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Abstract
The vast universe of chemicals in the Canadian environment is presently understood only poorly by science. For many thousands of chemicals, important data regarding chronic toxicity are lacking. As a result, the requirement that the plaintiff in a negligence action prove causation of illness on a but-for standard has frequently been unattainable. In Resurfice Corp. v. Hanke, the Supreme Court of Canada articulated an important exception to the but-for test. In circumstances where but-for causation is unprovable due to limits in scientific knowledge, proof that a defendant materially contributed to the plaintiff's risk of incurring the type of injury that was ultimately suffered will satisfy the causation element. This reform is an important first step in the evolution of a tort regime that is capable of doing justice in the chemical era.

Keywords
Toxic torts; Causation; Resurfice Corporation--Trials; litigation; etc.; Hanke; Ralph Robert--Trials; litigation; etc.; Canada

Material Contribution to Justice? Toxic Causation after *Resurfice Corp. v. Hanke*

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The vast universe of chemicals in the Canadian environment is presently understood only poorly by science. For many thousands of chemicals, important data regarding chronic toxicity are lacking. As a result, the requirement that the plaintiff in a negligence action prove causation of illness on a but-for standard has frequently been unattainable. In *Resurfice Corp. v. Hanke*, the Supreme Court of Canada articulated an important exception to the but-for test. In circumstances where but-for causation is unprovable due to limits in scientific knowledge, proof that a defendant materially contributed to the plaintiff's risk of incurring the type of injury that was ultimately suffered will satisfy the causation element. This reform is an important first step in the evolution of a tort regime that is capable of doing justice in the chemical era.

À l'heure actuelle, le vaste univers des produits chimiques dans l'environnement canadien n'est compris que médiocrement par la science. Pour des milliers de produits chimiques, d'importantes données relatives à la toxicité chronique sont absentes. Par conséquent, l'exigence voulant que le demandeur dans une action pour négligence prouve l'élément de causalité de la maladie sur le critère des normes a été fréquemment impossible à atteindre. Dans la cause *Resurfice c. Hanke*, la Cour suprême du Canada a fait valoir une exception importante au critère du facteur déterminant. Dans des circonstances où le critère de l'élément de causalité ne peut être prouvé en raison des limites des connaissances scientifiques, la preuve à l'effet qu'un défendeur a contribué de manière importante au risque du demandeur d'encourir le genre de préjudice qui a finalement été subi satisfera à l'élément de causalité. Cette réforme est une première étape essentielle dans l'évolution du système de responsabilité délictuelle qui peut rendre justice dans le domaine des produits chimiques.

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The rules and procedures that the courts develop will determine to a great extent the level of risk of environmental harm that ordinary people will be exposed to.[1]

An unfortunate aspect of our modern industrial society is that there is ubiquitous potential for human contact with substances that may be toxic.[2]

IN 1962, RACHEL CARSON ALERTED THE AMERICAN PEOPLE —and ultimately the world—to the dangers inherent in the many thousands of synthetic chemicals that had entered the marketplace, the environment, and human bodies. "For the first time in the history of the world," she warned, "every human being is now subjected to contact with dangerous chemicals from the moment of conception

1. John Z. Swaigen, "The Role of the Civil Courts in Resolving Risk and Uncertainty in Environmental Law" (1991) 1 J. Envtl. L. & Prac. 199 at 217.

2. Pharmacia Corporation, as found in *Ring v. Canada (A.G.)* (2009), 290 Nfld. & P.E.I.R. 310 (N.L. C.A.) [*Ring*] (Factum of the Appellant at para. 93).

until death."[3] Since the publication of Carson's pivotal work, *Silent Spring*, tens of thousands of new synthetic substances have been created and marketed around the world.[4] Some of these are known to be toxic to humans, while others are believed to be innocuous. Surprisingly, the vast majority fall into a grey area of incomplete data and imperfect understanding.[5] To date, both public and private environmental law have failed to incentivize the production and dissemination of robust data on the safety (or danger) of synthetic chemicals.[6]

Statutory environmental law has historically operated on an "innocent-until-proven-guilty" paradigm that discourages rigorous research and encourages the manufacture of ignorance.[7] Tort law, for its part, has required the injured plaintiff to present evidence proving on a balance of probabilities that the defendant's substance caused his or her illness, even where the data to support or refute such a claim simply does not exist. On the traditional approach, plaintiffs who cannot prove that the defendant's substance caused their injury will recover nothing. This is the case even where plaintiffs have succeeded in showing that the defendant owed them a duty of care and breached the requisite standard of care in its treatment of the substance at issue. For several decades now, advocates and scholars have argued that this state of affairs is manifestly unjust and calls out for causation

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3. Rachel L. Carson, *Silent Spring* (Boston: Houghton Mifflin, 1962) at 15.

4. See Committee on Toxicity Testing and Assessment of Environmental Agents *et al.*, *Toxicity Testing in the 21st Century: A Vision and a Strategy* (Washington: The National Academies Press, 2007) at 40, online: <http://books.nap.edu/catalog.php?record_id=11970#toc> [Committee on Toxicity Testing, "Toxicity 21"]; Committee on Toxicity Testing and Assessment of Environmental Agents *et al.*, *Toxicity Testing for Assessment of Environmental Agents: Interim Report* (Washington: The National Academies Press, 2006) at 99, online: <http://www.nap.edu/openbook.php?record_id=11523&page=R1>. Note that the relevant universe of chemical substances also includes millions of chemical combinations resulting from the interactions of the various permitted substances.

5. See *e.g.* David Roe *et al.*, *Toxic Ignorance: The Continuing Absence of Basic Health Testing for Top-Selling Chemicals in the United States* (New York: Environmental Defense Fund, 1997), online: <http://www.edf.org/documents/243_toxicignorance.pdf>.

6. See generally Wendy E. Wagner, "Choosing Ignorance in the Manufacture of Toxic Products" (1997) 82 Cornell L. Rev. 773.

7. Dayna Nadine Scott, "Testing Toxicity: Proof and Precaution in Canada's Chemical Management Plan" (2009) 18 R.E.C.I.E.L. 59 at 61 [Scott, "Proof and Precaution"].

reform. In *Resurfice Corp. v. Hanke*,[8] the Supreme Court of Canada arguably answered this call.

Although it was not itself a toxic tort case, the 2007 decision in *Resurfice* articulated a framework for exemption from the traditional but-for test and opened up the possibility of recovery for toxic tort plaintiffs faced with a previously insurmountable burden of scientific uncertainty. In this article, we argue that in the narrow circumstances in which it applies, *Resurfice* shifted the focus of the causal inquiry from injury to risk. We view this as an appropriate response to the overwhelming burden of scientific uncertainty faced by many plaintiffs in toxic tort action—one that appropriately balances the interests of plaintiffs and defendants and produces a more precautionary signal to those who produce and disseminate chemical substances. While previous commentators have suggested that the *Resurfice* exemption effectively dispenses with the causation requirement,[9] we conclude that it is in fact a moderate and measured reform that will allow some toxic plaintiffs recovery where it was previously unavailable, but will still preclude recovery in many cases. Post-*Resurfice*, Canadian causation law now incorporates a sliding scale of causation standards, ranging from the traditional but-for requirement at one end to the *Resurfice* material contribution to risk test at the other.

Three years after the decision in *Resurfice*, it is appropriate to assess its impact on toxic tort litigation and its ensuing implications for the private law regulation of toxic substances in Canada. This article addresses both the context and content of the *Resurfice* approach to causation. In Part I, we analyze the theoretical bases of causation in tort law, with a focus on corrective justice. Part II examines the central problem in the toxic causation inquiry—that of scientific uncertainty concerning the nature and effects of chemical substances. Part III recapitulates traditional approaches to causation, and Part IV surveys the various risk-based reforms that have been undertaken in other jurisdictions to address the unique problems posed by toxic torts. Part V clarifies the distinction between material contribution to injury and material contribution to risk, while Part VI analyzes

8. [2007] 1 S.C.R. 333 [*Resurfice*].

9. See *e.g.* Russell Brown, "Material Contribution's Expanding Hegemony: Factual Causation after *Hanke v. Resurfice Corp.*" (2007) 45 Can. Bus. L.J. 432 [Brown, "Expanding Hegemony"].

the meaning and import of the *Resurfice* decision. Finally, Part VIII considers the application of *Resurfice* in the toxic tort scenario specifically.

We conclude that *Resurfice* reflects sound judicial—and environmental—policy. To a greater extent than traditional approaches, the *Resurfice* test will incentivize precaution in the treatment of toxic substances while retaining a rigorous causal standard. Though *Resurfice* ends the questionable approach of asking plaintiffs to prove the impossible, it does require the demonstration of a material increase in risk—a standard that is frequently challenging and leaves ample room for defendants to adduce exculpatory evidence. Because the *Resurfice* test would tend to discourage investigations that might reveal a material increase in risk, we end by proposing additional reforms that would improve the deterrent effect of toxic tort liability.

I. CAUSATION, CULPABILITY, AND CORRECTIVE JUSTICE

Ernest Weinrib and others have argued that the very essence of tort law is the goal of achieving corrective justice.[10] According to Weinrib, tort law is essentially based on the concept of "correlativity," or the notion of relationships organized on binary terms. This correlativity is said to be expressed both in the "bipolar nature of private law litigation" and in the doctrine of causation, which provides the necessary connection between the defendant's culpable conduct and the plaintiff's claim.[11] Justice Sopinka took this position when he stated in *Snell v. Farrell* that "[c]ausation is an expression of the relationship that must be found to exist between the tortious act of the wrongdoer and the injury to the victim in order to justify compensation of the latter out of the pocket of the former."[12] In keeping with the corrective justice principle of correlativity, Weinrib argues that the requirement of causation is necessary to justify the imposition of tort liability.[13]

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10. Peter Cane, "Corrective Justice and Correlativity in Private Law" (1996) 16 Oxford J. Legal Stud. 471 at 472, citing Ernest J. Weinrib, *The Idea of Private Law* (Cambridge: Harvard University Press, 1995) [Weinrib, *The Idea*].

11. Cane, *ibid.* at 471.

12. [1990] 2 S.C.R. 311 at para. 26 [*Snell*]. See also *ibid.* Cane clarifies that, for Weinrib, corrective justice "explains why the duty of one party under corrective justice is the mirror image of the other party's right" (at 472).

13. See *e.g.* Ernest J. Weinrib, "Causation and Wrongdoing" (1987) 63 Chicago-Kent L. Rev. 407. Weinrib argues that "tort law is not concerned solely with the defendant's emission of a

However, it is far from universally agreed that corrective justice is the sole justification for tort law. Goals such as distributive and retributive justice have also been defended not only as valid objectives, but as inevitable results of tort law. For example, Peter Cane has pointed out that since tort law is based on precedent, judicial allocations of liability, even if based solely on bipolar corrective justice in the case at hand, do have strong distributional effects. Taking the example of *Donoghue v. Stevenson*,[14] Cane explains:

> Let us assume that before that case the relevant rule of law was that a bystander could not recover against a manufacturer in respect of injuries caused by the negligence of the manufacturer in producing a product. After that case the relevant rule imposed such liability. An effect of the case was, therefore, to redistribute resources (in the form of legal rights) from one group (manufacturers) to another group (bystanders). Therefore, to say that the meaning of private law is corrective justice is to give an incomplete account of the structure of private law.[15]

Cane criticizes Weinrib for merely trying to explain the inner coherence of the current structure of tort law, rather than justifying the reasons for and consequences of that structure.[16] Others who view corrective justice as a laudable goal define the concept differently.[17] Indeed, corrective justice could be understood more broadly as having the intention of correcting wrongs in the form of injustices, correcting the imposition of externalities, and correcting the creation of unnecessary risks. Choosing a narrow, bipolar form of corrective justice focused

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harmful possibility but with that possibility's coming to rest on a particular plaintiff. ... Causation is the element in this relationship that functions to particularize the former as the victim of the latter's wrongdoing" (at 414).

14. [1932] A.C. 562 (H.L. (Eng.)).

15. Cane, *supra* note 10 at 482-83.

16. *Ibid.*

17. See *e.g.* Richard A. Posner, "The Concept of Corrective Justice in Recent Theories of Tort Law" (1981) 10 J. Legal Stud. 187, citing George P. Fletcher, "Fairness and Utility in Tort Theory" (1972) 85 Harv. L. Rev. 537; John Borgo, "Causal Paradigms in Tort Law" (1979) 8 J. Legal Stud. 419; Richard A. Epstein, "Nuisance Law: Corrective Justice and its Utilitarian Constraints" (1979) 8 J. Legal Stud. 49; and Richard A. Epstein, "Causation and Corrective Justice: A Reply to Two Critics" (1979) 8 J. Legal Stud. 477.

on causation proved by the plaintiff will frequently have the distributive effect of absolving those who wrongfully impose risks on a broad range of potential victims.

