Increasing the risk of injury and proof of causation on the balance of probabilities

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A risk is a probability of a negative outcome.[1] The concept of risk plays several distinct roles in relation to proof of causation in English tort law:

(a) *Inferential*. The fact that D's wrongful conduct increased the risk of C's injury may assist in inferring on the balance of probabilities that this conduct was a cause of C's injury.

(b) *Increasing the risk as a weak kind of causing*. English law claims that, where the conditions of the *Fairchild* exception are met, materially to increase the risk of an injury is to be a cause of that injury, in a weak sense, where the injury has occurred.[2]

(c) *Being exposed to risk as suffering damage or loss*. At one point, English law appeared to accept that exposing another person to a risk of suffering an injury could itself, in certain circumstances, be to damage that person.[3]

In this short note, I will discuss some problems concerning (a). The overarching question will be: in cases where there is reliable statistical evidence, and where we know that the type of thing D has done *can* in principle cause C's injury,[4] in what circumstances will proof that D's wrongful conduct has increased the risk of C's injury suffice for that conduct to be proven to be a cause of C's injury on the balance of probabilities? I will be assuming that, under those circumstances, statistical evidence can *in principle* prove causation in an individual case.[5]

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[1] For discussion of the nature of probability relevant to 'risk' claims, see S Steel, *Proof of Causation in Tort Law*, ch 2.

[2] See *Durham v BAI Run off Ltd* [2012] UKSC 14 (esp per Lord Mance).

[3] *Barker v Corus* [2006] UKHL 20 (per Lord Hoffmann).

[4] Cases in which 'general' causation is proven.

[5] For some defence of this assumption, see Steel above n 1, ch 2. At any rate, the assumption reflects English law (see *Jones v Secretary of State for Energy and Climate Change* [2012] EWHC 2936) despite *dicta* in the Supreme Court pointing in the opposite direction: *Sienkiewicz v Greif (UK) Ltd* [2011] UKSC 10 (per Lord Rodger).

Suppose that D has negligently, by exposing C to a pollutant, P, increased C's risk of cancer A from 10% to 20% and that C has suffered cancer A.

What is the probability that D's negligence was a cause of C's injury?

Prior to D's negligence, 10 out of 100 people in C's position get cancer A. Suppose that these people get cancer as a result of a toxin in the air, T.

As a result of D's negligence, it is now true that 20 out of 100 people in C's position get cancer A. Given that C actually has cancer A, we know that C is one of the unlucky 20 people who in fact obtain the cancer.

What is the probability that D's negligence was causally responsible for C's cancer? Given that 10 cancers are due to T and 10 cancers are due to P, the probability C's cancer is due to P is 10/20 = ½ or 50%.[6]

Notice, then, that if D's negligence had moved C from a 10% risk to a 21% risk, and C has suffered the injury, that C could prove causation on the balance of probabilities.

Suppose that D has negligently, by exposing C to a pollutant, P, increased C's risk of cancer A from 49% to 51% and that C has suffered cancer A.

What is the probability that D's negligence caused C's injury?

By the same reasoning as above, the answer is 2/51. Consequently, C will not have succeeded in proving that D's negligence was a cause of A on the balance of probabilities.

In intuitive terms, D's negligence is highly unlikely to be a cause given that C was subject already to 49% risk of suffering cancer A and D's negligence only added a small further risk. Which of those two risks was more likely to have materialized? Obviously, the much greater risk. In short, the real question, if one is determining whether D's negligence caused the injury on the balance of probabilities is how much risk did D *add* to the pre-existing risk.

[6] I will also make the simplifying assumption that the two risks do not causally interact in an overdetermined way.

But not everyone appears to accept this reasoning. They argue as follows. If D's negligence moves C from 49% to 51%, the balance of probabilities rule treats this as if it were a move from 0% to 100%. This is because, by virtue of the balance of probabilities rule, the law treats what is merely probable as if it were certain. So the 49% becomes '0' and the 51% becomes '100'. Call this 'the alternative view'.

The alternative view should be rejected.[7] First, if this reasoning were correct, it would make it very difficult to understand why the Court of Appeal has insisted that it is possible to prove causation on the balance of probabilities by proving a statistical *doubling* of the pre-existing risk.[8] Why focus on *doubling* the risk if an increase of 2% will do (i.e. from 49% to 51%)?

Second, we should not interpret the balance of probabilities rule as leading to absurd consequences unless this is clearly required by authority. This interpretation leads to absurd consequences. Suppose that D's negligence increases C's risk of cancer A from 49.99% to 50.01% and C suffers from the cancer. The probability that this negligence was a cause of this is (50.01-49.99)/50.01 which is roughly 0.004%. Is it really the case that the law holds D liable here where the probability of causation is 0.004%? Certainly, the balance of probabilities rule arguably gives rise to some arbitrariness (by distinguishing between 49% and 51%), but it is not usually criticized on the basis that it allows claimants to succeed where there is in reality virtually no probability that the defendant's wrongful conduct was a cause of its injury.

