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Developing Exposure-based Preconception Tort Liability: A Scientific Challenge to Traditional Tort Concepts

Cover Page Footnote

J.D. Candidate, May 2017, The Catholic University of America, Columbus School of Law; B.A., 2014, Xavier University. The author extends his most sincere gratitude to Mr. Adam Dinnell for his expertise and guidance in drafting this Comment. The author is also grateful to his family and friends who have supported throughout his time in law school. Finally, the author would like to extend his thanks to the *Catholic University Law Review* for its assistance in publishing this Comment.

DEVELOPING EXPOSURE-BASED PRECONCEPTION TORT LIABILITY: A SCIENTIFIC CHALLENGE TO TRADITIONAL TORT CONCEPTS

Nicholas P. Putz⁺

As society progresses, human interaction with the environment becomes increasingly precarious. According to many scholars, “[t]here is increasing acceptance of the assertion . . . that most human disease, if not all, is the result of the interaction between underlying genetic susceptibility and exposures to various components of the environment, including chemical, dietary, infectious, physical, and behavioral.”¹ Unfortunately, the U.S. legal system has continually struggled to reconcile scientific advances with legal precedent and doctrinal tort concepts.² Commonly referred to as a “preconception” tort, U.S. courts are

⁺J.D. Candidate, May 2017, The Catholic University of America, Columbus School of Law; B.A., 2014, Xavier University. The author extends his most sincere gratitude to Mr. Adam Dinnell for his expertise and guidance in drafting this Comment. The author is also grateful to his family and friends who have supported throughout his time in law school. Finally, the author would like to extend his thanks to the *Catholic University Law Review* for its assistance in publishing this Comment.

1. ENCYCLOPEDIA OF EPIDEMIOLOGY 418 (Sarah Boslaugh ed., 2008); *see also* Jamie A. Grodsky, *Genetics and Environmental Law: Redefining Public Health*, 93 CAL. L. REV. 171, 267–68 (2005). Grodsky asserts that:

[t]he additional data yielded by new scientific capabilities might bolster the claims of populations affected by such risk. Information concerning environmental susceptibilities, exposure, and subclinical biological effects may serve as the ingredients for a new generation of tort claims based on injuries from chemical exposure, as well as increased risk in the absence of manifest injury.

Id. (emphasis omitted).

2. *See, e.g.*, Lyria Bennett Moses, *Understanding Legal Responses to Technological Change: The Example of In Vitro Fertilization*, 6 MINN. J.L. SCI. & TECH. 505, 515–16 (2005) (positing that, when dealing with scientific or technological advances, such as in vitro fertilization, “[t]he law is frequently accused of containing gaps, of being slow or outpaced and thus lagging behind technology, and of needing to respond to new technologies and address new issues”); Deborah Tuerkheimer, *Science-Dependent Prosecution and the Problem of Epistemic Contingency: A Study of Shaken Baby Syndrome*, 62 ALA. L. REV. 513, 526 (2011) (providing an analysis of how criminal proceedings relating to shaken baby syndrome, a concept that relies heavily on scientific evidence, had severely lagged behind scientific advances for a significant period of time); *see generally* Jamie A. Grodsky, *Genomics and Toxic Torts: Dismantling the Risk-Injury Divide*, 59 STAN. L. REV. 1671, 1733–34 (2007). Grodsky provides a vivid description of how medical advances challenge classic legal thinking:

As the medical world leaps forward to prevent and treat disease at the subcellular level, the law’s traditional focus on overt, symptomatic disease is increasingly out of step with science. New constellations of biological markers may indicate that bodily integrity has been compromised well before the appearance of classic symptoms. By forcing plaintiffs to attain late-stage injury before seeking remedies, current toxic tort law may actually discourage medical interventions that could benefit both defendants and plaintiffs. If the

extremely hesitant to extend recovery to plaintiffs who allegedly suffered an injury caused prior to conception from exposure to a hazardous substance.³ However, what may be even more telling of this hesitancy is the reluctance of courts to extend recovery to injuries that resulted from hazardous exposure in utero.⁴ One of the most difficult challenges facing plaintiffs is the ability to establish a duty that often spans two to three generations, which often depends on whether the injury suffered was foreseeable at the time the parent or grandparent was affected.⁵ Additionally, as many causes of action are rooted in exposure to toxic or hazardous materials, plaintiffs also struggle to establish a clear and definite theory of causation.⁶ In general, courts have refused to uphold preconception tort actions for three main reasons: (1) there is no duty to subsequently conceived offspring;⁷ (2) it is difficult to establish causation by pinpointing genetic damage and tracing it back to a single incident;⁸ and (3) public policy does not favor recognizing preconception tort actions.⁹

law remains wedded to conventional notions of injury, it will ignore the fruits of a scientific revolution and thus may forego preventive opportunities as yet unimagined.

Id. See also Monroe E. Price, *The Newness of New Technology*, 22 CARDOZO L. REV. 1885, 1913 (2001). Price discusses the notion of a lagging judiciary within the context of technological advances, contending that:

[L]aw moves more slowly than its external impacts and not always or immediately in parallel with them. The development of law is imprisoned in the rhetoric of its prior existence. That is the weakness, certainly of courts, but of legislatures as well. Altered flows of information, resulting from new technologies, change the balances that previously existed in a legal framework. But it is hard to know when those changes undo the preexisting formulaic approaches to a task.

Id.

3. Julie A. Greenberg, *Reconceptualizing Preconception Torts*, 64 TENN. L. REV. 315, 342 (1997).

4. *Kardas v. Union Carbide Corp.*, 802 N.Y.S.2d 509, 510 (N.Y. App. Div. 2005) (holding that plaintiff who allegedly suffered profound brain damage due to repeated exposure of her father's semen to contaminants did not have a preconception cause of action).

5. See *Lough v. Rolla Women's Clinic, Inc.* 866 S.W.2d 851, 854 (Mo. 1993) (asserting that foreseeability is the paramount factor in determining existence of a duty).

6. See, e.g., *Whitlock v. Pepsi Americas*, 681 F. Supp. 2d 1123, 1126 (N.D. Cal. 2010) (opining that future advances in science and medicine could make the attribution of injuries to chemical exposure clearer).

7. *Hegyesh v. Unjian Enters., Inc.*, 286 Cal. Rptr. 85, 101–02 (Cal. Ct. App. 1991).

8. David Rosenberg, *The Causal Connection in Mass Exposure Cases: A 'Public Law' Vision of the Tort System*, 97 HARV. L. REV. 849, 857 (1984) (“Epidemiologists can estimate the proportion of disease incidence attributable to the ‘excess risk’ created by the toxic agent and the proportion attributable to the ‘background risk’ – the cumulative risk attributable to all other factors. But given current limits on our knowledge of the etiology of insidious diseases, and given the generality of statistical data, it is impossible to pinpoint the actual source of the disease afflicting any specific member of the exposed population.”).

9. *Elsheref v. Applied Materials, Inc.*, 167 Cal. Rptr. 3d 257, 265 (Cal. Ct. App. 2014) (quoting *Oddone v. Superior Court*, 101 Cal. Rptr. 3d 867, 874 (Cal. Ct. App. 2009)) (“One of the consequences to the community of such an extension [of liability] is the cost of insuring against liability of unknown but potentially massive dimension.”).

There is minimal recognition of preconception tort actions throughout the U.S., often because of a strict adherence to the common tort concepts of duty and foreseeability by many courts.¹⁰ Thus, even with a clear line of causation, under certain circumstances, some courts continue to refuse to impose preconception tort liability.¹¹ Perhaps most telling of the general refusal to recognize preconception torts, outside of a narrow line of cases, is the reliance on the misleading policy implications of imposing a duty in such scenarios.¹²

In an effort to prevent overextending traditional tort concepts of duty and causation, many courts have strongly rejected preconception liability.¹³ A special relationship between the alleged tortfeasor and plaintiff provides one possible way by which to circumvent the foreseeability aspect of causation.¹⁴ However, not only have some courts refused to recognize preconception tort liability absent a special relationship, but they have also consciously construed such relationships extremely narrowly.¹⁵ Because most of the hazardous exposure cases fall outside the scope of any special relationship, a lack of foreseeability and inability to pinpoint causation continues to be the demise of such actions.¹⁶

This Comment begins with an analysis of potential recovery for genetic damage to one's progeny resulting from hazardous exposure by examining the

10. See, e.g., *Hegyegy*, 286 Cal. Rptr. at 104 (“We refuse to be persuaded by [the] notion that causation and injury are the sole determinants of liability. The fundamental expression of the need in the law of negligence for a concept of duty and foreseeability was provided over 60 years ago in *Palsgraf v. Long Island R.R. Co.*, and has withstood the test of time.”) (citation omitted).