Others have proposed further definitions of corrective justice, both in terms of its significance and operation. Richard Posner argues that corrective justice is part of the economic analysis of law, since it is (in his view) a mechanism for wealth maximization, which for him is the fundamental mandate of a just state.[18] The existence of alternative definitions of corrective justice suggests that concerns broader than simply the relationship between plaintiff A and defendant B can be central to choosing corrective justice as a rationale for tort law. These other concerns may also serve to determine what qualifies as needing legal correction in a particular case. It also suggests that for those who do not choose financial wealth maximization as a first priority, corrective justice itself may be an inappropriate goal.

Having explained why it is important, Posner cites a different approach to corrective justice, found in Frederick Sharp's analysis of *Rylands v. Fletcher*:[19]

> . Between all citizens there is proportionality, which is altered when one suffers injury. ... [A]nyone who carries on a hazardous activity which alters the social proportion of benefits by inflicting injury must bear the burden, because the nature of the activity has brought "gain" to the enterpriser. This is corrective justice in the sense that hazardous enterprises can cause injury disproportionate to the expectations of citizens living together by agreement in a commonwealth. .... It is thus that I argue Aristotle's support for the doctrine of enterprise liability for ultrahazardous activities, on the basis that industry must pay its own way.[20]

This again suggests that a relational approach to corrective justice does not have to be bipolar. Certainly bipolarity is not an accurate depiction of how a vast number of harms occur in modern society. When a company decides to release a faulty medication or chemical without adequate testing, this risk is imposed not in a one-on-one relationship, but upon society as a whole. Since the company has decided to create a multipolar relationship, this should be the structure of the liability that is created and the basis of any approach to causation as well.[21]

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18. Posner, *ibid.* at 206.

19. [1868] 3 L.R. 330 (H.L. (Eng.)) [*Rylands*].

20. Posner, *supra* note 17 at 199-200, citing Frederick L. Sharp, "Aristotle, Justice and Enterprise Liability in the Law of Torts" (1976) 34 U.T. Fac. L. Rev. 84.

21. It is also not true that all litigation is bipolar or has to be so. Class actions and public law actions are examples of multipolar claims.

Margaret Berger argues that the requirement to prove causation of harm in the toxic tort context is in fact antithetical to corrective justice notions of moral responsibility. She asserts that the causation element produces irrational distinctions in the treatment of defendants. Two companies may be equally guilty of chemical misconduct (*e.g.*, the failure to investigate a product that has a known potential to cause harm), but will receive different treatment depending upon the evidence of causation in their respective cases. Indeed, "even defendants that concede negligence, or are found negligent, in failing to exercise due care, escape liability completely under the current system if causation cannot be established. Causation knocks out the link between culpability and liability."[22] Berger finds support for this position in the writings of Christopher Schroeder, who observes that "causation is often fortuitous and thus morally arbitrary. To erect sharp disparities of treatment on such a foundation violates the requirement of equal treatment implied by the conception of equal dignity and respect."[23] Emily Sherwin concurs, asserting that if the duty to provide compensation for wrongful harm is a moral obligation, then it should target the choices made by defendants rather than the "fortuitous consequences of [those] choices."[24]

The focus on culpability is reflected in the Supreme Court's reasoning in *Snell*. In that decision, Justice Sopinka observed that

> [r]eversing the burden of proof may be justified ... [where] it is clear that the injury was not caused by neutral conduct. It is quite a different matter to compensate a plaintiff by reversing the burden of proof for an injury that may very well be due to factors unconnected to the defendant and not the fault of anyone.[25]

But the releasing of toxics or chemicals whose risks and effects are unknown *is* viewed as culpable. Therefore, an approach to causation that allows this kind

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22. "Eliminating General Causation: Notes Towards a New Theory of Justice and Toxic Torts" (1997) 97 Colum. L. Rev. 2117 at 2133-34 [citations omitted].

23. *Ibid.* at 2134, citing Christopher H. Schroeder, "Causation, Compensation, and Moral Responsibility" in David G. Owen, ed., *Philosophical Foundations in Tort Law* (Oxford: Clarendon Press, 1995) 347 at 349.

24. "Why is Corrective Justice Just?" (1992) 15 Harv. J.L. & Pub. Pol'y 839 at 847.

25. *Snell*, *supra* note 12 at para. 26.

of culpable act to go undeterred is not an approach that leads to justice, corrective or otherwise. Moreover, as explained below, the requirement of proof of causation of injury is frequently Orwellian in the toxic tort context, because such proof is scientifically unattainable.

Whether or not critics such as Berger, Schroeder, and Sherwin are correct in their assessment of the moral (ir)relevance of causation, there is no question that the cause requirement is firmly entrenched in Canadian tort law. As a result, the task before Canadian jurists is to do justice through the appropriate interpretation and application of the causation requirement in the toxic tort context (and beyond). Because of the pervasive presence of scientific uncertainty concerning toxic substances, this project is a daunting one in the chemical era.

II. THE PROBLEM OF SCIENTIFIC UNCERTAINTY IN TOXIC TORT

The cause requirement in toxic tort can be deconstructed into two constituent components: generic causation and specific causation. Generic causation concerns the *capacity* of the substance to cause the illness in question. This analysis involves general questions about the nature of the substance at issue and its interaction with the human body. For example, can asbestos cause mesothelioma? Is Bisphenol A a hormone disruptor? Specific causation becomes relevant only after an affirmative response is provided to the generic causation inquiry. Having established that a particular substance is capable of causing the type of illness suffered by a plaintiff, the court must go further and determine whether it actually did cause the illness in his or her specific case. At this stage, a plaintiff must adduce evidence of the nature, duration, and extent of his or her exposure to the substance in question. Here, as at the generic stage of the analysis, defendants may raise alternative explanations for the plaintiff's illness, including genetics, lifestyle, and exposure to a myriad of potentially toxic substances produced by others.[26] As we shall see, however, plaintiffs' ability to prove both components of the causation analysis in toxic torts

26. See Jean Macchiaroli Eggen, *Toxic Torts in a Nut Shell* (St. Paul, Minnesota: West Publishing Co., 1995) at 197; Lynda M. Collins, "Material Contribution to Risk and Causation in Toxic Torts" (2001) 11 J. Envtl. L. & Prac. 106 at 110 [Collins, "Material Contribution to Risk"].

is profoundly impaired by the existence of pervasive scientific uncertainty concerning the characteristics of chemical substances.

A. CHEMISTS IN WONDERLAND: THE DEARTH OF DATA ON CHEMICAL SUBSTANCES

The phenomenon of scientific uncertainty concerning toxic substances has been amply elucidated in both the legal and scientific literature.[27] Perhaps the single biggest driver of this uncertainty is the sheer number of chemical substances currently in existence, a number that is constantly increasing. In Canada (as elsewhere), there is a very large group of chemical substances for which relatively little research has been conducted regarding possible human health effects. Dayna Scott explains:

> When [the *Canadian Environmental Protection Act*] was initially being drafted in the mid-1980s, a key compromise was made. Given the vast numbers of chemicals already in commerce and the rate that new chemicals were being introduced onto the market—over 2000 every year—the approach that was adopted was to require pre-market testing for new chemicals, but essentially to "grandparent" the 23,000 chemicals already in use in Canada. These substances formed the Act's Domestic Substances List (DSL) and, unlike new substances to Canada, were not subject to assessment.[28]

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27. See *e.g.* Collins, "Material Contribution to Risk," *ibid.* at 107-08; David Rosenberg, "The Causal Connection in Mass Exposure Cases: A 'Public Law' Vision of the Tort System" (1984) 97 Harv. L. Rev. 851 at 858; Carl F. Cranor, *Toxic Torts: Science, Law, and the Possibility of Justice* (New York: Cambridge University Press, 2006) at 12; Dayna Nadine Scott, "Confronting Chronic Pollution: A Socio-legal Analysis of Risk and Precaution" (2008) 46 Osgoode Hall L.J. 293 at 299-303; and Joe Thornton, *Pandora's Poison: Chlorine, Health, and a New Environmental Strategy* (Cambridge, MA: MIT Press, 2000) at 414, 422 (citing a USEPA report that used four scientifically acceptable models to calculate the carcinogenicity of trichloroethylene in drinking water and generated results that varied by a factor of one hundred million. The authors explained that "[t]hese estimates provide a range of uncertainty equivalent to not knowing whether one has enough money to buy a cup of coffee or pay off the national debt"). See also *infra* notes 29-31.

28. Scott, "Proof and Precaution," *supra* note 7 at 61, citing *Canadian Environmental Protection Act*, S.C. 1999, c. 33 [*CEPA*].

To put these numbers into context, the federal government's ambitious new "Challenge" program targets only 200 high priority chemicals for in-depth assessment. For its part, Ontario's new toxics reduction strategy, the most progressive of its kind in Canadian history, has thus far identified 250 chemicals for regulation, with a priority group comprising 47 substances defined under Phase 1 of this regulation.[29] In other words, only a small fraction of chemicals in circulation undergo rigorous testing for possible human health effects. The situation is similar in other developed countries. As of 2002, "[t]here are approximately 80,000 industrial chemicals now registered for use [in the United States], but very few have been tested for their health effects, singly [or] synergistically."[30] In a 2007 report on toxicity testing, the US National Research Council noted that, under current systems, "many chemicals [are] not being tested at all despite potential human exposure to them. Furthermore, the data that are generated might not be ideal for answering questions regarding risk to human health."[31]

The failure of current scientific methods to keep pace with the expanding universe of chemical substances has led to proposals for reform. The National Academy of Sciences in the United States has recently proposed a radical revision of toxicity testing protocols, limiting animal testing in favour of molecular analysis to predict the interaction of substances with human bodies. However, the project is a long-term one, likely requiring many decades of work before a regulatory shift can be made. In the interim, regulators and plaintiffs alike are left with an imprecise, costly, and time-consuming animal testing

29. Ministry of the Environment, "Backgrounder: Development of Lists of Substances Proposed to be Prescribed under the Toxics Reduction Act, 2009: Toxic Substances and Substances of Concern" (21 September 2009) at 5, 9, online: <http://www.ene.gov.on.ca/stdprodconsume/groups /lr/@ene/@resources/documents/resource/stdprod_080013.pdf>.

30. Samuel Wilson *et al.*, *Cancer and the Environment: Gene-Environment Interactions* (Washington: National Academies Press, 2002) at 68. See also National Institute for Occupational Safety & Health (NIOSH), "The Effects of Workplace Hazards on Male Reproductive Health" (1997), online: <http://www.cdc.gov/niosh/malrepro.html> (observing that the majority of the approximately four million chemical mixtures then in commercial use had never been tested for their reproductive effects).

31. Committee on Toxicity Testing, "Toxicity 21," *supra* note 4 at 18. See also Roe *et al.*, *supra* note 5 (concluding that chronic toxicity data was lacking for 70 per cent of top-selling synthetic chemicals).

regime that virtually guarantees a dearth of scientific data on tens of thousands of substances.[32]

Beyond the laboratory, once a substance has been released into the human environment (including the market), the chances of detecting chronic toxicity frequently remain slim at best.[33] Indeed, the sheer ubiquity of chemical substances makes it difficult, if not impossible, to detect their chronic effects. Imagine, for example, that a commonly used fictional component of shampoo causes an incremental increase in blood pressure, producing hypertension in some people while worsening it in others. The near-universal use of shampoo in Canadian society would virtually guarantee that the link between shampoo and hypertension would never be discovered. Since there is no significant community that declines to use shampoo, there is no control group. Further, assuming the phenomenon had not been discovered in laboratory testing, there would likely be no group of researchers or clinicians even searching for the effect.

Now imagine that the shampoo component interacts with a pesticide residue commonly occurring in orange juice to produce severe migraine headaches. It is a virtual certainty that the two substances will not have been tested in combination in the lab, and again, the very common daily use of these two products by Canadians will tend to obscure the causal association. Add to our fictional plaintiff's exposure the chemical residues in common household cleaning products, dry-cleaned clothing, municipal drinking water, and urban

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32. For details of the proposed reform in testing protocols, see Committee on Toxicity Testing, "Toxicity 21," *ibid.* In addition to the efficiency concern, the use of animals for the testing of chemical substances, particularly those intended for non-essential uses (*e.g.*, cosmetics) also raises obvious ethical issues regarding the humane treatment of non-human animals. See Laura Donnellan, "Animal Testing in Cosmetics: Recent Developments in the European Union and the United States" (2007) 13 Animal L. 251.

33. Acute effects, in contrast, are often readily traceable to the product that caused them. Consider, for example, the listeriosis that was caused by contaminated meats produced by Maple Leaf Foods. See *e.g.* CBC News, "$27M settlement reached in Maple Leaf listeriosis suits" (2 February 2009), online: <http://www.cbc.ca/money/story/2009/02/02/maple.html>. Toxic tort cases involving acute effects are therefore generally unproblematic from a causation standpoint and are well positioned for settlement. See *e.g. Walkerton Compensation Plan Class Action Settlement*, Class Action File #00-CV-192173CP (March 2001), online: <http://www.walkertoncompensationplan.ca>.

air, and the combinations and permutations become infinite. The crowded marketplace of chemical substances thus blurs causal links that might otherwise become clear, exacerbating the pre-existing uncertainty associated with each substance in isolation.

