

STANFORD UNIVERSITY
DEPARTMENT OF STATISTICS
DEPARTMENTAL SEMINAR

4:15 p.m., Tuesday, May 9, 2000
Sequoia Hall Rm. 200
(Cookies at 3:45 in 1st Floor Lounge)

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ESTIMATING PROBABILITY OF CAUSATION

According to common judicial standard, judgment in favor of the plaintiff should be made if and only if it is “more probable than not” that the defendant’s action was “the cause for” the plaintiff’s injury (or death). How can we estimate probabilities of such hypothetical events as “was the cause for”?

I will propose a formal semantics, based on structural models, for the probability $PN(x,y)$ that event y would not have occurred if it were not for event x , given that x and y did in fact occur. Armed with this semantics, I will then explicate conditions under which $PN(x,y)$ can be estimated from statistical data, and show how data from both experimental and nonexperimental studies can be combined to yield information that neither study alone can provide. Finally, I will examine when the standard epidemiological criteria (e.g., Excess-Risk-Ratio) are adequate for measuring the probability of causation, and how they can be corrected for confounding bias.

Reference: J.Pearl, *Causality*, Cambridge University Press, 2000. Also, Tech Report R-271, www.cs.ucla.edu/~judea/