11. See, e.g., *id.* at 89 (noting that a duty to the unconceived in California exists only when a defendant's conduct involves providing medical services or products relating to the reproductive process).

12. See, e.g., *Elsheref*, 167 Cal. Rptr. 3d at 265; see also Daniel S. Goldberg, *Against Genetic Exceptionalism: An Argument in Favor of the Viability of Preconception Genetic Torts*, 10 J. HEALTH CARE L. & POL'Y 259, 271 (2007) (“The major reason courts deny recovery for preconception genetic torts is fear of multiple-generation liability. Courts are afraid that no practical limit on liability may exist.”).

13. *Elsheref*, 167 Cal. Rptr. 3d at 265 (holding the employer of the plaintiff's father owed no duty to the plaintiff to protect or warn of possible exposure to hazardous chemicals); *Hegyegy*, 286 Cal. Rptr. at 104 (holding that preconception duty only exists when a defendant's conduct involves providing medical services or products directly related to the reproductive process); *Albala v. City of New York*, 429 N.E.2d 786, 787 (N.Y. 1981) (holding that recognizing a preconception cause of action stemming from medical negligence would extend traditional tort concepts too far).

14. *Hegyegy*, 286 Cal. Rptr. at 104 (using special relationships to limit preconception liability by holding that a duty only exists when the defendant's conduct involves providing medical services or products directly related to the reproductive process).

15. Compare *Whitlock v. Pepsi Americas*, 681 F. Supp. 2d 1123, 1126 (N.D. Cal. 2010) (holding that no special relationship exists between a polluting landowner and neighbor which would impose a duty to an unconceived child), with *Hegyegy*, 286 Cal. Rptr. at 104.

16. *In re Asbestos Litig.*, No. 04C-07-099-ASB, 2007 WL 4571196, at *1 (Del. Super. Ct. Dec. 21, 2007) (refusing to acknowledge a relationship which would give way to a legal duty of care between husband's employer and the plaintiff wife, who was exposed to asbestos when washing her husband's work clothes).

treatment of preconception torts in American Jurisprudence. Next, this Comment focus on the two applicable legal principles of duty and causation, drawing on comparable tort duties and technological advances in genetic identification that could strengthen causation. Finally, this Comment argues that causation and duty exist on a sliding scale. Therefore, with advances in genetic identification strengthening causation, the duty component of the tort should become less stringent. In response to policy implications that would arise from recognizing such a tort, this Comment proposes that the tort inherently limits itself, but if necessary, statutory regulation may be the best mechanism in preventing the tort from becoming uncontrollable.

I. PRECONCEPTION TORT LIABILITY—A COMMON LAW DEVELOPMENT OF LIABILITY AND CHALLENGES FACING INJURED PLAINTIFF

A. *The Origin of the Preconception Tort*

Like any other tort, a preconception tort requires the plaintiff to establish duty, breach of duty, causation, and injury.¹⁷ However, because of the unique nature of preconception torts, especially those involving exposure, the elements necessary to establish a cause of action are malleable and much more complex than usual.¹⁸ Elements of causation and duty are particularly problematic, as evidenced by the difficulties plaintiffs face in establishing preconception liability.¹⁹

1946 marked the first time a U.S. court recognized a cause of action for an injury to a child prior to birth, when the court in *Bonbrest v. Kotz*²⁰ reasoned that the child was viable or “one capable of living outside the womb.”²¹ Since then, courts have wrestled with how best to approach these controversial causes of action.²² In 1963, *Jorgenson v. Meade Johnson Labs.*²³ undercut the viability test articulated in *Bonbrest* by recognizing a right of recovery for a wrongful

17. See, e.g., Christopher M. Ernst, 3 Baldwin’s Oh. Prac. Tort L. § 17:2 (2015) (“A preconception negligence claim must satisfy all the elements of a traditional negligence cause of action.”).

18. Christopher J. Wiener, *Transgenerational Tort Liability for Epigenetic Disease*, 13 DEPAUL J. HEALTH CARE L. 319, 328–30 (2011) (“Three elements [duty of care to the unborn and their progeny, generational causation, legally cognizable injuries] of a negligence claim are particularly problematic when confronting a claim for transgenerational epigenetic harm . . .”).

19. *Id.*

20. 65 F. Supp. 138 (D.D.C 1946).

21. *Id.* at 140.

22. The predicament facing the courts today revolves around reconciling century-old doctrinal tort concepts with modern scientific and medical advances. Courts view challenges to these doctrinal concepts, such as duty and foreseeability, as the first in what would be a wave of limitless litigation. In confronting these challenges, the courts have mostly defended such concepts, relying on an array of rationale—policy, tortfeasor relationship and legislative specialization. See *infra* Section I.B.

23. 483 F.2d 237 (10th Cir. 1973).

action that occurred prior to conception.²⁴ Subsequently, courts have applied the rationale of *Jorgenson* and recognized preconception tort liability because the child's existence triggers the ability to recover.²⁵ Preconception tort actions of this type have been successful, in part, because of the definite causation link traceable from the injury to the defendant.²⁶ However, the recognition of preconception tort liability in *Jorgenson* and *Renslow* did not lead to widespread acceptance of preconception tort liability throughout the United States, as courts have limited the applicability of these holdings to a subset of factually identical cases.²⁷

B. The Pot Calling the Kettle Black: The Arbitrary Refusal of Courts not to Impose a Preconception Duty

Much less scientific than the causation aspect of preconception torts, the question of duty turns almost solely on policy. Embedded in these policy considerations is the hardened concept of foreseeability, established by Judge Cardozo in *Palsgraf v. Long Island Railroad Co.*²⁸ According to Cardozo, negligence is "a term of relation."²⁹ Thus, one does not owe a duty to unforeseeable plaintiffs.³⁰ Some courts have been weary of imposing a duty to the unconceived solely on the basis of an inability to reconcile foreseeable liability and endless liability.³¹ Because courts must consider the repercussions

24. *Id.* at 240 (noting one would not deny recovery to an infant suffering injury as a result of a defective food product manufactured prior to conception).

25. *See, e.g., Renslow v. Mennonite Hosp.*, 367 N.E.2d 1250, 1255 (Ill. 1977) (holding that "there is a right to be born free from prenatal injuries foreseeably caused by a breach of duty to the child's mother" but injury can only occur after existence, not prior); *see also* David S. Steefel, *Preconception Torts: Foreseeing the Unconceived* *Renslow v. Mennonite Hospital*, 48 U. COLO. L. REV. 621, 624 (1977) (noting that this constitutes "a biological approach to justify recovery for preconception torts").

26. In *Renslow*, causation was premised on the well-established medical fact that Rh-positive blood is never transfused with Rh-negative blood, thus effectively eliminating the need for the court to grapple with complex causation issues. *Renslow*, 367 N.E.2d at 1253.

27. Greenberg, *supra* note 3, at 335–41. Greenberg notes that courts have limited the recognition of preconception liability with most states willing only to recognize preconception liability in medical malpractice actions and products liability action. *Id.* In 1997, only three states had considered whether to impose preconception liability outside of medical malpractice and preconception liability, with Indiana being the only state to allow the cause of action to proceed to trial. *Id.* at 340–41.

28. 162 N.E. 99 (N.Y. 1928).

29. *Id.* at 101.

30. *Id.* ("If the harm was not willful, he must show that the act as to him had possibilities of danger so many and apparent as to entitle him to be protected against the doing of it though the harm was unintended.")

