ESSAY

SELF-PROVING CAUSATION

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THE nature of causation has long challenged philosophers and legal theorists.[1] The courts in tort cases sometimes claim to deal in straightforward commonsense rather than philosophical theory. But saying that causation is straightforward or a matter of commonsense does not make it so. In this Essay, I want to explore a feature of the law of causation that has received little analysis. I have elsewhere called this "self-proving" causation and will use that term here to refer to the doctrine.[2]

This is a class of negligence cases in which there is no independent evidence of cause-in-fact. Rather, there is evidence resting on the fact that the defendant was (or allegedly was) negligent. If the owner of an apartment house fails to light its stairway, that negligence increases the risk that people will fall on the stairs, even if no individual person who falls can prove that, but for the absence of light, she would not have fallen. In cases such as this, the question is whether the very fact that the defendant was negligent is legally sufficient evidence of causation. If the evidence that the defendant was negligent supports an inference that, but-for this negligence, the plaintiff would not have suffered harm, then the evidence is legally sufficient—the plaintiff has made out a prima facie case on cause-in-fact and there is a question of fact as to this issue.

At first glance, it may seem peculiar to base an inference of causation on evidence of negligence. Any negligence case consists of four differ-

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[1] See generally H.L.A. Hart & Tony Honoré, Causation in the Law (2d ed. 1985); Wex S. Malone, Ruminations on Cause-in-Fact, 9 Stan. L. Rev. 60 (1956); David W. Robertson, The Common Sense of Cause in Fact, 75 Tex. L. Rev. 1765 (1997); Richard W. Wright, Causation in Tort Law, 73 Calif. L. Rev. 1735 (1985).

[2] Kenneth S. Abraham, The Forms and Functions of Tort Law 119 (4th ed. 2012). To the best of my knowledge, no other term has been used to identify or describe this doctrine.

ent elements—duty, breach of duty, damages, and a causal connection between breach of duty and damages. Treating proof of one element of a negligence case (breach of duty) as if it were proof of another distinct and separate element (causation) appears to be some sort of category mistake.[3] In fact, however, evidence of negligence is always at least some evidence of causation. Negligence is conduct that unreasonably increases the risk of causing harm. Any conduct that is negligent has increased the probability that harm will occur, or the conduct would not be negligent. Evidence of negligence is therefore necessarily evidence that a negligent party's conduct has increased the probability of causing harm.

In most cases, however, evidence of negligence cannot serve as the basis, and certainly not as the sole basis, of an inference that this negligence caused the harm for which the plaintiff seeks damages. The fact that a driver was exceeding the speed limit by ten miles per hour when he collided with another vehicle ordinarily is not legally sufficient evidence that speeding caused the collision. So the question is: What distinguishes self-proving causation from other proof of causation? In Part I, I will argue that cases of self-proving causation are distinctive, but not as distinctive as they appear to be. Self-proving causation involves a particular form of circumstantial evidence. But examining the nature of self-proving causation leads to a more general insight: All evidence of causation ultimately is circumstantial evidence. As part of this analysis, I place self-proving causation in the context of a more general "reference-class" problem that afflicts much legal decisionmaking. The reference class problem arises because the level of generality or specificity at which an issue is classified—the reference class that defines the issue—often predetermines resolution of the issue. That is certainly true in self-proving causation cases. Yet in many instances we have only intuition, rather than established legal standards, to use in evaluating the validity of classifications of this sort.

I then turn in Part II to what has become in a short time the most salient and provocative self-proving causation case ever decided, *Zuchowicz v. United States*.[4] In an opinion by Judge Calabresi, the court held that, because overdoses of prescription drugs often increase the risk of harm,

[3] By a category mistake, I mean presenting things of one kind as if they were another kind. For a more technical discussion, see 2 The Encyclopedia of Philosophy 47–48 (Paul Edwards ed., reprint 1972).

[4] 140 F.3d 381 (2d Cir. 1998).

the plaintiff had introduced legally sufficient evidence of causation by proving that the defendant had negligently provided the plaintiff an excessive dose of a particular drug. This was the holding even though the drug in question had never been known to cause the disease that the plaintiff contracted. My impression, admittedly informal, is that many torts scholars are skeptical of the decision in *Zuchowicz*. They wonder, as I do, whether there actually was a basis for the court's holding that the plaintiff had introduced legally sufficient evidence of causation. I therefore attempt to peel off the layers of Judge Calabresi's opinion in that case by identifying the key steps in the reasoning that lead to its conclusion.

Finally, in Part III, I explore the precedential significance of *Zuchowicz* and its application in some subsequent cases.[5] I then consider what this analysis can tell us about the requirements for application of self-proving causation generally. I suggest that, beyond the strength of the circumstantial evidence itself, three considerations are especially relevant: the impossibility under the circumstances of proving but-for causation by conventional means; the absence of a meaningful alternative causal candidate other than the defendant's negligence; and the defendant's failure to refute the plaintiff's choice of reference class as a matter of law.

Self-proving causation is merely one doctrine within the law of causation, but examining it can deepen our understanding of important questions about the larger subject of causation in torts. Why is proof of cause-in-fact a prerequisite to the imposition of liability for negligence? When are we justified in inferring causal responsibility on the basis of knowledge that we think we have about the world that is difficult or impossible to confirm? If we are faced with causal uncertainty, when should plaintiffs be left without recovery and when should defendants bear the risk that this uncertainty cannot be resolved? Uncovering the issues posed by self-proving causation cannot answer these questions, but it can help us better understand both the questions and what is at stake in answering them.

[5] See, e.g., Williams v. KFC Nat'l Mgmt. Co., 391 F.3d 411, 422–32 (2d Cir. 2004) (Calabresi, J., concurring).

I. THE NATURE OF CAUSE-IN-FACT AND THE DISTINCTIVENESS OF SELF-PROVING CAUSATION

Suppose that you fall on negligently unlighted stairs, or are negligently given an overdose of a prescription drug and then quickly become ill. We know that the negligence in these cases increased the risk that the harms in question would occur. We know this, or think that we know this, from the circumstances. So the question whether to permit an inference not only that there was increased risk, but also that negligence in these cases caused the harms that occurred, concerns the strength of the circumstantial evidence. These are cases of self-proving causation—or at least possible cases. But it turns out that all questions of causation are in a sense about circumstantial evidence and therefore that the distinctive character of self-proving causation will need explication.

A. Why Causal Inferences Are Always Circumstantial

We are accustomed to thinking of questions of fact as being about things in the world, past, present, or future. Did the defendant drive fifteen miles per hour over the speed limit? Did the plaintiff stop at the red light? Is the plaintiff unable to work? Answers to questions of fact such as these are empirical, as distinguished from answers that are evaluative—answers to mixed questions of law and fact,[6] such as whether the defendant was negligent.

Causation in tort cases does not pose a mixed question of law and fact, and in this sense poses a pure question of fact. The causation question in negligence cases, and indeed in all tort cases, involves the connection between the defendant's breach of duty and the harm for which the plaintiff seeks compensation. In common parlance, the defendant's breach (for our purposes, negligence) must have caused the plaintiff's harm. The seeming implication of this formulation is that causation concerns what actually happened—whether the defendant's negligent conduct caused the plaintiff's harm. But as has been widely recognized, in fact this is not quite right, because the causation question is counterfactual.[7] Causation is not factual in the sense that events that occur in the

[6] On the nature of mixed questions of law and fact, see Abraham, supra note 2, at 9; O.W. Holmes, Jr., The Common Law 122–23 (Boston, Little, Brown, & Co. 1881).

[7] See, e.g., Dan B. Dobbs, The Law of Torts § 169, at 411 (2000) (describing cause-in-fact as involving a "hypothetical alternative"); Prosser and Keeton on the Law of Torts § 41, at

world are factual. The causation question is not about events that occur in the world, but about the relationship between events in the world. It is about the relationship between separate empirical facts, in this case the relationship between the defendant's negligence and the plaintiff's injury. As a result, evidence of causation is always circumstantial, and always circumstantial in a particular way.

It is not possible to directly perceive or observe causation. Rather, causation is a conclusion we reach when we expect a certain consequence to follow a certain antecedent and we have what we consider a tenable explanation for this relationship between an antecedent and a subsequent event.[8] The more reliable the expectation has been in the past that a particular subsequent event will follow a particular antecedent, and the more coherent the explanation for this relationship, the more convincing is the conclusion that the antecedent caused the consequence. We say that striking a match causes it to burn because burning regularly occurs after striking a match, and because we have a chemical explanation for the burning that regularly follows from striking a match. We see an act, we see what happens after the act, and we reach a conclusion about the (causal) relationship between the two. But we do not see this "causation." Rather, we infer that a causal relationship exists.

For everyday purposes, the fact that causation is not something we can perceive or see, but a relationship, is of no concern. Most of the time all we care about is that certain things regularly happen after other things happen. Because explaining and predicting ordinarily are all we need to do with the concept of causation, it does not matter whether causation can be seen or perceived, as long as explanations and predictions based on causal notions are regularly reliable.

But beyond this idea of regularity, the notion of causation as a positive description of something that has actually occurred is elusive. Consequently, in seeking to identify causation, we often ask a counterfactual question: whether a particular consequence would or would not still have occurred in the absence of the event that we are considering as a possible cause of that consequence. If the consequence would still have occurred in the absence of the event, then we tend to say that the event

265 (W. Page Keeton et al. eds., 5th ed. 1984) (describing cause-in-fact as a comparison between factual and "contrary-to-fact" conditions).

[8] This way of understanding causation goes back at least to 1 David Hume, A Treatise of Human Nature 132–51 (London, John Noon 1739).

did not cause the consequence. It would have occurred anyway.[9] In tort law, this way of thinking of course leads to the familiar but-for test for cause-in-fact. "But-for" the defendant's negligence, would the plaintiff have suffered the harm at issue? If not, then the defendant's negligence is a cause-in-fact of that harm.

However, to the extent that we are still instinctively inclined to think of causation as something that existed in an actual occurrence—to think of causation as a positive event in the world—the but-for test is an indirect, and arguably odd, way of getting at that. The but-for test seems only to be a test for something (a causal relationship between events), arguably a proxy for that something, rather than the something itself.[10]

Regardless of the difference between this instinct and the actual nature of causation, one thing is clear. Because the but-for test turns on what would have happened in the absence of something that did happen, and regardless of what the courts sometimes say, under the but-for test there can never be any truly "direct" evidence of cause-in-fact.[11] What might, or what would have happened, but did not happen, cannot be directly witnessed or perceived. Rather, findings of cause-in-fact require an inference from the circumstances to the conclusion that, but-for the defendant's negligence, the plaintiff would not have been harmed. It follows that at bottom all evidence of cause-in-fact is circumstantial evidence.

Admittedly, sometimes the circumstantial evidence of causation is so strong that the inference from the circumstances to a causal conclusion is compelled. When a defendant runs a red light and strikes the plaintiff, the causal inference from the circumstances is, for practical purposes,

[9] A separate situation in which the but-for requirement is not applied involves what has been called multiple sufficient causes, any one of which would have been enough to cause harm even in the absence of the others. Tort law tends to treat each as a cause, even though the but-for test is not satisfied. See Restatement (Third) of Torts: Liab. for Physical & Emotional Harm § 26 cmt. i (2010).

