop 65 litigation prompted promulgation of federal standards for lead in plumbing fixtures. Roe, *supra* note 46, at 283–84 (2012). Another commentator likewise makes brief mention of two Prop 65 enforcement actions that "led to development of new legislative standards providing a substantial reduction in exposures to toxics," citing the ultimate codification of consent judgment standards with respect to lead in jewelry and lead in imported Mexican candies. Margulies, *supra* note 42, at 20. Our detailed examples of Prop 65's regulatory triggering mechanism are intended to be illustrative, not exhaustive.

75. *Death of a Child after Ingestion of a Metallic Charm—Minnesota, 2006*, *supra* note 50.

76. *Cadmium in Children's Jewelry*, N.Y. STATE DEP'T PUB. HEALTH, https://www.health.ny.gov/environmental/chemicals/cadmium/cadmium_jewelry.htm (describing biting, sucking, or mouthing jewelry as "common in children younger than six").

77. *See* Eliza Brooke, *Why Cadmium, a Metal that Can Cause Kidney and Bone Damage, Is Still Used in Jewelry*, VOX (Oct. 12, 2018), https://www.vox.com/the-goods/2018/10/12/17963844/cadmium-jewelry-health-problems (describing intensive product purchasing by the nonprofit Center for Environmental Health (CEH) to determine Prop 65 compliance).

78. *See* 60-Day Notice of Violation from Center for Environmental Health to Target Corp. et al., Notice No. 2003-00585 (Dec. 8, 2003); 60-Day Notices of Violation from As You Sow to Mervyn's and Other Parties, Notice Nos. 2004-00226, 2004-00227, 2004-00228, 2004-00228, 2004-00229, 2004-00230, 2004-00231, 2004-00232, 2004-00233, 2004-00234, 2004-00235, 2004-00236, 2004-00237, 2004-00238, 2004-00239, 2004-00240, 2004-00241 (all filed May 20, 2004). These notices are available on the California Office of the Attorney General's 60-Day Notice Search website: https://oag.ca.gov/prop65/60-day-notice-search.

79. Notice of Entry of Order Granting Motion to Modify Consent Judgment and Entry of Amended Consent Judgment, California *ex rel.* Lockyer v. Burlington Coat Factory Warehouse Corp., No. RG 04-162075 (Super. Ct. Alameda Cty. June 15, 2006).

The terms of this settlement did not give manufacturers the option to warn about toxic exposures, but instead required that they improve product safety by reducing lead levels. Over time, more than 120 additional companies entered the "opt-in" consent decree that bound them to its lead-reduction terms and immunized them from further Prop 65 litigation.[80] While the consent decree was an important victory, it also prompted more lasting change in the form of state legislation. In 2006, the California legislature enacted the Lead-Containing Jewelry Law, Assembly Bill 1681 (AB 1681),[81] codifying the lead limits contained in the Prop 65 consent judgment and thus making them markedly more robust and enduring.[82]

The Prop 65 action was expressly acknowledged as birthing the Lead-Containing Jewelry Law. One committee report described the purpose of the bill as permanent statewide application of the specific substantive standards established in the global consent decree, and noted as background, "[t]he state's testing found high levels of lead in both the metallic and nonmetallic components of the jewelry targeted in the case . . . well above the level that triggers the requirement to provide a Proposition 65 warning to consumers."[83] The report also lauded the attorney general for "[the] notable task of hastening the removal of lead from jewelry" in the absence of any enforceable federal standards.[84]

AB 1681 established the nation's most stringent restrictions on lead in children's jewelry. In 2008, the Consumer Product Safety Commission (CPSC) belatedly issued a binding limit on lead in children's products, implicitly including metal jewelry.[85] But California law has continued to leapfrog past

80. Roger Pearson, *New Legislation Ends Protection for Signatories of Lead-In-Jewelry Consent Decree,* PROP. 65 CLEARINGHOUSE NEWS (Nov. 11, 2001), https://www.prop65clearinghouse.com/articles/2039.

81. A.B. 1681, 2005-2006, Reg. Sess. (Cal. 2006).

82. In the Prop 65 context and more generally, a statute provides substantially greater protection against chemical exposures than a consent judgment for several reasons. First, where a company endeavors to comply with the law *ex ante*, positive law provides superior notice: It is much easier to research the existence of a statute than to discern the existence or non-existence of a relevant consent judgment. Second, where a product exceeds a numerical limit on a toxic chemical (whether expressed as a maximum fraction of a product's composition, or a limit on human exposure to that chemical), a statutory prohibition requires a producer to reduce that chemical, whereas Prop 65 provides the alternative route of simply providing a warning. Third, limitations and exemptions specific to Prop 65—including the need to prove that every defendant had knowledge and intent with respect to creating an exposure to a listed chemical, and the law's restriction to businesses with ten or more employees—make the law weaker than a strict liability statute. Fourth, and finally, even where a party decides to submit to a toxics-reduction consent judgment rather than provide a warning, nonparties generally cannot enforce that judgment. For these reasons, transforming a Prop 65 victory into a formal legislative enactment is an important upward ratcheting of protection.

83. Cal. Bill Analysis, A.B. 1681 S. Comm. on Env't Quality 3 (June 26, 2006), http://leginfo.legislature.ca.gov/faces/billAnalysisClient.xhtml.

84. *Id.* at 5.

85. Consumer Product Safety Improvement Act (CPSIA), 15 U.S.C. § 1278a(2) (2012), https://www.govinfo.gov/content/pkg/USCODE-2011-title15/pdf/USCODE-2011-title15-chap30-sec1278a.pdf. The CPSIA was prompted by recalls of popular toys like Barbie and Thomas the Train that were found to contain high levels of lead. *See Guide for Parents The Dangers of Heavy Metals in Children's Jewelry*,

CPSC standards. California's lead-in-jewelry law was first amended to encompass more product categories and improve compliance and enforcement;[86] amended anew and rebranded as the Metal Containing Jewelry Law to address certain manufacturers' replacement of lead with (also-toxic) cadmium;[87] and amended yet again to encompass additional products.[88] A recently enacted bill (2019) strengthens California's law further still, by reducing the allowable lead content below federal limits and raising the age limit for those defined as "children" whose health interests the law most stringently protects.[89]

In the meantime, the attorney general has reentered the enforcement picture, but now with the ability to litigate under the prohibitory statute that Prop 65 litigation birthed. The attorney general recently sued and settled with five jewelry distributors that violated the new Metal Containing Jewelry Law,[90] bringing them into compliance with the state's lowest-in-the-nation limits on toxics in jewelry. Although scarcely noted in the Prop 65 literature, California's legislation regarding metals in jewelry demonstrates the power of Prop 65 litigation to ramify well beyond settling parties, as court judgments or settlements cross over into overtly regulatory space, triggering direct regulation and transforming mere warning requirements into substantive limits on the use of toxic materials.

2. Prop 65 Science Supports First-in-Nation Phthalate Restrictions

California's legislation to restrict phthalates in toys and childcare products provides another example of industry-transformative regulation of consumer products that was triggered, at least in part, by Prop 65. Here, the simple fact of OEHHA's Prop 65 listings—and the specific scientific expertise that accrued to the agency in the process—helped to boost chemicals into the direct-regulation lane, and convinced an industry-lobbied and ambivalent governor to sign a controversial bill into law.

Phthalates are a group of highly versatile chemicals that soften hard plastics (infamously, rubber duckies[91]); that cause perfumes to linger; and that act as

U.S. CONSUMER PROD. SAFETY COMM'N: ON SAFETY (Jan. 13, 2010), https://onsafety.cpsc.gov/blog/2010/01/13/guide-for-parents-the-dangers-of-heavy-metals-in-childrens-jewelry/.

86. A.B. 2901, 2007-2008, Reg. Sess. (Cal. 2008).

87. S.B. 929, 2009-2010, Reg. Sess. (Cal. 2010).

88. S.B. 646, 2010-2011, Reg. Sess. (Cal. 2011).

89. Safe Jewelry Act, S.B. 647, 2018-2019, Reg. Sess. (Cal. 2019); Claudia Boyd-Barrett, *In Effort to Protect Children, California Could Set Nation's Strictest Limits on Cadmium and Lead in Jewelry*, CAL. HEALTH REP. (May 6, 2019), http://www.calhealthreport.org/2019/05/06/in-effort-to-protect-children-california-could-set-nations-strictest-limits-on-cadmium-and-lead-in-jewelry/.

90. Roger Pearson, *Selling Tainted Jewelry and Support for Stronger Legislation,* PROP. 65 CLEARINGHOUSE (May 18, 2019).

91. RICK SMITH & BRUCE LOURIE, *Rubber Duck Wars*, in SLOW DEATH BY RUBBER DUCK: THE SECRET DANGER OF EVERYDAY THINGS 33 (2011).

effective industrial solvents.[92] Produced, manufactured, or imported into the United States in volumes of nearly half a billion pounds annually,[93] phthalates are deeply embedded not only in American commerce, but also in Americans: National biomonitoring data reveal many phthalate metabolites in the bodies of the general population.[94] Phthalates can disrupt the endocrine system, feminize the male reproductive system, and pose a cancer risk.[95] Their use is increasingly controlled by state and federal law.

Phthalate regulation in the United States began as a direct result of Prop 65's operation in California, where OEHHA's scientific work in support of phthalate chemical listings informed and enabled passage of the nation's first state phthalate restriction: the Toxic Toys Act of 2007.[96] At a time when the toxicity of phthalates as a chemical class was politically (and to some degree, scientifically) contested,[97] OEHHA listed multiple phthalates under Prop 65, emboldening legislators to regulate. Thereafter, OEHHA's reassurance to Governor Schwarzenegger that the science behind such action was sound appears to have been crucial to getting his signature on a hard-fought phthalates restriction bill.[98]

Between 2003 and 2007, OEHHA listed the most widely used phthalate and four of its chemical cousins as developmental toxicants under Prop 65, generating substantial scientific support documents for each listing.[99] In the

92. *See* Jennifer Sass, *Good News! CPSC Proposes to Ban Hazardous Phthalate Chemicals in Toys and Child Care Products*, NAT. RESOURCES DEF. COUNCIL: EXPERT BLOG (Apr. 28, 2015), https://www.nrdc.org/experts/jennifer-sass/good-news-cpsc-proposes-ban-hazardous-phthalate-chemicals-toys-and-child-care (describing uses of phthalates).

93. EPA, PHTHALATES ACTION PLAN (2012), https://www.epa.gov/sites/production/files/2015-09/documents/phthalates_actionplan_revised_2012-03-14.pdf (citing 2006 estimate of domestic volume of "over 470 million pounds per year").

94. *Phthalates Factsheet,* CTR. FOR DISEASE CONTROL & PREVENTION: NAT'L BIOMONITORING PROGRAM, https://www.cdc.gov/biomonitoring/Phthalates_FactSheet.html (last visited Oct. 3, 2020); *see also* LEGISLATIVE FINDINGS S.B. 1108, sec. (1)(b) (2007) (noting, based on national urine sampling, that "virtually everyone carries some levels of phthalates in their body").

95. *See generally* Sailas Benjamin et al., *Phthalates Impact Human Health Epidemiological Evidences and Plausible Mechanism of Action,* 340 J. HAZARDOUS MATERIALS 360 (2017) (clinically focused review article on diverse health hazards of phthalates).

96. A.B. 1108, 2006-2007, Reg. Sess. (Cal. 2007) (codified as CAL. HEALTH & SAFETY CODE § 108937).

97. Conflicting regulatory and scientific stances on phthalates' safety during the relevant time period is exemplified by a unanimous statement by the U.S. Expert Panel for Cosmetic Ingredient Review declaring phthalates to be safe as used in cosmetics, coincident with a European Commission requirement that the industry remove two phthalates from cosmetics. *See* THOMAS O. MCGARITY & WENDY E. WAGNER, BENDING SCIENCE: HOW SPECIAL INTERESTS CORRUPT PUBLIC HEALTH RESEARCH 194–95 (2008) (describing this discordance).

98. E-mail from Sam Delson, Deputy Dir. for External and Legislative Affairs, Cal. Off. of Env't Health Hazard Assessment (OEHHA), to Claudia Polsky (June 18, 2018) (on file with authors) [hereinafter Delson E-mail].

99. OEHHA listed dibutyl phthalate (DBP), benzyl butyl phthalate (BBP), di-n-hexyl phthalate (DnHP), diisodecyl phthalate (DIDP), and Di-2-ethylhexyl phthalate (DEHP) as reproductive/ developmental toxicants. In 1988, OEHHA listed DEHP as a carcinogen, and in 2013, it listed a sixth phthalate, diisononyl phthalate (DINP), as a carcinogen. Cancer listings for DEHP and DINP were based

midst of this listing flurry, the California legislature in 2006 made a first pass at enacting a phthalates restriction law.[100] Although the initial bill failed, the legislature successfully passed the Toxic Toys Act (Assembly Bill 1108) the following year, imposing stringent regulations on the use of four of the Prop 65 phthalates (as well as two additional phthalates) in toys or childcare articles.[101] The bill findings described "extensive scientific literature reporting the hormone-disrupting effects [of certain] phthalates . . . found in humans at levels associated with adverse effects."[102]

The advocacy group literature supporting this law emphasized that four of the phthalates proposed for regulation were listed under Prop 65, and decried the absence of any law controlling their use.[103] Multiple committee reports likewise described the Prop 65 listings as among the factors pointing to the need to regulate phthalates.[104] Additionally, AB 1108 provided that when replacing

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on an independent evaluation by the state's qualified expert body, the Carcinogen Identification Committee. *See Di(2-ethylhexyl)phthalate (DEHP)*, CAL. OFF. ENV'T HEALTH HAZARD ASSESSMENT, https://oehha.ca.gov/proposition-65/chemicals/di2-ethylhexylphthalate-dehp (last visited Feb. 24, 2020); *Chemical Listed Effective December 20, 2013 as Known to the State of California to Cause Cancer Diisononyl Phthalate (DINP)*, CAL. OFF. ENV'T HEALTH HAZARD ASSESSMENT (Dec. 12, 2013), https://oehha.ca.gov/proposition-65/crnr/chemical-listed-effective-december-20-2013-known-state-california-cause-cancer). OEEHA's reproductive toxicity listings for phthalates were based on listings by other authoritative bodies. *See* Cal. EPA OEHHA, Notice to Interested Parties, Chemical Listed Effective October 24, 2003 as Known to the State of California to Cause Reproductive Toxicity (Oct. 24, 2003), https://oehha.ca.gov/media/downloads/crnr/6ddehpnot.pdf (DEHP listing); Cal. EPA OEHHA, Notice to Interested Parties, Chemical Listed Effective December 2, 2005 as Known to the State of California to Cause Reproductive Toxicity (Dec. 2, 2005), https://oehha.ca.gov/media/downloads/proposition-65/chemicals/120205final3phthalates.pdf; Cal. EPA OEHHA, Notice to Interested Parties, Chemical Listed Effective April 20, 2007 as Known to the State of California to Cause Reproductive Toxicity (Apr. 20, 2007), https://oehha.ca.gov/media/downloads/proposition-65/chemicals/42007notice20diisodecyl20phthalate.pdf (DIDP, BBP, DBP, and DnHP listings).

100. Cal. Bill Analysis, A.B. 1108, Assemb. Comm. on Health 4 (May 8, 2007), http://www.leginfo.ca.gov/pub/07-08/bill/asm/ab_1101-1150/ab_1108_cfa_20070507_095358_asm_comm.html (describing an "Informational Hearing").

101. A.B. 1108, *supra* note 96. The Act restricts the use of DEHP, DBP, BBP, and DIDP to negligible fractions in toys and children's products. In 2009, Prop 65 already listed these chemicals. The Act also restricts DINP, which OEHHA listed in 2013, and DnOP, which remains unlisted.

102. *Id.* at sec. 1(b).

103. *Terminate Toxic Toys*, CAL. LEAGUE CONSERVATION VOTERS (2007), https://web.archive.org/web/20070816040035/http://www.ecovote.org/toxictoys/ (urging support letters for AB 1108). In perhaps a reflection of the insularity of U.S. domestic policymaking, a U.S. state or federal body's identification of chemicals as toxic has repeatedly proven important in the chemicals hazard arena: Legislatures and administrative agencies are typically unwilling to rely on, for example, European Union assessments of chemical hazards, as evidenced by the persistence in the market of many consumer product chemicals banned in European Union countries. *See Banned in Europe, Safe in the U.S.,* IFL SCI. (June 9, 2014), https://www.iflscience.com/health-and-medicine/banned-europe-safe-us/; MICHAEL P. WILSON ET AL., GREEN CHEMISTRY: CORNERSTONE TO A SUSTAINABLE CALIFORNIA 7 (describing the gap between safety of European and U.S. consumer product ingredients). Thus, the mere fact of a domestic state-agency listing under Prop 65 has conferred an imprimatur of legitimacy on an expert body's hazard identification.

104. *See* Committee Reports, AB 1108, *available at* http://leginfo.legislature.ca.gov/faces/billAnalysisClient.xhtml?bill_id=200720080AB1108.

phthalates addressed in the bill, manufacturers must specifically avoid introducing any other chemical listed under Prop 65.[105]

According to an OEHHA spokesman involved in the bill analysis, enacting state phthalate legislation was still a political nail-biter:

> The bill was highly controversial and passed the Senate and the Assembly with [just over] the minimum votes it needed in each house. But the Governor took a strong interest in it, and took the unusual step of asking OEHHA scientific questions about the issue during the period when he was formulating his decision. He eventually signed it.[106]

Thus, in addition to supplying up-front reasons to restrict certain phthalates and a back-end regulatory floor for reformulation efforts, OEHHA's intensive engagement with phthalates science for the Prop 65 listing process made it a credible information source in ways that appear to have swayed the governor, resulting in AB 1108's enactment into law.

