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Paul R. Sheeche: Dynamic Risk Analysis in Retrospective Matched Pair Studies of Disease.  
Biometrics 1962; 18:323-341.

I am indebted to James Schlesselman for bringing to my attention Paul Sheeche's 1962 paper "Dynamic Risk Analysis of Retrospective Matched Pair Studies of Disease." I believe the paper contains several innovations that were ignored because they were too far ahead of their time. It is therefore presented, out of sequence, along with articles of a comparable level of evolution.

On page 327 of this paper, Sheeche proposed to analyze case-control studies by means of "risk functions" (actually hazard functions in modern failure-time analysis terminology—what Sheeche termed "risk" would now be known as "incidence density" or "hazard"). On pages 330-331 he introduced a relative risk model, based on multiplicative interactions and exponential dose-response for the factors, that is analogous to the modern Cox and conditional logistic models. On page 332, he illustrated the univariate version of this model as a special case of a general relative risk function. On the same page, he delineated what is now known as matched density sampling as a foundation for the application of his model. On pages 332-334, he showed that the effect parameter in his model can be estimated from matched density-sampled case-control data, and can be taken as a coefficient in a linear model for the log relative risk. Finally, on pages 338-339, he considered the possibility of other dose-response models, especially linear models.

The paper is not without problems, especially on page 326, where Sheeche erroneously omitted the step of dividing by length of time interval when deriving his "instantaneous incidence" or "risk" measure. Note that in failing to do so, Sheeche's interval incidence necessarily converges to zero as the interval width converges to zero. Fortunately, this error does not affect the rest of the paper, for Sheeche mathematically treated his "risk function" as if it were a properly derived hazard function. Also, Sheeche's least-squares statistics would now be regarded as obsolete in light of modern conditional-likelihood methods. But all in all I suspect our current methods would be far more advanced had Sheeche's work been properly recognized in its time.

(Nonstatistical readers be warned: Sheeche's paper is the most technically difficult of this collection.)