[10] The philosopher of science Nancy Cartwright has argued that causation is one word, but many things. She suggests that, instead of thinking of causation as a single, monolithic concept, it would be more fruitful to use thick concepts such as attract, discourage, and allow. Nancy Cartwright, Causation: One Word, Many Things, 71 Phil. Sci. 805, 814–15 (2004). Tort law has not and probably could not employ a series of thick, specific concepts to replace the general notion of but-for cause. But it is worth recognizing that in practice the notion of cause-in-fact is not monolithic and that a rigid but-for test for cause-in-fact may be misleadingly simplistic.

[11] The opinion in *Zuchowicz* itself, for example, refers to "direct" evidence of causation. See 140 F.3d at 391.

certain. If the defendant had not run the red light, he would not have struck the plaintiff-pedestrian, because he would have been stopped at the red light. Similarly, if the defendant negligently administers cyanide to the plaintiff's decedent, the inference that, but-for the cyanide, the decedent would not have died, is very strong indeed.

Merely because inferences of but-for causation in such cases are strong or even compelled, however, does not make the inferences any less based on circumstantial evidence. There may be something that seems close to "direct" evidence that cyanide is what killed the plaintiff's decedent—evidence of cyanide's bio-chemical properties, for example. But even this is really only circumstantial evidence of what has happened in the past when people have taken cyanide, together with a biological explanation for the connection between cyanide and death. There can be no direct evidence that the plaintiff's decedent would not have died if he had not been administered cyanide, only a very strong inference based on the circumstances, including what has happened in the past under similar conditions.

Thus, in one way or another, evidence of causation in negligence cases is always evidence of the probability, based on the circumstances, that what actually happened would not have happened if the defendant had exercised reasonable care. Sometimes the circumstantial evidence supports an inference that this probability is extremely high, but the evidence is always necessarily circumstantial and always about probability.

With this insight, however, comes a puzzle. What seems at first glance to be distinctive about self-proving causation is that it involves drawing an inference of causation from circumstantial evidence—evidence that the defendant was negligent. Yet if all evidence of causation is circumstantial, is there still something distinctive about self-proving causation? Is it that in the case of self-proving causation the circumstantial evidence of causation is the defendant's negligence itself, or does the distinctiveness of self-proving causation, if it exists, consist of something else? And if it is something else, what is it? To answer these questions, it is necessary to understand the fundamentals of self-proving causation.

B. Unpacking Self-Proving Causation

Four decades ago, then-Professor Guido Calabresi laid the conceptual groundwork for understanding, among other things, what I have been calling self-proving causation. Writing in the tradition of Professor Wex

Malone, who had suggested twenty years earlier that rules governing cause-in-fact are a matter not only of fact but of policy,[12] Calabresi's approach was both broader and deeper. He wrote that although two causal concepts, cause-in-fact and proximate cause, figure expressly in tort law, a third concept is also important. This is what he called "causal link."[13]

There is a causal link between an event and an injury when the occurrence of the event increases the probability of the injury.[14] As to but-for causation, "far from being the essential, almost categorical imperative it is sometimes described to be," Calabresi contended that the but-for test is simply a useful way of totaling up the costs a potential defendant should take into account in deciding whether to risk an accident or invest more in avoiding it.[15] That is, just as it was for Malone, for Calabresi the function of the requirement of but-for causation was to serve a policy purpose. If a more suitable requirement or measure than the but-for test would deter or compensate more effectively, that measure might be preferable, or at least acceptable. And while Calabresi did not quite say so explicitly, his implication was that causal link is such a possible measure—because imposing liability based on causal linkage would be a useful way of totaling up the costs a potential defendant should take into account in deciding whether to take precautions against a risk of loss.[16]

1. Causal Link and Self-Proving Causation

It turns out that self-proving causation is simply one application of Calabresi's notion of causal linkage. In self-proving causation cases, the

[12] See Malone, supra note 1, at 61–64.

[13] Guido Calabresi, Concerning Cause and the Law of Torts: An Essay for Harry Kalven, Jr., 43 U. Chi. L. Rev. 69, 71 (1975).

[14] Id.

[15] Id. at 85.

[16] At the time Calabresi was writing (1975), there had been few exceptions to the requirement that plaintiffs prove but-for causation. But his conceptual structure clearly captured the tenor of the times. Within eight years, both *Sindell v. Abbott Laboratories*, 607 P.2d 924 (Cal. 1980), and *Herskovits v. Group Health Cooperative*, 664 P.2d 474 (Wash. 1983), had been decided. The former adopted market-share liability, *Sindell*, 607 P.2d at 936–38, and the latter liability for loss-of-a-chance to survive, *Herskovits*, 664 P.2d at 477–78. Neither case cited Calabresi's article, but it was the intellectual godfather of both decisions nonetheless. The courts in these cases did not say that they were substituting causal link for but-for causation, but that is precisely what they did. Market-share liability measures the damages for which a defendant is liable by the probability that the defendant's product (its market share) caused the plaintiff's injury. And liability for loss of a chance is measured by the reduction in the decedent's chance of survival for which the defendant was responsible—not quite the same as probability of causation.

causal link is between a particular feature of the defendant's negligence and the plaintiff's injury. In these cases there is no independent evidence of causation. Rather, evidence that the defendant's conduct substantially increased the probability that the plaintiff would suffer the harm he or she did suffer is also circumstantial evidence of causation.

The seminal case on the subject is *Reynolds v. Texas & Pacific Railway Co*.[17] The plaintiff there was waiting for a train in a railroad station. The train had been delayed until 2:00 AM. When the train did arrive, the passengers went from a lighted waiting room to stairs leading to the platform where the train stood. The stairs were unlighted; the passengers had been told to hurry; and the plaintiff was a "corpulent woman, weighing two hundred and fifty pounds."[18] While on the stairs she fell and was injured. She sued the railroad for negligence in failing to light the stairs.[19]

The trial court, apparently sitting without a jury, found for the plaintiff. On appeal, the defendant contended that there was insufficient proof of causation, because the plaintiff might have fallen "even had it been broad daylight."[20] Rejecting this contention, the Supreme Court of Louisiana affirmed. The court held that "where the negligence of the defendant greatly multiplies the chances of accident to the plaintiff . . . the mere possibility that it might have happened without the negligence is not sufficient to break the chain of cause and effect between the negligence and the injury."[21]

The evidence of causation in *Reynolds* was simply the evidence that the defendant was negligent in failing to light the stairs. Evidence of negligence, pure and simple, was not enough. Evidence of negligence, said the court, would be sufficient evidence of causation only when the negligence of the defendant "greatly multiplies" the chance that the plaintiff will be injured. Of course, this is just another way of saying that when the negligence of the defendant greatly multiplies the chance of causation, there is, in Calabresi's terminology, a strong causal link be-

[17] 37 La. Ann. 694 (La. 1885).

[18] Id. at 696–98. Some cases, however, take the position that merely showing that there was a fall on unlighted stairs is insufficient proof of causation. See, e.g., Wolf v. Kaufmann, 237 N.Y.S. 550, 551–52 (N.Y. App. Div. 1929) (holding that evidence of negligent violation of a statute requiring the lighting of stairs was insufficient to support an inference that the decedent, found unconscious at the foot of the stairs, was injured because of this negligence).

[19] 37 La. Ann. at 698.

[20] Id.

[21] Id.

tween the defendant's negligence and the occurrence of harm. Under such circumstances, there is sufficient evidence of causation.

As logically straightforward as this doctrine is, however, in practice its requirements will not be frequently satisfied. First, in most negligence cases the defendant's conduct poses risks causing a variety of consequences, not a single consequence. A driver who exceeds the speed limit risks being unable to bring his vehicle to a full stop if a vehicle in front of him comes to a full stop, but he also risks being unable to avoid people who dart out in his path, unduly distracting other drivers as he passes them, and losing control of his vehicle when he changes lanes. Speeding is negligent because of the sum total of harms that it increases the probability of causing. Proof of speeding, therefore, ordinarily is not much evidence that speeding caused the particular harm that actually occurred, because it does not necessarily "greatly" multiply the chance that a particular kind of accident will occur. That would depend on more specific facts, including the defendant's rate of speed, the time that elapsed between the plaintiff's darting out and impact, road conditions, and so forth. The evidence would have to consist of more than the simple fact that the defendant was negligent in speeding.

In contrast, in *Reynolds* the negligence of the defendant consisted primarily of increasing the risk that a particular causal sequence would occur: someone falling on the unlighted stairs. It was the risk of this particular causal sequence that made the defendant's conduct negligent. The defendant was negligent because it unduly risked causing what actually occurred, not because it risked a set of possible consequences, only one of which occurred.

A second reason that self-proving causation will be inapplicable in most cases is this: Even when the principal or exclusive risk that makes the defendant's conduct negligent is the particular risk that materialized in harm, what makes the conduct negligent often is not that the conduct "greatly increased" the risk that the harm would occur. The conduct may only minimally or modestly increase the probability that a particular causal sequence will occur. Nevertheless, the conduct may be negligent because the severity of the harm the conduct risks is great. In the familiar *B*/*PL* of the negligence calculus,[22] *P* (the increased probability of harm resulting from negligent conduct) may be small, but if *L* (the magnitude of the loss that the defendant's conduct risks) is large and *B* (the

[22] See United States v. Carroll Towing Co., 159 F.2d 169, 173 (2d Cir. 1947).

burden of precautions) is small, the conduct may still be negligent. If this is the reason such conduct is negligent, then evidence of negligence is very little evidence of causation, because negligence has not substantially increased the risk of harm.

For example, in *Fedorczyk v. Caribbean Cruise Lines*,[23] the defendant had negligently failed to install enough adhesive strips in a bathtub in a stateroom in its cruise ship. The plaintiff was injured by a fall in the tub.[24] The primary reason it is negligent not to install enough adhesive strips in a tub is that the strips decrease the risk of falling. But the plaintiff was unable to show that her feet were on a bare spot in the tub when she fell. The negligence of the defendant increased the risk of falling, but because there were some adhesive strips in the tub, the court apparently thought that there was insufficient evidence that this negligence increased the risk of falling substantially enough.[25] I think that this is a close question. But the result might well have been different if there had been no adhesive strips at all in the tub, rather than some strips but not enough of them. Then the absence of adhesive strips probably would have greatly multiplied the plaintiff's chance of falling because it would have been undisputed that she had been standing on the tub without any possibility of the added traction provided by adhesive strips.

Cases involving drowning also reflect this distinction between negligence that substantially increases the risk of harm and negligence that, given the facts, does not. For example, in *New York Central Railroad v. Grimstad*,[26] the defendant negligently failed to provide life buoys for a barge on which the plaintiff's decedent was the captain. He fell overboard and drowned. There is little question that the failure to provide lifesaving equipment increases the risk that a person who falls in the water will drown. But the plaintiff introduced no evidence that life buoys would have been within easy reach if they had been provided, or that the decedent would still have been on the surface when a buoy was thrown. The court held, in effect, that there was legally insufficient evidence that the defendant's negligence had substantially increased the risk of drowning.

