

STANFORD UNIVERSITY  
DEPARTMENT OF STATISTICS  
DEPARTMENTAL SEMINAR

4:15 p.m., Tuesday, January 23, 2001  
Sequoia Hall Rm. 200  
(Cookies at 3:45 in 1st Floor Lounge)

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**Optimal Dynamic Treatment Regimes**

Dynamic treatment regimes are individually tailored treatments that provide treatment to individuals only when and if they need the treatment and adjust the level of treatment to the individual's need. In a dynamic regime, rules for how the treatment level and type should vary with time are specified prior to the beginning of treatment; these rules are based on time varying measurements of subject-specific need for treatment. Thus the assigned treatment level depends on past individual information. These regimes hold the promise of maximizing treatment efficacy by avoiding ill effects due to over-treatment and by providing increased treatment levels to those who can benefit.

If all relevant probability distributions (e.g. specifying the multivariate distribution of the response and the time-varying subject-specific need for the variety of different time varying treatment levels) are known then backwards induction or dynamic programming arguments can be used to find the optimal regime. However if this multivariate distribution must be estimated, direct use of the backwards induction arguments can lead to parametrization inconsistencies and subsequent biasing of the estimator of the optimal regime. These issues along with a solution will be discussed. The solution will be valid when the treatment levels in the available data are sequentially randomized.