

Pharmacokinetics (PK) is a branch of pharmacology dedicated to determine the fate of substances (e.g. pharmaceuticals or drugs) administered to living organisms. In simple words, it is the study of how the body affects a drug. The dose of a drug and the frequency at which it is administered determine its plasma concentration. Therefore, a correlation between the dose and half-life can be assumed. A drug must achieve a specific concentration (therapeutic minimum) to be able to show biological activity which at the same time should not exceed a particular concentration (therapeutic maximum) after which it would become toxic. A number of factors affect the pharmacokinetic profile of a drug, ranging from age, gender and weight to route of administration to physiological states such as rate of metabolism and excretion. If not always, these factors could render a drug either as ineffective or toxic. Also, it is not practical to determine the exact dose of a drug required by every individual during the preclinical and clinical phases of drug development. The aim of this project is to improve an existing solution for calculating and displaying plasma levels of drugs for various patient parameters. We hope that the conclusions would provide useful insights on improving the effectiveness and safety of drugs in the context of personalized/precision medicine.

Additionally, access to a large amount of anonymized patient indication data allows to do statistical evaluation of disease and affliction frequencies, and determining which conditions occur together. However, it is not trivial to determine the relevance of this data without a good visualization and detailed analysis. So the intent is to develop a tool that displays this data in an easy-to-interpret fashion like an interactive heatmap, which allows different views on the underlying data and interactive filtering by gender, age and icd10 groups, and scaling and normalization. This can be built on the base of existing javascript solutions, or re-made from scratch using other suitable tools