Third, if it is possible to hold defendants liable where the probability of causation is virtually nil under the balance of probabilities rule, this makes it very difficult to understand why one would have *any* objection to a rule such as *Fairchild*:[9] if the balance of probabilities rule *already* permits defendants to be held liable where the probability that they were a cause of C's injury is virtually nil, why think of *Fairchild* as a problematic exception calling for strong justification (as the courts clearly do)?

Fourth, the alternative view of the balance of probabilities rule robs the rule of one of its most important virtues: its expected accuracy. By deciding

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[7] There is some US authority which rejects it: *Marcantonio v Moen* (2006) 177 Md. App. 664, 689-90.
[8] *Novartis (Grimsby) Ltd v Cookson* [2007] EWCA Civ 1261.
[9] *Fairchild v Glenhaven Funeral Services Ltd* [2002] UKHL 22.

cases under this rule, the court acts on its best chances of getting the matter right. By using statistical probabilities, presumably the idea is to increase accuracy. By using statistical probabilities in the way suggested by the alternative view, we reach results which are *extremely likely to be factually incorrect*.

Suppose that D has negligently decreased C's chances of survival from cancer from 60% to 40% and C has now suffered the cancer.

The probability of that D's negligence was a cause of C's suffering the cancer is 1/3. To see this, consider that D has increased C's risk from 40% to 60% and so is responsible for 20% of the total 60% of risk.

There is a proviso to this. The analysis given above only makes sense where it is causally determined that C either belongs to the group which gets cancer due to the additional risk (of 20%) or to the group which gets cancer due to the pre-existing risk (of 40%) and we are just trying to estimate to which group C belongs: was C part of the group which was always doomed (the group of 40 who are doomed to get the cancer regardless of D) or was C part of the group of 20 to whose recovery D actually makes a difference? Given that C actually suffers the cancer (and so does not belong to the group of 40 who survive even despite D's negligence) we know that C is more likely to belong to the former rather than the latter group.

But imagine the following situation. C has the opportunity either to go to casino 1, which will give C a 60% chance of winning £10,000 by rolling a weighted die, *or* to go to casino 2, which will give C a 40% chance of winning a prize of £10,000 by rolling a (differently) weighted die. Due to D's negligence, C decides to go casino 2 and, as things turn out, C wins nothing.

Now suppose that C argues that *but-for* D's negligence, C would have gone to casino 1, and would have had a 60% chance of winning £10,000. Is this enough to prove on the balance of probabilities that but-for D's negligence C would have won £10,000?

Intuitively, this argument seems logically correct: there would indeed have been a 60% probability that C would have won. Why is this case different, then, from the hypothetical cancer example, where D's negligence also

appears to reduce C's chances from 60% to 40%, but we concluded that the probability of causation was only 1/3?[10]

The difference is that in the cancer case it makes sense to ask whether C was 'one of the 20' who would have been saved by D's taking care or 'one of the 40 who are doomed' to suffer the cancer anyway. In the casino case, in other words, we intuitively assume that the situation is indeterministic: there is no feature of C which determines into which group C falls, whether C is a winner or a loser. By contrast, in cases of disease, our typical assumption is determinism: there is a fixed fact of the matter about whether C avoids the cancer or not. Of the 60 people out of 100 we would expect to lose at the casino, there is no fixed 20 of them who would not have lost but for D's negligence. So in indeterministic cases, the probability of causation is given by the ex ante chance that the person had before the breach of duty.[11]

Suppose that D has negligently, by exposing C to a pollutant, P, increased C's risk of cancer A from 0% to 51% and that C has not yet suffered cancer A.

Can C obtain damages in English law against D before C has suffered cancer A (or any physical manifestation of the cancer or a connected physical change) *for the cancer itself*?

As a matter of law, no. Damage is the gist of negligence. C has not suffered any damage. If 'being subject to an increased risk of physical injury' were damage in the tort of negligence, then the position would be different. But

[10] That there is a difference between the indeterministic case and the deterministic case was the lesson I drew from an interesting example constructed by Roderick Bagshaw in an email correspondence.

[11] A different, possibly more perspicacious, way of putting this point is to say that in the casino example, our finding out that C lost in casino 2 should not affect our judgement about what C's chance of winning in casino 1 was. But in the deterministic case, we can say that, if C suffers the cancer despite there being a 40% chance of avoiding the cancer, this suggests C was ex ante either in the group of 20 who survive if D does not breach a duty or in the group of 40 who suffer cancer regardless of what D does. Our subsequent knowledge (that C suffers the cancer and so is not one of the 40 who avoids cancer regardless) affects our view about which group C was in *ex ante*.

'being subject to an increased risk of physical injury' is not itself actionable damage: *Grieves v FT Everard & Sons*.[12]

Is this right as a matter of principle? In my view, the answer is: not always. But that deserves another note.

[12] [2007] UKHL 39.