31. *See, e.g., Albala v. City of New York*, 429 N.E.2d 786, 787 (N.Y. 1981) (holding that recognizing a preconception cause of action stemming from medical negligence would extend traditional tort concepts too far).

of their holdings, the concern of overextending liability by recognizing a duty to the unconceived is quite common.³²

1. *Adherence to Foreseeability in Preventing Limitless Liability*

*Albala v. City of New York*³³ was a case in which the argument in favor of finding preconception tort liability appeared to be strong. However, the Court of Appeals of New York refused to recognize any such action.³⁴ In *Albala*, the plaintiff's mother suffered a damaged uterus when she underwent an abortion.³⁵ Four years after the negligently administered abortion, the plaintiff was born with severe brain damage, allegedly caused by the mother's damaged uterus.³⁶ In holding that the plaintiff did not have a cognizable cause of action, the court noted the "staggering implications of any proposition which would honor claims assuming the breach of an identifiable duty for less than a perfect birth and by what standard and the difficulty in establishing a standard or definition of perfection."³⁷

Echoing *Albala*, *Catherwood v. American Sterilizer Co.*³⁸ refused to consider the possibility of recovery for a plaintiff alleging that her mother's exposure to a hazardous substance caused chromosomal damage.³⁹ The court acknowledged that New York had "carefully avoided opening the doors to litigation by plaintiffs claiming injury due to acts of defendants before their birth[,]” and thus, reiterated that it would abide by precedent in refusing to recognize a duty to the unconceived.⁴⁰

In *Hegyves v. Unjian Enterprises, Inc.*,⁴¹ a California court discussed the importance of foreseeability in preconception cases, noting:

[w]e refuse to be persuaded by [the] notion that causation and injury are the sole determinants of liability. The fundamental expression of the need in the law of negligence for a concept of duty and foreseeability was provided over 60 years ago in *Palsgraf v. Long Island R. Co.*, and has withstood the test of time.⁴²

32. See, e.g., *id.* (“We are of the opinion that the recognition of a cause of action under these circumstances would require the extension of traditional tort concepts beyond manageable bounds”).

33. 428 N.E.2d 786 (N.Y. 1981).

34. *Id.* at 788.

35. *Id.* at 787.

36. *Id.*

37. *Id.* at 273 (citing *Becker v. Schwartz*, 46 N.Y.2d 401, 411 (N.Y. 1978)) (citation omitted).

38. 498 N.Y.S.2d 703 (N.Y. Sup. Ct. 1986).

39. *Id.* at 705.

40. *Id.* at 706.

41. 286 Cal. Rptr. 85 (Cal. Ct. App. 1991).

42. *Id.* at 104 (citation omitted).

In *Hegybes*, the plaintiff's mother was injured in a car accident two years prior to conception.⁴³ Directly following the accident, the mother was fitted with a lumbo-peritoneal shunt,⁴⁴ which eventually caused the plaintiff's premature birth and resulted in various personal injuries.⁴⁵ The court held that the defendant owed no legal duty to the subsequently conceived child, as the defendant's conduct of driving negligently "was not 'likely to result' in plaintiff's conception or birth, let alone her alleged injuries nearly three years after the car accident."⁴⁶ Although unrelated to any type of exposure or genetic damage, *Hegybes* remains a seminal preconception tort case, as it underlines the reluctance of courts to impose an unforeseeable duty or limitless liability on a preconception tortfeasor.⁴⁷

Policy rationale, although much different in nature, was yet again the demise of a preconception tort in *Peters v. Texas Instruments Inc.*,⁴⁸ where the plaintiff alleged that his father's exposure to toxic substances at work caused him to be born with several birth defects, including partial blindness.⁴⁹ Distinct from the policy rationale of *Albala*, the court acknowledged that Texas precedent established that it was the role of the legislature, rather than the judiciary, to recognize such complex actions.⁵⁰ In support of this, the court cited a prior Texas case which pointed to the necessity of research and analysis of scientific and medical data, and the development of specific laws to address the findings—a procedure unique to the legislature.⁵¹

43. *Id.* at 86.

44. *Id.* A lumbar-peritoneal shunt is a tube inserted between two vertebrae in the lumbar portion of the spine to redirect excess fluid. *Spinal Shunt*, BEAUMONT, www.beaumont.edu/neuroscience/neurological-treatments-services/spinal-shunt (last visited Nov. 7, 2016).

45. *Hegybes*, 286 Cal. Rptr. at 86.

46. *Id.* at 101.

47. *See, e.g.*, *Whitlock v. Pepsi Americas*, 681 F. Supp. 2d 1123, 1126–27 (N.D. Cal. 2010) (holding that "to date no California courts have found a duty to a preconception plaintiff for torts unrelated to the reproduction context. *Hegybes* has been the law in California for 19 years.").

48. C.A. No. 10C-06-043 JRJ, 2011 WL 4686518 (Del. Super. Ct. Sept. 30, 2011).

49. *Id.* at *1.

50. *Id.* at *7.

To the extent a workable standard of care could be developed or the scope of conduct to which the standard is applied could be limited, it would only be through extensive research and analysis of scientific and medical data, an evaluation of broad matters of public policy, and the development of specific laws to address the concerns and needs of the citizenry. *These matters are uniquely within the realm of the legislature, not the judiciary. It is the legislature's role to reflect the values of its constituents in its creation of laws.*

Id. (quoting *Chenault v. Huie*, 989 S.W.2d 474, 478 (Tex. App. 1999) (emphasis in original)).

51. *Id.* at *6–7 (citing *Chenault*, 989 S.W.2d at 477-78).

2. *Narrowly Construing Special Relationships to Limit Duty to the Unconceived*

When deciding whether to impose a duty, courts have regularly looked to the relationship between the alleged tortfeasor and the plaintiff.⁵² Many successful plaintiffs have relied on special relationships⁵³ to convince courts to recognize a duty to the unconceived.⁵⁴ However, courts continue to emphasize the narrow applicability of such relationships.⁵⁵ Thus, because most, if not all, hazardous exposure cases fall outside the scope of any special relationship, the inability to establish foreseeability continues to be the demise of such actions.⁵⁶

In *Rodriguez v. Intel Corp.*,⁵⁷ a Delaware state court rejected the plaintiff's attempt to establish a special relationship and declined to impose a duty on the defendant.⁵⁸ In *Rodriguez*, the plaintiff alleged that her father's preconception exposure to reproductively harmful chemicals while working at the defendants' factories caused severe birth defects.⁵⁹ Although the relationship between the father and the defendants may have been sufficient to impose a duty, the court held that a preconception duty would not be recognized because the plaintiff did not demonstrate a special relationship between the defendants and the plaintiff child.⁶⁰

Similarly, the California Court of Appeals has narrowly construed special relationships, holding that an employer/employee relationship does not establish a duty to the employee's unconceived children.⁶¹ In *Elsheref*, the plaintiff alleged that his father's preconception exposure to toxic chemicals, while working at the defendant's factory, caused multiple birth defects.⁶² Concluding that the workplace relationship was not sufficient to establish a special relationship, not only did the court hold that the defendant did not have a duty to protect the plaintiff, but the court also held that the defendant did not have a duty to warn the plaintiff's father that certain chemicals may pose a danger to

52. See, e.g., *Rodriguez v. Intel Corp.*, C.A. No. N11C-08-029 JRJ, 2014 WL 605472, at *7 (Del. Super. Ct. Jan. 28, 2014) (holding that a preconception duty to the plaintiff could not be imposed absent the existence of a special relationship).

53. For example, a relationship like "physician-patient" constitutes a special relationship. *Hegyes v. Unjian Enterprises, Inc.*, 286 Cal. Rptr. 85, 87 (Cal. Ct. App. 1991).

54. See *id.* at 90, 93, 94-95 ("[C]ase law imposes liability only when there is a 'special relationship' between the defendant and the mother giving rise to a duty to the minor plaintiff. The defendant's conduct in those cases is inextricably related to the inevitable future pregnancy, a key element missing from the present facts.") (emphasis in original).

55. See *supra* note 15 and accompanying text.

56. See, e.g., *Rodriguez*, 2014 WL 605472, at *6-8.

57. C.A. No. N11C-08-029 JRJ, 2014 WL 605472 (Del. Super. Ct. Jan. 28, 2014).

58. *Id.* at *1, *7.

59. *Id.* at *1.

60. *Id.* at *7.

61. See *Elsheref v. Applied Materials, Inc.*, 167 Cal. Rptr. 3d 257, 265 (Cal. Ct. App. 2014).

62. See *id.* at 260.

his unborn children.⁶³ By refusing to impose a duty to warn, *Elsheref* moved a step further than most courts, thereby exemplifying the reluctance of courts to impose any sort of preconception duty.⁶⁴

C. Establishing Causation Without Actually Establishing Causation

One would think that advances in science and technology may afford courts the ability to more easily recognize preconception torts, but this is often not the case.⁶⁵ However, the need to properly compensate victims and deter wrongful conduct may begin to push courts to think differently.⁶⁶ Regardless, plaintiffs face an upward battle in convincing a court that a single substance or action is responsible for an injury, given that humans are exposed to a variety of chemicals and substances on a daily basis.⁶⁷ Plaintiffs must not only demonstrate that a substance or product is able to cause an injury, but also that the resulting harm is directly attributable to that substance or product—what are commonly referred to as general and specific causation, respectively.⁶⁸

1. General Causation

a. Epidemiological Causation

The use of epidemiological evidence is the most common way to prove general causation.⁶⁹ Epidemiological evidence establishes cause and effect by

63. *See id.* at 265.