[23] 82 F.3d 69 (3d Cir. 1996).
[24] Id. at 74.
[25] Id. at 74–75.
[26] 264 F. 334, 334–35 (2d Cir. 1920).

In *Kirincich v. Standard Dredging Co.*,[27] however, the decedent's shipmates tried to save him from drowning with negligently inadequate lifesaving equipment. The trial court dismissed the suit, but the Second Circuit reversed and remanded, holding that under the circumstances the causation issue was a question of fact. In contrast to *Grimstad*, here there was no question that personnel had easy access to lifesaving equipment and ample time to attempt a rescue. The inference that the negligent failure to provide adequate rescue equipment substantially increased the risk of drowning was permissible.

In short, Calabresi's notion of a causal link goes a long way toward explaining the self-proving causation cases. If a defendant's negligence has substantially increased the risk that the plaintiff will suffer harm, and the risk that the plaintiff will suffer that very type of harm is what makes the conduct negligent, then there is strong circumstantial evidence of causation. In other kinds of cases, such as those in which it is negligent to risk a range of different types of harm, or in which an act or omission is negligent only because it modestly increases the risk of a severe harm and in comparison the burden of precautions is not great, separate proof of causation is required. In these latter cases proof of negligence is likely to be only minimal evidence of causation, if that.

2. The Reference Class Issue and the Legal Sufficiency of the Evidence

The notions of causal link and self-proving causation are essentially statistical. They involve generalizations about classes of events—the causal probabilities associated with forms of negligent conduct. Such statistical generalizations, whether or not they involve actual quantitative data, depend on how things in the world are classified—that is, what the relevant form of negligent conduct is. We can think of *Reynolds* as involving a fall on unlighted stairs, a fall on unlighted stairs late at night, a fall on unlighted stairs as passengers are being hurried from a lighted room into an unlighted area, and so forth.

Yet there is a variety, perhaps an infinity, of classifications that are possible, and no objective or agreed upon principle for privileging one classification over another. This poses what scientists and, increasingly, legal scholars, call the "reference class" issue.[28] The law has no general

[27] 112 F.2d 163 (3d Cir. 1940).

[28] See Ronald J. Allen & Michael S. Pardo, The Problematic Value of Mathematical Models of Evidence, 36 J. Legal Stud. 107, 112–13 (2007); Edward K. Cheng, A Practical Solu-

principles to guide evaluation of this kind of choice as to reference class.[29] Not only the law of causation in torts, but other tort doctrines (and indeed doctrines in other areas of law) require courts to make generalizations about the world. For example, res ipsa loquitur applies when an accident of the sort that occurred in the case at hand ordinarily occurs, when it occurs, because of negligence.[30] Barrels do not ordinarily fall out of warehouse windows without negligence on the part of the employees of the warehouse.[31] Unconscious patients undergoing appendectomies do not ordinarily suffer neck injuries in the absence of negligence by medical personnel.[32] How do the courts know that the proper reference classes in these cases are warehouses and hospitals, rather than commercial buildings generally and places where people receive physical care from others?

The courts are rarely self-conscious about the issue.[33] Part of the explanation may be that these classifications seem to be self-evident. We may have certain ways of perceiving the world, or of dividing it up into categories, that lead to categorizations that courts find acceptable, and perhaps even seem natural.[34]

Even after courts have categorized the world in a manner that they may or may not be able to justify, however, what they know about their characterizations may be open to question. How courts that have no experience with warehouses and no medical training know, or think that they know, how the world tends to work in situations such as this is a puzzle. Of course, it would be extremely useful to have evidence regard-

tion to the Reference Class Problem, 109 Colum. L. Rev. 2081, 2081–84 (2009); Dale A. Nance, The Reference Class Problem and Mathematical Models of Inference, 11 Int'l J. Evidence & Proof 259, 259–60 (2007); see also Frederick Schauer, Profiles, Probabilities, and Stereotypes 204–05 (2003) (discussing how the dictate to "[t]reat like cases alike" is not meaningful without criteria for determining what makes two cases "alike").

[29] See Cheng, supra note 28, at 2082–85.

[30] See Abraham, supra note 2, at 106–08.

[31] Byrne v. Boadle, (1863) 159 Eng. Rep. 299 (Exch.) 301; 2 H & C 722, 726–29.

[32] Ybarra v. Spangard, 154 P.2d 687, 689–90 (Cal. 1944).

[33] They are sometimes slightly more self-conscious about the related question, does this sort of thing, whatever "this" sort of thing is, ordinarily happen because of negligence of such evidence? See, e.g., Colmenares Vivas v. Sun Alliance Ins. Co., 807 F.2d 1102, 1108–09 (1st Cir. 1986) (Torruella, J., dissenting) (discussing absence of basis for inferring that the malfunction of an escalator is ordinarily the result of negligence).

[34] There is literature, for example, on psychologically distinct "situation-types." See Henry E. Smith, Modularity and Morality in the Law of Torts, 4 J. Tort L., 2011, at 1, 23 & n.100 (citing Jon Barwise, The Situation in Logic 79–92 (1987), and Keith Devlin, Logic and Information 49–51 (1991)).

ing the causal probabilities that are relevant in self-proving causation cases. How often do people fall on lighted versus unlighted stairs? How often do people who fall overboard drown when there is, and when there is not, any lifesaving equipment available? Sometimes such evidence is available, though often it is not. One way to obtain this evidence if it were available would be to require the plaintiff to introduce it, and to find the plaintiff's prima facie case deficient without it. Obviously, there is no such general requirement, or self-proving causation cases would never go to the jury. There is, however, an implicit requirement that the plaintiff introduce such evidence when the issue it addresses is not within the everyday understanding of courts and juries. Res ipsa loquitur is available in some medical malpractice cases, for example, only if it is supported by expert testimony.[35]

But often, rightly or wrongly, the courts feel competent to say whether the kind of accident that occurred ordinarily is caused by negligence, or at least whether a jury could so find. And typically, rightly or wrongly, the courts feel competent to say whether evidence that the defendant was negligent is sufficient circumstantial evidence of causation because in their view this kind of negligence substantially increases the chance that it will cause harm. Courts think they know enough about why people fall down stairs to warrant rulings that the mere fact that the defendant negligently failed to light the stairs may constitute legally sufficient evidence of causation.

But that is not necessarily the end of the story. The defendant may then introduce evidence. And that evidence may call the plaintiff's express or implied reference class into question. That is exactly what seems to have happened in *Fedorczyk*,[36] where evidence of the presence of some adhesive strips in the bathtub led to the court's conclusion that the plaintiff's evidence of causation was insufficient as a matter of law. This evidence did not prove what caused the fall; it too would have been legally insufficient to do that. But by showing that the accident involved a bathtub with some adhesive strips rather than one without any, the evidence rendered the plaintiff's evidence legally insufficient.

Similarly, in *Williams v. Utica College*,[37] the plaintiff was an assault victim who lived in a dormitory with negligently inadequate security.

[35] See Dobbs, supra note 7, § 248, at 649–50.
[36] See 82 F.3d at 74–75.
[37] 453 F.3d 112, 113–15 (2d Cir. 2006).

The evidence (apparently from the defendant) showed that there had been a number of assaults committed by residents rather than intruders. In an opinion by Judge Calabresi that distinguished *Zuchowicz*,[38] the court granted summary judgment to the defendant. In effect, the defendants' evidence called into question the plaintiffs' implied choice of reference class: dormitories without a record of residents committing assaults on other residents. Instead, by taking into account the defendants' evidence, the court determined that a different reference class was appropriate, and that an inference of causation based on that reference class was not permissible.[39]

And in *Strutz v. Vicere*,[40] there was evidence that the defendant negligently maintained the stair and railing on which the plaintiff's decedent fell. There was also evidence, however, that the decedent was walking backward when he fell and had experienced circulatory problems in his legs. The court granted summary judgment to the defendant on the ground that the plaintiff's evidence of causation was insufficient as a matter of law, stating that there was no affirmative evidence of the cause of the decedent's fall.[41] But it seems likely that the fact that the decedent was walking backward on the stairs influenced that holding, by demonstrating that the proper reference class was not simply people descending inadequately maintained stairs, but people with decedent's physical ailment who were also descending backwards. The plaintiff's evidence might have been legally sufficient in the absence of the defendant's evidence, but with the addition of the latter, it was not.

In short, the reference class issue highlights the fragility of the categories that are sometimes used in deciding whether there is sufficient circumstantial evidence of causation. Tort law has no systematic or rigorous way of dealing with this concern, but does address it by permitting an assessment of the legal sufficiency of the plaintiff's evidence in light of the evidence that the defendant has introduced as part of its case. This assessment can best be understood as a comparative analysis of competing reference classes.

[38] Id. at 120–22.
[39] Id.
[40] 906 N.E.2d 1261, 1265–66 (Ill. App. Ct. 2009).
[41] Id. at 1267.

3. The Policy Attraction of Self-Proving Causation

Many self-proving causation cases fall into a category that Professor Saul Levmore has called the "recurring miss."[42] The negligence of a defendant is responsible for some percentage of recurring injuries, but it would never be held liable if the plaintiff's evidence of causation were considered legally insufficient. There would be a consistent shortfall in the imposition of liability and in the awarding of compensation. Defendants would be systematically undeterred because they could expect never to be proven to have negligently caused the harm that their negligence characteristically risks.[43]

This is true not only of falls on unlighted stairs, and drownings that occur in the absence of lifesaving equipment, but of many cases in which there has been a negligent failure to warn of a danger posed by the defendant's conduct.[44] As long as the failure to warn involves a mass produced product rather than a sporadic accident involving a one-time failure to warn, there is a risk of a recurring miss. Although the failure to warn causes injury to a certain percentage of potential plaintiffs, if self-proving causation were not available, then defendants would know that they would never be held liable for the failure to warn. In addition, there is an autonomy-enhancing aspect of threatening liability in connection with warnings. All product users receive a warning and are able to make better-informed decisions as result, including those whose actual actions do not change as a result.

These considerations are sufficiently strong for some courts to have adopted a presumption that the failure to warn was a cause-in-fact in cases involving prescription drugs.[45] This "heeding presumption" can be defeated with evidence that the plaintiff would have taken the drug even if a proper warning had been given. But such evidence is not likely to exist except when a warning was superfluous or the plaintiff had a history of idiosyncratic preferences. Uncertainty about what the plaintiff would have done if a warning had been given is resolved by a presumption in favor of recovery.

[42] Saul Levmore, Probabilistic Recoveries, Restitution, and Recurring Wrongs, 19 J. Legal Stud. 691, 707–10 (1990).

[43] See Ariel Porat & Alex Stein, Tort Liability Under Uncertainty 160–61 (2001) (arguing that, for this among other reasons, liability should be imposed when, and because, the defendant's conduct is responsible for evidentiary uncertainty).

[44] See, e.g., Liriano v. Hobart Corp., 170 F.3d 264, 266 (2d Cir. 1999) (Calabresi, J.).

[45] See Abraham, supra note 2, at 234.