Ironically, because both tort and regulatory systems have historically presumed chemicals "innocent until proven guilty," legal signals have tended to push producers away from well-understood chemicals (for which evidence of harm is available) and towards those that are more poorly studied. When the less-studied substance turns out to be as or more dangerous than the better-understood substance which it replaced, risk migration occurs.[34] The risk migration scenario aptly illustrates the degree of uncertainty present in the area of synthetic chemicals. If relatively well-resourced, legally-empowered regulators fail to accurately prove or predict the characteristics of chemical substances, it seems clear that the individual plaintiff is likewise doomed to failure in this project.

B. UNCERTAINTY IN THE COURTROOM

The phenomenon of scientific uncertainty concerning chemical substances produces a variety of causal problems in negligence actions. In the indeterminate defendant scenario, most famously illustrated by the DES cases,[35] plaintiffs can show that a class of defendants owed them a duty, breached that duty, and that the alleged breach produced their illness. However, because of the fungible nature of the product or substance at issue, they cannot demonstrate which specific defendant among the group of possible tortfeasors produced the agent that caused their injury. The indeterminate plaintiff scenario arises most commonly

34. In California, for example, the chemical hexane was used to replace chlorinated solvents after a state-wide regulatory ban was imposed on chlorinated solvents in degreasers. The paralysis of auto mechanics led to the discovery that hexane is in fact neurotoxic. See Lee Bishop & Mitch Anstey, "Green Chemistry: Chemists Clean Up their Act" (2009) 16 Berkeley Sci. Rev. 27. See also Peter Spencer *et al.*, "The Enlarging View of Hexacarbon Neurotoxicity" (1980) 7 Crit. Rev. in Toxicology 279.

35. See *e.g. Sindell v. Abbott Laboratories*, 26 Cal.3d 588 (1980) [*Sindell*]. These cases concerned the liability of drug manufacturers for cancers caused in the daughters of mothers who ingested the drug diethylstilbestrol (DES) while pregnant. Because of the long latency period, it was impossible for many DES plaintiffs to prove which manufacturer had made the drug that caused their illness. Some state courts developed innovations to allow for recovery in this scenario. See generally Glen O. Robinson, "Multiple Causation in Tort Law: Reflections on the *DES* Cases" (1982) 68 Va. L. Rev. 713.

where epidemiological (or other) evidence can show that a defendant's substance has increased the incidence of a particular illness in a particular population (*e.g.*, those exposed to the emissions from a toxic incinerator), but it is scientifically impossible to prove that the defendant caused any particular plaintiff's illness.[36]

To summarize, our current regulatory (including tort) systems permit the dissemination of many thousands of chemicals for which little to no data is available regarding not only their chronic human toxicity, but also their likely interaction with other substances in the human environment. As a result, plaintiffs in toxic torts may be unable to prove causation of injury or to identify the defendant who produced their loss. Though some may be willing to go so far, we do not assert that this state of affairs represents a dire dystopia in which human welfare is destined to be undermined by toxic threats.[37] Indeed, most people who are exposed to the suite of chemical substances in common use are generally healthy.[38] We do contend that for the unlucky plaintiff who does become ill as a result of exposure to chemical substances the phenomenon of scientific uncertainty is frequently an impossible hurdle and the requirement to prove causation on traditional principles an unreasonable demand.

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36. See *e.g.* S.M. Waddams, "Causation in Canada and Australia" (1993) 1 Tort L. Rev. 75 at 77; James Zaitsoff, "Two Steps Forward, No Looking Back: Confronting the Problem of the Indeterminate Plaintiff" (2009) 5 Can. Class Action Rev. 240. A third phenomenon, that of indeterminate harm, arises where the plaintiff can demonstrate, on a balance of probabilities, that the defendant negligently exposed him or her to a chemical substance but cannot prove that the substance has caused (or will cause) the injury forming the subject of his or her litigation. The indeterminate harm scenario is not actionable in Canada; there is no liability in Canadian tort law for mere exposure to risk, without injury. But see David Gerecke, "Risk Exposure as Injury: Alleviating the Injustice of Tort Causation Rules" (1990) 35 McGill L.J. 797.

37. Indeed, in some cases there is a significant degree of choice in the realm of toxic exposure, and individual decision making can result in significantly reduced risk. See *e.g.* David R. Boyd, *Dodging the Toxic Bullet: How to Protect Yourself from Everyday Environmental Health Hazards* (Vancouver: Greystone Books, 2010).

38. Although the incidence of certain illnesses that may be environmentally related is increasing (see *e.g.* International Agency for Research on Cancer, *World Cancer Report* by Peter Boyle & Bernard Levin, eds. (Lyon: World Heath Organization, 2008); Irva Hertz-Picciotto & Lora Delwiche, "The Rise in Autism and the Role of Age at Diagnosis" (2009) 20 Epidemiology 84. Overall life expectancy has increased since the chemical revolution, though future trends in longevity are uncertain. See Julie St. Arnaud, Marie P. Beaudet & Patricia Tully, "Life Expectancy" (2005) 17 Health Rep. 43.

III. TRADITIONAL APPROACHES TO CAUSATION

A. THE BUT-FOR TEST

The but-for test is the default standard for proving causation in negligence. The plaintiff must prove, on a balance of probabilities, that but-for the defendant's breach of the standard of care, the loss at issue would not have been sustained. If the plaintiff would have suffered the injury in the absence of the defendant's breach, then causation is not established and the action fails. Although there has been some confusion regarding the application of the but-for test in cases of multiple causes,[39] the *Resurfice* decision clarified that but-for is the default test even in these situations. In applying the but-for standard, traditional tort law has implicitly assumed that a plaintiff's inability to prove causation of an injury suggests a strong probability that the injury was in fact not caused by the defendant, and so a refusal to impose liability is justified. In effect, the absence of evidence of causation has been taken to be evidence of the absence of causation, a logical fallacy that is well-known (and guarded against) in the scientific community.[40]

B. MATERIAL CONTRIBUTION TO INJURY

In *Athey v. Leonati*,[41] the Supreme Court appeared to articulate a material contribution alternative to but-for causation. In particular, the Court held that where the but-for test is unworkable, the causation requirement may be satisfied

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39. *Resurfice*, *supra* note 8 at paras. 19, 20.

40. See *e.g.* Sander Greenland, "The Need for Critical Appraisal of Expert Witnesses in Epidemiology and Statistics" (2004) 39 Wake Forest L. Rev. 291. Greenland notes that "the logical fallacy of treating absence of evidence as evidence of absence ... has been recognized as a fallacy for over forty years" (at 298). See also Sir Austin Bradford Hill, "The Environment and Disease: Association or Causation?" (1965) 58 Proc. Royal Soc'y Med. 295; William W. Rozeboom, "The Fallacy of the Null-Hypothesis Significance Test" (1960) 57 Psychol. Bull. 416; and Douglas G. Altman & J. Martin Bland, "Absence of Evidence is not Evidence of Absence" (1995) 311 Brit. Med. J. 485.

41. [1996] 3 S.C.R. 458 [*Athey*]. In this case the plaintiff, who had a pre-existing back condition, injured his back and neck in two separate motor vehicle accidents negligently caused by the defendants. In the course of his rehabilitation, the plaintiff suffered a herniated disk while conducting an exercise recommended by his physician. The issue before the Court was whether the disc injury was caused by the injuries sustained in the accidents or whether it was a product of his pre-existing condition. Because the Court held that the accidents were "a necessary ingredient in bringing about the herniation," the but-for test was clearly applicable (at para. 43).

"where the defendant's negligence 'materially contributed' to the occurrence of the injury."[42] On the facts of that case, the but-for test was applicable, and the decision therefore offered little guidance as to the specific circumstances in which but-for would be deemed unworkable. Indeed, even as a matter of internal coherence it is difficult to understand how a causal contribution can be viewed as "material" if the injury would have occurred with or without it (*i.e.*, where the but-for test is not met).

There was substantial confusion following *Athey* regarding both the content of the material contribution test and the circumstances in which it could apply.[43] A number of courts appeared to treat the test as a general loosening or liberalization of the causation element, to be applied whenever there were multiple causes involved in a claim.[44] On such a reading, material contribution to harm amounted to something less than but-for causation but also stood outside the *de minimis* range. In *Resurfice*, however, the Court confirmed that but-for remains the default test in

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42. *Resurfice*, *supra* note 8 at para. 13.

43. See generally Gillian Demeyere, "The 'Material Contribution' Test: An Immaterial Contribution to Tort Law: A Comment on *Briglio v. Faulkner*" (2000) 34 U.B.C. L. Rev. 163. See also Dennis Klimchuk & Vaughan Black, "A Comment on *Athey v. Leonati*: Causation, Damages and Thin Skulls" (1997) 31 U.B.C. L. Rev. 163.

44. See Demeyere, *ibid.* at note 43, citing *Hanvold v. Spiess*, [1999] B.C.J. No. 1573 (S.C.) (QL); *Chow (Litigation Guardian of) v. Wellesley Hospital*, [1999] O.J. No. 279 (Sup. Ct. J.) (QL); *Whitfield v. Calhoun* (1999), 242 A.R. 201 (Q.B.); *A.J. v. Cairnie Estate* (1999), 136 Man. R. (2d) 84 (Q.B.); *Sohal v. Brar* (1998), 211 A.R. 81 (Q.B.); *Martin v. Listowel Memorial Hospital*, [1998] O.J. No. 3126 (Ct. J. (Gen. Div.)) (QL); *Ferguson v. Ferguson*, [1998] B.C.J. No. 2286 (C.A.) (QL); *Dennison v. Young*, [1998] S.J. No. 403 (Q.B.) (QL); *Sherman v. Salsberg*, [1998] O.J. No. 3074 (Ct. J. (Gen. Div)) (QL); *Chavarria v. Antoniuk*, [1998] B.C.J. No. 2410 (S.C.) (QL); *M.M. v. R.F.*, [1997] B.C.J. No. 2914 (C.A.) (QL); *Hampton v. Marshall*, [1997] B.C.J. No. 301 (S.C.) (QL); *Mozersky v. Cushman*, [1997] O.J. No. 4912 (Ct. J. (Gen. Div.)) (QL); *Foo-Fat (Next friend of) v. Ahmed* (1997), 208 A.R. 218 (Q.B.); *Gadsby v. MacGillivray*, [1997] B.C.J. No. 1564 (S.C.) (QL); *Harbora v. McIvor* (1997), 202 A.R. 99 (Q.B.); and *Wickberg v. Patterson* (1997), 196 A.R. 43 (C.A.). See also *Hanke v. Resurfice Corp.* (2005), 380 A.R. 216 at para. 14 [*Hanke*] (where the Court of Appeal of Alberta held that when there is more than one potential cause the material contribution test should be used, finding the but-for test "unworkable" in light of the comparative blameworthiness of Resurfice and allowing the appeal brought by Hanke).

cases of multiple causes,[45] leaving little relevance for the material contribution to injury test. Indeed, the only scenario in which material contribution to injury (or an analogous test) remains both viable and useful is that of independently sufficient causes.[46]

C. THE *SNELL* TEST

In *Snell*,[47] the Supreme Court explicitly rejected transformative reforms to the traditional test for causation in negligence. Justice Sopinka acknowledged that the causation requirement had been criticized for its alleged inability to deal justly with claims involving uncertainty:

> There is concern that, due to the complexities of proof, the probable victim of tortious conduct will be deprived of relief. This concern is strongest in circumstances in which, on the basis of some percentage of statistical probability, the plaintiff is the likely victim of the combined tortious conduct of a number of defendants but cannot prove causation against a specific defendant or defendants on the basis of particularized evidence in accordance with traditional principles. The challenge of the traditional approach has manifested itself in cases dealing with non-traumatic injuries such as man-made diseases resulting from the widespread diffusion of chemical products.[48]

However, Justice Sopinka stated that the ostensible failure of the but-for approach was not inherent in the test itself but resulted from its "too rigid" application by courts.[49] He held that courts should take a "robust and pragmatic" approach

45. *Resurfice*, *supra* note 8 at para. 21.

46. Multiple sufficient causes exist when two tortfeasors cause indivisible harm and the act of either one would have been sufficient to produce the loss. In such a case both would be exonerated on a but-for analysis. See *Maxwell v. KPMG LLP*, 520 F.3d 713 (7th Cir. 2008). The case notes that "when two fires join and destroy the plaintiff's property and each one would have destroyed it by itself and so is not a [but-for] condition[,] yet each of the firemakers (if negligent) is [nevertheless] liable to the plaintiff for having 'caused' the injury" (at 6).