64. *Compare id.* (refusing to impose a duty to warn), with *supra* notes 33–51 and accompanying text (courts refusing to impose a duty of care, but not reaching the question of duty to warn).

65. *See* Allison Hite, *Who's to Blame?: How Genetic Information Will Lead to More Accurate Decisions in Toxic Tort Litigation*, 63 S.C. L. REV. 1031, 1031 (2012) (“In the absence of the exacting science that courts crave, decisions in toxic tort cases are often based on mere inferences.”) (emphasis omitted).

66. *See* Steefel, *supra* note 25, at 625 (noting that “[t]he birth of children with debilitating physical injuries imposes undesirable costs on society” and “to the extent that the tort law is compensatory, it is irrelevant whether the plaintiff exists when the tortious conduct initially occurs.”).

67. *See* Danielle Conway-Jones, *Factual Causation in Toxic Tort Litigation: A Philosophical View of Proof and Certainty in Uncertain Disciplines*, 35 U. RICH. L. REV. 875, 881–82 (2002) (“Because a toxic exposure plaintiff may have encountered various background risks, proving that the specific toxin caused her injury strongly militates against a finding of factual causation in today’s legal climate.”).

68. Albert C. Lin, *Beyond Tort: Compensating Victims of Environmental Toxic Injury*, 78 S. CAL. L. REV. 1439, 1447–51 (2005).

69. *See* *Norris v. Baxter Healthcare Corp.*, 397 F.3d 878, 882 (10th Cir. 2005) (“We agree with the district court that epidemiology is the best evidence of general causation in a toxic tort case.”); *Hall v. Baxter Healthcare Corp.*, 947 F. Supp. 1387, 1403 (D. Or. 1996) (“The existence or nonexistence of relevant epidemiology can be a significant factor in proving general causation in toxic tort cases.”); Neal C. Stout, *Judging the Reliability of Expert Causation Opinions Based on Epidemiology Data After King v. Burlington Northern Santa Fe Railway Company: Is the Judge a Gatekeeper or a Matador?*, 43 CREIGHTON L. REV. 1049, 1052 (2010) (“Epidemiology is a

“comparing the incidence of disease across exposed and unexposed populations, or comparing the incidence of exposure across sick and healthy populations.”⁷⁰ Therefore, epidemiological evidence does not establish that an injury directly resulted from exposure, but merely that it *could* have resulted from such exposure.⁷¹ Although plaintiffs cannot rely solely upon epidemiological evidence to establish causation, courts have noted the important role the evidence plays in demonstrating a plausible link between exposure and injury.⁷² Absent the ability to show anything more than a mere probability, plaintiffs must provide scientific evidence that gives courts the opportunity to reach a concrete conclusion.⁷³

b. Temporal Causation

If unable to rely on a scientific connection, plaintiffs may attempt to prove general causation by showing a temporal relationship between exposure and injury.⁷⁴ Under *Daubert*, most courts do not consider a temporal connection alone to be sufficient proof of causation.⁷⁵ However, “[a] temporal, or chronological, relationship must exist for causation to exist.”⁷⁶ For plaintiffs alleging injury stemming from preconception exposure, temporal evidence has

branch of science focusing on the question of general causation, that is, whether a substance is capable of causing a particular disease.”).

70. Steve Gold, *Causation in Toxic Torts: Burdens of Proof, Standards of Persuasion, and Statistical Evidence*, 96 YALE L.J. 376, 379–80 (1986).

71. Michael Green et al., *Reference Guide on Epidemiology*, in REFERENCE MANUAL ON SCIENTIFIC EVIDENCE 608–09 (3d ed. 2011) (noting that specific causation is beyond epidemiology and that “epidemiologists investigate whether an agent can cause a disease, not whether an agent did cause a specific plaintiff’s disease”).

72. See, e.g., *In re “Agent Orange” Prod. Liab. Litig.*, 611 F. Supp. 1223, 1239–40 (E.D.N.Y. 1985), *aff’d sub nom. In re “Agent Orange” Prod. Liab. Litig.* MDL No. 381, 818 F.2d 187 (2d Cir. 1987) (“In a mass tort case such as Agent Orange, epidemiologic studies on causation assume a role of critical importance . . . [and] [c]ommentators have approved the growing judicial reliance on such scientific evidence.”).

73. Gold, *supra* note 70, at 379–80 (“[I]n an individual case, epidemiology cannot conclusively prove causation; at best, it can establish only a certain probability that a randomly selected case of disease was one that would not have occurred absent exposure, or the ‘relative risk’ of the exposed population.”).

74. Alani Golanski, *General Causation at A Crossroads in Toxic Tort Cases*, 108 PENN ST. L. REV. 479, 508 (2003).

75. See *Moore v. Ashland Chem. Inc.*, 151 F.3d 269, 273 (5th Cir. 1998) (en banc). In *Daubert v. Merrell Dow Pharms., Inc.*, the Supreme Court developed a list of factors for admissibility of scientific expert testimony under Fed. Rule Evid. 702, articulating that courts are to consider 1) whether the scientific methodology can be tested; 2) whether the technique has been subject to peer review or publication; 3) whether there is a known or potential error rate; 4) the existence and maintenance of standards controlling the technique’s operation and 5) whether the methodology is generally accepted in the relevant scientific community. *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579, 592–94 (1993).

76. Green et al., *supra* note 71, at 601.

minimal utility, given the lengthy period between exposure and actual injury.⁷⁷ Still, temporal evidence provides a causal link between the initial exposure and the corresponding genetic damage regardless of how many years ago the event may have occurred.⁷⁸

For example, in *Moore v. Ashland Chem. Inc.*,⁷⁹ the plaintiff alleged that his exposure to a toxic chemical caused reactive airways dysfunction syndrome.⁸⁰ With just a few months separating the exposure and his diagnosis, the plaintiff attempted to use the temporal relationship as evidence of causation.⁸¹ The court rejected this reasoning, holding that, absent any scientific evidence, and “[i]n the absence of an established specific connection between exposure and illness . . . the temporal connection between exposure to chemicals and an onset of symptoms, standing alone, is entitled to little weight in determining causation.”⁸²

However, some courts have allowed such evidence to be introduced. For example, in *Westberry v. Gislaved Gummi AB*⁸³ the U.S. Court of Appeals for the Fourth Circuit allowed the plaintiff to introduce expert testimony relating the temporal proximity of exposure to the onset and worsening of sinus problems as evidence of causation.⁸⁴ The court reasoned that “depending on the circumstances, a temporal relationship between exposure to a substance and the onset of a disease or a worsening of symptoms can provide compelling evidence of causation.”⁸⁵

2. Specific Causation

Needing to show more than the capability of a substance to cause injury, plaintiffs have struggled to demonstrate a definite connection between exposure and injury.⁸⁶ Some courts have required plaintiffs prove that “a defendant’s conduct more than doubled the plaintiff’s risk of injury” in order to establish

77. *Id.* at 601–02.

78. *Id.* at 601.

79. 151 F.3d 269 (5th Cir. 1998).

80. *Id.* at 272.

81. *Id.* at 278 (citing *Cavallo v. Star Enter.*, 892 F. Supp. 756, 772–73 (E.D. Va. 1995)) (“The proffered expert relied substantially on the temporal proximity between exposure and symptoms.”).

82. *Id.*

83. 178 F.3d 257 (4th Cir. 1999).

84. *Id.* at 265.

