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HEALTH LAW

Proving Causation in Environmental Litigation

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To recover damages in a personal injury lawsuit, a plaintiff has the burden of establishing a causal relationship between the defendant's harmful conduct and the plaintiff's injury. In environmental litigation, proving causation can be difficult for both physician and attorney. In environmental cases, courts commonly refer to two types of causation: general and specific. General causation addresses whether a substance is capable of causing a particular injury or condition, while specific causation addresses whether a particular substance caused a specific individual's injury [1, 2].

The difficulty of proving causation in environmental litigation is a significant barrier to recovery of damages [3]. To begin with, scientific knowledge about the toxicity of many substances is limited [3]. Second, how substances move through air, soil, and water is often unknown and difficult to trace, and, third, the level or timing of a plaintiff's exposure is also often unknown [3, 4]. Together, these factors can lead to ambiguity about the cause of a plaintiff's disease. Multiple causation poses the challenge of proving that a particular injury was the result of one substance rather than another or a combination of substances [4]. For example, while asbestos is known to cause lung cancer, so are the various toxins found in cigarettes and cigarette smoke [4].

Courts have provided assistance in dealing with these issues, generally allowing evidence from epidemiological or toxicological studies that establish a likely causal relationship between exposure and harm [4, 5]. Epidemiology studies, which examine existing populations for an association between a disease or condition and a factor suspected of causing that disease or condition, are increasingly indispensable in tort cases concerning toxicity where specific causation studies are lacking [1].

Courts are quick to point out, however, that proof of an association is not equivalent to causation [1, 6]. Rather, epidemiological studies show the degree of statistical significance between events and variables [1]. Further, a positive association between exposure to an agent and development of disease is only one piece of the causation puzzle. Once an association has been found, a medical expert must next determine whether the association reflects a true cause-and-effect relationship [1]. To do this, medical experts consider several factors, including: (1) the strength of the association; (2) the dose-response relationship (e.g., whether higher exposures to the agent increase risk of disease); (3) replication of findings; and (4) biological

plausibility [1]. No generally agreed-upon method exists for determining how much weight to apply to each factor [1].

If a medical expert's testimony establishing *general* causation is admissible, the court next determines whether the medical expert has established *specific* causation using differential etiology—the procedure by which a physician isolates an external factor as the cause of internal disease [1]. In performing a reliable differential etiology, the expert first compiles a list of hypotheses that might explain the clinical findings under consideration and engages in an evidentiary process of elimination to reach a conclusion about the likely cause of the disease [1]. At this “ruling-out” stage, the court focuses on whether the expert has a reasonable basis for concluding that a certain agent was likely the cause of the patient's symptoms [1].

Before an expert's testimony can be admitted into evidence, it must meet general standards for admissibility. The court decides whether the witness' knowledge, skill, expertise, training, and education qualify him or her as an expert. If the opinion involves science or specialized knowledge, trial courts must also determine whether the reasoning or methodology underlying the expert's opinion is scientifically valid [1]. Next, the court must determine whether the expert reliably applied the methodology [1]. Five factors are considered when determining reliability: (1) whether the theory or technique can be, or has been, tested; (2) whether the theory or technique has been subjected to peer review and publication; (3) whether there is a known or potential rate of error; (4) whether there are standards controlling the technique's operation; and (5) whether the theory or technique enjoys general acceptance within the relevant scientific community [1].

In the two tort cases that follow, both plaintiffs claimed damage from toxic substances, and the courts came to different decisions on the admissibility of expert testimony about causality.

Fraser v. 301-52 Townhouse Corporation

In *Fraser v. 301-52 Townhouse Corporation*, former tenants brought action against their former landlord, alleging they sustained respiratory problems, rash, and fatigue as a result of dampness and mold infestations in the apartment building [6]. The district court did not admit certain expert testimony on the plaintiffs' behalf, a decision the plaintiffs appealed [6]. The Supreme Court of New York, Appellate Division, upheld exclusion of the plaintiffs' expert testimony on the ground that the underlying casual theory lacked support in the scientific literature [6].

The higher court reasoned that, while indoor dampness and mold are known to be associated with upper respiratory complaints, the observed association is not strong enough to constitute evidence of a causal relationship [6]. As was stated above, association is not equivalent to causation [6]. The court held that the plaintiffs failed to demonstrate general acceptance of the notion that a causal relationship existed between the conditions and ailments in question [6].

Even if the medical expert's testimony regarding general causation was valid, the court noted, the plaintiffs' medical expert failed to specify the threshold level at which dampness and mold produced health problems similar to those the plaintiffs suffered [1]. Without evidence that the plaintiffs were exposed to a level of dampness or mold sufficient to cause their alleged injuries (specific causation), the court reasoned, the plaintiffs could not prevail [6]. Ultimately, the court rejected the entirety of the plaintiffs' medical expert testimony.