California's law immediately gained federal attention and prompted emulation. In 2008—after debate that consistently referenced California's status as "the first state in the Nation to ban the sale of kids toys with phthalates"[107]—Congress enacted the Consumer Product Safety Improvement Act.[108] This law for the first time established federal consumer product safety standards for phthalates; they were borrowed from, and mimic, California's standards.[109] In

105. This was the first time the Prop 65 list was used wholesale in state law as a prohibitory list with respect to reformulations of covered products. As such, it marked an evolution in legislative thinking towards avoiding problematic chemical substitutions—thinking that would become central to the state's Safer Consumer Products program. *See infra* Subpart II.B. We note that although AB 1108 requires that when reformulating products to comply with restrictions on specific phthalates, manufacturers avoid using other chemicals "listed in the California Safe Drinking Water Act (Chapter 4 (commencing with Section 116270) of Part 12 [of the Health and Safety Code])," CAL. HEALTH & SAFETY CODE §108939(b), this is an erroneous cross-reference. The law clearly meant to cross-reference Prop 65, insofar as the cited code section does not "list" anything, but rather, describes the state's desire to exceed federal standards for contaminants in public drinking water supplies. The error surely stems from the similarity between the title of cited statute and the official title of Prop 65 (the "Safe Drinking Water and Toxic Enforcement Act").

106. Delson E-mail, *supra* note 98. The bill passed by slim margins: a 21-18 vote in the Senate, and a 41-34 vote in the Assembly. Unofficial Ballot, A.B. 1108 (Cal. Sept. 4, 2007), http://leginfo.ca.gov/pub/07-08/bill/asm/ab_1101-1150/ab_1108_vote_20070904_0435PM_sen_floor.html; Unofficial Ballot, A.B. 1108 (Cal. June 5, 2007), http://leginfo.ca.gov/pub/07-08/bill/asm/ab_1101-1150/ab_1108_vote_20070605_0703PM_asm_floor.html.

107. *Safety of Phthalates and Bisphenol-A in Everyday Consumer Products Hearing Before the H. Subcomm. on Commerce, Trade, and Consumer Prot. of the Comm. on Energy and Commerce,* 110th Cong. 153 (2008), *available at* https://www.govinfo.gov/content/pkg/CHRG-110hhrg56091/pdf/CHRG-110hhrg56091.pdf.

108. Consumer Product Safety Improvement Act of 2008, Pub. L. No. 110-314, § 108 ("prohibition on sale of certain products containing specified phthalates").

109. As the Office of the California Attorney General has explained: "CPSIA adopted the same phthalate restrictions that had previously been enacted in AB 1108. CPSIA sets the same concentration limit (0.1 percent) on the same six phthalates as does AB 1108, and both statutes use the same . . . approach to the types of products covered by their standards." Letter from Timothy Sullivan, Deputy Attorney Gen., to Cheryl A. Favley, Gen. Counsel, U.S. Consumer Prod. Safety Comm'n 3 (Dec. 3, 2008), https://oag.ca.gov/prop65/ag-letters. The Deputy Attorney General's letter notes, however, that definitional

this case, OEHHA's work as a credible source of toxicity information about phthalates—an institutional role wholly created by Prop 65—had a triggering effect, prompting health protections that now extend nationwide.

3. Prop 65 Spurs Reduction of Lead in Drinking Water

The formal title of Prop 65—the "Drinking Water and Toxic Enforcement Act of 1986"—suggests that drafters' concerns about toxic exposures from drinking water were particularly acute. This makes it perhaps facially surprising (at least, to those who ruminate over bill titles) that non-drinking water enforcement cases so heavily predominate. The law's prohibition on discharge of listed chemicals to drinking water has in practice been a minor feature, accounting for a tiny fraction of enforcement cases.[110] In fact, however, the proposition's title was more marketing maneuver than substantive focus: "If you want to get the public to pay attention to an issue," advises primary bill author David Roe, "use the words 'drinking water' or 'children.'"[111]

Additionally, the law's drinking water provisions have in practice proven substantially more difficult to enforce than its warning requirements. In the case of pesticides listed under Prop 65—which, like agricultural pesticides generally, are often applied so as to make them likely to contaminate drinking water—a key political accommodation (reflecting the lobbying power of California's agricultural industry) has made lawsuits harder to bring than the statute's text would suggest. Specifically, a 2001 OEHHA regulation states that where a party responsible for application of a Prop 65 pesticide can show compliance with various state pesticide and groundwater protection regulations, "it shall be presumed that the chemical probably will not pass into any source of drinking water" and thus does not trigger the drinking water discharge prohibition.[112]

Other challenges in enforcing Prop 65's drinking water provisions were either uncontemplated, or left unaddressed, by bill authors.[113] The biggest problem is proving where, how, and from whom a Prop 65 drinking water

differences regarding products subject to the federal and California laws mean that AB 1108 applies to more products.

110. *See* CARRICK, *supra* note 9, at 180, 218 (noting that in the early years of Prop 65, "the no discharge unless safe requirement was . . . virtually non-existent as an enforcement phenomenon," and that in the years since, "[it] has clearly lagged the duty to warn as a focus of enforcement action").

111. Interview with David Roe, former Staff Attorney at the Envt'l Def. Fund (Mar. 31, 2020) (on file with authors).

112. CAL. CODE REGS. tit. 22, § 12405 (2020). Prop 65 discharge suits remain theoretically viable where a plaintiff can prove actual, as opposed to merely threatened, pesticide contamination of drinking water. *See* Michael W. Graf, *Regulating Pesticide Pollution in California under the 1986 Safe Drinking Water and Toxic Exposure Act (Proposition 65)*, 28 ECOLOGY L.Q. 663, 742–43 (2001) (discussing this possibility). Problems of proof and high investigatory cost, however, have deterred most such litigation in practice.

113. The list that follows cumulated from author Polsky's experiences attempting to construct drinking water enforcement cases on behalf of the Office of the California Attorney General; related difficulties shared by private enforcers of Prop 65; and difficulties that Mr. Roe acknowledges inhere in the law itself. *See* Roe Interview, *supra* note 111.

contaminant emanates, given that causal chains are often long.[114] It is also challenging to establish a "significant amount" for purposes of the law's drinking water discharge prohibition,[115] particularly given uncertainty as to whether the measurement point is at the point of discharge or at a more distal point after some mixing with and dilution by receiving water.[116]

Additionally, most discharges to sources of drinking water that could expose consumers to listed chemicals emanate from publicly owned treatment and water works that benefit from Prop 65's restriction to private parties.[117] Finally, the tendency of toxic water pollutants to come from multiple dischargers in the same watershed, such as where many growers of the same crop use and discharge the same listed pesticide, makes it difficult to determine whether any one party has caused a resulting violation.

A further impediment to drinking water suits is that the potency of the motivating remedy—a discharge prohibition with no possibility of warning instead—greatly complicates both settlement and litigation. As Roe observes: "A company will not voluntarily say, *Put me out of business by prohibiting my discharge*. And these politics matter in court if you are seeking injunctive relief. A judge will not want to enforce the letter of the law if there are business-obliterating consequences."[118] Here, the power of the statutory remedy may, ironically, have disserved the law's stated goal of drinking water safety.

Finally—and potentially importantly, given private plaintiffs' domination of Prop 65 enforcement—the penalty structure of the law may make drinking water cases less lucrative to prosecute than failure-to-warn cases,[119] at least where the object of concern is a water-polluting facility rather than a consumer product that causes drinking water pollution. Prop 65 specifies a $2,500 maximum penalty per "violation," which can mean a single unit of a consumer product.[120] A full day of toxic discharge to drinking water from a facility may

114. *See* Graf, *supra* note 112, at 741 (noting that "[t]ypically, groundwater contamination is detected as a pesticide concentration in the groundwater reservoir. Such a detection may not provide immediate information as to the source or nature of the discharge"). Graf identifies possible ways to establish causation, including "discovery into local hydrology and local pesticide uses," but this is a heavy lift, and substantially more complex than plaintiffs' problems of proof in many types of Prop 65 litigation. *Id.* at 742.

115. The prohibition on discharges of listed chemicals to drinking water does not apply if, inter alia, "[t]he discharge . . . will not cause any significant amount of the discharged . . . chemical to enter any source of drinking water." CAL. HEALTH & SAFETY CODE § 25249.9(b)(1) (West 2020).

116. Cal. Off. Att'y Gen., *Proposition 65 The Safe Drinking Water and Toxic Enforcement Act of 1986, An Outline* 11 (July 2015) (on file with authors) [hereinafter *Prop 65 Outline*]; *see also* CARRICK, *supra* note 9, at 208–09 (discussing problems in interpreting the applicability of any agency policy regarding a "mixing zone" for purposes of determining Prop 65 compliance).

117. CARRICK, *supra* note 9, at 218 (describing implications of governmental exemption in CAL. HEALTH & SAFETY CODE § 25249.11(b)).

118. Roe interview, *supra* note 111.

119. *Id.*

120. *Prop 65 Outline*, *supra* note 116, at 15 (stating that although the term "violation" is undefined, "[i]t is argued by plaintiffs and the Attorney General to mean each exposure without warning, which can generate very large potential penalties").

constitute only a single violation, however, essentially capping penalties at less than $1 million per full year of unlawful discharge ($2,500 x 365 days).[121] Facing high investigative costs, vague regulatory standards, little settlement leverage, uncertain litigation prospects, and a potentially low monetary return on investment, it is unsurprising that only the most mission-minded plaintiffs spend time developing drinking water discharge cases.

These many impediments notwithstanding, occasionally a legally well-conceived and factually compelling drinking water suit breaks through—often, where a consumer product is the culprit in contaminating a source of drinking water.[122] Such a health-consequential breakthrough was the case for the metal weights used to balance car and truck tires, which drew the attention of mission-oriented nonprofit Center for Environmental Health (CEH).

Until recently, vehicle wheel weights worldwide were made almost entirely of lead,[123] with no regulatory controls on manufacture or use. According to the U.S. Geological Survey, weights that fall off vehicle wheels and onto U.S. roads have contributed well over 1,000 metric tons of lead per year to the environment.[124] As wheel weights' role in environmental lead contamination became known—present concentration of lead in the environment being approximately 1,000 times pre-industrial levels[125]—multinational pressure for source control emerged. In 2005, the European Union banned lead wheel weights, and Japan and Korea began a phaseout.[126]

That same year, the Michigan nonprofit Ecology Center petitioned the U.S. Environmental Protection Agency (EPA) to ban lead wheel weights under the Toxic Substances Act.[127] In a familiar act of U.S. exceptionalism in toxics

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121. Several seasoned members of the Prop 65 defense bar have characterized such a potential penalty as an "enormous" liability risk from the perspective of dischargers, however. Rick R. Rothman et al., *California's Prop 65 and the Boy Who Cried Wolf*, 14 NAT. RESOURCES & ENV'T 227, 229 (2000). In other words: what insufficiently motivates plaintiffs to litigate may still sufficiently frighten defendants to prompt compliance.

In 2002, Rothman et al. decried what they characterized as a (then-recent) "onslaught of Proposition 65 claims" related to drinking water discharges from leaking underground fuel tanks and other sources that revealed the latent (and to their clients, unwelcome) power of Prop 65's drinking water discharge prohibition. *Id.* at 230.

122. A Prop 65 violation occurs where a party contaminates a surface or groundwater "source" of drinking water, which need not be a source used for this purpose. The statute defines a "source of drinking water" to include both present sources of drinking water and any waters that a regional water quality control board has designated or identified in a water quality control plan as "suitable for domestic or municipal uses." HEALTH & SAFETY § 25249.11(d).

123. Center for Environmental Health (CEH), *Clean Highways and Water! An End to Lead Wheel Balancing Weights in California* (Aug. 2008), as cited in Senate Rules Committee analysis of SB 757 (June 2009), at p.4 (describing wheel weights as typically 95 percent lead and 5 percent antimony).

124. Donald I. Bleiwas, U.S. Geological Survey, *Stocks and Flows of Lead-Based Wheel Weights in the United States* 4 (2006), https://pubs.usgs.gov/of/2006/1111/./2006-1111.pdf (citing estimates of 1,600 metric tons per year and upward, depending on the year and study methodology).

125. CEH, *supra* note 123.

126. S. COMM. ON ENV'T QUALITY REPORT, SB 757—LEAD WHEEL WEIGHTS 4 (Apr. 20, 2009), https://leginfo.legislature.ca.gov/faces/billAnalysisClient.xhtml?bill_id=200920100SB757.

127. TSCA Section 21 Petition; Notice of Receipt*,* 70 Fed. Reg. 35,667, 35,667 (June 21, 2005).

policy, however,[128] the agency declined to exercise its discretionary authority.[129] In a further too-familiar move, EPA instead in 2008 launched a weak voluntary program, the National Lead-Free Wheel Weight Initiative.[130] Several years later, lead remained the U.S. wheel weight material of choice, and a policy impasse remained at the federal level.[131]

In 2008, however, CEH found a clever way to use its California home court to take on the wheel weight industry. Lead from wheel weights that get pulverized on roadways ultimately ends up in—among other places—surface waters; CEH reasoned that this environmental fate implicated Prop 65's prohibition on discharges of listed chemicals to sources of drinking water.[132] CEH thereupon issued a notice of violation to four major domestic manufacturers of wheel weights that together accounted for a substantial share of lead wheel weight sales in California,[133] on the theory that the amount of lead discharged by each and all of them was sufficient to constitute a violation given the law's stringent safe harbor level for lead.[134]

Not only did the manufacturers settle quickly and fail to contest CEH's claims in court, but they also *appreciated* that all the key manufacturers were targeted at once. Plaintiff's counsel Mark Todzo explains:

> It was a perfect storm, in that when we sent the notice of violation to manufacturers, they knew lead was bad. But nobody wanted to be the only one to switch. Lead wheel weights mold to the tires better, don't fall off, and have other advantages over their steel counterparts. Nobody wanted to be the one to lose market share to the companies still using lead. Defendant companies essentially welcomed [the suit and its resolution] so that they could all transition out of lead together.[135]

The resulting consent judgment contemplated a lead phaseout that was technically straightforward, notes Todzo, insofar as defendants were already manufacturing some non-lead wheel weights at the time they received the Prop

128. *See* discussion *supra* note 103 (describing U.S. toxics regulators as largely impervious to inspiration from abroad).

129. Letter from Jeff Gearhart, Ecology Center, et al. to Lisa Jackson, Admin., EPA, Re: Citizen Petition under TSCA to Prohibit the Production and Use of Lead Wheel Weights in the United States 1 (May 28, 2009), *available at* https://www.epa.gov/sites/production/files/2015-10/documents/petition4.pdf (renewed 2009 petition, describing failed petition attempt in 2005).

130. *Id.* at 2 (describing EPA's action and estimating that "no more than one-third of the lead wheel weight market would potentially be changed to lead-free due to the [initiative]").

131. *Id.* (describing insufficiency of federal action and states' increasing legislative activity to fill the policy void).

132. Interview with Mark Todzo, Counsel, Lexington Law Group (May 19, 2020) (on file with authors).

133. Complaint for Injunctive Relief and Civil Penalties, Ctr. for Envt'l. Health v. Perfect Equip., Inc., No. RG08388923 (Super. Ct. Alameda Cty. May 22, 2008) ¶ 23 (on file with authors).

134. Nothing in the statute expressly indicates the availability of relief predicated on joint-and-several or market-share liability, and no fully litigated case has resolved such questions. Plaintiff's facts made for a particularly strong test case, however, insofar as CEH had sued nearly every domestic wheel-weight manufacturer.

135. Todzo interview, *supra* note 132.

65 notice[136]—presumably as a form of bet-hedging in light of foreign regulatory signals and domestic regulatory pressure. But as is typical in an unregulated market, competitive pressure to maximize performance while minimizing cost meant that lead wheel weights continued to dominate; absent legal restriction, they were not organically displaced by available, safer, and environmentally preferable alternatives, such as steel weights. Thus, raising the regulatory floor for all current industry players permitted a relatively painless market transition that was affirmatively supported by targeted businesses.

From there, it was a small step to the statehouse, where again, defendants not only acquiesced in but *urged* the codification of the consent judgment as a state law.[137] Here, the enthusiasm of wheel weight manufacturer-defendants—who were all U.S. based—stemmed from the fear that foreign (and specifically, Chinese) manufacturers would fill a vacuum and greatly increase their provision of lead wheel weights to the U.S. market. According to Todzo: "After the litigation settled, the looming threat was that as soon as defendants exited the lead-in-wheel-weight marketplace, Chinese manufacturers would zoom in and take up market share."[138] Foreign manufacturers would be much harder to prosecute in U.S. courts and to obtain an enforceable judgment against.

Senate Bill 757 of 2009 (SB 757), which flowed quickly and directly from CEH's Prop 65 litigation,[139] prohibited manufacturing, sale, or installation in California of a wheel weight containing more than 0.1 percent lead.[140] Reflecting increased attention to the problematic phenomenon of toxic replacements for regulated chemicals, the bill further provided that if any alternative to lead contained in wheel weights was identified as a "chemical of concern" pursuant to the state's green chemistry law,[141] then that alternative would be subjected to the harm-reduction evaluation process specified therein.[142] Here, as with heavy metals in jewelry and phthalates in plastic toys, Prop 65 directly spurred health-protective state legislation—and that legislation likewise ramified well beyond state borders.

