



## COMPLEX TORT MATTERS: SCIENTIFIC CERTAINTY VERSUS LEGAL CERTAINTY

Attorneys have recently attempted to confuse medical/scientific witnesses by asserting that legal certainty is less rigorous than scientific certainty, therefore, implying that courts do not require meeting a scientific certainty burden. While this may seem an esoteric issue in causation assessment, it is not trivial and can mean the difference between winning and losing a case.

In trial and deposition, I have been asked the question: "Are you requiring scientific or legal certainty?" This question arises in the context of a causal assessment in, for example, a toxic tort or pharmaceutical liability claim. The question is designed to be a "gotcha." Why? Because most attorneys believe that scientific certainty is more rigorous (i.e., 95%) than legal certainty (more probable than not, or 51%). While some attorneys believe there is truth to that comparison, the question actually compares apples to oranges.

Scientific certainty, that an event can occur as a result of a precedent event or trigger (Influenza A virus causes the flu) or that a relationship exists between two variables, is needed for the initial aspect of a causal assessment. Legal certainty is required for a different aspect. Thus, far from a "gotcha," this question illustrates a common misunderstanding or misapplication regarding the utilization of probability tools to the respective issues: scientific certainty versus legal certainty.

Scientific certainty (that A can cause B) should be established before legal certainty (that A did cause B). The legal certainty question comes into play when there are many potential variables that have been proven to cause a similar result, and you are trying to determine which one actually caused the event.

Scientific "certainties" (actually scientists don't use this legal term of art, but I shall explain it from an attorney's point of view), are a reflection of the quality of the underlying data. In other words, are the studies that underlie the claim at issue valid, statistically significant and accepted by the scientific community? Statistically, is there a scientifically-accepted likelihood that an observed relationship is simply not due to chance? That is where the 95% confidence number comes from. A "p" value of 0.05, by convention the cutoff between statistically significant and not, is that 95% likelihood. But that percentage applies only to one of the quality criteria as to whether the science used to assess causality in a claim.

The "gotcha" scenario of implying scientific certainty can be diluted, yet still scientifically valid, is ludicrous. In fact, if a study showed only a 51% likelihood of reflecting a true relationship rather than a chance relationship, then no scientist, no regulatory body, no one who reviews scientific data, would consider that study indicative of any causal relationship. A 51% outcome would not even merit a follow up or "validation" study by the scientific community. In the words of legalese: "The relevant scientific community would consider the use of such a study methodologically improper."



By contrast, the legal issue of “more probable than not,” or “reasonable medical/scientific certainty” asks an entirely different question. First, it assumes that there is recognized and accepted scientific certainty for a position. Then it asks, is it more probable than not that X caused Y in this case? It is the answer to that legal question—the more probable than not question—that requires only a 51% assurance.

As an example: assume that chemical X has been strongly connected scientifically to disease Y. Therefore, there must be scientific studies that show (with a p value of 0.05 or 95% confidence) that X is connected to Y. I have assumed for this argument that there are also sufficient numbers of studies and that such things as relative risks are substantial, issues which are important, but not germane to this discussion. Now assume that we have a claimant who has been exposed to X and has developed disease Y. In that case, general causation – that X can cause Y – is scientifically satisfied. The next question: did it actually cause this person’s disease, requires other elements. Sufficiency of dose, correct timing of exposure, appropriate latency period and others are among them. If those other elements are also affirmatively satisfied, then an expert might state that it is more probable than not (greater than 51%) that this claimant’s disease Y was caused by agent X. On the other hand, if the studies linking X to Y were not available, or if they were not by scientific standards (95%) positively connected, then one could not even approach the legal causation question because there would be no scientific foundation upon which to base it. Said another way: if X can not be shown scientifically (using scientific measures of statistical significance) to be connected to disease Y, then a claim that disease Y came from exposure to agent X has no scientific or legal merit.

Therefore, scientific certainty (step 1) is, indeed, more rigorous than the ultimate test of legal certainty (step 2), however, one does not get to step 2, without first satisfying step 1 (see flowcharted algorithm below). Thus, both scientific certainty and legal certainty are part of a causal assessment. So, asking an expert witness whether his test was one of legal or scientific certainty makes no sense. The proper answer is “both tests are needed, each for a different component of the causal assessment analysis.”

The following are several illustrative examples:

<b>Disease/Disorder</b>	<b>Scientific Certainty</b>	<b>Legal Certainty</b>
Mesothelioma from asbestos	Yes	*Possible
Prostate Cancer from Benzene	No	No
Brain Damage from Indoor Mold Exposure	No	No
Lung Cancer from Cigarette Smoking	Yes	*Possible

\*Depends on specific facts of case **B** dose, timing, latency, etc



## Scientific or Legal Certainty: A Component of Causal Assessment