47. *Supra* note 12. In *Snell*, the plaintiff had a cataract surgically removed by the defendant ophthalmologist. After injecting a local anesthetic the defendant noted a small discolouration in the eye at the puncture site below the eye. Despite this evidence of retrobulbar bleeding, the defendant continued with the surgery. The plaintiff suffered severe pain from the surgery and it took nine months for the blood in the anterior chamber of the eye to clear, which revealed the plaintiff's optic nerve was atrophied.

48. *Ibid.* at para. 15.

49. *Ibid.* at para. 29.

to evidence of causation.[50] He reiterated that burdens of proof in negligence are flexible and held that in circumstances in which the salient facts are peculiarly within the defendant's knowledge, "very little affirmative evidence" adduced by the plaintiff could justify an inference of causation in the absence of countervailing evidence adduced by the defendant.[51] Thus, while the legal burden of proof remained with the plaintiff, the *Snell* test (where applicable) would impose an increased tactical burden of proof on the defendant. The *Snell* test was clearly intended to allow for a liberalization of the traditional causation test where warranted by the requirements of justice but left much to be desired in terms of clarity. In particular, it is difficult to ascertain how to apply the standard of "very little" evidence without altering the traditional balance of probabilities standard of proof.

However, it is telling that in a case about medical negligence, Justice Sopinka cites "cases dealing with non-traumatic injuries such as man-made diseases resulting from the widespread diffusion of chemical products"[52] as the quintessential examples of situations where but-for causation led to unfairness. By retaining proof of causation of injury as a touchstone for liability in negligence, *Snell* ultimately failed to articulate a standard that would allow for recovery in many such cases.

IV. PROPOSALS FOR RISK-BASED LIABILITY

Because of the impossibility of proving causation of injury in many toxic tort scenarios, scholars have proposed (and some courts have adopted) a variety of doctrinal innovations to permit recovery in the presence of scientific uncertainty. As noted by Justice McLachlin (as she then was, writing extra-judicially), the unifying feature in many of the ad hoc reforms adopted in the area of toxic torts is the imposition of liability based on risk.[53]

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50. *Ibid.* at para. 22 (quoting Bridge L.J. in *Wilsher v. Essex Area Health Authority*, [1988] 2 W.L.R. 557 (H.L. (Eng.)) [*Wilsher*]).

51. *Ibid.* at para. 30.

52. *Ibid.* at para. 15.

53. Beverley M. McLachlin, "Negligence Law—Proving the Connection" in Nicholas J. Mullany & Allen M. Linden, eds., *Torts Tomorrow: A Tribute to John Fleming* (Sydney: LBC Information Services, 1998) 16 at 22.

A. US INNOVATIONS

In response to the problem of defendant indeterminacy, *i.e.*, the situation in which we know that a particular substance has caused the plaintiff's loss but it is impossible to determine which one of a group of defendants produced or emitted the specific dose that particular plaintiff received, US courts have developed a range of specialized tests. An early reform was the creation, in *Summers v. Tice*,[54] of alternate liability—a theory that imposed liability on two hunters who both fired negligently in a plaintiff's direction, even though it was impossible to prove which hunter's shot had actually made the connection. This theory was adopted by the Supreme Court of Canada on the similar facts of *Cook v. Lewis*.[55]

A second innovation was the doctrine of enterprise liability, which holds that, where a defective product is produced by a small, finite group of manufacturers, liability may be imposed jointly and severally on all members of the industry.[56] In cases where there is evidence of collaboration between defendants in the commission of a tort (*e.g.*, through the joint establishment of inadequate industry standards or suppression of adverse test results), a third development allows defendants to be held collectively liable as civil conspirators.[57] This theory is also available under Canadian law but is infrequently invoked because of the evidentiary difficulties in proving active cooperation between the defendants.[58]

Some US states also permit an allocation of liability proportionate to the defendant's share in the relevant market at the time the plaintiff was injured by the product in question. In California, where market share liability originated with the famous case of *Sindell v. Abbott Laboratories*,[59] the doctrine applies

54. 5 A.L.R.2d 91 (Cal. 1948) [*Summers*].

55. [1951] S.C.R. 830 at 842 [*Cook*].

56. *Hall v. E.I. Dupont De Nemours & Co., Inc.*, 345 F. Supp. 353 (E.D.N.Y. 1972). See also Jamie Cassels & Craig E. Jones, *The Law of Large-Scale Claims: Product Liability, Mass Torts, and Complex Litigation in Canada* (Toronto: Irwin Law, 2005) at 300-06.

57. See *e.g. Ryan v. Eli Lilly & Co.*, 514 F. Supp. 1004 (D.S.C. 1981); *Nicolet Inc. v. Nutt*, 525 A.2d 146 (Del. 1987).

58. *Canada Cement LaFarge Ltd. v. British Columbia Lightweight Aggregate Ltd.*, [1983] 1 S.C.R. 452. For a discussion of civil conspiracy in Canadian law, see Cassels & Jones, *supra* note 56 at 135-40.

59. *Supra* note 35. In this landmark decision, the plaintiff brought suit against the major manufacturers of DES. The plaintiff was unable to link her cancer to a single manufacturer because she was unable to determine the specific brand ingested by her mother during

where a plaintiff has joined a "substantial percentage" of the market and where the product at issue is "fungible," making it difficult or impossible to identify its specific producer.[60] In the California articulation, although defendants are presumptively liable for their market share, each defendant is given the opportunity to exculpate itself by proving that it did not in fact produce the drug ultimately ingested by the plaintiff (*e.g.*, by producing evidence of geographic distribution of its product). Although the majority of US states have rejected this market share conception of liability, some have actually expanded on its California formulation.[61] In *Hymowitz v. Eli Lilly and Co.*,[62] for example, a New York court imposed liability on a DES manufacturer that demonstrated it had not in fact produced the drug that harmed the plaintiff. The court applied a version of pure risk-based liability, explaining:

> Because liability here is based on the over-all risk produced, and not causation in a single case, there should be no exculpation of a defendant who, although a member of the market producing DES for pregnancy use, appears not to have caused a particular plaintiff's injury.[63]

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pregnancy. The Supreme Court of California followed *Summers*, *supra* note 54, and shifted the burden of proof on causation to the defendants, holding each manufacturer liable in proportion to its market share of DES. See also Richard Delgado, "Beyond *Sindell*: Relaxation of Cause-In-Fact Rules for Indeterminate Plaintiffs" (1982) 70 Cal. L. Rev. 881. Note that in most states the DES plaintiffs failed on causation and recovered nothing.

60. *Sindell*, *ibid.* at 611-12.

61. See generally Donald G. Gifford & Paolo Pasicolan, "Market Share Liability beyond DES Cases: The Solution to the Causation Dilemma in Lead Paint Litigation?" (2006) 58 S.C.L. Rev. 115; Benjamin Thomas Greer, "Comment: Market Share Liability Shouldn't Die: Proposed Application to Agricultural Pesticides and the Need to Refine the Apportionment of Liability" (2007-2008) 17 San Joaquin Agric. L. Rev. 85; Christopher J. McGuire, "Market-Share Liability After *Hymowitz* and *Conley*: Exploring the Limits of Judicial Power" (1991) 24 U. Mich. J.L. Ref. 759; and Emily H. Damron, "Reviving the Market for Liability Theories: The 'Commingled Product' Theory of Market Share Liability Enters the Judicial Lexicon" (2006) 111 Penn. St. L. Rev. 505.

62. 539 N.E.2d 1069 (N.Y. Ct. App. 1989).

63. *Ibid.* at 1078. See also *Collins v. Eli Lilly Co.*, 116 Wis.2d 166 (1984) [*Collins*]. In *Collins*, the Wisconsin Supreme Court allowed a plaintiff to sue any one of a group of negligent manufacturers of DES and recover 100 per cent of her damages on proof of "possible

To address the scenario in which a plaintiff has not yet become ill but has been exposed by the defendant to an unreasonable risk of harm, US courts have developed the "medical monitoring remedy."[64] In a claim for medical monitoring damages, the plaintiff must prove an underlying tort capable of grounding a right to compensation. Courts then quantify damages by reference to the costs of reasonable medical monitoring necessary to mitigate the plaintiff's increased risk resulting from the defendant's substance.[65] The actual loss element in negligence is a significant hurdle for plaintiffs in these cases but may sometimes be met by demonstrating the occurrence of subcellular changes to the plaintiff's body or even mere exposure to a substance known to be injurious.[66] A claim for medical monitoring was advanced in the Canadian case of *Ring v. Canada (A.G.)*, but the case was denied certification as a class action.[67]

An alternative to the claim for medical monitoring damages is that for fear of future illness, or "cancerphobia." As in the medical monitoring cases, plaintiffs in the cancerphobia scenario have been exposed to a hazardous substance but have not yet contracted a physical illness. However, these plaintiffs have sustained psychological injury as a result of their exposure to a known toxicant. To address this reality, a number of US courts have allowed plaintiffs to recover for such harm—provided that a variety of specialized tests to address emotional harms resulting from toxic exposures are met.[68] Although not yet recognized, fear of future illness claims would be governed under Canadian tort law by the ordinary law of negligent infliction of nervous shock.[69] The touchstone for recovery is

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causation" of her injury. The court cited as justification the fact that "each defendant contributed to the *risk* of injury to the public and, consequently, the risk of injury to the individual plaintiffs" (at 191) [emphasis in original]. Market share liability has had little success outside the DES context. See Greer, *supra* note 61; and McGuire, *supra* note 61.

64. See *Friends for All Children v. Lockheed Aircraft Inc.*, 746 F.2d 816 (DC Cir 1984) [*Friends*]; *Ayers v. Jackson Twp.*, 525 A.2d 287 (N.J. 1987) [*Ayers*].

65. *Friends, ibid.*; *Ayers, ibid.*

66. See D. Scott Aberson, "Note: A Fifty-State Survey of Medical Monitoring and the Approach the Minnesota Supreme Court Should Take When Confronted with the Issue" (2006) 32 Wm. Mitchell L. Rev. 1095.

67. *Ring, supra* note 2.

68. See James F. d'Entremont, "Fear Factor: The Future of Cancerphobia and Fear of Future Disease Claims in the Toxicogenomic Age" (2006) 52 Loy. L. Rev. 807.

69. Indeed, the leading case is arguably a toxic tort, involving as it did contamination of drinking water. See *Mustapha v. Culligan*, [2008] 2 S.C.R. 114.

whether serious psychiatric harm would be a foreseeable result in a person of normal fortitude.[70] If so, then plaintiffs exposed to toxic substances should be able to recover for resulting emotional damage in Canada.

Although a number of US commentators have argued for the explicit imposition of liability based on unreasonable risk, US courts generally do not yet appear ready to go this far.[71] It is clear, however, that the reforms described above reflect some willingness on the part of the US judiciary to attach legal consequences to the negligent creation of toxic risk.

B. THE UK POSITION

An early UK foray into risk-based liability occurred in the well-known case of *McGhee v. National Coal Board*.[72] In that case, the defendant negligently failed to provide on-site shower facilities to the plaintiff employee, with the result that the plaintiff had to bicycle home covered in brick dust and perspiration. The scientific evidence indicated that the plaintiff's dermatitis may have been caused by a failure to shower at the end of his work day, but may also have resulted from non-culpable causes. It was scientifically impossible to determine whether the defendant's negligence was a but-for cause of the plaintiff's loss.

In *McGhee*, Lord Wilberforce famously held that where proof of causation is unavailable due to limits in scientific knowledge, the burden of proof on causation should be shifted to the defendant after the plaintiff has shown (1) that the defendant materially (and negligently) increased his risk of sustaining a particular harm and (2) that the plaintiff actually suffered injury within the area of risk created by the defendant.[73] This approach has been followed in Canada by some courts, such as those at the trial and appellate level in *Snell*, but has so far been clearly rejected by the Supreme Court of Canada.[74]

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70. *Ibid.* at para. 14.

71. See *e.g.* Berger, *supra* note 22.

72. [1973] 1 W.L.R. 1 (H.L. (Eng.)) [*McGhee*].

73. *Ibid.* at 6.

74. *Snell*, *supra* note 12 at 2.

In its home jurisdiction, *McGhee* has undergone a roller coaster of judicial revision and reinstatement.[75] In *Wilsher v. Essex Area Health Authority*, the House of Lords reinterpreted *McGhee*, eschewing the material contribution to risk approach in favour of the traditional but-for test, softened by the availability of an inference of causation in appropriate circumstances.[76] *Wilsher*, in turn, was effectively reversed in a series of three asbestos cases in which the House of Lords had to grapple with the effects of the but-for causation test in the presence of intractable scientific uncertainty. Gathered together under the style of cause *Fairchild v. Glenhaven Funeral Services*,[77] the cases involved employees who had each been exposed to asbestos by a number of different employers and who suffered from mesothelioma, a signature illness associated with asbestos exposure. The scientific evidence at trial suggested that it was possible that mesothelioma could be caused by exposure to a single asbestos fibre. If this was the case, then the plaintiffs' illnesses, which had occurred after the plaintiffs had been exposed to asbestos by multiple employers, may well have been the sole result of the negligence of one of those employers, with the others having no causal involvement whatsoever.