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136. *Id.*

137. As one experienced Prop 65 defense attorney concedes in describing the "[m]assive enforcement waves targeting entire industries [that] have always existed under Proposition 65," such waves "foster cooperation and uniform solutions to ensure a level playing field." Judith M. Praitis, *Trends in the Enforcement of California's Proposition 65*, 15 ABA ENV'T ENFORCEMENT & CRIMES COMM. NEWSL. 5, 5 (2014).

138. Todzo interview, *supra* note 132.

139. The bill's direct traceability to CEH's suit is clear from all committee reports. *See* Committee Reports, S.B. 757, *available at* http://leginfo.legislature.ca.gov/faces/billAnalysisClient.xhtml?bill_id=200920100SB757. Indeed, plaintiff's counsel helped draft the bill. Todzo interview, *supra* note 132.

140. S. B. 757 2008-2009, Reg. Sess. (2009), (adding this prohibition as section 25215.6(a) of the California Health and Safety Code).

141. *See* discussion *supra* notes 72 and 104 (discussing the problem of health-harmful or insufficiently researched chemical substitutions).

142. CAL. HEALTH & SAFETY CODE § 25215.6(b). California's green chemistry law, Assembly Bill 1879 of 2008, contemplates a detailed process for analysis of chemicals proposed as alternatives to known-toxic ones. *Id.* §§ 25252–25257.2.

In the wake of SB 757, nine states passed copycat legislation banning the sale, distribution, and use of lead wheel weights, in every case with industry support.[143] Although EPA in 2009 granted a renewed petition from environmental groups to initiate a rulemaking on banning lead wheel weights, the agency has never issued a proposed rule.[144] Even absent federal regulation, however, Prop 65-triggered state actions appear to have greatly reduced domestic manufacture of leaded wheel weights: A Google search for "buying lead wheel weights," for example, today yields primarily hits for eBay and other aftermarkets selling used lead weights for lead scrap or fishing sinkers.[145] Thus, Prop 65's drinking water discharge prohibition, like its warning requirement, has by regulatory triggering reduced the potential for human exposure to (and environmental contamination with) one of the most toxic materials in commerce.[146]

4. Prop 65 Listings and Risk Levels Enhance Workplace Safety

As with drinking water, the usual Prop 65 narrative with respect to workplace safety—supported by an examination of filed Prop 65 enforcement actions—is that the law has little capacity to reduce chemical exposures to workers. Well understood limitations with respect to workers' chemical safety relate largely to Prop 65's limitations on the duty to warn in a workplace setting, such as its exemption for businesses with fewer than ten employees.[147] This makes the law unenforceable as to small businesses, which also often have weaker worker protections.[148]

Likewise, employers' compliance with California Division of Occupational Safety and Health (Cal/OSHA) requirements for communication to workers

143. Environmental Counsel of the States, Res. 08-9: Phasing Out the Sale and Installation of Lead Wheel Weights 2 (2008), https://www.ecos.org/wp-content/uploads/2020/04/Resolution-08-9-Lead-Wheel-Weights-v2020.pdf.

144. *Id.* (describing petition by the Ecology Center and the Sierra Club).

145. *See, e.g.*, *Lead Wheel Weights All Listings*, EBAY, https://www.ebay.com/b/Lead-Wheel-Weights/bn_7024799170 (visited May 31, 2020). Manufacturers are in limited cases selling new lead wheel weights in unrestricted states. *See, e.g.*, *Search results for "lead wheel weight"*, ZORO, https://www.zoro.com/search?q=lead%20wheel%20weight (visited May 31, 2020) (noting sale-restricted states).

146. *See generally* PRESIDENT'S TASK FORCE ON ENVIRONMENTAL HEALTH RISKS AND SAFETY RISKS TO CHILDREN, FEDERAL ACTION PLAN TO REDUCE CHILDHOOD LEAD EXPOSURES AND ASSOCIATED HEALTH IMPACTS 3 (2018), https://ptfceh.niehs.nih.gov/resources/lead_action_plan_508.pdf ("No safe blood lead level in children has been identified. Even low levels of lead in blood have been shown to affect IQ, ability to pay attention and academic achievement.").

147. CAL. HEALTH & SAFETY CODE § 25249.11(b) (2020).

148. Small firms (fewer than 100 employees) are known to have much higher rates of occupational injury and illness than large firms, a disparity attributed to their lesser ability to pay for safety equipment and training, exemption from some workplace safety rules, and frequent lack of workers compensation coverage. *See* J. PAUL LEIGH, ET AL., COSTS OF OCCUPATIONAL INJURIES AND ILLNESSES 44 (U. of Mich. Press, 2000). A differential in regulatory awareness is also likely a factor. *See* Caroline E. Scruggs, et al., *Effect of Company Size on Potential for REACH Compliance and Selection of Safer Chemicals*, 45 ENV'T SCI. & POL'Y 79, 79 (2015) (showing that small companies are significantly less aware than large companies of European chemicals regulatory requirements).

about occupational hazards is deemed by law to fulfill Prop 65 warning obligations,[149] even though this form of communication is limited and occurs primarily through provision of Safety Data Sheets (SDSs) that are often less eye-catching than a Prop 65 warning.[150] Further, Prop 65 cannot be applied to products manufactured outside of California.[151]

Additionally, as a practical matter, Prop 65 enforcers do not have the same access to private workplaces that they do to consumer product marketplaces for purposes of detecting violations. And finally, even where workers are aware of workplace chemical exposures warranting a Prop 65 warning, they are—given their employment vulnerability in a largely nonunionized, at-will workforce—usually in a tricky position from which to press the matter with their employer.

Although these limitations on Prop 65's relevance to workplace settings stand, our research indicates that the law has, in indirect but significant ways, enhanced occupational chemical safety in California and perhaps beyond.[152] In 2007, as a result of detailed study, OEHHA issued a report on Prop 65 chemicals that were uncontrolled or insufficiently controlled in California workplaces.[153] The study drew California's occupational health regulators' attention to these toxicants and over time helped increase the stringency of their regulation. This state-level action is important, given woefully weak federal controls on workplace chemical exposures.

Occupation chemical exposures are governed at the federal and state level by standards known as "permissible exposure limits" (PELs). The primary role

149. The federal Occupational Safety and Health Administration (OSHA) conditioned its approval of Prop 65's incorporation into Cal/OSHA's plan in part on the state's agreement that methods of warning under the Hazard Communication Standard would be deemed to constitute Prop 65 compliance. *See* 62 Fed. Reg. 31,159 (June 6, 1997). This was an indirect mechanism for preempting Prop 65 as applied to workplaces, by making dilution of the law's warning requirement a requirement for delegation of regulatory authority to the state with respect to occupational safety and health.

150. While businesses must maintain a file of SDSs and make them accessible to employees, there is no requirement to display warnings, and in a typical workplace, SDSs are stored far from where products are used. Furthermore, a random survey of employers found more than 50 percent were out of compliance with key requirements of the Hazard Communication Standard. U.S. GOV. ACCOUNTABILITY OFF., GAO/HRD-92-8, OSHA ACTION NEEDED TO IMPROVE COMPLIANCE WITH HAZARD COMMUNICATION STANDARD (1991), https://www.gao.gov/assets/160/151270.pdf. Hazard communication has improved with U.S. adoption of the Globally Harmonized System, which stipulates standardized pictograms and hazard phrases, but here too employers are not required to supply warnings to employees at the point of potential chemical exposure. Occupational Health & Safety Admin. Hazard Communication Final Rule, 77 Fed. Reg. 17574 (Mar. 26, 2012), https://www.osha.gov/FedReg_osha_pdf/FED20120326.pdf.

151. 62 Fed. Reg. 31159 (June 6, 1997); *see also* Shell Oil Co. v. U.S. Dep't of Labor, 106 F. Supp. 2d 15, 21 (D.D.C. 2000) (upholding this limitation in the face of industry challenge).

152. We did not survey other states to assess their uptake (if any) of California's occupational health standards.

153. CAL. OFF. ENV'T HEALTH HAZARD ASSESSMENT, CAL/EPA, OCCUPATIONAL HEALTH HAZARD RISK ASSESSMENT PROJECT FOR CALIFORNIA: IDENTIFICATION OF CHEMICALS OF CONCERN, POSSIBLE RISK ASSESSMENT METHODS, AND EXAMPLES OF HEALTH PROTECTIVE OCCUPATIONAL AIR CONCENTRATIONS (2007), https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/OHB/HESIS/CDPH%20Document%20Library/riskreport.pdf [hereinafter RISK ASSESSMENT PROJECT].

of PELs is to set workplace limits on inhalation exposure to chemicals.[154] By establishing quantitative limits on the exposure to airborne chemicals allowable in a workplace, PELs have considerably more regulatory bite than a simple Prop 65 warning.

Prop 65 has made a meaningful, nonobvious contribution to workplace chemical safety in California by prompting the development of or markedly strengthening numerous California PELs. The federal Occupational Safety and Health Administration (OSHA) has, in turn, expressly acknowledged that California's PELs—which are updated on a regular basis[155]— are superior to federal PELs, which are typically decades old. In a rare display of government candor, OSHA describes the insufficiency of its own standards to fulfill their core task of protecting workers from chemical exposures. The federal agency's website states:

> OSHA recognizes that many of its permissible exposure limits (PELs) are outdated and inadequate for ensuring protection of worker health. Most of OSHA's PELs were issued shortly after the adoption of the Occupational Safety and Health Act in 1970 and have not been updated since that time . . . .

OSHA therefore suggests that employers seeking to protect their own workers should look elsewhere for guidance, and it provides "alternate occupational exposure limits" for this purpose. The agency states:

> OSHA recommends that employers consider using the alternative occupational exposure limits because the Agency believes that exposures above some of these alternative occupational exposure limits may be hazardous to workers, even when the exposure levels are in compliance with the relevant PELs.[156]

OSHA identifies California's PELs—which it refers to synonymously as "Occupational Exposure Levels"—as one of three important sources of alternative occupational exposure limits. OSHA notes that of the twenty-two states with OSHA-approved state plans, "California has the most extensive list of OELs [Occupational Exposure Levels]."[157] Indeed, California's standards, promulgated by Cal/OSHA, are the only state exposure levels posted. Thus,

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154. *1988 OSHA PEL Project Documentation*, NAT'L INST. FOR OCCUPATIONAL SAFETY & HEALTH, CTR. FOR DISEASE CONTROL & PREVENTION, https://www.cdc.gov/niosh/pel88/pelstart.html (last visited Feb. 24, 2020) (describing PELs as enforceable limits on the amount or concentration of a substance in the air, established to protect workers from hazardous exposures). Some PELs additionally identify particular chemicals as dermal irritants, signaling that they require precautionary handling or use of protective equipment such as gloves.

155. CAL. DEP'T INDUS. RELATIONS, DIV. OCCUPATIONAL HEALTH & SAFETY, POLICY AND PROCEDURE FOR THE ADVISORY COMMITTEE PROCESS FOR PERMISSIBLE EXPOSURE LIMIT (PEL) UPDATES TO TITLE 8, SECTION 5155, AIRBORNE CONTAMINANTS 1 (Mar. 2007), https://www.dir.ca.gov/dosh/DoshReg/PEL-Process-3-07-final-draft.pdf (describing "the policy of the Division of Occupational Safety and Health to periodically update the list of Permissible Exposure Limits [in California]").

156. *Permissible Exposure Limits – Annotated Tables*, OCCUPATIONAL SAFETY & HEALTH ADMIN., U.S. DEP'T LABOR, https://www.osha.gov/dsg/annotated-pels/ (last visited Feb. 26, 2020).

157. *Id.*

Cal/OSHA's PELs serve as a shadow regulatory regime: unenforceable outside California but available to other state regulators and explicitly endorsed by federal OSHA.[158]

In several consequential instances, Prop 65 chemical listings and related advocacy have directly affected and strengthened Cal/OSHA's PELs. This cross-fertilization resulted from the state's mid-2000s targeted effort to ensure that health-risk information from the Prop 65 process would inform the state's approach to occupational chemical safety. Specifically, the California Department of Public Health (CDPH), which has a formal role in recommending PELs to Cal/OSHA, contracted with OEHHA on an "Occupational Health Hazard Risk Assessment Project for California" that focused on screening the Prop 65 list for unregulated or under-regulated chemicals of concern in the workplace.[159] The idea was to identify chemicals listed as carcinogens or reproductive toxicants under Prop 65; to determine whether a relevant PEL existed; and if it did, to assess whether it adequately protected workers from these specific health risks.[160]

OEHHA's final report concluded that California's PELs were under-protective as to numerous Prop 65 chemicals and recommended that Cal/OSHA address this safety gap. Researchers found that among then-Prop-65-listed chemicals present in the workplace, there were no PELs whatsoever for forty-four chemicals listed as carcinogens, and for five chemicals listed as reproductive or developmental toxicants.[161] These included chemicals associated with health effects as serious as brain damage and sterility. This meant that workplace exposure to these chemicals was wholly unregulated, even though workers are often highly exposed to hazardous chemicals compared to the general population.

For dozens of additional Prop 65 chemicals, the report noted that the existing PEL was based on a health effect other than cancer or reproductive toxicity, meaning that the PEL might not be low enough to prevent those two serious outcomes.[162] The report concluded that PELs based on quantitative risk assessments for cancer or reproductive harm (as relevant) should be developed for these chemicals.[163] These new PELs would either establish exposure limits where none existed, or make existing standards more health-protective.

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158. This endorsement matters, insofar as the Occupational Safety and Health Act requires states to obtain federal approval of their state plans for occupational health. *See State Plans*, OCCUPATIONAL SAFETY & HEALTH ADMIN., U.S. DEP'T LABOR, https://www.osha.gov/stateplans (last visited Feb. 26, 2020).

159. RISK ASSESSMENT PROJECT, *supra* note 153, at 1.

160. *Id.*

161. *Id.* at 2.

162. *Id.* OEHHA noted, for example, that short-term PELs rather than eight-hour-averaged PELs should be set for developmental toxicants, because even a brief or single exposure to these chemicals may cause harm. *Id.* at 109.

163. *Id.* at 110 (recommending "using existing OEHHA cancer and noncancer risk assessments to update occupational standards in California").

In response to OEHHA's 2007 analysis and recommendations, and its subsequent advocacy before advisory and regulatory bodies involved in establishing California PELs, Cal/OSHA moved fairly quickly to establish PELs for two Prop-65-listed solvents. Solvents pose particular hazards to workers[164] because the chemicals by nature volatilize quickly into surrounding air and may be readily inhaled. They can also be absorbed into the bloodstream through the skin.[165] As such, solvents presented the most compelling case for filling a workplace regulatory gap.

Following OEHHA's report, the first solvent for which Prop 65 prompted and informed an occupational limit was N-Methylpyrrolidone (NMP), a chemical used for paint stripping and thinning, degreasing, cleaning of printing presses and electronic parts, graffiti removal, and adhesion.[166] In 2001, OEHHA had listed NMP as a Prop 65 developmental toxicant, and in 2003, it had set a safe harbor level for the chemical.[167] NMP was one of the five chemicals the 2007 report flagged as a reproductive toxicant lacking a PEL despite its significant health effects,[168] which include animal evidence of developmental toxicity and human evidence of central nervous system damage.[169]

A Department of Public Health toxicologist expressly used OEHHA's report to press Cal/OSHA for regulatory action on NMP, and vigorously advocated for adoption of a worker-protective PEL. Cal/OSHA cited and adopted the stringent one-part-per-million PEL for NMP the toxicologist proposed,[170] establishing a workplace protection for this chemical that remains in place today.[171] It also stands as the only PEL for NMP in the nation. This PEL represents an indirect regulatory triumph of Prop 65: but for OEHHA's report,

164. *Id.* at 26.

165. *See* HAZARD EVALUATION SYS. & INFO. SERV., CAL. DEP'T PUB. HEALTH, N-METHYLPYRROLIDONE (NMP) HEALTH HAZARD ADVISORY 4 (June 2014) [hereinafter N-METHYLPYRROLIDONE HEALTH HAZARD ADVISORY], https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/OHB/HESIS/CDPH%20Document%20Library/nmp.pdf (describing exposure routes).

166. RISK ASSESSMENT PROJECT, *supra* note 153, at A-10 (describing NMP toxicity in Table A–1: Workplace chemicals listed as known to the state to cause cancer or reproductive and/or developmental toxicity under Proposition 65 that do not have Cal/OSHA PELs); *see also* N-METHYLPYRROLIDONE HEALTH HAZARD ADVISORY, *supra* note 165, at 1 (describing uses of NMP).

167. OFF. ENV'T HEALTH HAZARD ASSESSMENT, CAL/EPA, PROPOSITION 65 MAXIMUM ALLOWABLE DOSE LEVEL (MADL) FOR REPRODUCTIVE TOXICITY FOR N-METHYLPYRROLIDONE FOR DERMAL AND INHALATION EXPOSURES (2003), https://oehha.ca.gov/media/downloads/proposition-65/chemicals/nmpmadl31403.pdf.

168. RISK ASSESSMENT PROJECT, *supra* note 153, at 25.

169. N-METHYLPYRROLIDONE HEALTH HAZARD ADVISORY, *supra* note 165, at 1–2.

170. CAL. DEP'T INDUS. RELATIONS, FINAL STATEMENT OF REASONS, AIRBORNE CONTAMINANTS: N-METHYLPYRROLIDONE 1 (July 18, 2013).

