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Date driven method for optimal allocation of gold standard testing under constrained availability

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The World Health Organization (WHO) guidelines for monitoring the effectiveness of human immunodeficiency virus (HIV) treatment in resource-limited settings are mostly based on clinical and immunological markers (e.g., CD4 cell counts). Recent research however indicates that the guidelines are inadequate and can result in high error rates. Viral load (VL) is considered the “gold standard,” yet its widespread use is limited by cost and infrastructure. In this talk, a two-step diagnostic algorithm is presented that uses information from routinely collected clinical and immunological markers to guide a selective and targeted use of VL testing for diagnosing HIV treatment failure, under the assumption that VL testing is available only at a certain portion of patient visits. The proposed algorithm identifies the patient subpopulation, such that the use of limited VL testing on them minimizes a predefined risk (e.g., misdiagnosis error rate). Diagnostic properties of our proposed algorithm are demonstrated by simulations. The method is illustrated using data from an HIV clinic in Rhode Island, and results show considerable promise for improving the effectiveness of HIV treatment monitoring in resource limited settings.

Biography

Tao Liu has completed his PhD from the University of Pennsylvania. He is an Assistant Professor at Brown University, Associate Director of Data and Statistics Core of the Alcohol Research Center on HIV (ARCH) and a faculty member of the Center for Statistical Sciences (CSS) and Center for AIDS Research (CFAR). His research expertise includes “Design of clinical trials, clinical decision making, analysis of incomplete data, sensitivity analysis, and statistical causal inference”. His collaborative research interest focuses on the area of HIV/AIDS and related diseases.

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