85. *Id.*

86. Golanski, *supra* note 74, at 487 (“Establishing specific causation under traditional standards would be ‘oppressively problematic’ in the toxic tort area because these cases typically involve long latency periods between exposure and illness, as well as disease types that may be associated with multiple causal factors. At the same time, the specific causation requirement usually endures in some form, and plaintiffs who establish a substance’s general harmful propensity may still fail to demonstrate that it probably caused their injury.”); Lin, *supra* note 68, at 1449–52; *see also* Joseph Sanders, *Apportionment and Proof in Toxic Injury Cases*, 10 KAN. J.L. & PUB. POL’Y 200, 202 (2000) (noting that “[s]pecific causation evidence seems to be the holy grail of toxic torts”).

causation beyond a preponderance of the evidence.⁸⁷ Although this requirement is essentially synonymous to extremely strong epidemiological evidence, without any mechanisms that provide absolute certainty, courts are forced to make a judgment call.⁸⁸ Thus, with respect to specific causation, epidemiological evidence can only show an extremely high probability that the relative risk of injury was doubled.⁸⁹ Without any absolute conclusiveness, defendants utilize experts to undermine the certainty of causation.⁹⁰

a. Toxicogenomics

With plaintiffs struggling to establish causation, toxicogenomics might provide the solution plaintiffs are seeking. An emerging scientific field, toxicogenomics analyzes the “impact of potentially toxic compounds on gene expression.”⁹¹ Although the admissibility of toxicological evidence is often more controversial than the admissibility of epidemiological evidence, such evidence can provide heightened levels of specificity.⁹² For example, toxicogenomics “permit[s] researchers to isolate the effects of exposure to a

87. Lin, *supra* note 68, at 1449–52 (emphasis omitted); Green et al., *supra* note 71, at 612 (“Courts . . . have permitted expert witnesses to testify to specific causation based on the logic of the effect of a doubling of the risk.”).

88. See generally Lin, *supra* note 68, at 1449–52 (discussing the different methods courts use to determine causation).

89. Margaret A. Berger, *Eliminating General Causation: Notes Towards a New Theory of Justice and Toxic Torts*, 97 COLUM. L. REV. 2117, 2126–28 (1997); David E. Bernstein, *Getting to Causation in Toxic Tort Cases*, 74 BROOK. L. REV. 51, 54 (2008) (“[T]he plaintiff must show that the exposure at issue did not simply slightly raise the hypothetical risk of injury, but in fact more than doubled the risk of the harm. Courts, borrowing scientific terminology, often refer to the doubling of the risk as a ‘relative risk’ of greater than two. In legal terms, this equates to ensuring that a preponderance of the evidence shows that the relevant exposure was the cause of his injury.”).

90. Berger, *supra* note 89, at 2129–29 (“In summary, the scientific evidence relied on to prove causation is subject to numerous kinds of uncertainty.”); see also Conway-Jones, *supra* note 67, at 884–85. A discussion by Conway-Jones about background risks is indicative of another way in which to inject uncertainty into causation:

One external problem is the existence of background risks that may cause a harm similar to the type of harm that could also be caused by exposure to a toxic substance. Scientific proof must isolate, or at the very least, account for background risks before plaintiffs can affirmatively state, with sufficient mathematical probability, that a toxic exposure is causally related to or associated with a disease or injury. The persistent reality is that populations in industrialized communities are exposed to multiple natural, as well as artificial, byproducts that may affect individuals as readily as any exposure to a toxic substance.

Id. at 884.

91. John C. Childs, *Toxicogenomics: New Chapter in Causation and Exposure in Toxic Tort Litigation*, 69 DEF. COUNS. J. 441, 441 (2002); see also Bernard D. Goldstein & Mary Sue Henifin, *Reference Guide on Toxicology*, in REFERENCE MANUAL ON SCIENTIFIC EVIDENCE 401, 403 (2d ed. 2011) (quoting CASARETT AND DOULL’S TOXICOLOGY: THE BASIC SCIENCE OF POISONS 13 (Curtis D. Klaassen ed., 5th ed. 1996) (“[Toxicogenomics] is ‘the study of the adverse effects of chemicals on living organisms.’”)).

92. Goldstein & Henifin, *supra* note 91, at 413–14.

single chemical or to known mixtures . . . offer[ing] unique information concerning dose-response relationships, mechanisms of action, specificity of response, and other information relevant to the assessment of causation.”⁹³ By analyzing how different environmental interactions impact gene expression, toxicogenomics can provide highly conclusive evidence of disease causation.⁹⁴

The most popular monitoring method is a DNA microarray, which provides “simultaneous monitoring of gene expression levels”⁹⁵ Scientists are able to identify sources of acquired disease, genetic mutations caused by exposure, and the degree to which certain toxins are responsible for the onset of disease.⁹⁶ The strength of this evidence faces the same challenges as epidemiological evidence because scientists have been unable to isolate other variables or discount individual susceptibility to disease.⁹⁷ However, it is certainly a stronger indicator of causation than the probabilistic epidemiological evidence and may provide the strongest path to relief for plaintiffs.⁹⁸

II. CIRCUMVENTING STRICT NOTIONS OF PRECONCEPTION TORT LIABILITY

While the decision of whether to recognize preconception tort liability appears clear cut on the surface, it is actually anything but clear.⁹⁹ A crucial factor to consider is the degree to which this type of liability is linked to century old, doctrinal tort concepts. The fear of disturbing the interpretation of such concepts weighs heavily on courts examining preconception tort actions.¹⁰⁰ However, the

93. *Id.* at 414.

94. Childs, *supra* note 91, at 441–42. Childs provides a concise overview of toxicogenomics, stating:

It is the study of the impact of potentially toxic compounds on gene expression. A gene “expresses itself” by acting on proteins and other body processes in very complex ways to affect how the body grows and develops. Toxicogenomics is the study of the alteration of those mechanisms that leads to conclusions about disease and disease processes.

Id.

95. *Id.* at 442.

96. *Id.* at 443.

97. *Id.* at 444 (“The task of clearly separately out and assigning causation to a discrete exposure is complicated by genetic variables affecting individual susceptibility. Every disease will have a genetic component to its causation.”).

98. *Id.*

“The value of toxicogenomics to toxic tort litigators is quite apparent. For plaintiffs who have insufficient scientific proof that a product was more likely than not to cause cancer, the ability to show that an exposure to the product resulted in a genetic polymorphism or gene sequence difference, which increased cancer susceptibility, could be outcome determinative.”

Id.

99. John G. Taylor, *Defendant Liability to Plaintiffs Neither Conceived Nor Born at the Time of Initial Exposure to A Toxic Substance or Drug*, 4 PROD. LIAB. L.J. 224, 232 (1993) (“The few jurisdictions which have had the opportunity to address the preconception tort issue have split as to whether a cause of action should be recognized.”).

100. *See, e.g.,* *Albala v. City of New York*, 429 N.E.2d 786, 787–88 (N.Y. 1981) (holding that the recognition of a preconception cause of action stemming from medical negligence would extend

fact that tort concepts are grounded in a mindset that never envisioned technological advances capable of both causing and identifying injury certainly perpetuates a rigid interpretation.¹⁰¹ For the most part, courts continue to balk at the opportunity to reconcile doctrinal tort concepts with modern preconception torts.¹⁰² To date, the courts that recognize preconception liability have done so with so many caveats that any sort of majority consensus has yet to be reached.¹⁰³ The threads of reasoning on both sides of the issue are explored below.

A. *The Great Flood of Litigation (Or Not)*

Courts are extremely reluctant to establish precedent that may allow for limitless liability.¹⁰⁴ These policy considerations are often at the forefront when preconception liability is limited.¹⁰⁵ No court wants to be the first to test the waters of recognizing a duty to the unconceived because doing so could impose a duty to an unknown and unpredictable population.¹⁰⁶ Implicit in the discussion

traditional tort concepts too far); *see also* Steve C. Gold, *When Certainty Dissolves into Probability: A Legal Vision of Toxic Causation for the Post-Genomic Era*, 70 WASH. & LEE L. REV. 237, 239 (2013) (Proof of toxic tort claims conforms poorly to the traditional deterministic legal model of but-for causation, because toxic injuries almost never involve an observable chain of physical events allowing easy inference of a causal relation between a particular defendant's conduct and a particular plaintiff's harm. Courts turn to science to replace causal intuition, but a disjunction remains between the probabilities that science can know and the determined result that the law wants proven.").

101. Gold, *supra* note 100, at 321–22.

102. *Id.* at 239.

103. *See, e.g.,* Hegyes v. Unjian Enterprises, Inc., 286 Cal. Rptr. 85, 90, 94, 101 (Cal. Ct. App. 1991) (recognizing that “[i]n a nonmedical preconception negligence case where there is no alleged ‘special relationship,’ it becomes more difficult to find a legal duty owed to the minor child and, hence, liability on the part of defendant”).

104. *Albala*, 429 N.E.2d at 788 (“Unlimited hypotheses accompanied by staggering implications are manifest. The perimeters of liability although a proper legislative concern, in cases such as these, cannot be judicially established in a reasonable and practical manner.”); *see also* Taylor, *supra* note 99, at 232 (contending that premising refusal to recognize preconception liability on being unable to limit liability “is unsatisfactory both in terms of legal policy and because it is unfounded”).