In the instance of the plaintiff Fairchild, it was accepted that each employer owed him a duty and had fallen below the standard of care in imposing the risk of exposure on him. However, due to the limits of current science, it was impossible to prove which of Fairchild's several asbestos-producing employers had exposed him to the single injurious fibre. Taking a purposive approach to the evolution and interpretation of tort law, the House of Lords held the employers jointly and severally liable in negligence, opining that "such injustice as may be involved in imposing liability on a duty-breaking employer in these circumstances is heavily outweighed by the injustice of denying redress to a victim."[78] The Court expressly said that the reason for changing the but-for test in this particular case was that "authority or policy requires or justifies a modified approach to proof of causation" under these circumstances.[79]

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75. Vaughan Black & David Cheifetz, "Through the Looking Glass, Darkly: *Resurfice Corp. v. Hanke*" (2007-2008) 45 Alta. L. Rev. 249 [Black & Cheifetz, "Looking Glass"].

76. *Wilsher*, *supra* note 50.

77. (2002), [2003] 1 A.C. 32 (H.L. (Eng.)) [*Fairchild*]. For a critique of the *Fairchild* decision, see Jane Stapleton, "Lords A'leaping Evidentiary Gaps" (2002) 10 Torts L.J. 276.

78. *Fairchild*, *ibid.* at para. 33.

79. *Ibid.* at para. 2.

It seems clear then that *Fairchild* supports the material contribution to risk test only where better proof is impossible due to scientific uncertainty. The rationale is that it is better to penalize a defendant who has been proven to have breached a duty of care—even if in the end the wrong did not materialize into harm to a particular plaintiff—than to leave the plaintiff in this situation uncompensated. This relaxation of the but-for test is openly declared to be a policy decision necessary to achieve fairness. According to the House of Lords, "[t]he overall object of tort law is to define cases in which the law may justly hold one party liable to compensate another,"[80] and clearly on the facts of the *Fairchild* trilogy, the but-for test for causation was not the basis for achieving a just allocation of liability.

In *Barker v. Corus*,[81] another asbestos case involving multiple defendants, the House of Lords refined the *Fairchild* holding significantly by imposing several-only liability on each defendant.[82] Such an imposition of proportionate liability based on risk is, at first blush, appealing from the perspective of fairness to defendants. The obvious pragmatic difficulty is that, given the long latency involved in many toxic illnesses, there is a realistic chance that one or more negligent defendants will be insolvent by the time of trial. As a result, the imposition of several-only liability may frequently result in a plaintiff receiving no more than a partial recovery.

In addition, the deterrence signal is undoubtedly weaker in this scenario, as defendants know that they will effectively be able to share the cost of illness among a group of negligent risk-creators. It should also be underlined that the imposition of proportionate liability inevitably strengthens the case for recovery based on risk alone—that is, where a plaintiff has no present injury but has been negligently exposed to an unreasonable risk. If it is appropriate to impose liability proportionate to the risk created when there is actual injury (and plaintiffs are likely to be undercompensated), then risk-based recovery should also be available where there is potential injury (and plaintiffs are likely to be overcompensated). Liability for

80. *Ibid.* at para. 9.

81. [2006] 2 A.C. 572 (H.L. (Eng.)) [Barker].

82. See Chris Miller, "Liability for Negligently Increased Risk: The Repercussions of *Barker v. Corus (UK) Plc*" (2009) 8 Law, Probability & Risk 39.

risk alone has clear advantages from the perspective of toxics regulation and would balance out the softening of deterrence created by *Barker*.

In *Resurfice*, the Supreme Court appears to favour the *Fairchild* approach, though the Court cites neither *Fairchild* nor *Barker*. No change was suggested to the imposition of joint and several liability for indivisible injuries, so we must assume that the traditional rules apply. Despite the absence of reference to *Fairchild* and *Barker*, there is a clear family resemblance between these two cases and the decision in *Resurfice*, no doubt due to their common ancestry in *McGhee*. In keeping with the *McGhee* approach, the Supreme Court has eschewed the ad hoc approach of US courts in favour of a coherent test for causation in the presence of scientific uncertainty.

V. MATERIAL CONTRIBUTIONS DISTINGUISHED

By the time *Resurfice* reached the Supreme Court of Canada in 2006, there were two species of material contribution test in Commonwealth tort jurisprudence. The material contribution test articulated in *Athey* concerned material contribution to injury (MCI), while the test of material contribution formulated by Lord Wilberforce in *McGhee* was one of material contribution to risk (MCR). The distinction is salient. The MCI test addresses how far liability will extend in a group of two or more causal contributors. It does not address the scenario of intransigent scientific uncertainty obscuring the causal mechanism itself. Indeed, to say that factor X contributed to injury Y implies that the etiology of injury Y is reasonably well understood. Thus, we can say that—barring any intervening event—each of three assailants who struck an otherwise healthy plaintiff on the head materially contributed to that person's brain injury, because we know that brain injury can be caused by blunt trauma to the head.

Where the claim involves a poorly understood chemical, however, the MCI test is of little utility. In many cases, it will be impossible to show (on a balance of probabilities) that substance X contributed to illness Y. This was the case in *McGhee*, where it was possible that the negligent failure to provide showers contributed to the plaintiff McGhee's dermatitis, but it could not be proven due to scientific uncertainty. Because of the lack of scientific understanding of the processes at issue, it was equally possible that the dermatitis resulted from entirely non-culpable causes. Thus, the MCI standard could not have been met. However, the expert evidence did establish that the failure to provide showers materially

contributed to the risk that McGhee would develop dermatitis, and it is this material contribution to risk that formed the basis for Lord Wilberforce's new test.

As a torts scholar, Chief Justice McLachlin has long been aware of the problem of scientific uncertainty in toxic tort. She wrote extra-judicially in 1998 that

> tort law, in its traditional form, seems increasingly incapable of effectively dealing with some of the most grievous cases of harm by willful and negligent conduct found in modern society. People suffering and dying from tobacco-induced and pollution-induced cancers and emphysema, toxic blood products, toxic drugs and unsafe medical procedures too often find themselves barred from recovery by the but-for test. ... Whatever the pitfalls of change, it may be that if the tort system is to remain meaningful, it must somehow find a way to permit recovery for risk.[83]

Indeed, as noted by Justice McLachlin (as she then was) in the same article, the unifying feature in many of the ad hoc reforms adopted in the area of toxic torts is their imposition of liability based on risk.[84] It is therefore not surprising that she formulated a test of material contribution to risk in *Resurfice*.

VI. *RESURFICE CORP. V. HANKE*: RESTATEMENT, REFORM, OR REVOLUTION?

A. FACTS AND LOWER COURT HOLDINGS

In *Resurfice*, the operator of an ice resurfacing machine (colloquially known as a "Zamboni") sustained severe injuries in an explosion that resulted when he mistakenly inserted a water hose into the gasoline tank of the machine. The plaintiff argued that the defendant's negligent design (in particular, the placement of the gasoline and water openings in close proximity and the similar appearance of the two tanks) was at least partially responsible for his mistake. On the question of causation, the trial judge found that the accident resulted from the plaintiff Hanke's act in turning on the water when he knew, or should have known, that the water hose was in the gasoline tank. The judge also found that Hanke was not in fact confused by the appearance and placement of the

83. McLachlin, *supra* note 53 at 34.

84. *Ibid.* at 22.

respective tanks, and therefore the alleged design defects did not cause his accident. The Court of Appeal of Alberta ordered a new trial, holding that the trial judge erred in the causation analysis by failing to consider the parties' "comparative blameworthiness" and by applying the but-for test rather than a material contribution test.[85]

B. SUPREME COURT'S HOLDING ON CAUSATION

Chief Justice McLachlin begins the causation analysis in *Resurfice* by acknowledging the ongoing judicial and academic controversies regarding the causation test. Eschewing a recapitulation of these debates, she sets out the basic principles governing causation in Canadian negligence law, articulating an exception to the but-for test that has the potential to substantially level the playing field in toxic tort cases. Given the centrality of this holding to Canadian negligence law, a lengthy excerpt is merited:

> 21 First, the basic test for determining causation remains the "but for" test. This applies to multi-cause injuries. The plaintiff bears the burden of showing that "but for" the negligent act or omission of each defendant, the injury would not have occurred. Having done this, contributory negligence may be apportioned, as permitted by statute.
>
> 22 This fundamental rule has never been displaced and remains the primary test for causation in negligence actions. As stated in *Athey v. Leonati*, at para. 14, *per* Major J., "[t]he general, but not conclusive, test for causation is the 'but for' test, which requires the plaintiff to show that the injury would not have occurred but for the negligence of the defendant." Similarly, as I noted in *Blackwater v. Plint*, at para. 78, "[t]he rules of causation consider generally whether 'but for' the defendant's acts, the plaintiff's damages would have been incurred on a balance of probabilities."
>
> 23 The "but for" test recognizes that compensation for negligent conduct should only be made "where a substantial connection between the injury and defendant's conduct" is present. It ensures that a defendant will not be held liable for the plaintiff's injuries where they "may very well be due to factors unconnected to the defendant and not the fault of anyone": *Snell v. Farrell*, at p. 327, *per* Sopinka J.

85. *Hanke, supra* note 44 at para. 16. The Court of Appeal of Alberta also overturned the trial judge's standard of care analysis.

> 24 ... [I]n special circumstances, the law has recognized exceptions to the basic "but for" test, and applied a "material contribution" test. Broadly speaking, the cases in which the "material contribution" test is properly applied involve two requirements.
>
> 25 First, it must be impossible for the plaintiff to prove that the defendant's negligence caused the plaintiff's injury using the "but for" test. The impossibility must be due to factors that are outside of the plaintiff's control; for example, current limits of scientific knowledge. Second, it must be clear that the defendant breached a duty of care owed to the plaintiff, thereby exposing the plaintiff to an unreasonable risk of injury, and the plaintiff must have suffered that form of injury. In other words, the plaintiff's injury must fall within the ambit of the risk created by the defendant's breach. In those exceptional cases where these two requirements are satisfied, liability may be imposed, even though the "but for" test is not satisfied, because it would offend basic notions of fairness and justice to deny liability by applying a "but for" approach.
>
> 26 ...Without dealing exhaustively with the jurisprudence, a few examples may assist in demonstrating the twin principles just asserted.
>
> 27 One situation requiring an exception to the "but for" test is the situation where it is impossible to say which of two tortious sources caused the injury, as where two shots are carelessly fired at the victim, but it is impossible to say which shot injured him: *Cook v. Lewis*. Provided that it is established that each of the defendants carelessly or negligently created an unreasonable risk of that type of injury that the plaintiff in fact suffered (i.e. carelessly or negligently fired a shot that could have caused the injury), a material contribution test may be appropriately applied.
>
> 28 A second situation requiring an exception to the "but for" test may be where it is impossible to prove what a particular person in the causal chain would have done had the defendant not committed a negligent act or omission, thus breaking the "but for" chain of causation. For example, although there was no need to rely on the "material contribution" test in *Walker Estate v. York Finch Hospital*, this Court indicated that it could be used where it was impossible to prove that the donor whose tainted blood infected the plaintiff would not have given blood if the defendant had properly warned him against donating blood. Once again, the impossibility of establishing causation and the element of injury-related risk created by the defendant are central.[86]

86. *Resurfice, supra* note 8 at paras. 21-28.

Importantly, the phrase "material contribution" in the above excerpt lacks an object. If the decision is referring to a MCI, then *Resurfice* enunciates no new principle of law, but merely reiterates the rule (such as it is) from *Athey* that a defendant's material contribution to a plaintiff's loss satisfies the causation requirement. However, if the test is one of MCR, then *Resurfice* has effectively revived the *McGhee* approach to causation in the presence of inescapable uncertainty. It is clear from the particulars of the analysis in paragraphs 21 and 25–28 that *Resurfice* articulates a test of material contribution to risk. First, the *Athey* MCI test for causation in the presence of multiple causes is clearly rejected in paragraphs 21 and 22. Moreover, the substance of the analysis in paragraphs 25–28 clearly discloses a test of MCR.

Indeed, the reflection of *McGhee* in *Resurfice* is instantly recognizable to scholars of toxic torts. *Resurfice* holds that liability may be imposed where "the defendant breached a duty of care owed to the plaintiff, thereby exposing the plaintiff to an unreasonable risk of injury, and the plaintiff ... suffered injury ... within the ambit of the risk created by the defendant's breach."[87] *McGhee* held that "where a person has, by breach of a duty of care, created a risk, and injury occurs within the area of that risk, the loss should be borne by him unless he shows that it had some other cause."[88] Although Chief Justice McLachlin did not explicitly cite *McGhee*, there can be no doubt that the *Resurfice* principle is a revival of *McGhee*, with one important exception. While Lord Wilberforce in *McGhee* would have reversed the burden of proof on causation where the requisite factors are made out, the *Resurfice* decision appears to leave the legal burden of proof with the plaintiff.