Indeed, the point can be made more strongly in a different way. In many self-proving cases, if this method of proving causation were inapplicable, it would be pointless to label the defendant negligent. And in contrast to cases in which it is uncertain whether the defendant was negligent, in these cases the defendant is definitely blameworthy and the argument for imposing liability when there is a possible absence of causal proof is stronger. A negligent defendant would rarely or never be held liable in these cases if self-proving causation were not applied. In contrast, there are many cases in which negligent defendants can anticipate considerable liability even if self-proving causation is not applicable. Dart-out cases, for example, in which the issue is whether a defendant-driver could have avoided colliding with the plaintiff if the defendant had not been speeding, fall into this category. A defendant who speeds risks a variety of accidents; running into a darting-out pedestrian is just one such occurrence. In the aggregate, speeding defendants are likely to bear a significant amount of liability even in the absence of self-proving causation, because their speeding will often clearly cause other types of accidents.

The requirement in self-proving causation that the defendant's negligence substantially increase the risk of the very injury that occurred thus identifies the situations in which the policy purposes of the doctrine militate in favor of its application. In such cases, both deterrence and compensation concerns argue in favor of dispensing with the but-for test for causation and relying openly on circumstantial evidence of causation.

II. *ZUCHOWICZ*

By far the most salient recent case involving self-proving causation is *Zuchowicz v. United States*.[46] As befits an intricate opinion written by Judge Calabresi on an important torts issue, *Zuchowicz* has been included in torts casebooks[47] and discussed in the *Restatement (Third) of Torts*.[48] And because the Second Circuit has been called upon to decide a number of subsequent cases involving self-proving causation, *Zuchowicz* has become a reference point in judicial analysis and application of this doctrine. In one of these cases, Judge Calabresi himself weighed in

[46] 140 F.3d 381 (2d Cir. 1998).

[47] See, e.g., Richard A. Epstein & Catherine M. Sharkey, Cases and Materials on Torts 382 (10th ed. 2012); Marc A. Franklin et al., Tort Law and Alternatives 343 (9th ed. 2011).

[48] See Restatement, supra note 9, § 26, at 365; id. § 28, at 457.

on the meaning of *Zuchowicz*.[49] The opinion in *Zuchowicz* therefore warrants analysis in some depth.

In February 1989, Patricia Zuchowicz was erroneously instructed at a Naval Hospital in Groton, Connecticut, to take 1600 milligrams per day of the prescription medicine Danocrine, as treatment for infertility. This was twice the recommended dose. She took this dose of the drug for about a month, and then took the proper dose for about two more months. By the fall of 1989, she was diagnosed with primary pulmonary hypertension ("PPH"), a rare and fatal disease. Thereafter she did become pregnant, and gave birth to a son in November 1991. She died one month later. Mrs. Zuchowicz brought suit against the United States, the employer of her pharmacist and her physician, under the Federal Tort Claims Act. When she died, her estate continued the action.

A. Trial

The defendant admitted negligence in providing Mrs. Zuchowicz with an overdose, but denied that its negligence caused her PPH. Importantly, neither Danocrine nor overdoses of Danocrine were previously known to cause PPH. Moreover, the disease is extremely rare. Only 197 cases had been recorded between the mid-1980s and 1992, the year after Mrs. Zuchowicz's death. No formal studies of the effects of Danocrine at the dose Mrs. Zuchowicz received had been performed, and "very, very few women have received doses this high in any setting."[50]

Thus, there were no scientific studies of the capacity of Danocrine, or a 1600 milligram dose of Danocrine, to cause PPH. There were, however, two forms of evidence of causation that played a role at trial. The first was testimony by expert witnesses. One witness, Dr. Richard Matthay, a Professor of Medicine at Yale, was an expert in drug-induced pulmonary diseases who had also examined and treated Mrs. Zuchowicz. He testified that Danocrine had caused Mrs. Zuchowicz's PPH,[51]

[49] See Williams v. KFC Nat'l Mgmt. Co, 391 F.3d 411, 431 (2d Cir. 2004) (Calabresi, J., concurring).

[50] *Zuchowicz*, 140 F.3d at 384-85.

[51] Courts and commentators sometimes distinguish between proof of "general causation" and "specific causation." See Restatement, supra note 9, § 28, at 404. The former is proof that exposure to a substance can cause the disease or illness that the plaintiff suffered, whereas the latter is proof that exposure to a substance did cause such harm. Id. Dr. Matthay's testimony that Danocrine caused Mrs. Zuchowicz's PPH presupposed general causation, but went beyond it, in that he testified that Danocrine did cause Mrs. Zuchowicz's PPH.

and, "[w]hen pressed," that the overdose had caused her disease.[52] His opinion was based on the fact that her symptoms quickly followed the overdose, as well as the similarities between the progression of Mrs. Zuchowicz's illness and accepted cases of drug-induced PPH. Dr. Matthay's opinion was also based on his exclusion of a number of other possible causes, including all previously known drug related causes of primary PPH, and all causes of "secondary pulmonary hypertension."[53]

A second witness, Dr. Randall Tackett, was a Professor of Pharmacology and department chair at the University of Georgia. He testified that the overdose of Danocrine had caused Mrs. Zuchowicz's PPH by decreasing her estrogen level, and increasing her insulin, testosterone, and progesterone levels. Taken together, he testified, these factors likely caused a dysfunction of her endothelium that led to her developing PPH. He relied on studies indicating that these hormones "could" cause endothelial dysfunction.[54] At trial there were *Daubert* challenges to the testimony of the plaintiff's expert witnesses, which the U.S. District Court for the District of Connecticut rejected. After a bench trial, the district court awarded her estate over $1 million in damages.

B. Appeal

The defendant's appeal turned principally on whether the district court had properly rejected the defendant's *Daubert* challenges to the plaintiff's expert witnesses, and whether the district court's finding that the overdose caused Mrs. Zuchowicz's PPH was clearly erroneous.

In an opinion by Judge Calabresi, the Second Circuit first affirmed the rejection of the *Daubert* challenges.[55] Having done this, it was virtually inevitable that the court would hold that the finder of fact could have concluded on the basis of Dr. Matthay's testimony that Danocrine had caused her PPH. This testimony could hardly have satisfied *Daubert* without also being sufficient to support an inference that the substance of the testimony was accurate. However, the court did not then immediately take the next step and determine whether the expert testimony was

This was evidence of specific causation, but not of specific causation as a result of the overdose. The latter came only when he was "pressed."

[52] *Zuchowicz*, 140 F.3d at 385.

[53] Id. at 385–86.

[54] Id. at 386.

[55] Id. at 387.

legally sufficient to support an inference that the *overdose* had caused her PPH.

One can only speculate, but it seems likely to me that the court thought this testimony was sufficiently weak, or open to attack, and that it was necessary to seek support for the trial court's finding from another quarter. Although the close temporal relation between the plaintiff's taking Danocrine and her contracting PPH was a basis for Dr. Matthay's opinion that Danocrine caused Mrs. Zuchowicz's PPH, how could that temporal relation be a basis for his opinion that an overdose (as opposed to a proper dose) of Danocrine caused her PPH? There was no previous evidence that Danocrine could cause or had caused PPH, and therefore no previous evidence that an overdose was more likely to cause it. And when Dr. Matthay first examined Mrs. Zuchowicz as his patient, he concluded that Danocrine had caused her PPH before discovering that the 1600 milligram dose he knew she had taken was in fact an overdose.[56]

Consequently, Dr. Matthay's conclusion that the overdose of Danocrine caused Mrs. Zuchowicz's PPH would seem to have been based implicitly on the notion that as a general matter overdoses are more likely to cause harm than recommended doses. Otherwise it is unclear how he could distinguish the causal effect of a *recommended* dose from the causal effect of an *overdose*. In effect, Dr. Matthay seems at least in part to have based his opinion that the overdose caused Mrs. Zuchowicz's PPH on a medical version of self-proving causation.

I will suggest below that the court's application of self-proving causation later in the opinion could have gained support from Dr. Matthay's conclusion. His expert testimony implied that an overdose of Danocrine was more likely to cause PPH than a recommended dose. The court's later, seemingly independent, assertion of this proposition could have relied on his testimony. But one gets the sense from the opinion that the court did not connect what he had said with what it was about to say. Instead the court turned to the law governing causation in negligence cases as support for the holding toward which it was headed.

The court indicated that the law of Connecticut required that negligent conduct be a "substantial factor" in bringing about the plaintiff's harm. A necessary ingredient of this test, said the court, is that the negligent

[56] Reply Brief of the Appellant Cross-Appellee at 2–3, *Zuchowicz*, 140 F.3d 381 (Nos. 97-6057, 97-6099).

conduct be a "but for" cause.[57] Thus, although the "substantial factor" test is sometimes understood to be an alternative to the but-for test,[58] in Connecticut it is not. Rather, Connecticut law requires evidence of but-for causation. But Connecticut had endorsed an approach as to which "Chief Judge Cardozo in New York and Chief Justice Traynor in California led the way."[59] This approach, said the court, permits an inference of but-for causation if:

> (a) a negligent act was deemed wrongful *because* that act increased the chances that a particular type of accident would occur, and (b) a mishap of that very sort did happen, this was enough to support a finding by the trier of fact that the negligent behavior caused the harm. Where such a strong causal link exists, it is up to the negligent party to bring in evidence denying *but for* cause and suggesting that in the actual case the wrongful conduct had not been a substantial factor.[60]

This is of course a statement of what I have been calling self-proving causation. The court indicated that *Zuchowicz* was a "good example of [these] principles in their classic form":

> The reason the FDA does not approve the prescription of new drugs at above the dosages as to which extensive tests have been performed is because all drugs involve risks of untoward side effects in those who take them. Moreover, *it is often true that the higher the dosage the greater is the likelihood of such negative effects*. At the approved dosages, the benefits of the particular drug have presumably been deemed worth the risks it entails. At greater than approved dosages, not only do the risks of tragic side effects (known and unknown) increase, but there is no basis on the testing that has been performed for supposing that the drug's benefits outweigh these increased risks. *It follows that when a negative side effect is demonstrated to be the result of a drug, and the drug was wrongly prescribed in an unapproved and excessive dosage (i.e. a strong causal link has been shown), the plaintiff who is injured has generally shown enough* to permit the finder of fact to

[57] *Zuchowicz*, 140 F.3d at 388.
[58] Abraham, supra note 2, at 119.
[59] *Zuchowicz*, 140 F.3d at 390.
[60] Id. at 390–91.

> conclude that the excessive dosage was a substantial factor in producing the harm.[61]

The court then concluded that the plaintiff had therefore satisfied its burden of introducing legally sufficient evidence of causation.[62]

C. Analysis of the Opinion

Now that we have both an understanding of self-proving causation and the opinion in *Zuchowicz* on the table, it is worth analyzing the opinion in depth in order to see whether we can make sense of it, and to identify both what is difficult or troubling in the opinion and what is not. As I indicated at the outset, *Zuchowicz* has puzzled torts scholars and seems to many to be a difficult case. The core challenge is to pin down and then evaluate the self-proving causation claim in the opinion.

I want to suggest that, far from being an example of the application of the principles of self-proving causation in "classic form,"[63] as the court indicated, *Zuchowicz* is actually an example of the application of these principles in unusual form. To see why, consider the two key passages in the court's reasoning, which I have italicized in the quotation above. First, the court indicated that "it is often true that the higher the dosage the greater is the likelihood of such negative effects."[64] It is therefore possible that the greater the dose of Danocrine, the higher the likelihood that it will result in negative side effects because prescription drugs tend to have this dose-side effect relationship. But it is not always true that the higher the dose of a drug, the greater the risk of negative side effects. This is only "often" true, as the court itself indicated. So the question is what significance to attach to this proposition.