171. CAL. DEP'T INDUS. RELATIONS, TABLE AC-1: PERMISSIBLE EXPOSURE LIMITS FOR CHEMICAL CONTAMINANTS, https://www.dir.ca.gov/Title8/5155table_ac1.html (last visited Feb. 26, 2020). As with all California PELs, the regulatory limit established by the PEL is an eight-hour, time-weighted average. N-METHYLPYRROLIDONE HEALTH HAZARD ADVISORY, *supra* note 165, at 4 (explaining PELs).

there is no telling how long it might have taken for this potent solvent to command Cal/OSHA's attention.[172]

Prop 65 listing also directly prompted adoption of a PEL for the toxic solvent 1-Bromopropane (1-BP). Like NMP, the chemical 1-BP is used in many applications requiring degreasers, adhesives, or solvents; it is also used in dry cleaning.[173] The anticipated adverse human reproductive health effects of 1-BP are more expansive still than for NMP, and include damage to testes/prostate/sperm and potential male sterility, as well as damage to ovaries and menstrual cycles and potential female sterility.[174] Multiple studies have shown high 1-BP exposure and associated neurotoxicity in workers using spray adhesives to manufacture foam furniture.[175] California's Department of Public Health has noted the National Toxicology Program's expression of "serious concern for reproductive and developmental effects [of 1-BP] in the workplace at high exposure levels."[176] 1-BP has also been linked to liver damage and neurotoxic effects,[177] and more recently, to cancer.[178]

In the case of 1-BP, OEHHA's Prop 65 listing helped a long-languishing proposed PEL cross the finish line. Although Cal/OSHA had circulated a draft PEL for public comment in early 2004,[179] the chemical was not then listed under Prop 65, and the PEL proposal was never finalized. However, OEHHA listed 1-BP as a male and female reproductive toxicant and a developmental toxicant under Prop 65 later that year,[180] and OEHHA's 2007 report on occupationally relevant Prop 65 chemicals expressed dismay at the absence of workplace controls for such a potent toxicant.[181] The report made plain that Cal/OSHA

172. Further, as discussed *infra* Subpart II.B.1, both the Prop 65 listing of NMP and the PEL thereby triggered have helped to support California's proposed regulation of NMP through yet another regulatory avenue—the Safer Consumer Products program of the Department of Toxic Substances Control (DTSC)—presenting an example of a twice-removed health-protective impact from a Prop 65 chemical listing.

173. HAZARD EVALUATION SYS. & INFO. SERV., CAL. DEP'T PUB. HEALTH, 1-BROMOPROPANE (N-PROPYL BROMIDE) HEALTH HAZARD ALERT 1 (Dec. 2016) [hereinafter 1-BP HEALTH HAZARD ALERT], https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/OHB/HESIS/CDPH%20Document%20Library/bpropane.pdf.

174. *Id.* at 2.

175. *OSHA NIOSH Hazard Alert 1-Bromopropane*, OCCUPATIONAL SAFETY & HEALTH ADMIN., U.S. DEPT. OF LABOR (July, 2013), https://www.osha.gov/dts/hazardalerts/1bromopropane_hazard_alert.html (describing workers using glue on foam cushions who developed disabling symptoms of neurotoxicity, some of which persisted for years).

176. *Id.*

177. RISK ASSESSMENT PROJECT, *supra* note 153, at 25.

178. 1-BP HEALTH HAZARD ALERT, *supra* note 173, at 2. Evidence of the carcinogenicity of 1-BP post-dated OEHHA's 2007 report, but it did induce OEHHA to add a listing for 1-BP as a Prop 65 carcinogen in 2016. *See* OFF. ENV'T HEALTH HAZARD ASSESSMENT, CAL/EPA, CHEMICALS KNOWN TO THE STATE TO CAUSE CANCER OR REPRODUCTIVE TOXICITY 3 (June 28, 2019), https://oehha.ca.gov/media/downloads/proposition-65//p65list062819.pdf.

179. Airborne Contaminants Advisory Committee, Cal. Dep't Indus. Relations, *Draft 2001 to 2004 Minutes*, at 76.

180. OFF. ENV'T HEALTH HAZARD ASSESSMENT, *supra* note 178, at 3.

181. *See* RISK ASSESSMENT PROJECT, *supra* note 153, at 26.

should promulgate a PEL.[182] In 2009, Cal/OSHA acquiesced.[183] As with NMP, this new standard for 1-BP helps to protect California workers from reproductive toxicants in the workplace that federal OSHA leaves wholly unregulated.[184]

Many additional Prop 65 chemicals that OEHHA's 2007 report called out as lacking and warranting a PEL—ranging from occupationally hazardous minerals such as beryllium to solvents such as toluene—have since received Cal/OSHA's regulatory attention.[185] Rulemaking documents make plain that Prop 65 listing helped to support these PELs, by establishing specific chemicals as carcinogens or reproductive toxicants and by providing scientific data to support risk assessment.[186]

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182. *See id.*

183. CAL. DEP'T INDUS. RELATIONS, FINAL STATEMENT OF REASONS—AIRBORNE CONTAMINANTS 7 (Mar. 19, 2009).

184. 1-BP HEALTH HAZARD ALERT, *supra* note 173, at 4.

185. In 2010, Cal/OSHA established PELs for 1,4-dioxacyclohexane and various forms of nickel. *Cal/OSHA Updates Permissible Exposure Limits; Part I Revised Limits*, SAFETY.BLR.COM (Sept. 3, 2010), https://safety.blr.com/workplace-safety-reference-materials/white-papers/hazardous-substances-and-materials/PELs-permissible-exposure-limits/CalOSHA-Updates-Permissible-Exposure-Limits-Part-I/. That same year, the agency established a PEL for refractory ceramic fibers. *Id.* In 2012, Cal/OSHA established PELs for toluene and carbon disulfide. ELLEN WIDESS & CORA GHERGA, CAL. OCCUPATIONAL SAFETY & HEALTH PROGRAM, 2012 STATE OSHA ANNUAL REPORT, https://www.dir.ca.gov/dosh/reports/State-OSHA-Annual-Report-(SOAR)-FY-2012.pdf. Cal/OSHA established a PEL for ethylbenzene in 2013 and PELs for naphthalene and related compounds in 2014. *Id.* at n.51; *see* also Airborne Contaminants, Appendix to Section 5155, CAL. CODE REGS. tit. 8, § 5155a, n.48 (2018), https://www.dir.ca.gov/title8/5155a.html. Cal/OSHA established PELs for numerous forms of silica in the years following OEHHA's 2007 report. *See, e.g.*, *Respirable Crystalline Silica – Horcher*, CAL. DEP'T INDUS. RELATIONS, https://www.dir.ca.gov/OSHSB/Respirable-Crystalline-Silica-HORCHER.html (last visited Feb. 26, 2020) (noting the 2016 establishment of PEL for respirable crystalline silica). PELs for benzyl chloride and alpha-chlorotoluene followed in 2017, with documentation referencing the Prop 65 cancer listing. *Airborne Contaminants – Benzyl Chloride*, CAL. DEP'T INDUS. RELATIONS, https://www.dir.ca.gov/OSHSB/Airborne-Contaminants-Benzyl-Chloride.html (last visited Feb 26, 2020); SUSAN RIPPLE, DRAFT BENZYL CHLORIDE HEAC HEALTH-BASED ASSESSMENT AND RECOMMENDATION (2010), https://www.dir.ca.gov/dosh/DoshReg/Benzyl%20chloride%206%203%202010.doc. PEL for beryllium and beryllium compounds was established in 2017. *Occupational Exposure to Beryllium – Horcher*, CAL. DEP'T INDUS. RELATIONS, https://www.dir.ca.gov/OSHSB/Occupational-Exposure-to-Beryllium-HORCHER.html (last visited Feb. 26, 2020).

186. For example, the Initial Statement of Reasons for the new 1,4-dioxacyclohexane PEL explicitly states that "[t]he Committee's recommendation is intended to address cancer risk, and is based on the airborne cancer unit risk factor developed by the California Office of Environmental Health Hazard Assessment (OEHHA, 2005) for the Proposition 65 warning determination for p-dioxane . . . ." OCCUPATIONAL SAFETY & HEALTH STANDARDS BD., CAL. DEP'T INDUS. RELATIONS, INITIAL STATEMENT OF REASONS, AIRBORNE CONTAMINANTS § 5155, 5 (2009), http://csmres.co.uk/cs.public.upd/article-downloads/airborne_contaminants09_ISOR_a2854.pdf. The Final Statement of Reasons references reliance on "the cancer unit risk value developed by OEHHA under the authority of Proposition 65." *Id.* at 17. The Prop 65 listing for ethylbenzene was also a recurrent theme in Health Effects Advisory Committee (HEAC) discussion of setting a PEL for the chemical. An October 2009 HEAC document states, for example, that "[t]he HEAC PEL recommendation, which identifies ethylbenzene as an occupational carcinogen, is consistent with OSHA regulation . . . and with the listing of ethylbenzene under Proposition 65 in 2004 as a chemical known to the State of California to cause cancer." JULIA QUINT, DEP'T OCCUPATIONAL SAFETY & HEALTH, DRAFT ETHYLBENZENE HEAC ASSESSMENT AND PEL RECOMMENDATION 14 (2009), https://www.dir.ca.gov/dosh/doshreg/Ethylbenzene%20HEAC%2010%2020%2009.doc.

Prop 65 activity has affected and enhanced worker protection standards even beyond the original OEHHA project that expressly established this cross-fertilization goal. Recent Cal/OSHA actions with respect to wood dust and titanium dioxide, for example, demonstrate that Prop 65 listing has continued to influence the development of new and stronger PELs.

In the case of wood dust, a Prop 65 listing helped trigger a PEL revision that necessitated new workplace safety measures to reduce exposure. Wood dust, which is produced whenever wood is cut or sanded, is one of many substances for which risk to workers dwarfs that to ordinary consumers: Average hourly exposure to airborne wood dust in a timber mill exceeds by orders of magnitude that in the home of an occasional wood craft hobbyist. In 2009, California listed wood dust under Prop 65 as a chemical known to cause cancer, based primarily on the risk of nose, throat, and sinus cancer from inhalation.[187] At the time of listing, California had already established PELs for wood dust in workplaces for most types of wood, and a more stringent PEL for wood dust from western red cedar due to its strong association with occupational asthma.[188]

In adopting significantly tighter workplace safety standards for wood dust in 2017, Cal/OSHA's parent agency, the California Department of Industrial Relations, cited the addition of wood dust to the Prop 65 list in support of stricter regulation.[189] The revised standards represent more than 50 percent reductions in the PEL for most wood types, and an 80 percent reduction in the PEL for western red cedar.[190] By triggering better dust capture systems, High-Efficiency Particulate Air (HEPA) vacuuming, and more extensive use of personal protective equipment in the form of respirators,[191] these enhanced wood dust standards can be expected to reduce worker exposure significantly. As with consumer product manufacturing, the effect of the Prop 65 listing on Cal/OSHA's workplace standards may well ramify out of state: Even while taking predictable issue with the existence of stringent wood dust PELs, a timber industry spokesman readily acknowledged that "California may set a precedent to be followed by other states [or] federal OSHA."[192]

187. *Wood Dust*, PROPOSITION 65 (May 2019), https://www.p65warnings.ca.gov/fact-sheets/wood-dust.

188. *California Toughens Wood Dust Regulation*, SAFE AT WORK CALIFORNIA (Aug. 11, 2020), https://www.safeatworkca.com/news/california-toughens-wood-dust-regulation/.

189. OCCUPATIONAL SAFETY & HEALTH STANDARDS BD., CAL. DEP'T INDUS. RELATIONS, INITIAL STATEMENT OF REASONS, AIRBORNE CONTAMINANTS – WOOD DUST AND WESTERN RED CEDAR 3–4, www.dir.ca.gov%2FOSHSB%2Fdocuments%2FAirborne-Contaminants-Wood-Dust-and-Western-Red-Cedar-ISOR.pdf&usg=AOvVaw217Yxq20CHUGFYhwwDC0c1 (describing the Prop 65 listing for wood dust in 2009, and citing Prop 65 listing documents among those "relied on by the Standards Board").

190. The new PELs are two milligrams per cubic meter for most wood types, and 0.5 milligrams per cubic meter for western red cedar. *See* CAL. DEP'T INDUS. RELATIONS, *supra* note 183.

191. *Id.*

192. Stewart E. Holm, Dir., Toxicology & Chem. Mgmt., Georgia-Pacific, LLC, Wood Dust: Prop 65 and CA OSHA Update, Presentation at the Annual Pulp and Paper Association Conference 29, https://www.ppsa.org/assets/ConferencePresentations/wood_dust_prop_65_and_cal_osha_update.pdf (n.d.).

In the case of the toxicant titanium dioxide, OEHHA's Prop 65 listing appears poised once again to generate a more health-protective PEL. Titanium dioxide is widely used as a white pigment that also confers opacity in cosmetics, art supplies, and personal care products, such as sunblock. Mixed into liquids or pastes, titanium dioxide is harmless to the user, but as a powder or in aerosolized droplets, it is suspected to cause cancer if repeatedly inhaled.[193] In 2011, OEHHA accordingly listed under Prop 65 a specific form of titanium dioxide: unbound particles small enough to be respirable.[194]

Titanium dioxide in its raw form is used to manufacture paint, plastics, rubber, and paper, potentially exposing tens of thousands of U.S. workers. Despite this, California has never set a chemical-specific PEL; the compound is instead governed by a default standard for respirable particulates that are not specifically regulated.[195] Beginning in 2012, the Prop 65 listing became the basis for recommending a safety-enhancing PEL revision.[196] In 2019, Cal/OSHA's Health Effects Advisory Committee finally included ultrafine titanium dioxide in its draft list of highest-priority chemicals for PEL development, proposing a significantly more stringent customized exposure standard than the default value.[197] The Committee stated that the proposed PEL would result in "[a] substantial change . . . that could contribute to increased protection of workers if adhered to by employers."[198] This, too, appears to be an occupational health victory traceable at least in part to Prop 65's upward pressure on Cal/OSHA standards for toxic workplace exposures.

Thus, despite Prop 65's limitations with respect to informing workers, these examples of "regulatory triggering" demonstrate how the law has developed and strengthened California's workplace safety standards by generating data and corresponding political pressure. Moreover, as with federal phthalates legislation traceable to Prop 65's influence, federal regulators have pointed to California's

193. *See* INTERNATIONAL AGENCY FOR RESEARCH ON CANCER, WORLD HEALTH ORGANIZATION, MONOGRAPHS ON THE EVALUATION OF CARCINOGENIC RISKS TO HUMANS, VOL. 93: CARBON BLACK, TITANIUM DIOXIDE, AND TALC 275 (2010), https://monographs.iarc.fr/wp-content/uploads/2018/06/mono93.pdf (describing animal data on carcinogenicity of inhaled titanium dioxide).

194. *Chemical Listed Effective September 2, 2011 as Known to the State of California to Cause Cancer Titanium Dioxide (Airborne, Unbound Particles of Respirable Size)*, CAL. OFF. ENV'T HEALTH HAZARD ASSESSMENT (Sept. 2, 2011), https://oehha.ca.gov/proposition-65/crnr/chemical-listed-effective-september-2-2011-known-state-california-cause-cancer.

195. CAL. CODE REGS. tit. 8, § 5155 (establishing default standard of five milligrams per cubic meter of air).

196. JULIA QUINT, RECOMMENDATIONS TO CAL/OSHA FOR NEW AND REVISED PERMISSIBLE EXPOSURE LIMITS (PELS) 7 (2012) (proposing PEL of 2.4 milligrams per cubic meter for fine particles of titanium dioxide, and PEL of 0.3 milligrams per cubic meter for ultrafine particles). Regulatory standards are often more stringent for smaller sizes of respirable particles, which penetrate the lungs more deeply.

197. CAL. DEP'T INDUS. RELATIONS, 6-4-19 PRIORITY 1 LIST FOR HEAC PEL REVIEW, https://www.dir.ca.gov/dosh/DoshReg/5155-Meetings/Priority-1-List-for-review.pdf. California Department of Industrial Relations denominates this list as a draft that should not be cited; it is here referenced simply as proof of its contents, not as evidence of their finality or scientific defensibility.

198. *Id.* To date the committee has not, however, recommended lowering the PEL for larger-sized titanium dioxide particles as Quint urged.

occupational health standards (implicitly including those responsive to Prop 65 listings) as a model for nationwide emulation.

B. Regulatory Ratcheting: Prop 65 List Informs Other Toxics Programs

Beyond legislative and agency use of Prop-65-derived information to trigger direct regulation of toxics on a chemical-by-chemical basis, the Prop 65 chemicals list has been incorporated wholesale into a variety of regulatory regimes in California and other states. Some of these are themselves right-to-know laws; others are direct chemical regulations; and still others are a hybrid. This incorporation, which we term "regulatory ratcheting," amplifies Prop 65's ability to limit toxic chemical exposures and magnifies its out-of-state reach. Proceeding chronologically—first within California and then beyond its borders—we describe how the Prop 65 list and its supporting science have been integrated into a wide variety of state laws that limit exposure to toxic chemicals.

