ATELIER « INFÉRENCE CAUSALE EN RECHERCHE SUR LA SANTÉ »
9 – 13 MAI 2011

WORKSHOP ON "CAUSAL INFERENCE IN HEALTH RESEARCH"
MAY 9 – 13, 2011

When to start cART ? Comparing dynamic treatment regimes using the parametric g-formula

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Some of the most interesting comparisons in HIV clinical research involve the comparison of dynamic treatment regimes. An example of a dynamic treatment regime is "start combined antiretroviral therapy (cART) within 6 months of CD4 cell count first dropping below x cells/mm3 or diagnosis of an AIDS-defining illness, whichever happens first" where x can take values between, say, 200 and 500. The previous presentation discussed how to use inverse probability (IP) weighting of dynamic marginal structural models to find the x that minimizes 5-year mortality risk. Unlike standard methods, IP weighting can appropriately adjust for measured time-varying confounders (e.g., CD4 cell count, viral load) that are affected by prior treatment. This presentation describes an alternative method to IP weighting for estimating the causal effect of dynamic treatment regimes : the parametric g-formula. The method naturally handles dynamic regimes and, like IP weighting, can appropriately adjust for measured time-varying confounders. Estimators based on the parametric g-formula are more efficient than IP weighted estimators, but their consistency relies on strong modeling assumptions. Recent software developments have now made the parametric g-formula more accessible to applied researchers. In this talk, we describe how to use the parametric g-formula to estimate risk by the end of some follow-up period under dynamic treatment regimes. We describe an application of this method to answer the "when to start" question using data from the HIV-CAUSAL Collaboration as a running example.

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