The court's second key assertion in the passage is that "[i]t follows that when a negative side effect is demonstrated to be the result of a

[61] Id. at 391 (emphasis added) (citation omitted). The citation omitted from the quoted passage is: "*See generally* 21 U.S.C. § 355(d) (indicating that the FDA should refuse to approve a new drug unless the clinical tests show that the drug is safe and effective for use under the conditions 'prescribed, recommended, or suggested in the proposed labeling')."

[62] Id. The court held that the defendant's attack on the district court's finding of causation—that the finding was "clearly erroneous," id. at 387—was "meritless." Id. at 391. Since the finding could only be clearly erroneous if there was legally insufficient evidence of causation, in the context of the appeal, the holding amounts to a conclusion that the evidence of causation was legally sufficient.

[63] Id. at 391.

[64] Id.

drug, and the drug was wrongly prescribed in an unapproved and excessive dosage (*i.e.* a strong causal link has been shown)," the plaintiff has introduced legally sufficient evidence of cause-in-fact.[65] The court seemed to be saying that, when there is testimony that taking a drug caused a particular side effect (as Dr. Matthay had testified), and the defendant's negligence consisted of increasing the risk of a side effect by providing an overdose of the drug, the plaintiff has introduced legally sufficient evidence of causation.

It is this passage, I suspect, that has most troubled those who are critical of the court's opinion, for a number of reasons. First, the premise of this passage—the testimony of Dr. Matthay that Danocrine caused Mrs. Zuchowicz's PPH—may appear questionable to the lay reader. The court itself candidly acknowledged this by noting that Dr. Matthay based his testimony mainly on the temporal relation between Mrs. Zuchowicz's exposure to Danocrine and the onset of PPH (though he also ruled out some of the known causes of PPH).[66] Especially since there had been no studies indicating that Danocrine could cause PPH, it is easy to worry that Dr. Matthay had committed the *post hoc ergo propter hoc* fallacy that the law of causation and the requirements of self-proving causation are designed to avoid. And if this seemed like bootstrapping, it was reinforced by what could seem like more bootstrapping—the court's implication that because overdoses "often" increase the risk of negative side effects, the overdose of Danocrine significantly increased the risk of a particular side effect ("a strong causal link has been shown"). So there may seem to have been double bootstrapping.[67]

How valid, then, was the court's reasoning? Recall that my analysis of self-proving causation in Part I revealed that a defendant may be neg-

[65] Id.

[66] Cf. Restatement, supra note 9, § 28, at 409 ("When the causes of a disease are largely unknown, however, differential etiology is of little assistance."). Further, in "most instances, differential etiology is not an appropriate technique for proving general causation." Id.

[67] I am indebted to Professor Jennifer Mnookin for suggesting this characterization. In fact, reading the Brief of Appellant in the Second Circuit might make the lay reader even more dubious. The brief recounts considerable evidence introduced at trial that Danocrine was unlikely to cause PPH, though most of this evidence seems to have been directed to the defendant's *Daubert* challenge rather than to the merits of the causation issue. In fact, current labels list the maximum permissible dosage of Danocrine at 400 milligrams for some conditions and 200 milligrams for other conditions. See Epstein & Sharkey, supra note 47, at 386. Although this change is irrelevant given the facts that were in evidence in *Zuchowicz*, it could be interpreted to increase the likelihood that Mrs. Zuchowicz's PPH would have been caused by the then-recommended dose of 800 milligrams.

ligent because its conduct substantially increased the probability of a loss, or because, even though the conduct did not "substantially" increase the probability of a loss, the severity of the loss and the comparatively small burden of precautions did not warrant taking the action. Thus the risk posed by a drug overdose, whether of Danocrine or something else, is a product of both the probability of suffering a side effect and the severity of the side effect if it occurs. So, if the facts about the properties of Danocrine were known, it could have been negligent to provide an overdose because the probability of negative side effects substantially increases at doses over 800 milligrams per day with little additional benefit. As the court said, this is "often" the case.

But instead it could have been negligent to provide an overdose for either of two other reasons. Although the probability of negative side effects might increase only slightly when an overdose is given, those side effects might be severe if they occur. Or the probability of negative side effects might increase only slightly when an overdose is given, and those effects might not be severe, but the increased benefit from the additional dose might still not be worth risking the modest increased risk of modest side effects.

The former would support drawing an inference of causation from the fact of negligence, because negligence would, in this instance, consist of substantially increasing the risk of negative side effects. But if either of the latter two situations was the case, this would not support drawing such an inference because negligence in those instances would consist of slightly increasing the risk of severe side effects, without known countervailing benefit, or slightly increasing the risk of modest side effects, without known countervailing benefit. In the latter instances the fact that the defendant had been negligent would be only slight evidence of causation, because it would be evidence of only a slight increase in the probability of causation.

And the court itself clearly did not know the basis on which the FDA had limited approved doses of Danocrine to 800 milligrams per day. Because the defendant stipulated to negligence shortly before trial, we do not have the benefit of either the trial or appellate court's reasoning about precisely what made providing the overdose negligent.[68] The plau-

[68] In fact, there was some testimony at trial that 800 milligrams per day was the recommended dose because "at the higher doses patients were not receiving any additional therapeutic benefits and were showing more androgenic effects, such as acne, weight gain, and

sible (perhaps even necessary) implication of the court's reasoning is that what made it negligent for the defendant to provide an overdose of Danocrine is that an overdose might or might not have increased the chance that Mrs. Zuchowicz would suffer a negative side effect. That is, there was a "known . . . unknown" involved in providing an overdose, without any basis "on the testing" for supposing that there would be sufficient benefit from providing a larger dose.[69] But this kind of negligence is not much evidence of causation because it is evidence of imprudent action in the face of uncertainty, rather than in the face of known, but excessive, risk.

Then what was the court's basis for asserting that, under the circumstances, a "strong causal link" had been shown? It depends on what that means. If there is a difference between an actual increased risk of contracting PPH from an overdose of Danocrine, and the mere possibility that an overdose increases the risk of PPH, then it was not accurate to say that a "strong causal link" had been shown. Is there a causal link only in the former situation, or also in the latter? As Professor Calabresi defined "causal link" almost forty years ago, the term means that the wrong committed by the defendant "increase[s] the chances" that the harm suffered by the plaintiff will occur in general.[70] In the classic cases of self-proving causation there is no question that there is, in precisely this sense, a causal link between the defendant's negligence and the kind of harm the plaintiff suffered. There is a definite, I would say indisputable, causal link between failing to light stairs and the risk of falling. Failing to light stairs where there is no daylight always increases the risk of falling. Speeding always somewhat increases the risk that a vehicle cannot be brought to a stop in the available space. On the other hand, the evidence and circumstances in *Zuchowicz* showed only that an excessive dose of Danocrine might have increased the risk of PPH. In *Zuchowicz*, one might say, there was only a risk that there was an increased risk—there was what has sometimes been called uncertainty, rather than clear risk.[71]

abnormal hair growth." Reply Brief of the Appellant Cross-Appellee, supra note 56, at 18–19.

[69] *Zuchowicz*, 140 F.3d at 391.

[70] Calabresi, supra note 13, at 71 ("There is a causal link between an act or activity and an injury when we conclude on the basis of the available evidence that the recurrence of that act or activity will increase the chances that the injury will also occur.").

[71] Frank H. Knight, Risk, Uncertainty and Profit 197–263 (Univ. of Chi. Press 1971) (1921).

It may be that self-proving causation should be extended to cases in which there is a risk that there is an increased risk. But even then, on my analysis, *Zuchowicz* is not a "classic example" of causal link, let alone of "strong causal link." Rather, arguably, *Zuchowicz* can be considered an extension of the law of causation in negligence cases. And since the case has become a salient feature in discussions of that body of law, it is worth asking, in light of *Zuchowicz* and the implications I have discerned in it, how we should now describe the doctrine of self-proving causation.

III. A NEW LAW OF SELF-PROVING CAUSATION?

I want now to explore what *Zuchowicz* may add to the doctrine of self-proving causation. The implications of *Zuchowicz* for this doctrine depend at least in part on what the case stands for. And *Zuchowicz* could conceivably stand for one of four propositions. First, the expansion of the self-proving causation doctrine for which the case seems to stand may apply only when there is also "direct" expert testimony on causation, as there was in *Zuchowicz*. Second, the holding may only produce burden-shifting regarding proof of causation rather than something more substantive about what counts as evidence of causation. Third, *Zuchowicz* may be an example of what Judge Calabresi suggested in a later case had been the operation of two concerns extending beyond the strength of circumstantial evidence—differential access to evidence and the allocation of error costs. Finally, the case may apply only when the defendant's negligence consists of taking an action without sufficient knowledge of whether the action involves unreasonable risk, and the state of scientific knowledge makes it impossible to prove but-for causation. I will discuss each of these possibilities below. Then, based on my earlier analysis and this discussion, I will attempt a synthesis that outlines the considerations that we can now see are central to self-proving causation.

A. A Rule Applicable Only if Accompanied by Expert Testimony

In most self-proving causation cases there is no evidence of causation aside from the defendant's negligence. Ordinarily in these cases there is no need for such additional evidence because the increase of risk that resulted from the defendant's negligence is a matter of common knowledge. Judges and juries know that the failure to light stairs in-

creases the risk of falling, and that the failure to have lifesaving equipment on boats increases the risk of drowning. Though not required, expert evidence on causation would be permitted in such cases, but there is likely to be none. Data on the increases of risk in cases such as these, or other relevant expertise, normally does not exist.

But in *Zuchowicz* there was additional evidence of causation, in the form of expert testimony by a physician and a pharmacologist. Some of their testimony was essential. Based on clinical judgment and certain other factors, their testimony was that Danocrine caused the plaintiff's PPH. Without this testimony or something like it,[72] the plaintiff's case would have failed because the properties of Danocrine are not a matter of common knowledge.

The question, however, is whether the further testimony of Dr. Matthay (given when "pressed"), that an *overdose* of Danocrine caused Mrs. Zuchowicz's PPH, was essential. The presence of this expert testimony makes the precedential force of *Zuchowicz* unclear. The court's opinion reads as if, even apart from the expert testimony that the overdose caused the PPH, the evidence that the defendant was negligent was itself sufficient to support the finding of causation.[73] As I suggested earlier, the opinion implies that this was the primary evidence and that the expert testimony served merely to strengthen the plaintiff's case on the overdose issue.[74]

I also suggested that Dr. Matthay's testimony must have partially, if only implicitly, relied on a medical version of self-proving causation—the notion that overdoses of prescription drugs are more likely to cause harm than recommended doses. The very fact that Dr. Matthay was willing to conclude, seemingly in part on this basis, that the overdose had caused Mrs. Zuchowicz's PPH, might well have made the court more justified in invoking self-proving causation because, in the sense I have suggested, Dr. Matthay invoked self-proving causation first. I think that

[72] Suppose, for example, that the testimony had been only that Danocrine is capable of causing PPH. In the terms sometimes used, this would be evidence of general causation. See Restatement, supra note 9, § 28 cmt. c, at 405.