1. Use of the Prop 65 List in Other California Toxics Programs

The power of the existing Prop 65 chemicals list to jumpstart new legal regimes manifested decades after the law's enactment when, in 2005, California used the list as the foundation for the nation's first state right-to-know law addressing toxic chemicals in cosmetics. Such chemicals are prevalent, but may be kept hidden from both the public and regulators under federal cosmetics law: Food and Drug Administration regulations exempt fragrances and flavors, as well as professional-use products, from label disclosure requirements.[199] The California Safe Cosmetics Act of 2005, in contrast, provides that manufacturers selling cosmetics in the state must disclose to the state's Department of Public Health (CDPH) any and all known carcinogens or reproductive toxicants in all of their products.[200] CDPH then makes public the list of reported products and chemicals via a searchable database.

In specifying the cosmetic ingredients subject to reporting, the California legislature used the Prop 65 list as its starting point, defining a "chemical identified as causing cancer or reproductive toxicity" as "a chemical identified pursuant to Section 25249.8 [Prop 65]" or identified by certain authoritative governmental bodies as having particular toxicity characteristics.[201] Thus, rather than having to formulate a list of reportable chemicals from scratch—and, as is the norm, encounter industry resistance, resulting delay, and potential litigation over each addition—CDPH could begin its work with an already-scientifically vetted and politically defended list of hundreds of Prop 65 chemicals

199. 21 C.F.R. § 701.3(a) (labeling requirements); U.S. Food & Drug Admin., *Summary of Cosmetics Labeling Requirements* (current as of Aug. 24, 2020), https://www.fda.gov/cosmetics/cosmetics-labeling-regulations/summary-cosmetics-labeling-requirements (describing exemption for salon-only products).

200. CAL. HEALTH & SAFETY CODE § 111792(a).

201. *Id.* § 111791.5(b).

immediately subject to reporting. Prop 65 chemicals presently comprise nearly the totality of chemicals required to be reported under the program.[202]

The Safe Cosmetics Act extends further than Prop 65, because manufacturers must report a chemical's presence, and CDPH informs the public of that presence, regardless of whether it would pose an exposure risk sufficient to trigger a Prop 65 warning.[203] Among other potential end uses, the database permits risk-averse consumers to choose products that do not contain listed chemicals; provides health researchers access to more ingredient information than is available on cosmetic ingredient labels; and enables nonprofit consumer and public interest groups to identify and promote safer products,[204] all of which may ultimately reduce chemical exposures.

The CDPH Safe Cosmetics Program ("Program") additionally plays a de facto surveillance and investigatory function that, in the case of one potent Prop 65 carcinogen, prompted enforcement action that in turn engendered product reformulation and potential substantive regulation. In the early years of its operation, the Program received reports that professional hair stylists experienced burning eyes and throats, bloody noses, asthma attacks, and other symptoms following exposure to Brazilian Blowout brand hair straightening products.[205] The chemical culprit was formaldehyde—a Prop 65 chemical that is acutely toxic and a known carcinogen but that had not been on the radar of Prop 65 enforcers because it was not listed on product labels and was not widely understood to be the active ingredient in certain hair straighteners.[206] Further investigation found very high formaldehyde concentrations in the hair product (indeed, higher than those used in embalming) and, with respect to salon workers, the concentrations greatly exceeded the level triggering a requirement to warn under Prop 65.[207]

Brazilian Blowout only came to state enforcers' attention, however, because its manufacturer had failed to inform the Safe Cosmetics Program that the product contained this Prop 65 chemical. Complaints to the program about the product were relayed to the Office of the Attorney General, triggering an

202. *Compare The Proposition 65 List*, OFF. ENV'T HEALTH HAZARD ASSESSMENT, https://oehha.ca.gov/proposition-65/proposition-65-list, *with* CAL. SAFE COSMETICS PROGRAM, CAL. DEP'T PUB. HEALTH, REPORTABLE INGREDIENTS LIST (2019), https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/OHB/CSCP/CDPH%20Document%20Library/chemlist.pdf.

203. Chemicals in Cosmetics, CHHS OPEN DATA, https://data.chhs.ca.gov/dataset/chemicals-in-cosmetics (providing information to public regarding hazardous product ingredients).

204. *See, e.g.*, *About EWG's Skin Deep*, ENV'T WORKING GROUP, https://www.ewg.org/skindeep/site/about.php (last visited Feb. 26, 2020) (describing the Prop 65 list as among the data sources informing its vast searchable "Skin Deep" database of information about the comparative safety of cosmetic products).

205. CALIFORNIA SAFE COSMETICS PROGRAM, CAL. DEP'T PUB. HEALTH, Q&A: BRAZILIAN BLOWOUT AND OTHER HAIR SMOOTHING SALON TREATMENTS 1 (2011), https://public.staging.cdph.ca.gov/sites/ada/Programs/CCDPHP/DEODC/OHB/CSCP/CDPH%20Document%20Library/BrazilianBlowoutQA.pdf.

206. *Id.*

207. *Id.* at 2 (citing California Department of Justice litigation regarding Prop 65 violation).

enforcement action whose settlement produced ingredient disclosure, a warning, and safer reformulation of the product.[208] Thereafter, two bills were introduced in Congress that address the unsafe use of formaldehyde in cosmetic products.[209]

Safe Cosmetics Program disclosures also appear to be prompting some manufacturers to reformulate away from Prop 65 chemicals *sua sponte* where possible, reducing human exposure. A 2018 CDPH audit identified hundreds of instances in which a company had edited its previous reports to the agency to remove a toxic chemical from a product's disclosure entry.[210] In more than 100 cases, CDPH was able to verify that toxic chemicals were absent on the product label, indicating that the products had indeed been reformulated to avoid Prop 65 chemicals.[211] These instances in turn implicated more than twenty-two distinct chemicals, skewing towards those that have been heavily targeted by Prop 65 enforcers (such as the foaming agent cocamide diethanolamine (DEA)), but also including chemicals that have not been the subject of litigation.[212] These disclosure-influenced, voluntary reformulations are particularly significant because they fill a void left by the oft-remarked weakness of federal cosmetics law—barely amended since its 1938 enactment—which imposes almost no safety standards on cosmetic ingredients.[213]

Three years after the Safe Cosmetics Program's creation, the Prop 65 chemicals list populated and provided targets for a more far-reaching California toxics reduction program. In 2008, California enacted the nation's most expansive statute governing toxic chemicals in consumer products: the Safer Consumer Products program, administered by the Department of Toxic

208. *See* Press Release, Cal. Off. Att'y Gen., Attorney General Kamala D. Harris Announces Settlement Requiring Honest Advertising of Brazilian Blowout Products (Jan. 30, 2012), https://oag.ca.gov/news/press-releases/attorney-general-kamala-d-harris-announces-settlement-requiring-honest.

209. Safe Cosmetics and Personal Care Products Act of 2019, H.R. 4296, 116th Cong. § 616(b)(2)(A)(ix) (2019) (proposing an outright ban on the use of formaldehyde in cosmetics); Personal Care Products Safety Act of 2019, S. 726, 116th Cong. § 607(a)(3)(A)(iii) (2019) (identifying formaldehyde as one of five chemicals that the Food and Drug Administration must review immediately vis-à-vis cosmetic safety). The inclusion of formaldehyde in these bills is the direct result of litigation over Brazilian Blowout products. It is partly but not wholly attributable to the attorney general's litigation, insofar as there were parallel tort suits over the product that also elevated the political profile of the issue.

210. PAULA JOHNSON, CALIFORNIA SAFE COSMETICS PROGRAM - PRODUCT AUDIT (2018) (on file with authors). E-mail from Paula Johnson, PhD, MPH, Safe Cosmetics Program Lead, Cal. Dep't Pub. Health, to Claudia Polsky (Aug. 14, 2019) (on file with authors). These apparent chemical removals represented about one-sixth of the total chemicals disclosed, or 16 percent of all disclosures. *Id.*

211. CALIFORNIA SAFE COSMETICS PROGRAM – PRODUCT AUDIT, *supra* note 210. Companies made more than 900 product report edits in all, reporting more than 1,100 instances of chemical elimination. To determine whether a company was simply correcting a previous reporting error or had actually removed an ingredient from its product, CDPH cross-checked the edits with online product ingredient labels and lists. In all likelihood, considerably more than 100 products were reformulated: 270 of the products that may have been reformulated could not be located online, and another 582 products did not provide an online ingredient list. *Id.*

212. *Id.*

213. *See, e.g.*, Grace Wallack, Note, *Rethinking FDA's Regulation of Cosmetics*, 56 HARV. J. ON LEGIS. 311, 313 (2019) (noting that "cosmetics are subject to significantly less stringent requirements than their food and drug counterparts").

Substances Control (DTSC).[214] Under the statute, DTSC developed a process for identifying chemicals of concern and the products that contain them, and prioritizing products for regulation to reduce or eliminate exposure to toxics.[215] Available regulatory responses include chemical restrictions and outright bans.

Prop 65's ratcheting effect in the Safer Consumer Products program occurred via regulation rather than statute, pursuant to a broad delegation of authority to DTSC that left many operational details unspecified. In devising framework regulations to shape its new toxics-in-products authority, DTSC identified the Prop 65 list as the first among authoritative lists that would define chemicals eligible for regulation. DTSC's Safer Consumer Products regulations state that "a chemical is identified as a Candidate Chemical [for regulation in a consumer product]" if it is among the chemicals "known to cause cancer and/or reproductive toxicity that are listed under Health and Safety Code section 25249.8 of the California Safe Drinking Water and Toxic Enforcement Act of 1986 [Prop 65]."[216] In this case, Prop 65's ratcheting effectively turned a right-to-know consequence of chemical listing into a right-to-control.

The relevance of the Prop 65 list to the Safer Consumer Products program became apparent when DTSC announced in 2018 its intention to regulate the Prop 65 chemical NMP in paint strippers, varnish strippers, and graffiti removers because of the high potential for consumer and worker exposures.[217] To document the fact of chemical exposure, DTSC cited studies finding that workers' dermal contact with NMP through product splashing and spills had caused elevated blood levels of the chemical and that personal protective equipment is rarely provided in the settings where NMP is used or that the equipment is often of the wrong type.[218] To establish NMP's hazard, DTSC pointed to its presence on the Prop 65 list, and also cited the Prop-65-triggered PEL.[219] In so regulating, DTSC is far ahead of federal agencies: EPA has since 2015 been engaged in rulemaking to restrict NMP as one of its announced highest-priority chemicals under the Toxic Substances Control Act, but as of early 2020, it has not issued a final rule.[220]

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214. Hazardous substances: toxic materials, A.B. 1879 (Cal. 2008) (enacted as CAL. HEALTH & SAFETY CODE §§ 25252–57).

215. CAL. CODE REGS. tit. 22, §§ 69501–10 (Safer Consumer Products Regulations).

216. *Id.* § 69502.2(a)(1)(A) (Candidate Chemicals Identification).

217. ROBERT BRUSHIA, PH.D., DEP'T TOXIC SUBSTANCES CONTROL, CAL/EPA, PRODUCT-CHEMICAL PROFILE FOR PAINT AND VARNISH STRIPPERS AND GRAFFITI REMOVERS CONTAINING N-METHYLPYRROLIDONE (NMP) 5–8 (2019), https://dtsc.ca.gov/wp-content/uploads/sites/31/2019/09/Final-NMP-Paint-Stripper-Graffiti-Remover_Profile.pdf.

218. *Id.* at 14.

219. *Id.* at 1.

220. As DTSC describes the status of federal action: "A public comment period on the proposed rule closed on May 19, 2017, but U.S. EPA has not yet finalized the rule and has begun taking steps to conduct an additional risk evaluation for NMP under the Frank R. Lautenberg Chemical Safety for the 21st Century Act." *Id.* at 23. According to EDF, which has been closely tracking EPA's dereliction in implementing the Lautenberg Act's mandates, EPA appears to have abandoned the rulemaking. *NMP (N-*

Although the Safer Consumer Products program has to date regulated only a few chemical/product combinations,[221] its publicized multiyear work plans have broadcast DTSC's intention to address numerous consumer product types, ranging from household cleaners to food packaging, potentially implicating dozens of chemicals on the Prop 65 list that are now directly regulable under DTSC's program.[222] DTSC's actions and announced intentions in turn send deterrent signals to new product manufacturers to avoid Prop 65 chemicals (discussed in Subpart II.C below), and incentivize existing manufacturers to formulate out of them where feasible.

More recently, the Prop 65 list was incorporated wholesale into California's Cleaning Product Right to Know Act of 2017. This law forces label disclosure of known-toxic ingredients in household and industrial cleaning products, such as window cleaner, furniture polish, and floor wax[223]—products of surprising health consequence, implicated in 10 percent of the state's work-related asthma.[224] In a telling feature of the 2017 bill, which draws from multiple lists to identify chemicals subject to disclosure, manufacturers fought hard to obtain a five-year delay in the requirement to list Prop 65 chemicals specifically.[225] The vigor of their fight—which ultimately succeeded—made plain their fear of litigation vulnerability were such chemicals label-listed. As a cleaning product manufacturer involved in bill negotiations explained: "[S]ome companies were using Prop-65-listed chemicals as ingredients; there was reluctance to disclose that. What was negotiated was . . . a postponement of disclosure . . . so companies would have the time to formulate the Prop 65 chemicals out of their products."[226]

Methylpyrollidone), ENV'T DEF. FUND (updated Aug. 2019), https://www.edf.org/health/nmp-n-methylpyrrolidone.

221. The program has to date regulated only three chemical/product combinations. *See Search,* CAL. SAFER CONSUMER PRODS. INFO. MGMT. SYS. https://calsafer.dtsc.ca.gov/cms/search/?type=PriorityProduct (last visited Feb. 26, 2020) (describing "Priority Products" regulated to date). It has also proposed and accepted public comment on several additional potential Priority Products. *See* CAL. SAFER CONSUMER PRODS. INFO. MGMT. SYS., https://calsafer.dtsc.ca.gov (last visited Feb. 26, 2020); *see also* Will Troutman & Andy Guo, *California Selects Nail Products Containing Toluene for Priority Product List*, CONSUMER PROD. L. BLOG (Feb. 23, 2019), https://www.consumerproductslawblog.com/2019/02/california-selects-nail-products-containing-toluene-for-priority-product-list/.

222. DTSC's most recent triennial work plan identifies the product categories the agency will evaluate in 2018 to 20 to identify Priority Products. *See Safer Consumer Products California Drafts 2018 - 2020 Work Plan*, CHEMYCAL NEWS (Feb. 12, 2018), https://chemycal.com/news/1f2f3c6d-f073-41e5-9248-8f0e491b40f0/Safer_Consumer_Products__California_drafts_2018_-__2020_Work_Plan.

223. Cal. Health & Safety Code § 108950–60 (codifying S.B. 258, Cleaning Product Right to Know Act of 2017).

224. *Cal. Bill Analysis, S.B. 258 S. Comm. on Env't Quality* 8 (Mar. 20, 2017), https://leginfo.legislature.ca.gov/faces/billAnalysisClient.xhtml?bill_id=201720180SB258 (analyzing the Cleaning Product Right to Know Act of 2017).

225. CAL. HEALTH & SAFETY CODE § 108954(a)(1)(C).

226. Interview with Martin Wolf, Dir. of Prod. Sustainability & Authenticity, Seventh Generation (Sept. 6, 2018) (on file with authors).

A conceptually related bill, the Cosmetic and Flavor Ingredient Right to Know Act of 2020, will require manufacturers to disclose to CDPH any known-toxic ingredients in the fragrances and flavors used in cosmetic and personal care products (such as perfume, lip gloss, and shampoo), including all Prop 65 chemicals.[227] Activity in the past two decades suggests that California's legislature and agencies will continue to rely on Prop 65 as a source list in designing both right-to-know and direct chemical control regimes.

2. Use of the Prop 65 List in Out-of-State Toxics Programs

Beyond California's borders, the Prop 65 list has informed and accelerated efforts to regulate chemicals in the five diverse state programs that, like the Safer Consumer Products program, seek to address federal toxics-control failures with respect to consumer products. In Washington, Maine, Minnesota, Oregon, and most recently New York, Prop 65 has been incorporated by law, or is (or will be) used in practice to identify consumer product chemicals warranting post-market safety regulation.

In Washington State, the Prop 65 list helped the Department of Ecology fulfill its new charge under the Children's Safe Products Act of 2008, which tasked the agency with identifying for regulation "high priority chemical[s]," defined as chemicals having any of various harmful attributes and "identified by a state agency, federal agency, or accredited research university, or other scientific evidence deemed authoritative by the department on the basis of credible scientific evidence."[228] Washington's program designers have written about their early reliance on the Prop 65 list (among other authoritative lists) in developing their own list of chemicals deserving regulatory scrutiny, given "the large number of chemicals in commerce without adequate toxicity characterization data, coupled with an ineffective federal policy for chemical management in the United States, [that leaves] many states . . . grappling with the challenge to identify toxic chemicals that may pose a risk to human health and the environment."[229] Additionally, Washington's regulators noted that the safe harbor levels OEHHA has set under Prop 65 "may prove useful in future

227. Cosmetic and Flavor Ingredient Right to Know Act of 2020, S.B. 312 (Cal. 2020). One of the bill's sponsors, the nonprofit Women's Voices for the Earth (WVE), frequently relies on Prop 65 as an authoritative list of hazardous chemicals when sponsoring legislation. Says the group's Director of Science and Research: "Anytime we do an ingredient disclosure bill, we use Prop 65 as an authoritative source of the chemicals that should be disclosed." Telephone interview with Alexandra Scranton (Oct. 28, 2019). In a provision of SB 312 not exclusively related to the Prop 65 list but encompassing it, the bill would also eliminate industry's ability to claim the identity of a toxic ingredient as trade secret. This is yet another dimension along which California would surpass federal law, and it demonstrates an additional, more attenuated form of regulatory ratcheting.