Should any doubt remain concerning the nature of the material contribution test articulated in *Resurfice*, the illustrations provided in the Court's judgment confirm beyond dispute that we are dealing here with material contribution to risk, not injury. In *Cook*, the Supreme Court addressed the scenario in which only one defendant caused an injury, but more than one contributed to the risk of the plaintiff being shot by negligently firing in his direction.[89] Since the risk at issue—gunshot wounds—did in fact materialize, the case comes within the *Resurfice*

87. *Ibid.* at para. 25.

88. *McGhee*, *supra* note 72 at 6.

89. *Cook*, *supra* note 55.

exception. The Court's reference to *Walker Estate v. York Finch General Hospital* can be similarly understood.[90] Though the *Walker* court used language suggesting a test of material contribution to injury, *Resurfice*'s interpretation of *Walker* holds that it was "impossible" in that case to prove what the infected donor would have done in the presence of adequate warnings.[91] As a result, on the *Resurfice* interpretation of *Walker*, one could not say that the negligent failure to warn contributed to the plaintiff's ultimate illness. However, it is clear that the failure to provide adequate warnings did increase the risk that an HIV-positive person would donate blood resulting in transmission of the illness to a recipient. Again, since this is the eventuality that did in fact occur, the *Resurfice* exception applies. Thus, both cases used to illustrate the *Resurfice* principle involve material contribution to risk.

In sum, *Resurfice* both creates and corrals a significant exception to the traditional test for causation, one that has the potential to meaningfully alter the outcome of at least some toxic tort litigation. It is neither a restatement of nor revolution in traditional approaches to causation. Rather, it is a reasonable and practicable reform consistent with the just operation of tort law in the twenty-first century.

VII. TOXIC CAUSATION UNDER *RESURFICE CORP. V. HANKE*

A. ILLUSTRATION

Consider a hypothetical chemical developed by the food industry to increase the shelf life of baked goods ("the Additive"). Several years after its release into the Canadian market, epidemiological evidence demonstrates on a balance of probabilities that the Additive creates a 25 per cent increase in the risk of learning disabilities in children. An infant plaintiff consumes bread containing the substance for the first four years of her life and develops a learning disability that will substantially decrease her lifetime earning capacity. However, the

90. *Resurfice, supra* note 8, citing [2001] 1 S.C.R. 647 [*Walker*].

91. *Resurfice, ibid.* at para. 28. It should be noted that in the *Walker* case itself the Supreme Court found that it was possible—even on the but-for standard—to predict how the donor would have behaved if properly warned. Thus, the *Resurfice* phrasing appears to be a reinterpretation of *Walker* for the purpose of illustrating material contribution to risk.

condition in question also occurs at background levels in the population and its origins are poorly understood. Assume further that there is currently no way of distinguishing learning disabilities caused by the Additive from those originating in other sources because of limits in scientific understanding of the Additive on the one hand and learning disabilities on the other. Provided that the defendant's breach of the standard of care can be proven, the *Resurfice* approach to causation offers a real benefit to the plaintiff in such a scenario.

Because the increased risk is less than 51 per cent, the plaintiff cannot show that it is more likely that she would not have sustained the injury absent consumption of the Additive. In other words, the plaintiff would fail on the traditional but-for test. The inferential reasoning permitted by *Snell* may or may not permit recovery; the malleability of the standard precludes a reliable prediction of the result. On the *Resurfice* analysis, however, recovery is clearly plausible. But-for causation cannot be proven because of current limits in scientific knowledge, making the *Resurfice* test available. The plaintiff has proved a 25 per cent increase in risk, which surely meets the standard of materiality, and has sustained injury within the area of risk. Again, assuming that the risk was created negligently, all requirements of the *Resurfice* test have been met, and the plaintiff will recover in circumstances in which her success was previously uncertain at best.

B. POLICY CONSIDERATIONS

In traditional tort scenarios involving instrumentalities that produce observable effects (*e.g.*, the classic slip-and-fall accident), the plaintiff's ability to prove causation is meaningfully linked to the likelihood of whether the defendant had caused harm to the plaintiff.[92] In the chemical context, the absence of evidence of the toxicity of a given substance may simply indicate that it has never been thoroughly investigated or that its characteristics and consequences are not detectable using current scientific methods. Strict application of but-for causation is appropriate in the Newtonian world of observable cause-and-effect but is arguably unjustifiable in a context where the impossibility of proving particular facts is totally unrelated to the likelihood of their existence.

92. See Rosenberg, *supra* note 27 at 858.

With the *Resurfice* decision, the Supreme Court has addressed the intractable difficulty of proving toxic causation in many cases and has provided courts with a broader range of causal approaches, so that the causation inquiry may be tailored to the nature of the case at issue. For traditional tort scenarios in which cause is readily ascertainable, a strict application of but-for remains appropriate. Where there is some scientific uncertainty and the facts lie peculiarly within the knowledge of the defendant, the *Snell* modification of the but-for test may be employed, allowing a court to draw an inference of causation based on very little affirmative evidence adduced by the plaintiff. Finally, in the minority of cases in which it is scientifically impossible to prove causation of injury, the *Resurfice* exception will apply. Thus, there is now a "sliding scale" of causation standards in Canadian tort law.

Put another way, one can imagine the available approaches to causation arranged in a pyramid formation, in which the horizontal axis (or the width of the pyramid) represents the number of cases to which the particular test will apply and the vertical axis (or the pyramid's height) represents the advantage to plaintiffs afforded by the respective tests. At the wide base of the pyramid is the traditional but-for test; this is the strictest standard available and will likely be applied to the majority of cases, as *Resurfice* makes clear. In the middle ground is the *Snell* modification of the but-for test. Finally, at the apex of the pyramid, affording the greatest advantage to plaintiffs, is the *Resurfice* material contribution to risk test. In the very narrow circumstances articulated in *Resurfice*, plaintiffs will be relieved from proving causation of injury as a policy-based exemption to the but-for approach.

There is no doubt that the *Resurfice* exemption affords a significant advantage to plaintiffs relative to the but-for test. However, it should be underlined that the *Resurfice* standard does not amount to a "free ride" for the toxic plaintiff, despite critics' fears in this regard. A number of articles published since the decision in *Resurfice* suggest that the case has effectively eliminated the causation requirement altogether.[93] Russell Brown captured this concern aptly, contending

93. David Cheifetz, "Causation in Canada in the Third Millennium: Nothing *is* Now Enough" Bennett Best Burn LLP (1 July 2008), online: <http://www.bbburn.com/articles/Resurfice

that, following *Resurfice*, "if causation is the only obstacle, it is no obstacle at all."[94] Such arguments are fundamentally based in the belief that proof of material increase in risk will always be available, such that the gate-keeping function of causation is altogether lost. Whether or not this is a valid proposition in non-chemical cases, it is clearly untenable in the context of toxic torts.

The degree of uncertainty associated with many chemical substances is so high as to preclude proof of material increase in risk. Indeed, the *Resurfice* test still privileges the manufacture of total ignorance: where a substance is too poorly understood to make any definitive conclusion about its characteristics, plaintiffs will fail to meet the *Resurfice* standard.[95] Even where a substance has received substantial toxicological attention, the level of persistent scientific uncertainty may still preclude proof of material contribution to risk. Take for instance the high-profile example of Bisphenol A (BPA), a substance present in polycarbonate baby bottles, among other products.[96] Although BPA in polycarbonate was effectively removed from shelves as a result of widespread public concern,[97] Health Canada's

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_status.pdf> [Cheifetz, "Causation"]; Brown, "Expanding Hegemony," *supra* note 9; Black & Cheifetz. "Looking Glass," *supra* note 75; Vaughan Black & David Cheifetz, "Material Contribution and Quantum Uncertainty: *Hanke v. Resurfice Corp.*" (2006) 43 Can. Bus. L.J. 155 [Black & Cheifetz, "Quantum Uncertainty"].

94. "Expanding Hegemony," *ibid.* at 445. See also Cheifetz, "Causation," *ibid.*

95. Statutory approaches and toxic battery are both effective avenues for prohibiting the release of very poorly understood substances. See *CEPA*, *supra* note 28; Lynda M. Collins & Heather McLeod-Kilmurray, "Toxic Battery: A Tort of our Time?" (2008) 16 Tort L. Rev. 131 [Collins & McLeod-Kilmurray, "Toxic Battery"].

96. See *e.g.* Debra Black & Kerry Gillespie, "Call for Ban on Chemicals in Baby Bottles" *Toronto Star* (21 November 2007), online: <http://www.thestar.com/news/ontario/article/278398>; Martin Mittelstaedt, "Are Plastic Products Coated in Peril?" *The Globe and Mail* (31 May 2006) A3, online: <http://www.theglobeandmail.com/life/are-plastic-products-coated-in-peril/article828261/print/>; and Shelley Page, "Is it Safe? Depends Who You Ask: The Controversial Chemical is in Everything from Canned Food to Baby Bottles" *Ottawa Citizen* (22 April 2007) B2.

97. See *e.g.* Martin Mittelstaedt, "Mountain Equipment Pulls Water Bottles Off Shelves" *The Globe and Mail* (7 December 2007), online: <http://www.theglobeandmail.com/news/national/article801474.ece>; Ylan Q. Mui, "Wal-Mart to Pull Bottles Made with Chemical BPA" *The Washington Post* (18 April 2008), online: <http://www.washingtonpost.com/wp-dyn/content/article/2008/04/17/AR2008041704205.html>. Regarding BPA in can linings, see Environmental Working Group, *Toxic Plastics Chemical in Canned Food*, (5 March 2007), online: <http://www.ewg.org/reports/bisphenola>. However, US manufacturers of infant

conclusions on the substance fall far short of establishing a material contribution to risk of illness.[98] Thus, even in the case of this high-profile substance targeted by the environmental and health communities,[99] it is quite possible (perhaps likely) that a plaintiff claiming to have suffered a particular illness as a result of exposure to BPA would fail on the *Resurfice* test.[100] Indeed, in the scientific community, to say that a particular substance creates a material risk of a particular illness is a strong assertion, one that would only be made in the presence of a robust body of data. For the reasons explained above, such data are often unavailable.

Thus, while clearly easing the burden on toxic plaintiffs, the *Resurfice* approach does not begin to dispense with the causation requirement in toxic negligence. *Resurfice* strikes a balance between the interests of plaintiffs and defendants in the chemical context. It does not abandon the requirement of proof of causation. What *Resurfice* does is shift the central focus of the causation inquiry from injury to risk. Rather than asking plaintiffs to prove the impossible—that a defendant's substance caused their injury—the *Resurfice* test

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formula have agreed to voluntarily remove BPA from their can linings. Brian Chorley, "Seminar Reviews Public Health Role of Congressional Oversight" *Environmental Factor* (January 2010), online: <http://www.niehs.nih.gov/news/newsletter/2010/january/spotlight-seminar.cfm>.

98. Indeed the federal government's Fact Sheet on BPA states that "[t]he current research tells us the general public need not be concerned. ... [With respect to] newborns and infants under 18 months ... [s]cience tells us that exposure levels are below those that could cause health effects; however, due to the uncertainty raised in some studies relating to the potential effects of low levels of bisphenol A, the Government of Canada is taking action... ." Environment Canada & Health Canada, *Bisphenol A: Fact Sheet* (8 October 2010), online: Chemical Substances Web Site <http://www.chemicalsubstanceschimiques.gc.ca/help-aide/important-eng.php >. Note that BPA research is hotly contested and many would argue that the material increase in risk standard has been met. See *e.g.* "Call to Ban BPA Baby Bottle after 'Compelling' Breast Cancer Link" *News.com.au* (1 December 2009), online: <http://www.news.com.au/breaking-news/call-to-ban-bpa-baby-bottle-after-compelling-breast-cancer-link/story-e6frfku0-1225805691216>. The point is simply that proof of MCR in the case of BPA is very far from a foregone conclusion.

99. See *e.g.* National Workgroup for Safe Markets, "No Silver Lining: An Investigation into Bisphenol A in Canned Foods" *Toxic Nations* (May 2010), online: Environmental Defence <http://www.toxicnation.ca/>.

100. This is not to suggest any particular conclusion regarding the safety (or not) of BPA or the likelihood of BPA-related suits succeeding in the future as more data becomes available.

permits plaintiffs to clear the causation hurdle by proving that the defendant negligently created the risk to which they were exposed (and that they actually sustained injury within that area of risk). Where this is achievable, the shift from injury to risk represents a substantial advantage to toxic plaintiffs. The causation requirement has traditionally been concerned with injury, and thus it is reasonable to assert that *Resurfice* represents a change in this respect. However, in our view, this change is a modest reform that is wholly consistent with the principles and history of tort law.