[73] See supra text accompanying note 61.

[74] The court stated that the plaintiff's case, while relying mainly on the principles of what I have called self-proving causation, "is stronger. For plaintiff introduced some direct evidence of causation as well. . . . Dr. Matthay[] testified that the timing of Mrs. Zuchowicz's illness led him to conclude that the overdose (and not merely Danocrine) was responsible for her catastrophic reaction." *Zuchowicz*, 140 F.3d at 391; see also supra text accompanying note 51.

it certainly would have been more difficult for the court to invoke self-proving causation if Dr. Matthay, "when pressed," had declined to testify that the overdose had caused Mrs. Zuchowicz's PPH.

To the extent that this analysis is correct, Dr. Matthay's testimony may not have been merely supplemental, as the court seemed to indicate, but necessary to the court's holding. However, none of the Second Circuit's subsequent cases on the causation issue involves facts anything like those in *Zuchowicz*. Rather, they are cases in which the defendant's negligence was fairly strong circumstantial evidence of causation even without expert testimony. So there has been no actual test of the precedential force of the decision in a situation in which negligence is not necessarily strong circumstantial evidence of causation. We will have to wait to see how *Zuchowicz* is eventually understood on this score.

B. A Rule Regarding Burden-Shifting

There are a number of classic cases in which there was what would otherwise have been legally insufficient evidence that the defendant's negligence caused the plaintiff harm, but the plaintiff did not lose. In such cases as *Summers v. Tice*[75] and *Haft v. Lone Palm Hotel*,[76] for example, the courts held that, under the circumstances—two defendants both negligently shooting at the plaintiff, or a negligent failure to provide a lifeguard who might have been able to give testimony regarding causation—the burden of proving causation shifted to the defendant. The failure of the plaintiffs to introduce the typically requisite evidence of causation therefore was not fatal to their claims.

These and similar cases hold that, under their circumstances, the burden of proof on the causation issue is shifted to the defendants. Conventionally understood, the term "burden of proof" refers, at the least, to the burden of persuasion, although it may include both the burden of production and the burden of persuasion. When the burden of persuasion is shifted to the defendant, the defendant loses if it introduces no evidence, and loses even if it introduces evidence but its evidence does not show more probably than not that its negligence was not the cause of the plaintiff's harm.

[75] 199 P.2d 1 (Cal. 1948).
[76] 478 P.2d 465 (Cal. 1970).

There is some language in *Zuchowicz*, and a bit more language in subsequent Second Circuit cases,[77] which can be read to imply that some sort of burden actually shifts to the defendant in self-proving causation cases. For example, describing the applicable precedents for invoking self-proving causation, the court in *Zuchowicz* indicated that, once the plaintiff introduces evidence of the defendant's negligence, and if it would be permissible to infer that this negligence increased the risk of causing harm, then "[w]here such a strong causal link exists, it is up to the negligent party to bring in evidence denying *but for* cause and suggesting that in the actual case the wrongful conduct had not been a substantial factor."[78] It seems unlikely, however, that this language reflects a shift in the burden of persuasion. Courts typically use the phrase "burden of proof" to refer to this notion, and they use it clearly and firmly. At the least they use the terms "burden" and "shift," neither of which appears in this passage. Judge Calabresi knows full well what it means to shift the burden of proof, and in neither *Zuchowicz* nor *Williams v. KFC National Management Co.* does he use this language. Actually he seems studiously to avoid using these conventionally understood terms.

Similarly, in *Liriano v. Hobart Corp.*, he stated that, where the plaintiff is entitled to rely on self-proving causation, and the defendant does not rebut the plaintiff's prima facie case on causation, then that case "suffices."[79] This might simply mean that although no burden shifts to the defendant under such circumstances, the plaintiff's case is legally sufficient—that is, it "suffices." Conceivably, however, it could be a statement that the actual burden of persuasion shifts to the defendant in such a case. But on this very point, Judge Calabresi cites the governing law of New York as set out in *Gayle v. City of New York*, which holds that the burden of persuasion does not shift in such a setting.[80] And again, as in *Zuchowicz* and *Williams*, he seems carefully to avoid using the terms "burden" and "shift."

Consequently, although the matter is not entirely certain, I think that we should understand the language in *Zuchowicz* and the other subse-

[77] See Williams v. KFC Nat'l Mgmt. Co, 391 F.3d 411, 430 (2d Cir. 2004) (Calabresi, J., concurring) (stating that because it could be inferred that the negligent absence of lights was a cause-in-fact of an accident, the "burden therefore shifted to the defendant to demonstrate that some other element had been responsible for the particular crash in question").

[78] *Zuchowicz*, 140 F.3d at 390–91.

[79] 170 F.3d 264, 272 (2d Cir. 1999).

[80] 703 N.E.2d 758, 759 (N.Y. 1998).

quent cases regarding the obligation of the defendant to disprove causation to be referring to something other than the burden of proof. The only other possible formal "burden" involved in these cases is the burden of production. I will use that term here to refer to the assessment of the plaintiff's prima facie case, made at the close of the plaintiff's case-in-chief. And I will refer to the question whether there is legally sufficient evidence to make out a question of fact to refer to the assessment of all the evidence, made after both parties' cases have rested.

Even setting aside the fact that Judge Calabresi does not mention the burden of production, and does not use the terms "burden" or "shift," there is still a fundamental question: What would it mean to shift the burden of production once the plaintiff has introduced evidence that satisfies whatever standard is applicable? It would not mean that, if the defendant failed to introduce any evidence tending to disprove causation, the plaintiff would be entitled to a directed verdict. Satisfying the burden of production on an element of a claim merely means that an inference (in this case, of causation) is permissible, not that it is required. In this situation the plaintiff's case "suffices," but a jury still would be permitted to find that the plaintiff had not proved causation. In any event, if the defendant introduces some evidence tending to show that its negligence did not cause the plaintiff's harm, then the burden of production becomes irrelevant and the case must, at the least, go to the jury. But in the types of cases in question, the defendant can almost always introduce some evidence of non-causation. In fall-down cases, for example, the defendant might show that no one else had fallen on the unlighted stairs that day. So the idea that *Zuchowicz* stands for a rule that involves burden shifting of some sort seems incorrect.

What then, did the court in *Zuchowicz* mean when it said that, if a plaintiff shows that the defendant's negligence consisted of increasing the chances that a particular type of accident would occur, and an accident of that very sort did occur, that it is then "up to the negligent party to bring in evidence denying *but for* cause"?[81] I think that the court was implying that, depending on what the defendant's evidence shows, the plaintiff's evidence of causation might still be ruled to be legally insufficient, but only after the defendant's evidence was introduced. Recall such cases as *Strutz v. Vicere*[82] and *Fedorczyk v. Caribbean Cruise*

[81] *Zuchowicz*, 140 F.3d at 390.
[82] 906 N.E.2d 1261, 1266 (Ill. App. Ct. 2009).

Lines.[83] Those rulings considered, among other things, the *defendant's* apparently undisputed evidence that, respectively, the plaintiff had been walking backward down the stairs and that there were some adhesive strips (rather than none) on the bathtub on which the plaintiff slipped. The courts granted summary judgment for the defendants, on the ground that the plaintiffs' evidence of causation was legally insufficient. Allegations of causation that might have survived a motion to dismiss, and proof of causation that might have survived a motion for a directed verdict at the close of the plaintiff's case if it had gone to trial, became legally insufficient once the defendant's evidence also was considered.

While that prospect may seem peculiar in this context, in fact it is perfectly sensible in connection with both causation and negligence, even if unusual. In a case alleging negligent driving, the plaintiff might identify the defendant as the party who was driving the car that struck him. But then the defendant might introduce undisputed evidence that he was out of town on the day of the accident. Similarly, the plaintiff might prove that the defendant's train derailed and injured him, relying on the inference that trains ordinarily do not derail in the absence of negligence. But then the defendant might prove that the derailment was caused by sabotage of the tracks occurring a few moments before the train arrived.[84] In each case the plaintiff would survive a motion for a directed verdict at the close of his case, only to find that a renewed motion at the close of the defendant's case was granted. Thus, the denial of a motion for a directed verdict at the close of the plaintiff's case-in-chief is not necessarily a ruling that the plaintiff's evidence is legally sufficient as a matter of law regardless of what the defendant's evidence subsequently shows. Consequently, what the court in *Zuchowicz* may have meant when it indicated that after the plaintiff's evidence is introduced "it is up to the negligent party to bring in evidence denying *but for* cause" was that the plaintiff's evidence of causation would be legally sufficient unless the defendant's evidence thereafter showed that the plaintiff's evidence was not legally sufficient.[85]

Sometimes, of course, perhaps even often, the defendant's evidence refuting causation will be admissible but not dispositive, and the causation issue still will be for the jury. But sometimes the defendant's evi-

[83] 82 F.3d 69, 74 (3d Cir. 1996).
[84] See Kanter v. St. Louis, Springfield & Peoria R.R., 218 Ill. App. 565, 565–66 (1920).
[85] *Zuchowicz*, 140 F.3d at 390.

dence will be undisputed and will render impermissible what had seemed at the close of the plaintiff's case to be a permissible inference of causation. Evidence of causation that had been ruled provisionally sufficient would have become legally insufficient. The reason we do not often see this happen in trials, I think, is that disputes following this form are also subject to disposition by summary judgment, and this may be the means by which they are screened out of the system. The undisputed evidence from the defendant renders insufficient what might otherwise be legally sufficient evidence of causation.

In short, although *Zuchowicz* seems technically not to be about burden shifting, its reference to the defendant's introduction of evidence disputing causation is significant. For this reference leads to the insight that the legal sufficiency of the plaintiff's evidence of causation may be tested at two points before the case may go to the jury, both at the close of the plaintiff's case and at the close of the defendant's case.

C. A Rule that Goes Beyond Circumstantial Evidence

Because, for the reasons I contended earlier, the circumstantial evidence of causation in *Zuchowicz* was in a sense weaker than in the typical case, it is worth considering whether something else, or something in addition, was going on in *Zuchowicz*. Conveniently, there is some pretty good authority on point. Five years after *Zuchowicz*, Judge Calabresi himself, in a concurring opinion in *Williams v. KFC National Management Co.*,[86] observed that three considerations must be examined in order to understand recent developments in both res ipsa loquitur and what I have been calling self-proving causation: the strength of the circumstantial evidence (of negligence or causation), the relative knowledge of the parties, and the asymmetry of error costs.

The first factor—the strength of the circumstantial evidence—is what I have been examining in detail thus far. But the parallels between the role the other two factors may play in self-proving causation and in res ipsa are suggestive. Often res ipsa is just a "simple, understandable rule of circumstantial evidence,"[87] as is the rule in conventional self-proving causation cases. In some cases, however, the function of res ipsa is instead, or in addition, to "smoke out" evidence from the defendant that

[86] 391 F.3d at 422–25 (Calabresi, J., concurring).