228. WASH. REV. CODE § 70A.430.010 (2020).

229. Alex Stone & Damon Delistraty, *Sources of Toxicity and Exposure Information for Identifying Chemicals of High Concern to Children*, 30 ENV'T IMPACT ASSESSMENT REV. 380, 380 (2010).

chemical prioritization steps or in the development of de minimis values for reporting requirements" under Washington's law.[230]

Maine, which in 2008 also enacted a focused law addressing Toxic Chemicals in Children's Products, has likewise relied on the Prop 65 list. Maine's law required its Department of Environmental Protection (DEP) to publish lists of chemicals of concern for potential regulation in children's products, ranging from toys to clothing. The law required DEP to list only those chemicals "identified by an authoritative governmental entity" as, for example, carcinogens or reproductive or developmental toxicants.[231] Although neither the law nor DEP's implementing regulations specify the authoritative entities and lists on which the department should rely, DEP's program has in practice used the Prop 65 list as a core resource in compiling its chemicals of concern list; for more than 200 chemicals, it is the sole authoritative source.[232]

Similarly, although Minnesota's Toxic Free Kids Act of 2009 does not mention Prop 65 by name, the state's biannual reports identifying "chemicals of high concern" that it may regulate in children's products identify a number of chemicals as listed based in part on their Prop 65 status.[233] Likewise, Vermont's 2014 law governing Chemicals of High Concern to Children requires the Commissioner of Health to maintain and biennially update a list of "chemicals of high concern to children"[234] based on criteria that overlap with Prop 65 chemical listing criteria. Insofar as the law also directs the commissioner to try to regulate "consistent with regulation of toxic chemicals in other states,"[235] and to "consider designations made by other states" in its listing decisions,[236] the Prop 65 list is near-certain to inform Vermont's choice of regulatory targets.

The Prop 65 list also seeded product-regulatory efforts in Oregon, which in 2015 became the fourth state to enact a law restricting toxic constituents in children's products.[237] Oregon's Toxic-Free Kids Act expressly adopted in statute the State of Washington's then-existing "Reporting List of Chemicals of High Concern to Children" as Oregon's initial palette for chemicals

230. *Id.* at 382.

231. ME. REV. STAT. ANN. tit. 38, § 1693(1)(A) (2019) (requiring DEP's "Identification of chemicals of concern").

232. *See* CHEMICALS OF CONCERN, ME. DEP'T ENV'T PROT. (2017), https://www.maine.gov/dep/safechem/childrens-products/concern/documents/ChemicalsofConcern_2017.pdf (identifying data sources, including "CA Prop 65" frequently).

233. *See* CHEMICALS OF HIGH CONCERN LIST, MINN. DEP'T HEALTH (2019), https://www.health.state.mn.us/communities/environment/childenvhealth/docs/chlist/mdhchc2019.pdf (identifying data sources, including "CA Prop 65").

234. VT. STAT. ANN. tit. 18, § 1773 (2019).

235. *Id.* § 1771(2).

236. *Id.* § 1773(b).

237. Legislatures' focus on toxicants in children's products stems from more than just the political appeal of protecting the innocent. As the Oregon Health Authority explained, children are a chemically vulnerable population due to their physiology and particular behaviors. *Toxic-Free Kids Act*, OR. HEALTH AUTH., https://www.oregon.gov/oha/PH/HEALTHYENVIRONMENTS/HEALTHYNEIGHBORHOODS/TOXICSUBSTANCES/Pages/Toxic-Free-Kids.aspx (last visited July 25, 2019).

regulation[238]—a list that itself incorporates Prop 65 chemicals. The statute additionally directed the Oregon Health Agency to add or remove chemicals from the list of high priority chemicals in the future

> if . . . the chemical is added to or removed from the Washington State Department of Ecology's Reporting List of Chemicals of High Concern to Children *or a list maintained by another state agency, another state or a federal agency that the authority has identified by rule as a list intended to identify high priority chemicals*.[239]

This language also implicates the Prop 65 list, insofar as that list informs the choice of priority chemicals for regulation under California's Safer Consumer Products program.

The influence of the Prop 65 list will grow to the extent that additional states develop chemicals regulatory programs. Recently—and consequentially in light of the size of its consumer market—the New York legislature in February 2020 enacted Senate Bill 501B to regulate chemicals in children's products.[240] As in Oregon, the legislature prescribed the initial list of regulable chemicals, and gave its Department of Environmental Conservation (DEC) authority to add any chemical if, for example, "it determines that the chemical has been identified by a state . . . on the basis of credible scientific evidence as . . . [a] carcinogen, reproductive or developmental toxicant, neurotoxicant, asthmagen, or endocrine disruptor"[241]—a structure inviting reliance on Prop 65's unique list of reproductive and developmental toxicants in particular.

New York's new law is a powerful amalgam of existing regulatory structures and may prove particularly far reaching. The law lists dozens of chemicals as "chemicals of concern," and a subset as "dangerous chemicals";[242] requires DEC to post these chemical lists publicly, and to update and expand them periodically;[243] and requires manufacturers to report use of any "dangerous chemical" in a children's product to DEC, to distributors, and to retailers.[244] Beginning in 2023, the law directly prohibits the sale of children's products containing certain "dangerous chemicals."[245] To the extent that New York regulators draw from the Prop 65 list in building their "dangerous chemicals" list—which, based on instructions from their legislature, appears likely—Prop 65 would exert influence on the opposite coast, in the third-largest U.S. consumer market.

Thus, although Prop 65's direct protection of the public has been presumed to flow primarily from litigation over businesses' failure to warn of toxic

238. OR. REV. STAT. § 431A.255(1) (2019).
239. *Id.* § 431A.255(4)(b) (emphasis added).
240. N.Y. ENV'T CONSERV. LAW §§ 37-0901–17 (McKinney's 2020).
241. *Id.* § 37-0903(d)(i).
242. *Id.* § 37-0901.
243. *Id.* § 37-0903(1), (2).
244. *Id.* § 37-0905(1).
245. *Id.* § 37-0907.

exposures—or, as described below, from industries' behind-the-scenes quiet compliance in anticipation of litigation—Prop 65 additionally advances its public protection role through the nonlitigation mechanisms of regulatory triggering and regulatory ratcheting flowing from the chemical-listing process.

C. Commerce-Transforming: Prop 65 Exerts Supply Chain Pressure

Prop 65's nonobvious, behind-the-scenes influence on business behavior appears at least as powerful as its publicly visible role in producing warnings and failure-to-warn litigation. The intense reform pressure that Prop 65 exerts on individual businesses—which becomes commerce-transforming in the aggregate—is the law's third hidden mode of operation, supplementing its regulatory triggering and ratcheting effects. Although presumably most laws generate some level of quiet compliance, Prop 65's aggressive enforcement scheme sends a particularly forceful deterrent signal. This operates behind the curtain to produce substantial changes in consumer product and business processes in diverse contexts. As one corporate sustainability director put it: "Citizen lawsuits put the fear of God into most companies because they create a reputational risk as well as a financial risk. So, it's a very effective enforcement mechanism."[246]

Previous commentators have noted the existence of quiet compliance in general terms. As one long-time Prop 65 enforcer wrote:

> I'm told that some companies make . . . changes once a chemical is placed on the Proposition 65 list, before there is even an immediate threat of litigation. Since these changes understandably aren't announced, we don't know how often they occur, or whether the changes in the risk posed by the products or emissions are significant.[247]

Our team's technical research and interviews with representatives from businesses in various supply chain positions revealed several distinct means by which Prop 65 shapes industry conduct to reduce exposure to listed chemicals.[248]

First, representatives across business sectors confirm that Prop 65 has strongly incentivized supply chain communication about the chemistry of consumer products, which was previously a minimal or nonexistent topic of conversation. Even as interviewees frequently remarked that the ubiquity of Prop 65 warnings in California is problematic and dulls their impact—"I think there

246. Interview with Martin Wolf, *supra* note 226.

247. Weil, *supra* note 68, at 13.

248. Interview material we quote is drawn from seventeen semi-structured interviews with manufacturers, retailers, business consultants, and institutional purchasers in various supply chain positions with respect to consumer goods, conducted by Dr. Jennifer Ohayon of the Silent Spring Institute from August 2018 to December 2018. Potential interviewees were selected because they were in the top five largest companies by revenue for their sector. Additional top "green" businesses were selected to illuminate how Proposition 65 informs decision making at companies expressly committed to avoiding toxic chemicals. A subset of those contacted consented to be interviewed. By request, we have anonymized most interviewees and their employers.

is perhaps some warning fatigue of having everything labeled," said the representative of a major global flooring company[249]—they nonetheless made clear that their company's goal was always to avoid issuing a warning. While some interviewees suggested that consumers might generally be numbed from over-warning, no business appeared to want to bear the particularized risk that a warning on its own product might prove damaging and lead to market deselection.

Several business representatives additionally noted the incentivizing power of the warning requirement even for companies with substantial non-California business. The flooring company representative said out-of-state customers "may not be familiar" with Prop 65 warnings, such that it would "create unnecessary anxiety by seeing labels such as 'This Product is Known to the State of California to Cause Cancer'" that would be difficult for the company to dispel.[250] A representative from a major electronics manufacturer made similar observations about his company's global marketplace:

> Although in California there's a lot of warning fatigue . . . outside of this jurisdiction, that's not always the case. So if you were to put a warning onto a product and ship it to anywhere else in the world saying, 'Oh, yeah, this product is going to cause cancer'. . . No one wants that, right?[251]

Second and related, larger and more sophisticated businesses have in many cases come to use the Prop 65 list as a de facto restricted substances list (RSL), that is, what has typically been referred to as a "black list" or "gray list" that guides product formulation. This means that downstream parties demand that their upstream suppliers of ingredients, product components, or finished products avoid using Prop 65 chemicals entirely, or use them only where deemed essential. Nonprofit consumer and public health groups likewise routinely use the Prop 65 list in market-based pressure campaigns, thereby increasing stigma around listed chemicals and further motivating businesses to avoid them.[252]

Third, the Prop 65 list is used by a range of certification schemes to identify products free from Prop 65 chemicals as environmentally preferable, conferring on them a potential market advantage. Companies also use the list as part of more

249. Interview with manager of product chemicals for a flooring company 9 (Dec. 18, 2019) (on file with authors).

250. *Id.* at 1.

251. Interview with leader of the materials team for a global electronics manufacturer 1 (Sept. 28, 2018) (on file with authors).

252. For example, WVE describes using the Prop 65 list to identify and advocate against the developmental and reproductive toxicants that may be hidden in fragrances. WVE's Director of Science and Research described the power of being able to "say to [our members], 'there's something in here that might harm your fertility or the health of your developing baby.'" Telephone interview with Alexandra Scranton, *supra* note 227. Another nonprofit, Breast Cancer Prevention Partners (BCPP), has successfully advocated for Target to restrict Prop 65 chemicals in its personal care products, and BCPP's Campaign for Safe Cosmetics uses Prop 65 to establish the hazard of chemicals that it urges companies to avoid in cosmetics. E-mail communication with Janet Nudelman, Dir. of Program and Policy, BCPP (Oct. 29, 2019) (on file with authors). *See also infra* note 278 (describing retail pressure campaign related to vinyl flooring).

ambitious programs to quantify and ultimately reduce a business's overall chemical or environmental footprint.

Finally, where companies conclude that Prop 65 chemicals are necessary or unavoidable in a given product, OEHHA-established safe harbor levels assist businesses in evaluating risk. In all of these ways, the toxicity information that Prop 65 forces into the marketplace through channels other than warning or direct enforcement action advances the law's ultimate goal of protecting consumers from harmful exposures.

1. Forcing Supply Chain Communication

Consistent with the maxim that you can't manage what you don't measure, interviews with businesses across a variety of consumer product sectors confirm that Prop 65 has engendered substantial supply chain communication that was previously absent. Put bluntly: the opacity of unregulated product supply chains would, if known, startle most consumers. Beyond confirming price and performance, downstream purchasers of components or finished products (such as brands and big box retailers) have historically had little reason to ask about attributes of what they obtain from upstream suppliers, including what chemistries comprise the products they will ultimately assemble or vend. The complexity of global supply chains further complicates the matter, with components often sourced from multiple overseas suppliers that are completely unknown to the brands or retailers. In the words of a representative who oversees environmental responsibility for a global apparel brand:

> You can start a clothing company and know nothing about the supply chain. You just tell somebody what you want, they can design it, develop it, make it, sell it to you. And you put your brand on it and sell it in the store. Perhaps that's a lot of clothing companies, from small companies to very, very large companies that do not get involved in how stuff is made . . . . There's no way they can manage the chemistry that gets applied to the materials in that supply chain because they don't even know what the supply chain is.[253]

This chemical ignorance can have considerable public health consequence: The apparel industry's toxic footprint, for example, is estimated to have an annual health cost of 2.25 million disability-adjusted life years,[254] with textile mills alone accounting for 20 percent of industrial water pollution worldwide.[255]

253. Interview with supply chain officer for a California-based apparel company 11 (Oct. 4, 2018) (on file with authors).

254. QUANTIS, MEASURING FASHION: ENVIRONMENTAL IMPACT OF THE GLOBAL APPAREL AND FOOTWEAR INDUSTRIES STUDY 20 (2018), *available at* https://quantis-intl.com/wp-content/uploads/2018/03/measuringfashion_globalimpactstudy_full-report_quantis_cwf_2018a.pdf. Disability-adjusted life-years are a metric for the healthy years of life lost population-wide that are attributable to a particular source of health harm. *Id.* at 64.

255. *Encourage Textile Manufacturers to Reduce Pollution*, NAT. RES. DEF. COUNCIL, https://www.nrdc.org/issues/encourage-textile-manufacturers-reduce-pollution (last visited Feb. 26, 2020).

By making ignorance of product composition risky and potentially expensive for businesses who fail to warn about toxic chemical exposures, Prop 65 forces questions and corresponding safety demands up the supply chain. As stated by a corporate responsibility officer involved in hospital-sector procurement:

> [F]or so long, we've lived under this cloud of secrecy, and [suppliers] haven't been transparent. This [Prop 65] kind of helps. This kind of encourages them to be more transparent, and that's what we want in all industries. Tell us what's in it . . . and we'll make the choice whether we want to buy it.[256]

One sustainability consultant said his firm uses average Prop 65 litigation settlement figures to motivate potential clients about supply chain due diligence:

> You can spend legal fees and pay a lawyer 48 grand if somebody finds this [Prop 65 chemical in your product], or you can pay us 48 grand to figure out what's actually in your supply chain and not incur any brand risk associated with that. So pay now or pay later, it's your call.[257]

Once retained, the consultant's firm must often break bad news to brands and manufacturers:

> [We say to our clients]: "Alright, we reached out to all your suppliers, we figured out what's in your product down to beyond everything that wasn't on SDS's. We signed a bunch of NDAs. Here we go. Instead of ten ingredients in your product, there's actually forty-two. Instead of none on the Prop 65 list, you actually have three." And then they're kind of like, "Oh Lord."[258]

Prop 65 not only provides businesses with an incentive to manage product composition; it supplies the force necessary to move information through reluctant channels.[259] While company representatives in some sectors described a push-and-pull with their suppliers to extract information about materials, many said that with persistence and business scale, they were able to make suppliers more transparent. One brand's approach to fragrance ingredient information illustrates this phenomenon.

Fragrances, whose constituents are not federally required to be listed on consumer product labels, typically contain numerous chemicals, some of which

256. Interview with corporate responsibility officer for a major operator of hospitals and provider of medical services (Nov. 13, 2018) (on file with authors).

257. Interview with sustainability consultant (Dec. 20, 2018) (on file with authors).

258. *Id.* at 2.

259. Comments of a representative from the green products company Seventh Generation about the norms of secrecy in certain materials sectors were typical: "[T]he things that make it difficult for us to comply [with Prop 65] are a lack of communication along the supply chain, particularly with respect to materials like plastics, where companies are very guarded about the ingredients they'll use, particularly minor components." Interview with Martin Wolf, *supra* note 226.

are toxic.[260] Fragrances for multiple product types, ranging from perfumes to room air fresheners to toilet bowl cleaners, are manufactured by a small number of fragrance houses whose chemical palettes and specific formulations are notoriously closely guarded secrets.