The law of negligence, in particular, has always been concerned with regulating unreasonable risk. Indeed, the imposition of a duty of care occurs when the nature of a given relationship is such that carelessness on the part of one party is likely to pose a risk to another. Standard of care defines the level of risk that is to be tolerated by the law; actors are permitted to cause some risk to others (*e.g.*, by driving a car) but will be held negligent if they pose an unreasonable risk (*e.g.*, by driving a car while drunk). Remoteness, on the other hand, limits a plaintiff's recovery to those risks that were reasonably foreseeable as possible consequences of a defendant's careless conduct. Thus, risk is a defensible target in the jurisprudence of negligence.

In imposing liability based on the negligent creation of risk, *Resurfice* does no more than modestly extend the reach of tort law in a direction in which it was already headed.[101] The extent to which the *Resurfice* promise of liability for risk will be fulfilled will depend upon its treatment by lower courts.

C. RECENT CASE LAW

Resurfice has been the subject of considerable debate in the academic world.[102] At the time of writing, it has also been considered in over two hundred cases by courts of varying levels and jurisdictions. We address this case law from two

101. *Contra* Weinrib, *The Idea*, *supra* note 10 at 157. In response, see Collins, "Material Contribution to Risk," *supra* note 26 at 137-38.

102. See *e.g.* Black & Cheifetz, "Looking Glass," *supra* note 75 at 249; Cheifetz, "Causation," *supra* note 93; Brown, "Expanding Hegemony," *supra* note 9 at 432; Cheifetz & Black, "Quantum Uncertainty," *supra* note 93; Jill Lawrie, Annie Leeks & Gordon McKee, "The Test for Causation in Canada: But for, But Maybe Not" (2008) 75 Def. Counsel J. 378; Russell Brown, "The Possibility of 'Inference Causation': Inferring Cause-in-fact and the Nature of Legal Fact Finding" (2010) 55 McGill L.J. 1; and Andrew Botterell & Christopher Essert, "Normativity, Fairness, and the Problem of Factual Uncertainty" (2009) 47 Osgoode Hall L.J. 663.

angles. First, we assess the general approach to interpreting and applying the *Resurfice* test in the courts, focusing solely on appellate courts and particularly on the treatment of *Resurfice* in the Ontario and British Columbia courts of appeal. Second, we look in detail at the application of the *Resurfice* test in the toxic tort cases that have arisen since its release.

1. APPELLATE CONSIDERATION

The Court of Appeal for British Columbia has interpreted *Resurfice* in several cases[103] and has confirmed that *Resurfice* addresses the uncertainty, rather than the multiplicity, of cause.[104] These decisions can also be interpreted to suggest that the court is of the view that the material contribution test in *Resurfice* is an adoption into Canadian law of the approach taken in *Fairchild*.[105] On the whole, the Court of Appeal appears to be faithfully applying the *Resurfice* test, insisting on but-for as the default even where cause is multiple and contested, but recognizing that (where applicable) the exemption provided for in *Resurfice* is a significant departure from the traditional requirement of causation. Where the impossibility criterion is met, proof of causation of risk, rather than of injury, will suffice.

In cases like *Barker v. Montfort Hospital*,[106] a medical negligence case, the Court of Appeal for Ontario has reflected the "sliding scale" of causation requirements discussed above. Although the *Resurfice* exemption was held to be unavailable in the case, the court was willing to adopt the liberal version of but-for causation articulated in *Snell*. However, even this more forgiving standard was not met on the facts before the court. In dissent, Justice Weiler held that although the evidence did allow the plaintiff to meet the but-for test, it would also have been an appropriate case to use the material contribution test from *Resurfice*, based on that decision's reference to *Cook*:

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103. See *e.g. Jackson v. Kelowna General Hospital* (2007), 277 D.L.R. (4th) 385(medical negligence); *MacDonald (Litigation Guardian of) v. Goertz* (2009), 275 B.C.A.C. 68 (motor vehicle accident) [*MacDonald*].

104. See also *Hutchings v. Dow* (2007), 238 B.C.A.C. 139, leave to appeal to S.C.C. refused, [2007] S.C.C.A. No. 244.

105. See Robin Hansen, "*Fullowka v. Pinkerton's of Canada Ltd.* and the Material-Contribution Test for Factual Causation in Negligence" (2011) 48 Alta. L. Rev. [forthcoming; copy on file with authors].

106. (2007), 223 O.A.C. 201, leave to appeal to S.C.C. refused, [2007] S.C.C.A. No. 299.

> Here, only one person was negligent but there are two medical causes for the respondent's condition... . Both ... are within the ambit of risk created by the appellant's negligence. If detection of the respondent's volvulus was beyond the current limits of scientific knowledge before an operation was carried out, the appellant's delay in operating after her condition worsened was a breach of his duty of care, ...[which] unreasonably exposed her to the risk of losing her bowel or to losing more of it than she otherwise would have lost. As such, I conclude that the short bowel syndrome from which she suffers is within the ambit of the risk that the appellant created.[107]

Erik Knutsen has argued that Justice Weiler was faithfully applying a purposive approach to *Snell* and that the majority was resistant to the robust and pragmatic approach to inferring causation.[108] It does seem that the Court of Appeal may be taking an unduly narrow approach to the *Resurfice* test.

In *Monks v. ING Insurance*, the Court of Appeal for Ontario incorrectly characterized *Resurfice* as a mere restatement of causation principles, apparently confusing MCI with MCR.[109] In a causation section entitled "The *Athey v. Leonati* Issue," Justice Cronk held that *Resurfice* had not altered the basic *Athey* causation principles.[110] This analysis appears to reinstate the material contribution test as a default formulation in cases of multiple causes, an approach clearly rejected by the Supreme Court in *Resurfice*. Furthermore, it apparently views that test as an inquiry into material contribution to injury (as per *Athey*), whereas the *Resurfice* test is clearly concerned with material contribution to *risk*.[111] More

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107. *Ibid.* at paras. 103-04.

108. "Clarifying Causation in Tort" (2010) 33 Dal. L.J. 153 at 177-80. Knutsen says that Weiler J.A. "took a common sense view of causation unhindered by the strict trappings of science. The difference in reasoning between the majority and minority ... is the weighing of evidence" (at 179).

109. (2008), 90 O.R. (3d) 689 at para. 86 [*Monks* 2008]. Note also *Monks v. ING Insurance Co. of Canada*, [2005] O.T.C. 514 (Sup. Ct. J.) at paras. 481, 496, where the trial judge called it an accident benefits (and therefore a contractual) case instead of a torts case but held that "principles of the *Athey* case as it regards the 'material contribution' test have been adopted in the accident benefits context" (para. 496).

110. *Monks* 2008, *ibid.* at paras. 84-86.

111. In any event, the Court of Appeal's interpretation of material contribution (whatever the modifier) is arguably *obiter dicta* since, as in *Athey*, it ultimately found that the evidence adduced was sufficient to meet the but-for standard. *Ibid.* at paras. 91-92.

recently, in *Frazer v. Haukioja*,[112] the Court of Appeal held that the two tests in *Resurfice* are mutually exclusive and that difficulty in proving cause is not tantamount to impossibility.[113]

To summarize, the general negligence jurisprudence out of both the British Columbia and Ontario Courts of Appeal suggests that the narrow, limiting criteria for application of the *Resurfice* test will be strictly policed, leading to application of the but-for test in the vast majority of cases. Because of the phenomenon of intransigent scientific uncertainty discussed above, one might reasonably predict that the category of toxic torts would be one in which the material contribution test will frequently apply. An analysis of the (limited) toxic tort jurisprudence suggests that this has not, so far, been the case.

2. APPLICATION OF *RESURFICE* IN TOXIC TORT CASES

There exists only a small body of toxic tort case law applying the *Resurfice* approach to causation. On the whole, the cases that have considered *Resurfice* in the context of toxic causation reveal a reluctance on the part of courts to apply the exception and confusion as to the substance of the material contribution to risk test.

In *Ball v. Imperial Oil Resources*,[114] having leaked hydrocarbons from an underground pipe, the defendant was found liable for illnesses and other harmful effects on the plaintiff's cattle. The trial judge explicitly found that "the 'material contribution' test was appropriate," and reasoned that "the Defendant breached a duty of care it owed to the Plaintiff and thereby exposed the Plaintiff's School Section herd to an unreasonable risk to injury which it in fact suffered."[115] However, the Court of Appeal of Alberta held that the trial judge had in fact applied the but-for test, and rightly so:

> [The lower court's] conclusion that the School Section herd's exposure to BTEX hydrocarbons was a "significant factor in its subsequent compromised health" constituted a finding of causation, in accordance with the primary [but-for] test. ... Imperial Oil's actions made it difficult if not impossible for Mrs. Ball to gather

112. (2010), 317 D.L.R. (4th) 688.

113. *Ibid.* at paras. 41, 42, 47-50.

114. (2010), 22 Alta. L.R. (5th) 1 (C.A.) [*Ball* 2010].

115. *Ball v. Imperial Oil Resources* (2008), 21 Alta. L.R. (5th) 169 (Q.B.) at paras. 128, 133.

> the evidence necessary to scientifically assess the extent to which the cattle had been exposed to hydrocarbon contamination. ...[I]t was within Imperial Oil's power to test the water[,] ... something it failed to do in any timely or comprehensive way. ... Thus, as in *Snell*, Imperial Oil's conduct made it impossible for it to overcome the inferences reasonably drawn from the plaintiff's evidence. Accordingly, we are of the view that the trial judge's acceptance of the plaintiff's evidence established causation employing the primary "but for" test, upon a balance of probabilities.[116]

This is another example of the courts strongly preferring the but-for test but using a pragmatic and robust approach from *Snell* to effectively soften the requirements of causation.

Justice Slatter, dissenting in *Ball*, emphasized that the problem on causation here was that there was no factual finding that the cattle consumed the toxics and that the trial judge should not have drawn an inference by extrapolating back because "[e]xtrapolating back from damage to find a cause ... runs the real risk of reversing the burden of proof. It is contrary to the rule in [*Resurfice*]."[117] Yet Justice Slatter also suggested that if consumption had been proved the issue of whether the consumed hydrocarbons created illness would have called for use of the lower standard of material contribution:

> Firstly, the limits of scientific knowledge and scientific testing, the rapid breakdown of the chemicals, the inherent impossibility of showing that any proven consumption of the soil or water led to the injuries are sufficient to make the "but for" test "unworkable", and to allow the application of the exceptional material contribution test. Secondly, ... the defendant "exposed" the cattle to an unreasonable risk of injury (through the consumption of hydrocarbons), and the injuries that resulted ... fell within the "ambit of the risk" ... [*i.e.*,] hydrocarbon poisoning.[118]

Thus, the dissent was helpful in indicating more specifically in what types of toxic tort situations the material contribution test would be applicable.

The facts in *Crooked Post Shorthorn v. Masterfeeds Inc.*[119] were similar to those in *Ball*. There, the Court of Appeal of Alberta faced a dispute over whether a manufacturer's cattle feed had negligently caused illness in the plaintiff Crooked Post Shorthorn's (CPS) herd. The trial judge found that causation remained a

116. *Ball* 2010, *supra* note 114 at paras. 67-69.

117. *Ibid.* at para. 110.

118. *Ibid.* at paras. 99-100.

119. (2010), 477 A.R. 280.

mystery and "declined to draw an inference that there was a latent defect in the Ration" feed.[120] Further, "[a]s the breaches did not expose CPS to the same injury that was actually suffered, the second requirement for the application of the material contribution test was not met."[121] The Court of Appeal stated that since there was a lot of evidence, though much of it conflicting, "[t]his was not a case in which there was an 'absence of evidence to the contrary' of CPS's theory of causation. In our view, this trial judge took the robust and pragmatic approach advocated in *Snell v. Farrell*."[122]

In *Berendsen v. Ontario*,[123] a farming family alleged negligence by the Ontario government in causing well water contamination on their property from roadbed waste material (asphalt and concrete waste) buried on the property in the 1960s. The owners at the time had consented to this disposal. The Berendsens, the new owners of the property, alleged that these contaminants made their cows unwilling to drink enough water, resulting in illness. The trial judge found the government liable, but misconstrued the nature of the *Resurfice* test, reverting to a pre-*Resurfice* material contribution to injury approach:

> In *Snell v. Farrell* the Supreme Court made it clear that increasing the risk of harm is not the same as causing the harm. ... The "material contribution" test has been held to apply to cases that involve "multiple inputs" that have all harmed the plaintiffs, and is invoked because of logical or structural difficulties in establishing "but for" causation, not because of practical difficulties in establishing that the defendant's negligent act was a part of the causal chain.[124]

This description aptly characterizes a test of material contribution to injury—the *Athey* approach, which (with the one exception of multiple sufficient causes) is no longer operative in Canadian law.[125] The Court of Appeal for Ontario reversed

120. *Ibid.* at para. 10.

121. *Ibid.* at para. 34.

122. *Ibid.* at paras. 39-40.

123. (2008), 69 C.L.R. (3d) 199 (Ont. Sup. Ct. J.) [*Berendsen* 2008].

124. *Ibid.* at paras. 276-78.