105. *See* Goldberg, *supra* note 12, at 270 (noting that “the divergence between courts in extending or restraining the boundaries of a particular duty rests on conflicting policy analyses, rather than any disagreements about whether a legal mandate compels a particular boundary”); *see also supra* note 9 and accompanying text.

106. Greenberg, *supra* note 3, at 341.

“The courts that bar all preconception actions, or severely limit the duty owed in preconception actions, have articulated the following concerns as justification for their actions: if courts open the door to recovery in any preconception action, a flood of litigation will ensue; if courts allow recovery to a child who was not conceived at the time of the negligent act, claims may be brought by successive future generations; if liability is imposed too far into the future, problems measuring insurance risks and the exorbitant costs of insurance may place an excessive burden on the defendant and society; and if recovery is allowed in medical malpractice actions, physicians may be faced with a conflict of interest between treating the mother or taking precautionary measures to protect a plaintiff who has not yet been conceived.”

of limitless liability stemming from the imposition of a preconception duty is the concept of multi-generational liability.¹⁰⁷ Because courts have been unable to devise a consistent, rational method by which to limit such liability and do not favor denying recovery simply because of the plaintiff's generation, often the only logical solution is to deny recovery for any preconception tort.¹⁰⁸

Professor Daniel Goldberg notes that the ability of courts to arbitrarily favor different policies when imposing duties heavily contributes to the schism between those recognizing and not recognizing preconception tort duties.¹⁰⁹ Thus, plaintiffs may simply be out of luck if faced with a judiciary that refuses to recognize a preconception action on the basis of policy considerations informed by foreseeability and duty.¹¹⁰

However, scholars have articulated strong points showing that such limitless liability is highly unlikely. First, as previously discussed, plaintiffs already face an uphill battle in simply establishing a liability because of the potential for multi-generational liability, which essentially operates a market force in limiting liability at the outset.¹¹¹ Second, because of the rare combination of events that give rise to preconception torts, litigation in this area has been minimal, indicating that a flood of litigation would not follow an expansion of preconception liability.¹¹² Although these seemingly inherent limitations to the preconception cause of action may prove to be viable, it is unlikely that courts that have repeatedly refused to expand preconception tort liability would be persuaded by this rationale.¹¹³ Therefore, plaintiffs must succinctly prove preconception actions with a level of specificity that would itself impose a limitation.

Id.

107. *Id.* at 345.

108. *See* *Catherwood v. American Sterilizer Co.*, 498 N.Y.S.2d 703, 705 (N.Y. Sup. Ct. 1986) (referencing the decision of *Albala* as being “purely one of policy” with both the majority and dissent noting that “the alleged injuries to the plaintiff therein were foreseeable, causally related and resulted in ascertainable damages”); *see also* Goldberg, *supra* note 12, at 271–72.

109. *Id.* at 270–71.

110. *See supra* note 9 and accompanying text.

111. *See* Goldberg, *supra* note 12, at 273.

112. Greenberg, *supra* note 3, at 342 (noting that in the twenty-four years prior to when her paper was written, appellate “courts have reported fewer than fifty preconception injury [tort] cases”); *see also* Goldberg, *supra* note 12, at 280 (“Simply banning preconception genetic torts by declaring that they are not viable claims is ill-advised. As nearly all courts specifically addressing the problem have noted explicitly or implicitly, preconception genetic torts pose novel and challenging issues.”).

113. *See, e.g.*, Greenberg, *supra* note 3, at 327–29. One such jurisdiction is New York, where the courts had the opportunity to impose preconception liability four times, but declined on the ground of limitless liability fears in three of the four cases. *Id.*

*B. Evidentiary Standards Preclude the Opportunity to Establish
Preconception Tort Liability*

Currently, establishing causation is one of the most significant barriers to a plaintiff's attempt to recover for a preconception tort. Courts have explicitly indicated this when rejecting preconception claims.¹¹⁴ The problem for many plaintiffs is not the fact that the physical causation is weak, but rather that the mode by which to present evidence of causation to the court is seemingly impossible.¹¹⁵ Some scholars have proposed that without changes in evidentiary standards, it may be impossible for plaintiffs to meet the requisite standard of causation.¹¹⁶ However, it is highly unlikely that courts will modify evidentiary standards simply because a small group of plaintiffs is struggling to meet the current evidentiary standards.

Advancements in genetics could provide plaintiffs with sufficient proof to establish causation in preconception actions.¹¹⁷ Currently, one of the most accurate methods is the use of biomarkers, which track toxins and the specific interactions with the body that lead to the development of a disease.¹¹⁸ Even if such evidence were permitted to be used in the courtroom, it would likely accompany scientific expert testimony.¹¹⁹ Due to the complexity of both the studies and the biomarker evidence, the generally accepted interpretation of *Daubert* could exclude the evidence if the court deems any of the methodology to be flawed.¹²⁰ Given the emerging nature of genetic evidence, modern evidentiary standards may again pose significant problems to plaintiffs.

*C. Timing is Everything: When the Harm Occurs and its Impact on
Preconception Torts*

What may seem to be rather unimportant has actually played a significant role in the analysis of preconception liability. Courts and scholars use the time at which an injury from a preconception tort occurs as a reason to advocate for and

114. See *Whitlock v. Pepsi Americas*, 681 F. Supp. 2d 1123, 1125–27 (N.D. Cal. 2010) (holding that absent the ability of DNA to attribute an injury directly to the alleged tortfeasor, causation is not strong enough to make an injury foreseeable).

115. Gold, *supra* note 70, at 379–80 (“The basic impossibility of proving individual causation distinguishes toxic tort cases from ordinary personal injury suits. Cancers and mutations provide no physical evidence of the inducing agent, so direct observation of individual plaintiffs provides little or no evidence of causation in many instances.”); see also Charles L. Moore, Comment, *Radiation and Preconception Injuries: Some Interesting Problems in Tort Law*, 28 SW L.J. 414, 423–24 (1974).

116. See Goldberg, *supra* note 12, at 274–75.

117. See Gary E. Marchant, *Genetic Data in Toxic Tort Litigation*, 14 J.L. & POL’Y 7, 7–8 (2006).

118. Goldberg, *supra* note 12, at 280–81.

119. Gary E. Marchant, *Genetic Susceptibility and Biomarkers in Toxic Injury Litigation*, 41 JURIMETRICS 67, 86–87 (2000).

120. See *In re Paoli R.R. Yard PCB Litig.*, 35 F.3d 717, 746 (3d Cir. 1994) (establishing the high level of accuracy courts demand for expert scientific testimony to be admitted).

against preconception tort liability.¹²¹ Two seminal cases, *Jorgenson* and *Catherwood*, limited liability because the injury occurred after conception.¹²² Some have suggested that this is merely a pleading problem that can be solved by pleading with a greater degree of specificity.¹²³ However, as technology advances and the reliance on genetic evidence increases, more accurate pleadings may not solve the problem.¹²⁴ If plaintiffs allege an injury to progeny from a genetic mutation—the alteration of the chromosome had to have occurred prior to conception—thus eliminating recovery in courts that do not recognize preconception injury, but only injury to a viable fetus.¹²⁵

D. Twenty-First Century Challenges to Traditional Tort Concepts

Free from the restraint of archaic legal concepts, groundbreaking scientific and medical studies have reached conclusions many courts refuse to consider as remotely possible.¹²⁶ More specifically, these studies concerning the interaction between the environment and human genes have expounded on mutations by genetic and epigenetic mechanisms.¹²⁷

For example, environmental toxicants, known as endocrine disruptors, “can induce transgenerational disease states or abnormalities”¹²⁸ One particular study specifically demonstrated that vinclozolin, a fungicide used in vineyards,

121. *Compare* *Renslow v. Mennonite Hosp.*, 367 N.E.2d 1250, 1255 (Ill. 1977) (“This court has long recognized that a duty may exist to one foreseeably harmed though he be unknown and remote in time and place.”), *with* *Goldberg*, *supra* note 12, at 269–70:

Whether or not chromosomal damage is seen as an actionable injury has many implications for the viability of claims such as increased risk of cancer. Perhaps much of this may turn upon the pleadings themselves. If the plaintiff in *Catherwood* had pled that the exposure occurred before conception and the injuries occurred subsequent to conception, as did the plaintiffs in *Jorgensen*, perhaps the New York court would have decided differently.

122. *See* *Jorgenson v. Meade Johnson Labs., Inc.*, 483 F.2d 237, 239–40 (10th Cir. 1973) (noting that actionable preconception torts are limited only to injuries occurring after conception); *see also* *Catherwood v. American Sterilizer Co.*, 498 N.Y.S.2d 703, 706 (N.Y. Sup. Ct. 1986) (denying a preconception tort action on the basis that the injury occurred prior to conception).