Major brands and retailers, however, have been able to use the leverage of Prop 65 to dictate both information transparency and actual chemical selection. Says a representative from a multi-billion-dollar brand encompassing high-sales-volume products like home air fresheners:

> We know what's in all our fragrances. Because we have such a large volume of fragrance products that we purchase, we only use certain fragrance houses. Part of their ability to get volume from us is that they have to be willing to tell us what all the components are. We've got what we call an 'approved chemical palette' for our fragrance houses to use, and that's the chemicals they can select from as they develop fragrances for us.[261]

Both the existing Prop 65 list and potential additions to it have directly informed the approved chemical palette:

> There have been fragrance components that were proposed for Prop 65 listing, and we felt that it was very likely that they would be listed, so we had the fragrance houses revise those fragrances for us ahead of time, so that we would just be out of the Prop 65 component before it got listed.[262]

2. Informing Corporate Restricted Substances Lists

Beyond making information move through supply chains, the Prop 65 chemicals list is a key component of corporate Restricted Substance Lists (RSLs)—black or gray lists of chemicals that companies must avoid or minimize to meet their downstream customers' requirements. The pharmacy chain CVS, for example, has this "California Prop 65 Warning Policy & Notice to Suppliers":

> CVS Pharmacy prohibits the application of California Proposition 65 in-store signage, on-product warning labels on products, and online product-specific warnings when a safe and effective alternative can be found that provides the same user experience. Any form of Proposition 65 warning, including on-product Proposition 65 warning labels and online product-specific Proposition 65 warnings, are used . . . [only by] exception . . . .
>
> Our expectation is that our Suppliers know what is in their products; disclose when a Proposition 65 chemical . . . or otherwise restricted chemical is

260. *See* BREAST CANCER PREVENTION PARTNERS, RIGHT TO KNOW: EXPOSING TOXIC FRAGRANCE CHEMICALS IN BEAUTY, PERSONAL CARE AND CLEANING PRODUCTS 10 (2018), https://www.bcpp.org/resource/right-to-know-exposing-toxic-fragrance-chemicals-report/.

261. Interview with regulatory compliance director for major household products brand 3–4 (Nov. 6, 2018) (on file with authors).

262. *Id.* at 4.

> present, and avoid introducing products to CVS that would require a California Proposition 65 consumer exposure warning label.[263]

A global electronics corporation's representative describes a more rigorous version of this Prop 65 screening process across his company, in which an expert team that included a chemist and a materials scientist engaged in a multimonth process to examine every chemical on the Prop 65 list and ask: "What is it? Where is it used? Is there any possible way it could be in our products? How could we verify that?" to ensure that listed chemicals relevant to the company's products were well understood and captured by its RSL.[264]

Although company RSLs typically aggregate regulatory requirements from many jurisdictions,[265] the Prop 65 chemicals list may disproportionately populate certain RSLs because of its length. More importantly, however: the Prop 65 list is not a mere compilation, but an independent scientific contribution. Our team has determined that by virtue of California's Qualified Experts listing mechanism, OEHHA has placed on the Prop 65 list fifty-six carcinogens and fifty-five reproductive toxicants that were either not listed by any other authoritative body at all at the time of Prop 65 listing (such as the endocrine disrupting chemical bisphenol A) or were listed somewhere else but not identified on other lists as reproductive or developmental toxicants (for example, the solvents benzene and n-hexane).[266] The state's Qualified Experts process thus makes the Prop 65 list significantly more responsive to emerging scientific data than many other toxic chemical lists on which businesses rely.[267]

In yet another business sector, Seventh Generation, a company specializing in environmentally friendly household products, likewise explains that Prop 65 is one of the key "reference lists" it uses in determining whether a product

263. CVS PHARMACY, CALIFORNIA PROP 65 CLEAR AND REASONABLE WARNING POLICY AND NOTICE TO SUPPLIERS (2018), https://www.cvssuppliers.com/sites/default/files/CVS.com%20-%20Prop%2065%20Policy%20and%20Notice%20-%20Warnings.pdf.

264. Interview with leader of the materials team for a global electronics manufacturer, *supra* note 251, at 8.

265. For example, one global electronics manufacturer described the importance of the European Union's content-based regulations on certain toxic materials in electronics industry components in informing company chemicals screening. Interview with green chemistry officer for global electronics manufacturer (Oct. 23, 2018) (on file with authors).

266. To identify these compounds, we sorted the Prop 65 list and selected chemicals for which "SQE" (State Qualified Experts) was the only listing mechanism. We then eliminated any carcinogens listed by either the International Agency for Research on Cancer, or the National Toxicology Program's (NTP) Report on Carcinogens. We also eliminated any reproductive or developmental toxicants identified as such in monographs by the NTP's Center for the Evaluation of Risks to Human Reproduction, or identified as confirmed for suspected endocrine disrupting chemicals by the European Union in Annex I of the European Commission report establishing a priority list of endocrine disruptors (available at https://ec.europa.eu/environment/archives/docum/pdf/bkh_main.pdf).

267. This is particularly significant in the area of reproductive and developmental toxicity, where scientific understanding is evolving rapidly and new health effects are regularly being discovered or finally understood, such as in the area of endocrine system disruption. *See* Evanthia Diamanti-Kandarakis et al., *Endocrine-Disrupting Chemicals An Endocrine Society Scientific Statement*, 30 ENDOCRINE REVS. 293, 293 (2009).

ingredient is acceptable in its products.[268] Additionally, the company asks its suppliers to identify any Prop 65 chemicals present as an incidental inclusion, such as a contaminant in raw materials or a residual from product manufacture that is not an intentional product constituent. The Prop 65 chemical 1,4-dioxane, for example, which releases the carcinogen formaldehyde, is a frequent contaminant in soaps and detergents.

Insisting on information about Prop 65 chemicals from upstream suppliers has in some cases cleaned up suppliers' operations and, in other cases, caused the inquiring brand to change its business relationships. Said a Seventh Generation representative: "Both have happened. So we've had companies that have changed their formulation to eliminate something we found objectionable, and we've also not purchased from specific suppliers because of incidental ingredients in their raw material."[269] In the case of the Prop-65-listed chemical 1,4 dioxane, the company said, "we had to find, among the many suppliers that were making the surfactant [we wanted], ones that were willing to guarantee, essentially, no detectable levels of 1,4 dioxane."[270]

Larger companies outside the green marketplace niche likewise say Prop 65 is integral to their internal practices and corporate decision making. A regulatory compliance officer for a major household product brand states that across a wide range of manufactured consumer goods from cleaning products to food-contact plastics to pesticides, the company uses the Prop 65 list to inform its own list of chemicals that are disallowed or heavily use-restricted, such that "in general, we don't formulate with Prop 65 chemicals . . . and we evaluate our raw materials, and if a potential vendor has a Prop 65 chemical in a product as an impurity, we'll simply not choose that as an appropriate vendor."[271] The company reports that it uses periodic audits of its primary vendors—their manufacturing process, their manufacturing location, and their testing data—to monitor supply chain compliance.[272]

Where the company acquires a new product line, its in-house toxicology department will assess the product suite for Prop 65 chemicals and determine whether any might require a consumer warning. For example, when the company acquired a line of water repellents containing a Prop-65-listed solvent at levels high enough to require a warning, the company eventually reformulated the product to obviate the need to warn.[273] Ultimately, said a representative, "if it's a product that we acquire that has a Prop 65 chemical, we actually do formulate

268. Interview with Martin Wolf, *supra* note 226, at 2.
269. *Id.* at 5.
270. *Id.* at 5–6.
271. Interview with regulatory compliance director for major household products brand, *supra* note 261, at 9.
272. *Id.*
273. *Id.* at 5.

them on out. It just isn't always the quickest thing to come up with a new formulation."[274]

At minimum, companies often include on their RSLs the subset of Prop 65 chemicals that they perceive their competitors are phasing out, the European Union is eliminating, or, in the words of an executive at Underwriters Laboratory (UL), "are considered high priority by customers." UL, which provides testing and compliance services for many major retailers, says that big box retailers such as Walmart and Target have varied approaches to eliminating or discouraging toxic chemistries through their RSLs, ranging from demanding that suppliers eliminate RSL chemicals by a specified date, to denying them marketing benefits, such as the most prominent shelf display space.[275]

Nonprofit groups' market pressure campaigns greatly increase companies' incentive to treat the Prop 65 list as a forbidden-chemicals list. The retailer-facing "Mind the Store" campaign, for example, which pressures major retailers to eliminate toxic chemicals from products and packaging, claims credit for helping to drive Prop-65-listed phthalates out of vinyl-type ("resilient") flooring. In 2015, before the advocacy campaign, a group of NGOs tested vinyl flooring samples from major retailers and found that 58 percent contained ortho-phthalates.[276] In 2018, after the campaign, a follow-up study found no ortho-phthalates in any resilient flooring tested.[277]

The resilient flooring sector also demonstrates how the Prop 65 list can steer manufacturers away from problematic chemistries at the outset, when launching a new business or product line. As explained by a representative from a flooring company that expanded from carpet-only product lines into vinyl: "When we got into the resilient business, we didn't have a lot of legacy product formulations or specifications built on ortho-phthalates. So it was relatively easy for us to just not use that category of plasticizers in our products and just make that clear to

274. *Id.* at 2. When reformulating a product, companies typically aim to simply eliminate a chemical of concern if it is deemed unnecessary; substitute with a safer alternative where possible; or more definitively redesign the product or manufacturing process to eliminate the need for the chemical altogether (by, for example, using inherently flame-resistant furniture materials rather than adding a toxic flame retardant chemical). The last solution is simultaneously the most difficult and the most likely to avoid unintentionally substituting a Prop 65 chemical with another hazardous chemical. For example, a graduate-level course called Greener Solutions developed a systems thinking approach to seeking safer alternatives. Megan R. Schwarzman & Heather L. Buckley, *Not Just an Academic Exercise Systems Thinking Applied to Designing Safer Alternatives*, 96 J. CHEM. EDUC. 2984, 2984 (2019), https://pubs.acs.org/doi/pdf/10.1021/acs.jchemed.9b00345.

275. Interview with Bill Pease, Safety Consultant, Underwriters Labs 3 (Oct. 25, 2018).

276. *Floored by Phthalates Findings*, HEALTHY STUFF, https://www ecocenter.org/healthy-stuff/reports/vinyl-floor-tiles/flooring_findings (last visited Feb. 26, 2020) (describing 2015 investigation).

277. Gillian Miller et al., *Vinyl Flooring Follow-up Report,* HEALTHY STUFF, https://www.ecocenter.org/healthy-stuff/pages/vinyl-flooring-follow-report (last visited Feb. 26, 2020) (describing 2018 follow-up testing). Although the California Office of the Attorney General's Prop 65 database reveals a spate of litigation over phthalates in vinyl flooring, this occurred in the 2010-2011 period, and appears not to have cleaned up the industry before the Mind the Store testing in 2015. The Ecology Center describes the industry transformation as stemming from specific pledges it obtained from retailers after its 2015 investigation. *See id.*

our suppliers."[278] In such cases, Prop 65 acts not as a potentially challenging course correction, but as a helpful up-front design frame.

3. Informing Quantitative Risk Analysis

Prop 65 also informs product formulation by establishing quantified "safe" exposure levels that industry uses to avoid potential liability. Although the Prop 65 list defines a universe of chemical exposures that may pose legal risk for businesses, liability does not attach "[if] an exposure is low enough to pose no significant risk of cancer or is significantly below levels observed to cause birth defects or other reproductive harm."[279] Where companies are unable to eliminate Prop 65 chemicals entirely—for reasons of price, performance, availability of alternatives, or otherwise—they need to know what exposure level is "low enough to pose no significant risk." OEHHA has substantively assisted in this regard by setting so-called "safe harbor levels" for hundreds of Prop 65 chemicals; only exposures exceeding these levels trigger warning obligations.[280]

Commentators have remarked on the impressive speed with which the state was not only able to develop an expansive list of chemicals presenting cancer or reproductive risks, but in many instances, to identify a level of exposure that would present a "significant" risk. Only six years into the law's operation, in what was described as "100 years of progress [by federal standards] in the areas of hazard identification, risk assessment, and exposure assessment," OEHHA had published significant risk levels for 282 chemicals.[281] This pace was possible because the structure of Prop 65—which permits OEHHA to list a chemical as toxic without establishing a permissible risk level—productively undermined industry's usual delay tactics. As the author of Prop 65 explains:

> The incentives for making risk-based determinations are very different under Proposition 65 than they are under federal laws that apply in the same contexts. Under conventional federal law, delay and extended disputes over

278. Interview with manager of product chemicals for a flooring company, *supra* note 249, at 11. For market incumbents, however, Prop 65 listings for phthalates played a different role. As described previously in note 101, from 2003 on, OEHHA sequentially listed a number of structurally related phthalates ("ortho-phthalates") under Prop 65. Unfortunately, but lawfully, manufacturers typically responded by simply swapping out regulated phthalates for similar but as-yet-unregulated ones, such as the ortho-phthalate DINP. When, however, OEHHA's State Qualified Experts identified DINP as a carcinogen in 2013—making Prop 65 the first authoritative list to single out this phthalate—chemical safety advocates sensed an opportunity: They used the event to launch a retailer-facing pressure campaign about the dangers of ortho-phthalates as a class, which virtually eliminated these chemicals from vinyl flooring. Telephone interview with Mike Schade, Dir., Mind the Store Campaign (Oct. 31, 2019).

279. *About Proposition 65*, CAL. OFF. ENV'T HEALTH HAZARD ASSESSMENT, https://oehha.ca.gov/proposition-65/about-proposition-65 (last visited Feb. 26, 2020).

280. *Current Proposition 65 No Significant Risk Levels (NSRLs) [&] Maximum Allowable Dose Levels (MADLs)*, CAL. OFF. ENV'T HEALTH HAZARD ASSESSMENT (Mar. 25, 2019), https://oehha.ca.gov/proposition-65/general-info/current-proposition-65-no-significant-risk-levels-nsrls-maximum.

281. David Roe, *Time to Measure this Social Experiment's Results,* 17 ENV'T L. NEWS 1, 4 (2008) (quoting California Environmental Protection Agency, Proposition 65 Review Panel Report, Summary of Issues).

> standard-setting are to the legal advantage of regulated industry, because no regulatory consequences can occur until a standard has been set.[282]

Under Prop 65, in contrast, regulators and the regulated have a shared incentive to clarify levels of chemical use that trigger the duty to warn.

As of March 2019, OEHHA had set 275 safe harbor levels for carcinogens and fifty-two for reproductive or developmental toxicants,[283] providing guidance that business interviewees have routinely praised.[284] As a materials manager in the electronics sector described the process of assessing listed chemicals in his company's products: "Logically, everything had the same problem, whether you had phthalates or plasticizers or anything in it. We needed to have some sort of *de minimis* level or safe harbor level . . . to be able to start that work."[285] A footwear company representative similarly stated, "We're doing the best that we can to ensure our materials that go into our products will be below safe harbor limits, or at least they're well below detectable levels."[286] Indeed, across businesses that were overall supportive or overall dismissive of Prop 65's utility as regulatory scheme *in toto*, there was consensus on the scientific and practical value of OEHHA-established safe harbor levels to guide businesses[287] and a strong desire for promulgation of more.

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282. David Roe, *Ready or Not The Coming Wave of Toxic Chemicals,* 29 ECOLOGY L.Q. 623, 633 (2002).

283. *See* CAL. OFF. ENV'T HEALTH HAZARD ASSESSMENT, PROPOSITION 65 SAFE HARBOR LEVELS (2019), https://oehha.ca.gov/media/downloads/proposition-65//safeharborlist032519.pdf (last visited Oct. 29, 2019). Multiple levels may be set for a single chemical based on age (e.g., infant versus adult) and route of exposure (e.g., oral versus dermal).

284. Businesses may by law set their own safe harbor levels. *See* CAL. CODE REGS. tit 27, art. 7-8. They often do—but this can be prohibitively complex and expensive, and these levels may be contested in litigation. Businesses thus generally prefer to establish their compliance with OEHHA's safe harbor levels, which provide a complete litigation defense. *See* CAL. HEALTH & SAFETY CODE § 25249.10(c) (providing that the warning requirement does not apply to exposures below the safe harbor level).

285. Interview with leader of the materials team for a global electronics manufacturer, *supra* note 251, at 2.

286. Interview with product chemistry expert for footwear company 11 (Aug. 14, 2018) (on file with authors).

287. Safe harbor levels might also in the future act as regulatory triggers. Public health researchers, for example, have invoked OEHHA safe harbor levels to contextualize the concentration of chemicals found in environmental samples, and in some cases to make a case for stronger regulatory action. In one study, researchers compared levels of DDT found in soil samples to safe harbor levels, and described the potential role of Prop 65 in forcing "the assessment and possible cleanup of such a situation through the threat of creating a health risk perception that could affect the market value of a property." John A. Lowe & Ijaz S. Jamall, *Assessing Health Risks Associated with DDT Residues in Soils in California A Proposition 65 Case Study*, 14 RISK ANALYSIS 47, 47 (1994). In two studies of toxic chemical exposure sources in childcare facilities, researchers compared levels of Prop-65-listed flame retardants and phthalates to safe harbor levels to make the case for greater regulatory controls. *See generally* Asa Bradman et al., *Flame Retardant Exposures in California Early Childhood Education Environments*, 116 CHEMOSPHERE 61 (2014); Fraser W. Gaspar et al., *Phthalate Exposure and Risk Assessment in California Child Care Facilities*, 48 ENV'T SCI. & TECH. 7593 (2014).

4. Informing Hazard Screens, Certifications, and Comprehensive Chemicals Policies

Beyond the sometimes-dramatic changes that Prop 65 has prompted in supply chain behavior, the law has proven central to hazard screening tools, certification programs for environmentally preferable products, and broader corporate chemical policies that aim to increase the chemical safety of consumer products. These technical, behind-the-scenes manifestations of Prop 65's influence, although powerful, have not previously been noted or described.

Leading companies are going beyond list-based chemical deselection measures to ensure that the chemicals they use are as safe as possible, rather than merely unregulated.[288] As one interviewee described with only slight exaggeration, the problem with the restricted-substances approach is that: "I could get rid of a Prop 65 chemical and replace it with plutonium and that would be totally fine."[289] Forward-looking businesses are instead using a combination of hazard assessment tools and green certifications to compare systematically the health and environmental impacts of multiple possible substitutes for known-hazardous chemicals.

