
FAHIMA NEKKA, Université de Montréal, Faculté de Pharmacie and Centre de Recherches Mathématiques
The Explanatory Power of Drug Intake Variability in Therapeutic Evaluation

Recognition by the medical community and pharmaceutical industry of compliance as a major factor for therapeutic failure and economic cost led to a regain of interest from the scientific community. This interest has further been promoted by the availability of new techniques of compliance measurement for the acquisition of good quality data. Analysis of fine individual drug intake data, generally collected by electronic monitoring devices, has revealed that individual marked random patterns are likely to persist through long therapeutic periods. Recently, our group and others have been able to address the compliance problem in a more systematic and quantitative way, using advanced mathematical and statistical methods. In this talk, we will show how the necessary information representing the patient drug intake history can be extracted and then used to provide a fair evaluation of the pharmacological performance. We revisited several classical pharmacological principles in the stochastic context of patient's drug intake irregularity. To illustrate our procedure, we have considered two cases of HIV treatment using Kaletra® for once daily and twice daily regimens. We have quantified the impact on therapeutic effect of various characteristics in dosing regimens, namely missing doses and deviations from nominal times. Using our newly defined pharmacological indices, we clearly showed the ability of our probabilistic approach in measuring the impact of noncompliance. As direct fallout, we have discussed strategies to attenuate the impact of noncompliance through an optimal design of dosing regimen.

This work is in collaboration with Jun Li.