123. *See* *Goldberg*, *supra* note 12, at 269.

124. *See id.* at 269–70 (speculating as to whether more accurate pleadings would have changed the court’s decision in the *Catherwood* case).

125. *Id.* at 269.

126. *See e.g.*, Liborio Stuppia et al., *Epigenetics and Male Reproduction: The Consequences of Paternal Lifestyle on Fertility, Embryo Development, and Children Lifetime Health*, 5 CLINICAL EPIGENETICS 120, 121 (2015).

127. *Id.* at 121. Genetic mutation refers to a change in the actual DNA sequence, while epigenetic mutation refers to change in gene activity and expression that occurs absent DNA alteration. *Id.*; *Epigenetic Modifications Regulate Gene Expression*, QIAGEN (2008), <http://www.sabiosciences.com/pathwaymagazine/pathways8/epigenetic-modifications-regulate-gene-expression.php>.

128. Matthew D. Anway et al., *Endocrine Disrupter Vinclozolin Induced Epigenetic Transgenerational Adult-Onset Disease*, ENDOCRINOLOGY, 5515 (Sept. 14, 2006), <http://press.endocrine.org/doi/pdf/10.1210/en.2006-0640>.

can cause the development of certain cancers and kidney disease in future offspring via an epigenetic mechanism.¹²⁹

Conversely, as described in a recent scholarly article on epigenetics and the male reproductive system, many studies have focused on actual genetic mutation.¹³⁰ Although these studies produce results that may not hold up as evidence in a court of law,¹³¹ they are indicative of the direction in which medical and scientific research is headed.

While the results of these studies merely scrape the tip of the iceberg, it will only be a matter of time before courts are forced to deal with the implications of these studies on preconception torts. Thus, how courts in the past have reconciled scientific advances with legal concepts can provide guidance for courts faced with the challenge of reconciling tort concepts with the potential implications of scientific advances.

1. DNA Evidence in Criminal Cases

Although the studies examined above have yet to produce results that would likely be admissible in court, they are headed in the right direction.¹³² The introduction of genetic evidence to preconception tort actions will likely take a vacillating path to acceptance, similar to what occurred when DNA was first introduced as evidence in criminal cases.¹³³ After an initial period of firm acceptance, “details of the laboratory procedures were questioned, and limitations were identified in the statistical and population-genetics models used in estimating the frequencies of the DNA types.”¹³⁴

As a result of these attacks, scientists and laboratories were forced to improve laboratory standards and perform additional research that would likely not be required within the scientific field.¹³⁵ However, as with all advances, at some point lines must be drawn, which “requires an appreciation and understanding of the law . . . , the costs and benefits of the techniques, and the political and

129. *Id.*

130. Stuppia et al., *supra* note 126, at 128. The authors provide the following overview of studies identifying genetic mutations as a result of substance exposure:

Several studies [have] previously demonstrated the presence of a strong association between paternal occupational exposures to chemicals and harmful health outcomes in the offspring. Feychting et al. demonstrated an increased risk of nervous system tumors related to paternal occupational exposure to pesticides and of leukemia related to woodwork by fathers. Reid et al. evidenced the presence of high exposure to exhausts by paternal grandmothers of children with acute lymphoblastic leukemia.

Id.

131. Goldberg, *supra* note 12, at 265.

132. Stuppia, et al., *supra* note 126, at 130–31.

133. See David H. Kaye, *The Science of DNA Identification: From the Laboratory to the Courtroom (and Beyond)*, 8 MINN. J.L. SCI. & TECH. 409, 410–18 (2007).

134. *Id.* at 413–14.

135. See *id.* at 416–17.

ethical principles that foster a free society of autonomous individuals.”¹³⁶ With this in mind, experts and scientists working on studies with potential applicability in the realm of preconception torts should not be discouraged by judicial resistance, but should instead be encouraged, as evidenced by the acceptance of DNA evidence in criminal cases.

III. A SYNTHESIS AND SLIDING-SCALE: THE PRESENTATION OF PRECONCEPTION TORTS BY PLAINTIFFS WILL FORCE THE COURTS TO COMMONLY RECOGNIZE PRECONCEPTION LIABILITY

The judiciary is not solely responsible for defining and recognizing preconception tort liabilities stemming from exposure to harmful substances. Plaintiffs and outside actors must also be proactive in pushing courts to recognize such actions.¹³⁷ This cannot be done by focusing on one aspect of the law, but rather requires a consideration of a range of issues—common tort concepts, evidentiary standards, and emerging scientific advances. If courts are actively confronted with a thorough synthesis of the aforementioned factors that directly address the misgivings in recognizing preconception liability, courts will be forced to consider ways in which doctrinal tort concepts can be reconciled with modern advances in science and medicine.¹³⁸

A. Causation and Duty Operate on a Sliding Scale

The two most important components of preconception torts, duty and causation, should not be isolated from each other, but rather should operate on a sliding scale. The isolation of causation and duty from each other strongly contributes to the refusal of courts to uphold preconception liability.¹³⁹ However, when not viewed in isolation, plaintiffs armed with causation comparable to what was present in *Hegyves* would have a viable opportunity to recover.¹⁴⁰ Instead of precluding liability solely because the injury to a later-conceived child is arbitrarily deemed unforeseeable, as it may open the door to limitless liability, courts need to seriously consider the facts in their entirety, which alone may limit the holding.¹⁴¹

136. *Id.* at 427.

137. Marchant, *supra* note 117, at 9–10, 25–26, 36; Gary E. Marchant, *Genetic Data in Toxic Tort Litigation*, 45-WTR BRIEF 22 (2016).

138. Marchant, *supra* note 117, at 9–10, 23, 25–26, 36.

139. See, e.g., *Hegyves v. Unjian Enterprises, Inc.*, 286 Cal. Rptr. 85, 101-02 (Cal. Ct. App. 1991) (refusing to recognize preconception liability where the defendant’s negligent driving clearly caused an injury to the reproductive system of the mother because no duty could exist to a child conceived three years later).

140. See Goldberg, *supra* note 12, at 269–71.

141. See *id.* at 285 (stating that “[t]here is little reason, neither for ‘pure’ legal considerations, nor for policy concerns, to prevent any preconception genetic tort claim from being brought before a trier of fact”).

1. *Using Facts to Limit Liability for the Courts*

In order for courts to alter the status quo in situations involving innovative or groundbreaking concepts that may have serious repercussions throughout the legal field, plaintiffs must provide them with a valid rationale to do so.¹⁴² One way to do this, particularly when dealing with complex, scientific material, is to emphasize the uniqueness of a preconception tort claim.¹⁴³ With fewer than fifty preconception cases reaching appellate courts in the past twenty-four years, the tort is already a rarity.¹⁴⁴

The obscure facts that accompany many preconception tort actions make it difficult for plaintiffs to piece together a viable theory of liability at the outset.¹⁴⁵ For example, in *Hegyegs*, following a car accident, the mother was fitted with a shunt that directly harmed her reproductive system and eventually caused an injury to her child.¹⁴⁶ Imposing a duty on the negligent driver in this type of situation would not impose limitless liability for the preconceived child in all car accidents.¹⁴⁷ If a mother were to injure her arm in a car accident, one would not assert that the driver is liable for any injuries a later-conceived child suffers. Therefore, the strength of causation and uniqueness of the incident enables courts to limit liability in an exacting way, thus reducing the fear of limitless liability.

2. *Modern Scientific Advances Provide the Key to Establishing Preconception Causation*

With groundbreaking advancements in science and technology, plaintiffs can significantly strengthen causation arguments in preconception tort actions. Although plaintiffs still must prove general and specific causation, a combination of different types of evidence can make doing so much easier.¹⁴⁸ Courts generally accept epidemiological evidence and find it sufficient to

142. See Steven L. Winter, *The Next Century of Legal Thought?*, 22 CARDOZO L. REV. 747, 749 (2001) (contending that “the challenge of the lawyer’s craft is to devise ex ante (i.e., with predictability) a position that will prevail ex post. To do this, a lawyer must construct an argument or draft a document that will convince some subsequent set of legal decision makers to take the desired action”).

143. Taylor, *supra* note 99, at 232 (noting that only a “few jurisdictions . . . have had the opportunity to address the preconception tort issue”).