[87] Ybarra v. Spangard, 154 P.2d 687, 689 (Cal. 1944); see also Abraham, supra note 2, at 109–10.

would not otherwise be produced.[88] This is a consideration based on the relative knowledge of the parties. And in other cases a justification, or at least an argument for res ipsa, may be that it produces a desirable form of strict liability in cases in which the circumstantial evidence that the defendant was negligent would not otherwise be considered legally sufficient.[89] Invoking res ipsa and thereby imposing a certain amount of strict liability may be a way of dealing with the risk of error that inheres in cases in which liability would otherwise never be imposed because there is insufficient circumstantial evidence of negligence. As I noted earlier in discussing the policy attractions of self-proving causation, the argument for imposing liability where causation is uncertain, and thereby risking the imposition of something analogous to strict liability, might be considered even stronger in self-proving causation cases, for in these cases there is no question that the defendant's conduct was blameworthy.

Applying these analogies to *Zuchowicz*, we can ask whether the approach taken in that case performs either of these functions. Judge Calabresi, looking at the decision in retrospect, seems to have thought that it did. After indicating in his *Williams* concurrence that the strength of the circumstantial evidence has been the focus of most cases involving the causation issue, he suggested that "the other two strands or factors—relative knowledge, and asymmetry in the significance of error—are not absent in this area either. They seem certainly to have played a role in cases like . . . *Zuchowicz* . . . ."[90]

Coming from the author of the opinion in *Zuchowicz*, this might be considered a remarkable statement. That opinion makes no reference to the relative knowledge of the parties or to the asymmetry of error costs that would result if the evidence in such cases were not considered legally sufficient. Nor do the earlier opinions by Judge Cardozo and Chief Justice Traynor, which state the "principle" on which *Zuchowicz* relies,[91] make reference to either of these considerations. How could these con-

[88] Abraham, supra note 2, at 112. I have argued that, with modern discovery, the importance and justification of this function have declined, see id., but this does not mean that the function has disappeared altogether.

[89] See id. at 115.

[90] *Williams*, 391 F.3d at 431 (Calabresi, J., concurring).

[91] See *Zuchowicz*, 140 F.3d at 391 (citing Martin v. Herzog, 126 N.E. 814, 816 (N.Y. 1920) (Cardozo, J.) and Clark v. Gibbons, 426 P.2d 525, 542 (Cal. 1967) (Traynor, C.J., concurring in part and dissenting in part on other grounds).

siderations have "played a role" in *Zuchowicz* without their ever having been mentioned?

With the perspective of five years, and with the opportunity to reflect on the relation between res ipsa and circumstantial evidence of causation, Judge Calabresi may have realized that more was going on in *Zuchowicz* than he had seen at the time he wrote the opinion in that case. And it is also possible that more was going on, even at the time, than was indicated in the opinion, which was after all an opinion of the court. We certainly should not commit the intentional fallacy of thinking that the meaning of a text is exhausted by the meaning that the author of the text intended the text to have at the time he wrote it, especially when the text is a collective statement.[92] Courts interpreting precedents do not commit the intentional fallacy—they commonly interpret past opinions without feeling bound by the intentions of the court that rendered the decision. In interpreting *Zuchowicz*, neither should Judge Calabresi be automatically bound to commit the intentional fallacy, by being limited in his interpretation to what he, or the whole court in *Zuchowicz*, may have intended the opinion to mean when he wrote it.

Rather, the two factors cited in his *Williams* concurrence may simply have been inchoate in *Zuchowicz*. More than forty-six years later, I recall with striking clarity Professor Calabresi's description of a good law review note. The student author looks at a set of cases, he told us, and his analysis yields an insight regarding what links them together, though the cases themselves do not recognize that link. Then the thesis of the law review note about this set of cases is, "Here's what's really going on." So the question we should ask is: What is "really going on" in *Zuchowicz*?—not whether the opinion talks expressly about the factors identified in Judge Calabresi's *Williams* concurrence, but whether the factors that now may help us to understand *Zuchowicz* were inchoate in the decision all along.

But were these factors inchoate or influential in *Zuchowicz*? I doubt that the first factor, the relative knowledge of the parties, played much of a role. Neither party had greater access to evidence about the effects of an overdose of Danocrine. There had been no testing at the level of 1600 milligrams. Under some circumstances, the threat of liability might cre-

[92] See W.K. Wimsatt, Jr. & M.C. Beardsley, The Intentional Fallacy, 54 Sewanee Rev. 468, 470 (1946) (arguing that the author's intention is virtually irrelevant to the meaning of a literary work).

ate research incentives that would alter the relative knowledge of the parties. But if we understand *Zuchowicz* to be about the liability of physicians, pharmacists, and their employers for inadvertently providing overdoses of prescription drugs, it is difficult to see how that threat of liability will create meaningful research incentives.

Neither physicians, pharmacists, nor their employers are likely to have the means to conduct research on the effects of drug overdoses. This is the province of drug companies, and they will not be defendants in cases involving inadvertent overdoses. It is true that in *Zuchowicz* itself the employer was the U.S. government, and that the FDA is one of its agencies. But even the FDA does not do primary pharmaceutical research. Even if we suppose, incorrectly, that *Zuchowicz* should be read mainly as applying when the U.S. government is the defendant, it is too great a stretch to imagine that the threat of liability of the United States for the behavior of Navy personnel in cases such as *Zuchowicz* will meaningfully encourage the FDA to require greater testing of the effects of drug overdoses by drug manufacturers.

The second factor that may have been influential in *Zuchowicz* is what Judge Calabresi called the "asymmetry" of error costs. A useful way to think about this factor, I think, is to understand that if the plaintiff's evidence of causation in cases such as *Zuchowicz* is legally insufficient, then defendants will always win as a matter of law. But if the plaintiff's evidence of causation is legally sufficient, then cases against negligent defendants will always go to the jury, and if there has been no significant evidence from the defendant rebutting causation, plaintiffs will almost always win. There will be errors under either approach, because the defendant's negligence is (presumably, at least) sometimes the cause of the plaintiff's harm and sometimes not the cause, yet plaintiffs will either always lose or almost always win. Are we indifferent to which kind of error occurs, or is there reason to prefer errors in one direction as opposed to the other?

Remember that in cases like *Zuchowicz*, the circumstantial evidence of causation is weak because of our lack of knowledge, not because we know that the probability of causation is small. So the question here is not which approach will most reduce error. Rather, the question is, if we were to be wrong more often than we were right about whether the defendant's negligence caused the plaintiff's harm, would we prefer more false positives (plaintiff recovery even when there was no causation) or

more false negatives (defendant held not liable even when there was causation)?

This is a perfectly reasonable question to ask, but it is not clear what would be relevant to answering it in this particular context. We might believe that errors favoring plaintiffs are superior to errors favoring defendants, but if that belief is derived from a general preference (whether instrumental or moral) for compensating injured people, then it is simply an application of that preference to injured parties who may or may not have been injured by someone who was definitely negligent. Or, in Calabresian terms, we could ask whether the plaintiff or defendant in situations such as *Zuchowicz* is likely to be the cheapest cost avoider.[93] But the consumers of powerful prescription drugs will hardly ever be the cheapest cost avoiders when it comes to the risk of inadvertent overdoses resulting from prescription errors. So it is difficult to see how this would be much more than a choice between compensating and not compensating those who are given prescription overdoses that may or may not have caused them harm.

Nonetheless, it may well be that this simple choice is indeed what is at stake in considering the asymmetry of error issue. Then the question is whether a preference for compensating plaintiffs in situations of uncertainty should be the reigning default rule. The language Judge Calabresi used in his concurrence in *Williams* seems to imply that he adheres to just such a default rule, favoring false positives and therefore plaintiffs. Given "the absence of any reason to prefer erring in favor of KFC [the defendant] rather than the plaintiff," he wrote, he was "convinced that the result we reach today is not only mandated by New York law but is also consistent with the modern doctrinal trends at the complicated intersection of circumstantial evidence and tort law."[94] So it was, under the circumstances, "the absence of any reason to prefer erring" in favor of the defendant that resolved the issue.

Perhaps that was also what was going on in *Zuchowicz*: The circumstantial evidence was uncertain and the imposition or denial of liability was unlikely to affect the availability of evidence in cases of this kind. Under these conditions, there was a preference for the plaintiff. Fair enough, although describing this as involving the "asymmetry of error costs" may not be the clearest way to acknowledge a default preference

[93] See Calabresi, supra note 13, at 84 (explaining the concept of the cheapest cost avoider).
[94] *Williams*, 391 F.3d at 432 (Calabresi, J., concurring).

that, other things being equal, plaintiffs should prevail when the circumstantial evidence is that the defendant's negligence might have substantially increased the risk of harm and there is no alternative explanation for what caused the harm.

In contrast to this way of thinking about error costs, however, we might think of the kind of asymmetry that is the result of particular policy preferences embedded in the law that go beyond mere differences between plaintiffs and defendants. In *Williams v. Utica College*, for example, Judge Calabresi noted that New York courts impose only a "minimal" duty on landlords to prevent intruders, and that this "is close to saying that if an error is to be made in this context, it is better made in favor of the defendant than in favor of the plaintiff."[95] An analogous policy preference, but one operating in favor of the plaintiff, may even have been at work in *Zuchowicz*, although the court certainly did not identify what that preference might have been. Other such policy preferences, depending on the context, might be concern in malpractice cases about reducing the supply of physicians, or concerns about individual autonomy reflected in rules expressly limiting the scope of the duty to exercise reasonable care in connection with rescue or gratuitous undertakings. We will have to see whether such background policy preferences turn out to tip the balance in future cases.[96]

D. A Rule that Applies Only to Action Taken Under Uncertainty About Risk

In most cases alleging negligence, there is evidence that the defendant's action increased the probability that harm of some sort would occur. This is as true in conventional self-proving causation cases as in other negligence cases. Yet in *Zuchowicz* that was not quite true. Setting aside the minimal expert testimony on the issue, which the court itself seemed to consider only supplementary, whether an overdose of Da-

[95] 453 F.3d 112, 121 (2d Cir. 2006).

[96] This type of preference may well have some influence on the resolution of causation issues in other fields as well. See, e.g., In re Publ'n Paper Antitrust Litig., 690 F.3d 51, 69 n.13 (2d Cir. 2012) ("This Court has on at least one occasion mentioned other factors that may inform a court's decision regarding disputed causation issues at summary judgment . . . . Such considerations have not been addressed by the parties, and we therefore do not address them further, although it appears that these factors favor plaintiffs here." (citing *Utica Coll.*, 453 F.3d at 121–22; *Williams*, 391 F.3d at 422–25 (Calabresi, J., concurring) (considering strength of evidence, relative knowledge of the parties, and "how strongly we feel about making an error in one direction as against an other"))).

nocrine increased the probability that Mrs. Zuchowicz would contract PPH was unknown. There was only a risk that there was a risk: The overdose increased the probability that there was an increased probability of PPH, because—as Judge Calabresi put it—it is "often the case" that an overdose of prescription drugs increases the probability of side effects.