Prop 65 has provided key input to third-party certifications and standards serving retailers and brands looking to reduce the use of hazardous chemicals. The institutional cleaning sector, for example, has been a focus of ecolabels such as the EPA's Safer Choice Program, which uses Prop 65, among other criteria, to deselect hazardous ingredients.[290] The nonprofit Environmental Working

288. The Mind the Store campaign (run by the nonprofit Safer Chemicals, Healthy Families) targets major retailers with an annual scorecard rating their use and management of hazardous chemicals. According to the campaign's leader, when the program was launched over six years ago, none of the major retailers had a chemicals policy. Within a year, however, Walmart and Target launched a chemicals policy with an RSL comprised of a "list of lists." Says the campaign leader, "Prop 65 is on these retailer lists nine times out of ten." Telephone interview with Mike Schade, *supra* note 278. The campaign is now encouraging companies to move stepwise from an RSL to a broader, more comprehensive chemicals policy. *Id.*

289. Interview with leader of the materials team for a global electronics manufacturer, *supra* note 251, at 13.

290. As of October 2019, EPA's "Safer Choice" program has certified more than 2,600 unique products. *See* OTHER SERVICE-ENABLED DATA, SAFER CHOICE, https://www.epa.gov/enviro/other-service-enabled-data (last visited Oct. 19, 2019). Prop 65 chemicals are prohibited as intentionally added ingredients in Safer Choice products. *See* U.S. EPA, SAFER CHOICE PROGRAM MASTER CRITERIA FOR SAFER INGREDIENTS (v.2.1, 2012), https://www.epa.gov/sites/production/files/2013-12/documents/dfe_master_criteria_safer_ingredients_v2_1.pdf; U.S. EPA, SAFER CHOICE INTERIM FRAGRANCES CRITERIA (2015), https://www.epa.gov/sites/production/files/2015-01/documents/dfe_interim_fragrances_criteria.pdf; E-mail communication from Alyson Lorenz to Megan Schwarzman (Oct. 10, 2019) (on file with authors). Similarly, the private label Green Seal prohibits the use of Prop 65 reproductive or developmental toxicants via fourteen standards used to certify more than 1,200 products to date. *See Standards List*, GREEN SEAL, https://www.greenseal.org/green-seal-standards/standards-list (last visited Oct. 20, 2020). We examined the product standards that reference Prop 65 explicitly (standards GS-1, GS-8, GS-11, GS-34, GS-36, GS-37, GS-40, GS-44, GS-48, and GS-50-54), and determined the number of products certified pursuant to each.

Both Safer Choice and Green Seal are singled out by the U.S. General Services Administration Environmentally Preferable Purchasing policy. *See* GEN. SERVS. ADMIN., OGP 2851.2, GSA ORDER RE:

Group (EWG) has gone further, developing an "EWG-Verified" licensing program for beauty and personal care products that certifies as safer more than 1,500 beauty and personal care products that do not contain Prop 65 chemicals (among other criteria).[291] In most of these standards and certifications, the Prop 65 list is one among several authoritative lists used for an ingredient screening process that identifies products containing known toxics.[292] The absence of these hazardous chemicals, combined in some cases with the presence of chemicals determined to be safer alternatives, becomes the basis for a positive product label or certification that purchasers then use to select safer materials and products.

Prop 65 also informs chemical hazard assessment tools that companies may use as an alternative or supplement to an RSL to more fully evaluate the toxicity of their products. A commonly used tool is the GreenScreen for Safer Chemicals, which incorporates the Prop 65 list by giving a highest-hazard score ("Benchmark 1") to listed chemicals.[293] Performing a full GreenScreen assessment requires time, money, and toxicological expertise that many companies lack, but the tool's reach has been dramatically extended through the GreenScreen List Translator,[294] which essentially automates part of the assessment by screening chemicals against authoritative lists to flag known hazards. The List Translator assigns the highest hazard score ("List Translator 1") to any Prop 65 chemical. The List Translator's screen informs standards that serve many institutional purchasers and specifiers, by flagging high-hazard

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GSA GREEN PURCHASING PLAN 30 (2011), https://www.gsa.gov/cdnstatic/GSA_Green_Purchasing_Plan.pdf (stipulating use of Green Seal certified cleaning products); *see also* GEN. SERVS. ADMIN., PBS 1096.1, GSA ORDER RE: THE PBS KEY SUSTAINABLE PRODUCTS INITIATIVE (2014), https://www.gsa.gov/cdnstatic/PBS_1096.1_The_PBS_Key_Sustainable_Products_Initiative_%28Signed_on_12-18-2014%29_%28Slightly_revised_on_7-29-2015%29.pdf. (specifying use of products certified by EPA pursuant to a prior program now rebranded as Safer Choice). Many cities, university systems, hotel chains, and a variety of NGO-led initiatives for "healthy" schools, office buildings, and homes also have environmentally preferable purchasing policies that privilege products without Prop 65 ingredients.

291. *See EWG Verified,* ENV'T WORKING GROUP, https://www.ewg.org/ewgverified/ (last visited Feb. 26, 2020).

292. UL's PurView® Platform reviews ingredient data against Prop 65 (among other lists), helping manufacturers and retailers source safer materials, ingredients, and products. PURVIEW, https://www.ulpurview.com (last visited Feb. 26, 2020). Made Safe, a certification program, screens product ingredients against a hazard list that includes Prop 65 chemicals and prohibits those ingredients from Made Safe Certified products. *About Made Safe's Hazard List*, MADE SAFE, https://www.madesafe.org/science/about-made-safes-hazard-list/ (last visited Feb. 26, 2020). Made Safe also works behind the scenes on ingredient consultation with large brands whose products would not pass certification, but who are taking steps to improve the safety of their products. Telephone interview with Sydney Cook, Dir. of Sci. & Research, Made Safe (Oct. 10, 2019). Seemingly unaware of these behind-the-scenes mechanisms, Prop 65 critic Donald Fisher argues that Prop 65 is today unnecessary in light of manufacturer responsiveness to consumer demands for green products and ingredient transparency, not recognizing that Prop 65 is a significant driver of transparency and green market demand and that its chemicals list is a key populator of tools that enable manufacturers to meet that demand. *See* Fischer, *supra* note 42, at 150–51 (arguing that Prop 65 is obsolete and should sunset because of a greening consumer market).

293. *See* GREENSCREEN FOR SAFER CHEMICALS, https://www.greenscreenchemicals.org (last visited Feb. 26, 2020).

294. *See GreenScreen List Translator*™, GREENSCREEN FOR SAFER CHEMICALS, https://www.greenscreenchemicals.org/learn/greenscreen-list-translator (last visited Feb. 26, 2020).

products in the building materials, textile, and electronics sectors.[295] A high hazard score will disadvantage a company vis-à-vis these sustainability standards and certifications, incentivizing companies to improve their scores.

The Prop 65 list additionally features centrally as a source of authoritative listings of hazardous chemicals in two projects that engage retailers and brands in more systematically assessing their use of hazardous chemicals, setting goals for toxics reduction, and promising market share to motivate their suppliers to reformulate. The Chemical Footprint Project (CFP)[296] enlists investors and major retailers in recruiting companies to take the annual CFP survey as part of a process to develop "comprehensive chemicals management programs that track and reduce chemical footprints."[297] Creators of the sector-specific Beauty and Personal Care product Retailer Scorecard,[298] which also uses the Prop 65 list, likewise highlight the market-driving role they intend their program to serve: "Resulting product assessment may be used to facilitate supplier-retailer conversations, drive improvements in supply chains, and independently evaluate and incentivize better, more sustainable products."[299]

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295. List Translator is integrated into the building sector by the Pharos web-based tool, the Health Product Declaration reporting standard, and the Leadership in Energy and Environmental Design (LEED v4) building standard, among others. It is incorporated into the textile sector by, for example, Scievera Screened Chemistry and GreenScreen Certified. The List Translator is integrated into the electronics sector by, for example, TCO Certified and EPEAT. Other programs are not sector-specific, such as Toxnot, a chemicals management and hazard assessment platform that gathers chemical ingredient data, screens them via the List Translator, and pools funding to support collaborative, full GreenScreen chemical hazard assessments. Each of these standards identifies and deselects Prop 65 chemicals using GreenScreen and/or the GreenScreen List Translator.

296. The Chemical Footprint Project (CFP) is a nonprofit organization that annually surveys participating companies to evaluate their performance in four categories: chemical management strategy, knowledge of chemical inventory, chemical footprint measurement, and degree of information disclosure. Over four years of the CFP Survey, returning companies have reported reducing their chemical "footprint" by more than 460 million pounds of toxic substances, including all chemicals on the Prop 65 list. CFP signatories include investors with $2.7 trillion in assets under management, as well as health care systems, group purchasing organizations and retailers with over $800 billion in purchasing power. *See* CHEMICAL FOOTPRINT PROJECT, TAKING THE JOURNEY TO A SMALLER CHEMICAL FOOTPRINT, 2019 SURVEY RESULTS (2019), https://www.chemicalfootprint.org/assets/downloads/ChemicalFootprintProject4thAnnualReport2019FINAL.pdf.

297. *Id.* at 4.

298. The scorecard, released in 2018, establishes numerous criteria for improving the sustainability of beauty and personal care products. It was created by eighteen organizations, including Walmart, Target, the Environmental Defense Fund, and the Sustainability Consortium. *See* Boma Brown-West, *An Unlikely Alliance Just Brought Us One Step Closer to Safer Beauty Products*, ENV'T DEF. FUND (May 21, 2018), https://business.edf.org/insights/an-unlikely-alliance-just-brought-us-one-step-closer-to-safer-beauty-products/?_ga=2.121921483.195891085.1526898905-1191367190.1512040169/.

299. THE SUSTAINABILITY CONSORTIUM & FORUM FOR THE FUTURE, BEAUTY AND PERSONAL CARE PRODUCT SUSTAINABILITY RATING SYSTEM III (2018), https://www.sustainabilityconsortium.org/wp-content/uploads/2018/04/TSC%C2%AE-BPC-Product-Sustainability-Rating-System.pdf. The textile industry provides an additional example of a coordinated industry effort through the Zero Discharge of Hazardous Chemicals (ZDHC) program, by which a coalition of fashion brands and their suppliers aims to empower the global textile, leather, apparel and footwear value chain to replace hazardous chemicals with safer ones in the production process, and try to reduce to zero by 2020 its use and discharge of hazardous chemicals. *See* ROADMAP TO ZERO, https://www.roadmaptozero.com (last visited Feb. 26,

Consumer-facing tools similarly use the Prop 65 list (among others) to score products based on ingredient hazards, and guide purchasers to safer products. These include the multi-product-sector Goodguide, and EWG's Skin Deep database for cosmetics and personal care products. No longer niche applications—Goodguide alone reports 500,000 to one million unique consumer users monthly[300]—their growing market penetration appears to affect purchasing patterns on a meaningful scale.[301]

Our research and interviews make plain that for however little public affection businesses show towards Prop 65, the law nonetheless has a marked effect on the behind-the-scenes conduct of large and sophisticated actors vis-à-vis product formulation, even in the absence of actual or threatened litigation. When businesses' desire to avoid issuing warnings is combined with the threat that Prop 65 listings will trigger statutory or regulatory restriction of listed chemicals, Prop 65 has considerably more market-shaping power than its critics acknowledge—and more even than its supporters typically realize and claim.

CONCLUSION

Where a law's substantive success is not easy to measure, there is a natural tendency for evaluators to look for things to count—whether or not they are good proxies for things that matter.[302] With respect to Prop 65, there has to date been much attention paid to a count of what may be the wrong things, or at least, a very incomplete list of things. The leading Prop 65 handbook begins by describing the law's role in prompting 22,199 sixty-day notice letters to 47,000

2020). ZDHC employs the Prop 65 list in establishing consensus RSLs and Manufacturing RSLs (MRSLs), which target chemicals in entire supply chains rather than only in finished products.

300. E-mail from Bill Pease, former Chief Scientist, Goodguide, to Megan Schwarzman (Oct. 14, 2019) (on file with authors).

301. Goodguide scores approximately 75,000 products from zero to ten10 based on ingredient hazard ratings, with higher ratings indicating safer products. The presence of a Prop 65 chemical will drive a product rating down to 0 or 1. The system then shows the user similar products with higher ratings. Goodguide tracks the relationship between its product rating and whether the product (or a higher-rated product) is purchased on Amazon via referrals from the Goodguide site. There is a strong correlation between Goodguide scores and product click-through and purchase rates on Amazon. E-mail from Bill Pease, *supra* note 300. Related tools include EWG's Skin Deep database and a browser extension created by the company Clearya, which instructs users to "Shop online as usual. We'll tell you if your cart has unsafe ingredients." *See* CLEARYA, https://www.clearya.com (last visited Feb. 26, 2020); *About EWG's Skin Deep, supra* note 204. Both tools use the Prop 65 list to identify carcinogens and reproductive toxicants.

302. Bradley Karkkainen has described this phenomenon with respect to the information-forcing NEPA. He notes that much commentary on the law's impact focuses on the declining number of instances in which an agency issues an environmental impact statement (EIS), even though a primary and positive effect of the law has been to encourage agencies to reduce the environmental impacts of their actions below the "significance" threshold that would require EIS preparation. Bradley C. Karkkainen, *Toward a Smarter NEPA Monitoring and Managing Government's Environmental Performance,* 102 COLUM. L. REV. 903, 921 (2002)*; see also* Bradley C. Karkkainen, *Bottlenecks and Baselines Tackling Information Deficits in Environmental Regulation*, 86 TEX. L. REV. 1409, 1431 (2008) (describing EIS preparation as a default "penalty" that agencies can avoid by improving their environmental performance).

businesses, and motivating 5,384 lawsuits; generating over $268 million in attorneys' fees to private and public enforcers; inducing $378 million in litigation defense costs; and triggering roughly $1 billion in business expenditures to achieve compliance.[303] Such figures may seem like neutral reportage, but they are commonly deployed by Prop 65's critics to suggest excessive, cost-ineffective, and unjustly remunerative enforcement. In neither case, however, do they illuminate whether Prop 65 has meaningfully advanced its policy goal: reducing human exposure to harmful chemicals.

This Article has told an encouraging but largely hidden story about Prop 65's health effects, by presenting qualitative evidence of the law's indirect roles in influencing legislation, regulation, and business activity to reduce exposure to toxic chemicals. Whereas some toxics right-to-know laws require periodic industry self-reporting of chemical uses or releases, making it easy for evaluators to determine reductions over time,[304] Prop 65 generally leaves no such data trail. Chronicling its exposure-reduction achievements accordingly requires analyzing case-specific litigation outcomes (as others have done) and excavating legislative histories, rulemaking dockets, and the activities of public and private standard-setting bodies, as well as obtaining information about business' internal decision making (as we have done).

Our research on Prop 65's modes of action through regulatory triggering, regulatory ratcheting, and commerce-transforming suggests a wide range of outcomes to tally in assessing Prop 65's record of success, extending well beyond the specific product reformulations, emissions reductions, and process changes induced by Prop 65 lawsuits. These include the many direct chemical controls that Prop 65 has spurred; the many safety standards and regulatory programs the law has influenced; and the enormous number of businesses and entire sectors that Prop 65 has helped to move away from known-toxic chemicals and, in many cases, towards more holistic, forward-looking chemicals management programs.

Beyond the Prop 65 context, we hope that, by example, our research offers lessons for assessing benefits of other significant information-forcing laws that

303. CARRICK, *supra* note 9, at 1–3. We note that estimates of defense costs are necessarily speculative, insofar as such costs are not memorialized in settlement agreements, which only address any payment of plaintiffs' attorneys fees.

304. The Toxics Release Inventory (TRI), produced pursuant to the Emergency Planning and Community Right-to-Know Act of 1986, requires industries to provide data on disposal and releases of several hundred specified chemicals to land, air, and water. *See generally* Roe, *supra* note 46. Two decades after enactment, commentators documented the law's dramatic success. *See* Nancy Bazilchuk, *TRI Corroding Its Original Intent?*, 114 ENV'T HEALTH PERSP. A420 (2006), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1513296/ (describing 60 percent decrease in on- and off-site releases from 1988 to 2004). These reductions have continued. *See* DANIEL TEITELBAUM ET AL , THE TOXICS RELEASE INVENTORY AND EMISSIONS CONTROL MEASURES 3 (2015), https://www.epa.gov/sites/production/files/2015-09/documents/teitelbaum.pdf (describing 52 percent decrease in on-site air releases of TRI-reportable chemicals from 2003 to 2013). Massachusetts' Toxic Use Reduction Act instead requires annual industry self-reporting of certain toxic chemicals in use, and analysis of how such chemicals could be reduced. *See MassDEP Toxics Use Reduction Program*, MA., https://www.mass.gov/guides/massdep-toxics-use-reduction-program (last visited Feb. 26, 2020).

lack clear metrics for judging success.[305] We say this notwithstanding the challenges we confronted (and others will surely confront) in tracing chains of causal influence, given the many and often unpredictable ways that information changes the behavior of policy and market actors. In the present anti-regulatory climate, where even longstanding right-to-know laws face strenuous opposition, accounting for such laws' full suite of benefits should be a priority project for those who care about public health protection and data-informed policy.

305. We of course also hope that as new chemical regulatory regimes are developed, they will incorporate data-collection features so that future evaluators may assess regulatory impact without the kind of detective work that Prop 65's design requires.