144. Greenberg, *supra* note 3, at 342.

145. Taylor, *supra* note 99, at 232 (“The plaintiff will face a substantial burden of demonstrating foreseeability, duty and causation, and this burden will grow more onerous the further removed the plaintiff is in place and time from the tortious act.”).

146. *Hegyegs v. Unjian Enterprises, Inc.*, 286 Cal. Rptr. 85, 86–87 (Cal. Ct. App. 1991).

147. *Cf. id.* at 116 (Johnson, J., dissenting) (arguing that “[a]ny extra burden placed on drivers by making them responsible to postconceived children-and it seems unlikely to be a significant burden-would only serve to increase the degree of care drivers must exercise”).

148. Lin, *supra* note 68, at 1446–51.

establish general causation.¹⁴⁹ On the contrary, courts generally do not accept temporal evidence, which uses the timing of exposure and injury to establish causation.¹⁵⁰ However, a combination of epidemiological and temporal evidence can provide plaintiffs with an evidentiary foundation upon which to establish causation.¹⁵¹ Essentially, if the epidemiological evidence is strong enough to indicate that exposure to a substance significantly increases the likelihood of a certain injury, the temporal evidence can provide a way by which to discount the possibility that something else contributed to the injury.¹⁵² Although this combination of evidence cannot function as a means by which to show specific causation, it lessens the emphasis placed on specific causation.

In addition to strengthening epidemiological evidence, temporal evidence also provides the requisite link between general and specific causation. One of the emerging methods of establishing specific causation, DNA microarrays monitor genetic expressions when exposed to different environmental stimulants.¹⁵³ Thus, if used properly, DNA microarrays can establish specific causation. However, one weakness in this method is its inability to isolate the interaction to a single stimulant, with one hundred percent certainty.¹⁵⁴ Again, this is where temporal evidence can supplement the plaintiff's inability to completely isolate genetic expression. Therefore, if a plaintiff can use a DNA microarray to establish a genetic alteration and temporal evidence to narrow the causation to a specific time, then the plaintiff may effectively satisfy the requirements of general and specific causation.¹⁵⁵

3. Establishing Liability Through Narrow Relationships and Foreseeable Consequences

Alternatively, when causation is not as clear as it was in *Hegyves*, an imposition of a stringent duty can aid courts in recognizing preconception tort liability.¹⁵⁶ This type of stringent duty is most commonly seen in relation to a woman's

149. See *In re "Agent Orange" Prod. Liab. Litig.*, 611 F. Supp. 1223, 1239–41 (E.D.N.Y. 1985), *aff'd sub nom, In re "Agent Orange" Prod. Liab. Litig.* MDL No. 381, 818 F.2d 187 (2d Cir. 1987) (citing numerous cases in which epidemiological evidence was heavily relied upon); see also Gold, *supra* note 70, at 379–80 (noting that parties must rely on the relative risks of exposure to toxic substances established by epidemiological evidence because of the difficulty of proving individual causation in toxic tort claims).

150. See, e.g., *Young v. Burton*, 567 F. Supp. 2d 121, 128 (D.D.C. 2008) (noting that temporal evidence "is generally insufficient to establish causation").

151. See *id.* at 128–29.

152. See *id.*

153. Childs, *supra* note 91, at 441–42.

154. *Id.* at 444.

155. See *Young*, 567 F. Supp. 2d at 127–28; see also Childs, *supra* note 91, at 442–44.

156. See *Hegyves v. Unjian Enterprises, Inc.*, 286 Cal. Rptr. 85, 90 (Cal. Ct. App. 1991) ("In a preconception tort case, as in any negligence case, there is an overwhelming need to keep liability within reasonable bounds and to limit the areas of actionable causation by applying the concept of duty.").

reproductive system.¹⁵⁷ For example, California recognizes a duty to the unconceived only when the defendant's conduct involves services or products relating to the reproductive system.¹⁵⁸ A major factor implicit in this line of reasoning is foreseeability because "[a]ny action that would foreseeably harm a woman's reproductive system and her ability to carry a child to term would presumably also foreseeably harm a child she conceives in the future."¹⁵⁹ Therefore, advances in technology can establish that an injury resulting in genetic damage to a parent could foreseeably result in an injury suffered by his or her progeny.¹⁶⁰ This essentially mirrors limiting preconception liability to circumstances concerning a woman's reproductive system.¹⁶¹ By emphasizing the foreseeability of tortious actions prior to conception, causation can be implicitly established, which will reduce the scrutiny of causation.

B. The Possibility of Legislative Action In Recognizing Preconception Tort Liability

What may seem like a viable option, very few courts have considered the role of the legislature in adjudicating preconception tort actions. Within the sparse judicial and academic commentary on this issue, a few common threads of reasoning are persistent. First, if courts are worried about unlimited liability, it is the job of the legislature to draw proper lines.¹⁶² While this may be true, there is a strong argument that common tort concepts may actually draw that line themselves: "[w]ith each successive generation, the burden on the plaintiff of proving causation and foreseeability grows more and more difficult."¹⁶³ However, if courts remain wary of opening the floodgates of litigation even in the face of this logic, the legislature's ability to limit liability affords the courts no excuse to refrain from imposing a duty to the unconceived child.¹⁶⁴

Moving a step further, *Peters v. Texas Instruments Inc.*¹⁶⁵ examined the role of the legislature in imposing a preconception tort duty.¹⁶⁶ Highlighting the inherent complexities of preconception tort actions, the court held that the

157. See *id.* at 86–97, 89–90.

158. See, e.g., *id.* at 89–90 (noting that a duty to the unconceived in California exists only when a defendant's conduct involves providing medical services or products relating to the reproductive process).

159. Greenberg, *supra* note 3, at 355.

160. See *Young*, 567 F. Supp. 2d at 127–28; Childs, *supra* note 91, at 442–44; Greenberg, *supra* note 3, at 354–56.

161. See Greenberg, *supra* note 3, at 354–56.

162. See Taylor, *supra* note 99, at 231–32 (“If, for public policy reasons, the state legislatures decide that a line must be drawn, then it is the duty of the legislatures, not the courts, to draw the line.”).

163. *Id.* at 232.

164. *Id.* at 229–30, 232.

165. C.A. No. 10C–06–043 JRJ, 2011 WL 4686518, at *6–7 (Del. Super. Ct. Sept. 30, 2011).

166. *Id.*

legislature is better suited to define preconception liability.¹⁶⁷ Although this assertion may be true, it seems that the legislature's role in formulating a duty may be misplaced, as courts are regularly relied upon to interpret and analyze scientific information post-*Daubert*.

IV. CONCLUSION

Currently, courts are being forced to weigh a multitude of factors in evaluating whether to impose preconception liability, such as foreseeability, special relationships, causation, and policy implications.¹⁶⁸ While courts commonly balance these factors when deciding whether to impose general tort liability, the complexity and scope of preconception liability poses a substantial challenge. It follows, that with advances in medicine, science and technology, the causal effects of certain actions or substances will become more definite, which will allow courts to impose liability without overextending duty to a limitless population.¹⁶⁹

In order to normalize the recognition of preconception tort liability, plaintiffs and outside actors must identify weaknesses in the judicial rationale that has denied recovery. Thus, a complete synthesis of scientifically-advanced evidence, causation, and duty can establish preconception tort liability. Implicit in this synthesis is the notion that causation and duty operate on a sliding scale, where a higher percentage of one requires less of the other. Ultimately, using the facts of a given situation, plaintiffs must identify the strength of their action, whether foreseeability or causation, and use that strength to give the judiciary no choice but to recognize preconception tort liability and begin to reconcile doctrinal tort concepts with scientific advances.

167. *Id.*

168. See e.g., *Lough v. Rolla Women's Clinic, Inc.* 866 S.W.2d 851, 854 (Mo. 1993) ("Foreseeability is the paramount factor in determining existence of a duty . . ."); *Hegyes v. Unjian Enterprises, Inc.*, 286 Cal. Rptr. 85, 90–91 (Cal. Ct. App. 1991) (discussing the role of special relationships and causation as underlying factors within preconception tort duty); *Goldberg*, *supra* note 12, at 270–71 ("If issues of proximate cause and duty turn on policy considerations, the logical question becomes what policy considerations have prompted the majority of courts to deny proximate cause and duty to plaintiffs in preconception genetic torts?").

169. *Marchant*, *supra* note 137, at 23 ("New genetic methods and data have the potential to fill these scientific uncertainties and data gaps in toxic tort litigation, thus making toxic tort litigation both more accurate and fair. At the same time, these same genetic data have the potential to make toxic tort litigation even more complex, contentious, and ethically problematic.").