125. This indicates the continuing confusion in the use of the term "material contribution." In *MacDonald*, the Court of Appeal for British Columbia pointed out that the confusion has resulted from the different uses of this phrase. According to the court, the *Resurfice* concept

the decision on the basis that the standard of care in the 1960s had been met.[126] But on causation, the court focused in detail on the factual "battle of the experts" without discussion of the appropriate test for causation. It merely referred to *Resurfice* to say that standard of care must be breached before liability can be found.[127] The Supreme Court granted leave to appeal in *Berendsen*, creating a real potential for clarification, but the case was unfortunately discontinued on consent.[128]

In *Blatz v. Impact Energy*,[129] the defendant's sour gas well and open pits allegedly seeped contaminants, polluting the plaintiff's well water so as to cause illness and economic harm.[130] Despite the detailed analysis of the conflicting evidence, the core of the dispute on causation is limited to three paragraphs.[131] The plaintiffs had argued that the material contribution test applied because

> it was impossible for experts to say exactly what water does underground, and since there are only two obvious sources for the problem in the well, either animal waste or oil drilling activity, the court should look to the material contribution test, rather than the "but for" test set out in [*Resurfice*].[132]

Explicitly distinguishing *Ball*, however, the court held that the but-for test applied despite conflicting evidence and that the test had been met on the facts. This case again maintains that even fiercely debated expert opinions do not amount to an "impossibility" in proving a claim on a but-for test due to scientific uncertainty. It also shows that it is possible to meet the but-for test in cases of uncertainty.[133]

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of material contribution is not "a test of causation at all; rather it is a policy-driven rule of law designed to permit plaintiffs to recover in such cases despite their failure to prove causation" (*MacDonald*, *supra* note 103 at para. 17). The other usage arises in *Athey*, *supra* note 41, where the defendant's action was *a* cause and thus materially contributed to the injury.

126. *Berendsen v. Ontario* (2009), 266 O.A.C. 39.

127. *Ibid.* at paras. 58-59.

128. *Berendsen v. Ontario*, [2010] S.C.C.A. No. 24, notice of discontinuance, 33543 (24 January 2011).

129. (2009), 478 A.R. 1 (Q.B) [*Blatz*].

130. *Ibid.* at para. 1.

131. The claims under *Rylands*, *supra* note 19 and in nuisance will not be addressed here.

132. *Blatz*, *supra* note 129 at para. 159.

133. *Ibid.* at paras. 159-60.

Similarly, in *Wainwright (Town of) v. G-M Pearson Environmental Management*[134] two waste brokers were found liable for fires caused by waste disposal in a facility not equipped to deal with hazardous waste. The parties argued that it was scientifically impossible to prove exactly what caused the fire in the waste incinerator. The judge held that

> a reasonable *inference* can be drawn as to cause and origin of the fire. ... In short, the Authority has established to my satisfaction that the flammable waste component of the Furniture Waste was ignited and caused the fire and resulting damage at issue in this case. I also note that the Defendants have not called any experts to suggest any alternate theory and mere speculation on their part is not sufficient.[135]

Again, the but-for test was held to be satisfied, despite contradictory evidence, and there was no mention of the material contribution test. On appeal, the affirming court held that "[a]lthough the trial judge did not specifically address the 'but for' test, his findings of fact inevitably lead to that conclusion."[136]

A different approach was taken in *MacIntyre v. Cape Breton District Health Authority*.[137] In that case, a dentist alleged severe health impacts from negligent procedures in renovating the hospital where he worked. The causation issue was dealt with at great length and each of the conflicting experts directly addressed factual causation in their opinions.[138] Ultimately, the court held that the plaintiff's period of exposure was minimal and that there was no evidence of heavy metals being released or of the plaintiff having any in his system.[139] It refused to draw an inference based on the illnesses of others at the hospital at the time.[140] Although the court found that the construction had been below standard and therefore the duty of care to the plaintiff was breached, it concluded "that the plaintiff [had] not met the 'but for' test" without even considering the applicability of the material

134. (2007), 430 A.R. 134 (Q.B.).

135. *Ibid.* at para. 276 [emphasis added].

136. *Wainwright (Town) v. 876947 Ontario* (2009), 446 A.R. 98 (C.A.) at para. 4, leave to appeal to S.C.C. refused, [2009] S.C.C.A. No. 36.

137. (2009), 279 N.S.R. (2d) 327 (S.C. (A.D.)).

138. *Ibid.* at paras. 267-320.

139. *Ibid.* at para. 317.

140. *Ibid.* at para. 318.

contribution test.[141] Again, this reflects a stringent approach to fact-finding, and the court clearly could not provide an alternative reason for the prolonged and serious illness it agreed that he had suffered. This case, in its resemblance to *McGhee*, appears to be a strong candidate for the material contribution test.

Finally, *Windsor v. Canadian Pacific Railway*[142] was a decision on a motion for certification as a class action in which the causation question was a contested issue. Several residential landowners sued CP Rail for land and water pollution—particularly of groundwater—resulting from the use of the degreaser (and known carcinogen) trichloroethylene (TCE). On causation, the Court of Appeal of Alberta held that "[a]pplying the 'but for' test ... to this claim, one must ask: is there a substantial connection between escape of TCE from the CP Rail's property (assuming this is proven) and the class members' reduction in property value, rental income, or fitness of their properties' use? If so, causation is made out."[143] The court did not provide the source for the expression "substantial connection"; perhaps this is just a rephrasing of the purpose of the causation step in negligence. Yet the court clearly was of the view that the but-for test applied, although without considering the *Resurfice* factors for material contribution. The actual resolution of the causation issue was left to the merits stage of the case.[144]

In sum, there is a need for greater clarity in the application of the *Resurfice* exception. In several of these cases, the courts appropriately decline to use this exception because it is not necessary—because there is either clearly no evidence at all of risk of harm, or there is ample evidence to allow the plaintiff to satisfy

141. *Ibid.* at para. 320.

142. (2007), 417 A.R. 200.

143. *Ibid.* at para. 29.

144. The other toxic tort cases citing *Resurfice* have done so for reasons not directly related to causation. See *Bingley v. Morrison Fuels, a division of 503373 Ontario* (2009), 95 O.R. (3d) 191 (C.A.) at para. 55, Simmons J.A., dissenting (referring to Professor Lewis Klar, who himself refers to *Resurfice* for the proposition that the presence of foreseeability at the duty, standard of care, and proximate cause stages of negligence is confusing). The case turned on standard of care, not causation. See also *Adams v. Borrel* (2008), 336 N.B.R. (2d) 223 (C.A.), rev'g (2007), 318 N.B.R. (2d) 3 (Q.B.), leave to appeal to S.C.C. refused, [2009] S.C.C.A. No. 470. The Court of Appeal for New Brunswick returned the case (relating to the negligence of Agriculture Canada in failing to detect a virus in potato seeds that caused harm to farmers) to the trial court, having reversed the findings on the duty of care of the government. In doing so, it stated that the trial court would have to deal with causation and cited *Resurfice* as the source of the appropriate test (at para. 67). The case turned mainly on the duty of care of government authorities.

the but-for test and prove causation. Yet some of these cases indicate that courts are taking a conservative view of *Resurfice*, interpreting it as raising the bar on causation. In others the problem seems to be simply confusion on the part of lower courts regarding the various available approaches to causation. The Supreme Court's achievement in *Resurfice*—the creation of a just and pragmatic approach to causation for toxic plaintiffs, among others—will only be useful if courts "get it" and use it. There would appear to be a strong case for additional guidance in future Supreme Court jurisprudence.

VIII. POST-*RESURFICE*: NEXT STEPS TOWARDS A PRECAUTIONARY TORT MODEL

As explained above, the *Resurfice* standard requiring proof of material contribution to risk will frequently be unattainable for plaintiffs in toxic tort cases. Because of the pronounced degree of uncertainty associated with chemical substances, there are many thousands of chemicals for which data sufficient to demonstrate a material increase in risk are simply unavailable. Arguably, then, the *Resurfice* test alone fails to provide adequate deterrent signals to chemical producers who would experiment with public health and the environment. Although *Resurfice* is certainly a salutary reform in Canadian toxic tort doctrine, courts and legislators may wish to consider further modifications. Regulators are evidently best positioned to demand rigorous testing of existing and new chemical substances, but where regulation fails, tort law can assist by creating a reasoned and coherent legal regime for chemical misconduct.

In our view, the test in *Resurfice* is neatly balanced with the claim in toxic battery. Where a plaintiff is unable to prove a material increase in risk, this inability will stem from one of two causes. First, it may be that adequate data exist demonstrating the safety of the chemical at issue, in which case it is appropriate that the plaintiff should fail. Second, it may be that the plaintiff's failure to prove material contribution to risk stems from the defendant's failure to adequately investigate its own substance. In this scenario, the exposure of the plaintiff (and others) to the substance in effect constitutes a form of involuntary experimentation, sufficient to create a claim in battery.[145] Involuntary

145. Collins & McLeod-Kilmurray, "Toxic Battery," *supra* note 95 at 131.

experimentation is a well-recognized instantiation of battery, since it violates the fundamental value of personal autonomy underlying the battery cause of action.[146] If courts are willing to impose liability in battery where a defendant emits a poorly understood or dangerous chemical, then the *Resurfice* tendency to reward intentional ignorance will be effectively counterbalanced. Indeed, the combination of *Resurfice* material contribution to risk and toxic battery for unacceptable uncertainty would create an elegant and precautionary tort scheme.[147]

In the alternative, courts may consider targeting the failure to investigate chemical substances from within the law of negligence. Margaret Berger and Wendy Wagner have proposed reforms in which proof of a failure to discover and disseminate adequate health information about a substance may attract liability in negligence regardless of what a plaintiff can or cannot prove about the characteristics of the chemical at issue.[148] Like the "involuntary experimentation" formulation of environmental battery, this cause of action turns the uncertainty dilemma on its head. Rather than penalizing plaintiffs for their inability to prove the characteristics of a substance, the information-based claims impose liability on defendants for releasing the substance before discovering these characteristics themselves.[149] Once a plaintiff has made a prima facie case that the defendant released an inadequately investigated chemical, the defendant could then exculpate itself by disproving causation—either by showing that the substance in question was incapable of causing the type of illness suffered by the plaintiff (*i.e.*, disproving general causation) or by proving that a particular plaintiff's illness was caused by other factors (*i.e.*, disproving specific causation).[150] If a plaintiff is unable to prove inadequate testing, then the traditional allocations of burden of proof would apply.

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146. *Ibid.*

147. For a discussion of the role of precaution in toxic tort law, see Lynda M. Collins, "Strange Bedfellows? The Precautionary Principle and Toxic Tort: A Tort Paradigm for the Twenty-First Century" (2005) 35 Envtl. L. Rep. 10361 [Collins, "Strange Bedfellows"].

148. Wagner, *supra* note 6 at 834-36; Berger, *supra* note 22 at 2117.

149. Berger, *ibid.* For a discussion of appropriate standards of investigation, see Wagner, *ibid.* at 835-36; Collins, "Strange Bedfellows," *supra* note 147 at 10370-71.

150. Wagner, *ibid.* at 835-36; Berger, *ibid.* at 2144-45.

IX. CONCLUSION

There is no question that statutory environmental law must remain the primary instrument for regulating toxic substances in Canada and elsewhere. The vast universe of useful yet potentially harmful chemical substances must be regulated by a regime that is comprehensive, systematic, and proactive. However, given the primacy of profit in Canadian corporate law and practice, it is equally clear that tort law has a meaningful role to play in shaping corporate conduct in the chemical arena. The significance of private law in protecting human health and the environment has been recognized by scholars and courts alike.[151] Coupled with an appropriate application of the tort of toxic battery, the *Resurfice* approach allows negligence law to realize its potential in this respect. We have argued that *Resurfice* represents a significant reform in the law of toxic torts, supplementing the frequently insurmountable but-for standard with a test of material contribution to risk. There is a need for greater willingness on the part of lower courts to apply the *Resurfice* exception where merited in order to achieve tort law's dual purposes of compensation and deterrence in the toxic tort context. Further development and clarification by appellate courts, and perhaps the Supreme Court of Canada itself, in future cases will assist trial courts in grasping the contours and content of the *Resurfice* approach to toxic causation.

To the extent that *Resurfice* has made it easier for courts to penalize those who deal negligently with chemical substances, it creates an economic signal favouring prudence. If it is true that the judicial treatment of those who negligently handle harmful chemicals affects the extent to which ordinary people are exposed to these substances, then *Resurfice* is unequivocally a step forward for the law of toxic torts in Canada.

151. See *e.g.* Keith N. Hylton, "When Should We Prefer Tort Law to Environmental Regulation?" (2002) 41 Washburn L.J. 515; *St. Lawrence Cement Inc. v. Barrette*, [2008] 3 S.C.R. 392; *Hollick v. Metropolitan Toronto (Municipality)*, [2001] 3 S.C.R. 158; and *Hollis v. Dow Corning Corp.*, [1995] 4 S.C.R. 634.