It turns out, then, that far from being an example of the principle established in the decisions by Judge Cardozo and Chief Justice Traynor on which Judge Calabresi's opinion relied, *Zuchowicz* is different. It is not a paradigm case of negligence, but an odd duck. Interestingly, in everyday life we are accustomed to the general sort of negligence that occurred in *Zuchowicz*. We commonly criticize people for taking chances when they do not know whether what they are doing is risky, and consider action that avoids taking such chances to be reasonable. We adopt, that is, a "precautionary principle."[97] For example, if we do not know for certain whether use of e-Readers not connected to the internet increases the risk of interference with an airplane's instrumentation, then it might make sense to prohibit their use during takeoff and landing until we are certain that doing so is safe.

But most tort suits, even those involving self-proving causation, do not follow this pattern. There typically is evidence regarding whether, and the extent to which, the conduct in question was actually risky because this evidence benefits plaintiffs' effort to prove negligence. Consequently, *Zuchowicz* may stand for a principle that will rarely be applied in practice, because the facts that trigger the principle will rarely occur. It may simply apply only to negligently provided drug overdoses that might have caused rare diseases whose causes are mostly unknown, and to a scattering of other actions that are negligent because they are taken in the face of scientific ignorance of their possible consequences. *Zuchowicz*, on this view, is very nearly a one-off case. We may not see another such case for a long time.

E. A Synthesis

In light of my analysis, it now seems desirable to recalibrate, by identifying the considerations that are most likely to be relevant to self-proving causation and to make its application justified. We can begin

[97] Cass R. Sunstein, Beyond the Precautionary Principle, 151 U. Pa. L. Rev. 1003, 1003–04 (2003).

with a factor that goes almost without saying because it is consistently relevant: the strength of the circumstantial evidence of causation. Not only does the strength of the circumstantial evidence influence the application of self-proving causation. In a sense, the stronger the circumstantial evidence, the more the evidence will resemble conventional circumstantial proof of causation. A plaintiff who descended unlighted stairs, stating to his companion, "I can't see where to put my feet, and I keep missing the next step," has no need of a special doctrine regarding proof of causation in his suit for injuries caused in a fall on the stairs.

Beyond the strength of the circumstantial evidence, however, three other conditions, each of which arose in my earlier discussion, seem highly relevant: the impossibility of proving or disproving but-for causation by conventional means; the absence of a meaningful causal candidate other than the defendant's negligence; and the failure of the defendant's evidence to show as a matter of law that the plaintiff's evidence is legally insufficient—that is, the failure of the defendant's evidence to refute the plaintiff's proposed reference class as a matter of law.

The Impossibility of Proving or Disproving But-for Causation by Conventional Means

It is one thing to place on the plaintiff the conventional burdens of production and persuasion regarding the historical, empirical facts relevant to the elements of a cause of action in tort. Whether the defendant ran a red light, intended to cause harm, or took a particular precaution, are facts in the world. It makes sense for plaintiffs to bear the risk that they cannot produce the evidence necessary to prove these matters. In principle the facts are available, and placing the burden of producing them precludes a plaintiff simply from selecting defendants and saying, "show why you aren't liable to me."

But because causation is not a fact in the world, the rules governing what it takes to prove causation need not be identical to those governing proof of facts in the world. Sometimes, of course, proof of causation can be based on empirical data or firm knowledge about the circumstances. There is data about the effects of cyanide, and we know to a practical certainty that a car that has run a red light would not have caused an intersection collision if it had been stopped at the light. In contrast, there are classes of cases in which there will be no such data and it is impossible in principle or very difficult in practice to prove but-for causation. Invoking self-proving causation seems most appropriate in such cases.

For example, there is likely to be no data about the causes of falls on stairs or about the likelihood of drowning with and without lifesaving equipment nearby. And although there may be data about the effects of overdoses of certain prescription drugs, there was no data, or at least insufficient data, in *Zuchowicz*, about the causes of PPH. Nor was there reason to believe that the imposition or denial of liability in *Zuchowicz* would have created incentives for the generation of such data. In contrast, consider mass tort cases, which are more likely to be susceptible to epidemiological proof. Self-proving causation seems more appropriate in cases like *Zuchowicz*, where there is likely never to be much relevant evidence, pro or con.[98]

There Is No Other Meaningful Causal Candidate

In *Zuchowicz*, all the causes of PPH were not known. The plaintiff's experts ruled out some of the causes of secondary pulmonary hypertension. But given the evidence, there was no alternative explanation for the cause of Mrs. Zuchowicz's PPH. In contrast, in a number of cases in which the plaintiff was not permitted to rely on self-proving causation, there were alternative possible causes. In *Strutz* and *Utica College*, for example, the alternative causal candidates were the manner in which the deceased descended the stairs (*Strutz*)[99] and the possibility that a dormitory resident rather than an intruder had attacked the plaintiff (*Utica College*).[100] In most cases involving falls on unlighted stairs, there is no other meaningful causal candidate. People do not usually fall on stairs, and "I slipped" is not a cause, but a description. People do sometimes drown when they fall in bodies of water, however, and that sometimes makes the very fact of falling into the water a meaningful causal candidate. It is no surprise, therefore, that there are mixed results in the drowning cases.

[98] See 3 David L. Faigman et al., Modern Scientific Evidence: The Law and Science of Expert Testimony § 23.4, at 226–27 (2011–2012 ed.) (noting the court's reluctance, where there is little or no epidemiological evidence of causation available, to burden "first plaintiffs" with the task of using epidemiology to prove general causation). There was actually some evidence in *Zuchowicz*, introduced by the defendant, directed at showing that Danocrine did not cause Mrs. Zuchowicz's PPH. See Brief of the Appellant at 6–7, *Zuchowicz*, 140 F.3d 381 (Nos. 97-6057, 97-6099).

[99] See 906 N.E.2d at 1266.

[100] See 453 F.3d at 115.

One aspect of proving causation is ruling out other possible causes, but one method of disproving it is ruling them in. Once the defendant's evidence makes another possible cause or causes plausible, then the strength of the inference of causation based on evidence of the defendant's negligence alone declines. It follows that sometimes the presence of an alternative causal candidate will render the plaintiff's causal proof legally insufficient, and sometimes it will not.

I have attempted to describe this possibility with the notion that an alternative causal candidate be "meaningful" in order to preclude self-proving causation. I do not mean to be playing with words here, but instead simply to state the conditions for invoking self-proving causation in causal rather than evidentiary terms. Determining the legal sufficiency of the plaintiff's proof of causation will of course always depend on whether "reasonable people could disagree" on the inference or inferences that could be drawn from the evidence. This can be stated by reference either to whether evidence of an alternative causal candidate is "meaningful" or whether enough causal possibilities have been ruled out, and no other possible causes ruled in, to render the plaintiff's evidence legally sufficient.

The Defendant's Evidence Does Not Refute the Plaintiff's Proposed Reference Class as a Matter of Law

In *Zuchowicz*, the key move was Judge Calabresi's assertion that "it is often true that the higher the dosage" of a prescription drug, "the greater is the likelihood" of negative side effects. The court in *Zuchowicz* used a generalization about some events in the world, based on what it considered to be the relevant similarities between Danocrine and the chosen reference class, prescription drugs. But the question is whether "prescription drugs" was the relevant category. Why not the much broader category, "things we ingest," or the narrower category, "steroids?"

There appears to have been no expert testimony on the point at trial—there certainly was no reference to it in the parties' briefs on appeal. Rather, the court seems to have arrived at the basis for its decision without any urging by the plaintiff. And the notion that overdoses often increase the risk of side effects apparently was so nearly self-evident to the court that, it seems, the court took judicial notice of the notion. More importantly, however, the court made no effort to justify its choice of the particular reference class (all prescription drugs) that it used as the basis

for its inference about the tendency of an overdose of Danocrine to increase the risk of side effects.

However, even when it is the plaintiff who proposes or presupposes a reference class, requiring that the plaintiff's choice always be thoroughly tested before the defendant presents any evidence would be cumbersome. If this choice and the proposed inference from it both seem plausible to a trial judge without technical or scientific expertise, it makes sense for the court to deny the defendant's motion for a directed verdict at the close of the plaintiff's case. To require the plaintiff to introduce concrete evidence that may not exist, in the face of a plausible choice of reference class and inference from it, would be unreasonable. And to suppose that a defendant could often easily cast doubt on that choice and proposed inference through cross-examination of the plaintiff's witness also seems implausible.[101]

Realistically, therefore, plausible choices of reference class and plausible inferences that may be drawn from them will satisfy the plaintiff's burden of production when that burden is assessed at the close of the plaintiff's case-in-chief. Given the structure of civil trials, the rules of evidence, and the unavoidable fact that trial judges are generalists, the locus of rigorous scrutiny of reference class issues inevitably has to be the defendant's case-in-chief at trial or the evidence submitted by the defendant on summary judgment. That is where evidence that undermines the plaintiff's reference class and proposed inferences will be introduced. Thus, the validity of the plaintiff's choice of reference class will almost inevitably depend largely on the defendant's evidence. That evidence may demonstrate as a matter of law that the plaintiff's proposed or implied reference class is inappropriate, thereby introducing an alternative causal candidate and so undermining the strength of the plaintiff's circumstantial evidence of causation that it renders the plaintiff's evidence of causation legally insufficient.

[101] A witness can only be cross-examined about matters covered in direct examination. Unless the plaintiff's expert testimony related closely enough to reference class and inference, such cross-examination would be improper. But even if this sort of cross-examination were possible, it would have to produce devastating admissions by the experts before it could lead to a holding that the plaintiff had failed to satisfy the burden of production. The cross-examination, that is, would have to lead the court to conclude that what had seemed like a plausible choice of reference class and a plausible inference from that class by the plaintiff was not merely open to question, but insufficient as a matter of law. Fictional lawyers may produce such results in cross-examination, but I doubt that real lawyers often do so.

None of this, of course, occurred in *Zuchowicz*. The notion that causation could be inferred from the defendant's negligence first saw the light of day in the Second Circuit's published opinion. If the plaintiff had relied on this notion at trial, the defendant might well have attempted to address it. The defendant might have introduced evidence, if it existed, that the proper reference class was the narrower one of all steroidal drugs, or the even narrower one of all steroidal drugs used to treat infertility. That there was no chance for this to happen in *Zuchowicz* is just one more factor that makes analyzing and assessing the significance of the decision, and its implications, so intriguing. It is no surprise that the case is a modern classic.

IV. CONCLUSION

Without at least sometimes invoking self-proving causation, tort law often would not be able to operate. We actually do not know very much about how often people drown when there is no lifesaving equipment nearby, how often people fall on unlighted stairs, how often they fall in bathtubs without safety strips, or how often they suffer side effects from drugs whose side effects are not well understood. We do know that negligence in these regards increases the risk of drowning, falling, and side effects. We could take the position that, in the face of this sort of incomplete knowledge, there can be no liability for negligence. But there is a lot more of such lack of knowledge than tort law acknowledges.

That, in the end, is what *Zuchowicz* is really about. No one could know whether an overdose of Danocrine caused Mrs. Zuchowicz's death. But overdoses can be dangerous, and there was no evidence that anything else caused her death. In such cases we could let the chips fall where they may and deny recovery whenever there is too much uncertainty for anyone to be confident about what happened. Or we can permit a judgment to be made based on the little that we do know. Most of us live our personal lives in the latter way. Life could not go forward without our relying on at least some such judgments. Tort law as we know it could not either.