EXPERTS BEWARE: IGNORING THE SCIENTIFIC METHOD RESULTS IN EXCLUSION OF OPINIONS

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ABSTRACT

Fire investigators shall "employ all elements of the scientific method as the operating analytical process throughout the investigation and for the drawing of conclusions." The scientific method contains six steps: (1) recognize the need; (2) define the problem; (3) collect data; (4) analyze the data; (5) develop a hypothesis and (6) test the hypothesis. The utilization of the scientific method ensures the reliability of the expert's opinion.

The United States Supreme Court's holding in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 589 (1993), requires that the district court ensure that expert opinions are scientifically reliable. To ensure that expert opinions are scientifically reliable, courts apply various factors, commonly referred to as the Daubert factors.

The scientific method has the same purpose of the Daubert factors: to ensure reliable opinions. This article analyzes the litigation consequences of experts' failure to utilize the scientific method.

The second step in the scientific method is to "define the problem." This step requires that the investigator conduct a proper origin and cause investigation. NFPA 921 contains the "universally recognized methodology" for fire investigations, which requires that the expert first determine the origin and then investigate the cause (the circumstances, conditions, or agencies that brought the source, fuel and oxidant together).

The proper methodology to determine whether a product caused the fire is to determine the ignition temperature for the first fuel ignited and then determine whether the heat source was capable of generating that temperature. The courts have identified a fair number of improper methodologies such as: (1) the first step taken by the expert was to conclude that the product at issue caused the fire; (2) failure to eliminate other possible ignition sources that were located within the area of origin identified by the expert; (3) failure to examine the scene when it is available to the expert; (4) concluding that the product that has sustained the most damage is the cause of the fire; and (5) ignoring the expert's own test data. Failure to follow the proper methodology will result in the expert's exclusion.

The third step in the scientific method is to "collect data." During the investigation, the expert must collect and preserve data that is capable of being verified. Courts have excluded experts' opinions because the experts failed to properly document the collection of physical evidence in accordance with NFPA 921.

The fourth step in the scientific method is to "analyze the data (inductive reasoning)." This step requires the expert to analyze the evidence in light of the expert's knowledge, training, experience and expertise. Neither speculation nor subjective information can be utilized in this analysis.

In determining whether an expert's testimony is admissible, courts analyze whether the opinion is sufficiently based upon reliable facts or data. Experts cannot ignore facts or speculate. Thus experts cannot reliably conclude that a particular product caused the fire when the evidence demonstrates that the product was not located within the area of origin. Similarly, experts cannot reliably conclude that the product at issue has an unavoidable potential for causing a fire where that expert did not test an exemplar of the product at issue and instead used the results of tests on "*similar*" products.

The fifth step in the scientific method is to "develop a hypothesis." During this step, the expert develops an opinion based solely upon the evidence. Courts exclude opinions that ignore the evidence, particularly the undisputed evidence that the product could not reach the necessary temperature to ignite the fuel due to the presence of safety devices. Experts cannot ignore functionality of the safety devices. They also cannot invent theories to provide an argument that the product could have reached the temperature necessary to ignite the fuel.

The sixth step in the scientific method is to "test the hypothesis (deductive reasoning)." Experts accomplish hypothesis testing by comparing their hypotheses to all of the known facts. This process is called deductive reasoning. The expert must discard the hypothesis if it cannot withstand deductive reasoning. An expert's theory does not withstand deductive reasoning where it is based upon speculation or ignores known facts such as safety devices designed to prevent fires.

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