King v. Burlington Northern Santa Fe Railway Company

In *King v. Burlington Northern Santa Fe Railway Company*, the wife of a deceased former railroad employee brought a tort action against the railroad, asserting that her husband contracted multiple myeloma—a cancer originating in the bone marrow plasma cells—due to his exposure to diesel exhaust emissions over his 28 years of work for the railroad [1]. The plaintiff appealed the trial court's decision to exclude testimony of her expert witness regarding the cause of myeloma [1]. The Supreme Court of Nebraska held that the trial court erred in determining that the medical expert's opinion was unreliable [1].

The *King* appeal centered on the testimony of the plaintiff's primary medical expert, Dr. Frank, a physician board-certified in internal medicine and occupational medicine. Dr. Frank testified that diesel exhaust contains benzene, and that scientific evidence supported the opinion that benzene alone and diesel exhaust could cause multiple myeloma [1]. Another medical expert, a certified industrial hygienist, reviewed Burlington Northern's environment samples and concluded that the plaintiff's husband had a significant exposure to diesel exhaust, particularly in the early years of his employment [1].

Dr. Frank recognized that contrary statements existed in the medical records regarding benzene's effect on health and that he did not know of any studies that explicitly linked benzene or diesel exhaust to multiple myeloma [1]. He explained, however, that scientific studies generally point to a causal relationship rather than stating outright that such a relationship exists [1]. Dr. Frank argued that the plaintiff's husband's extraordinary exposure to diesel exhaust was most likely a contributing cause to his disease [1]. There were few known causes of multiple myeloma, he stated, and benzene was the only diesel-exhaust component that had been separately studied as an agent of disease [1]. Burlington Northern's expert focused on this lack of a determined causal relationship, arguing that, with the exception of radiation exposure, researchers did not know the cause of multiple myeloma and that the majority of studies failed to show a specific positive association between benzene and multiple myeloma [1]. Dr. Frank had ruled out radiation exposure as a cause of the plaintiff's husband's myeloma because he found no evidence of unusual exposure to radiation [1].

The district court ruled that, although Dr. Frank was qualified to give expert testimony, his opinion was unreliable because it did not have general acceptance in the field [1]. In addition, Dr. Frank could point to no study that conclusively stated

that exposure to diesel exhaust and benzene caused multiple myeloma [1]. The district court also ruled out Dr. Frank's testimony because: (1) the record did not show what causes other than diesel-exhaust exposure Dr. Frank had considered in his differential etiology, (2) Dr. Frank "ruled in" diesel exhaust exposure as a possible cause, even though no medical or scientific study concluded that such exposure causes multiple myeloma, and (3) Dr. Frank had failed to explain why he had "ruled out" any other potential causes [1]. The court criticized Dr. Frank's conclusion that diesel-exhaust exposure was the most probable agent, even though no medical or scientific study authorized such a conclusion [1].

The Nebraska Supreme Court disagreed, however, and reversed the district court's opinion [1]. In its decision, the court looked to the standards for general admissibility of expert testimony and admissibility of testimony establishing general and specific causation [1].

First, the court discussed whether Dr. Frank's expert testimony was admissible under general standards, asking whether his opinion was based on reliable, valid methodology, not what conclusions those opinions generated [1]. In this regard, the trial court acts as "evidentiary gatekeeper, not goalkeeper," and is free to exclude expert testimony if there is too great an analytical gap between the data and the opinion proffered [1]. The court ruled that Dr. Frank's testimony was reliable, though the ultimate weight of his opinion was considered a question for the jury to decide [1].

Turning to the issue of general causation, the court found that the district court had erred in concluding that Dr. Frank's general causation opinion was unreliable [1]. The higher court reasoned that individual epidemiological studies need not draw definitive conclusions on causation before experts conclude that the agent causes a disease [1]. Rather, if the medical expert's methodology appears to be consistent with the standards explained above, the opinion is admissible [1]. Though the district court had criticized Dr. Frank's supposed lack of reliance on the totality of information regarding multiple myeloma, the Nebraska Supreme Court noted that Dr. Frank testified to a body of evidence in support of his conclusion, including human data studies, animal studies, and toxicology studies [1]. Further, his testimony did not reflect a disconnect between his opinion and the underlying data from these studies [1].

In sum, the court found that Dr. Frank's reasoning was consistent with general causation criteria [1]. The court commented that, in considering the sufficiency of underlying studies, the focus should be on whether no reasonable expert would rely on the studies to find a causal relationship, *not* whether the parties dispute their force or validity [1]. Hence, the analysis of Dr. Frank's opinion should be based on the validity of his methodology and the grounds for his opinion, not whether his conclusion differed from that of other experts [1].

Finally, regarding specific causation, the higher court rejected the district court's holding that Dr. Frank's medical opinion failed to adequately "rule out" or "rule in" potential causes [1]. The court noted that Dr. Frank had considered other causes of multiple myeloma including radiation exposure, diabetes, pesticide exposure, and cigarette smoking, and believed that epidemiological studies of these agents failed to show a causal relationship with the plaintiff's multiple myeloma [1]. Ultimately, the case was remanded to the district court for further proceedings consistent with the supreme court's opinion [1].

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