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EzeCHiel : Drug concentration prediction and analysis software

CHUV Centre hospitalier universitaire vaudois

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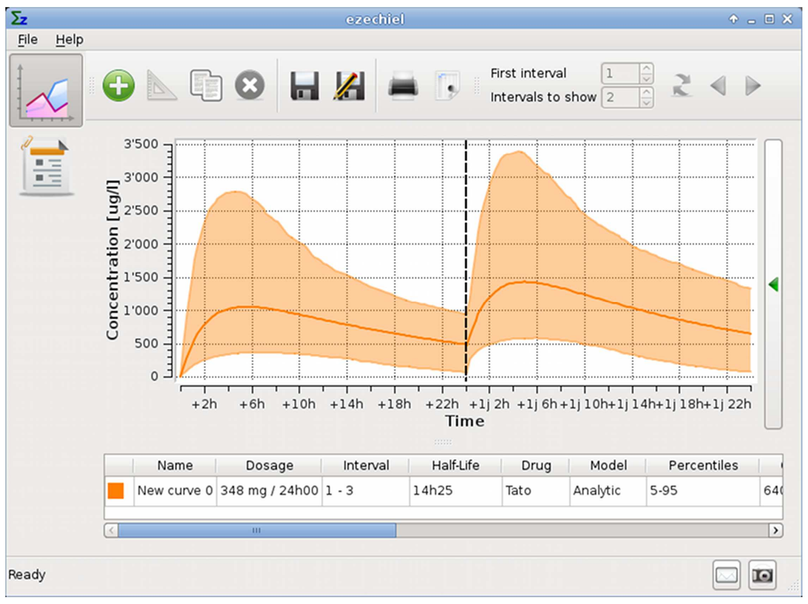


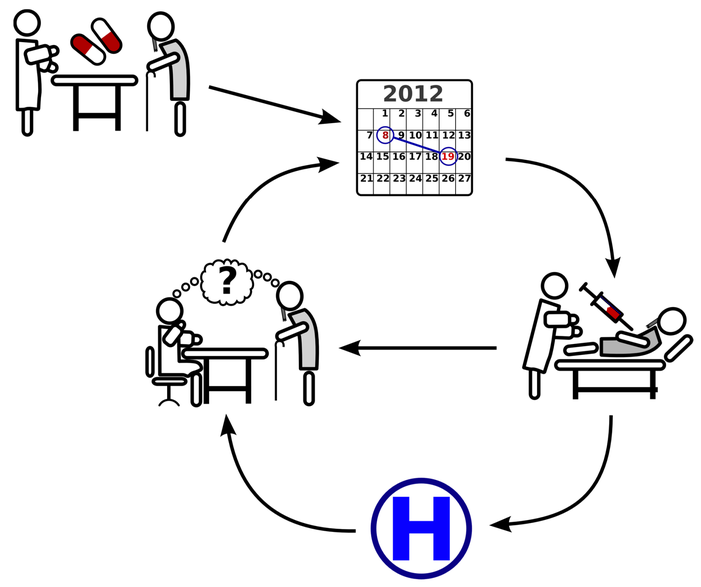
Objectives

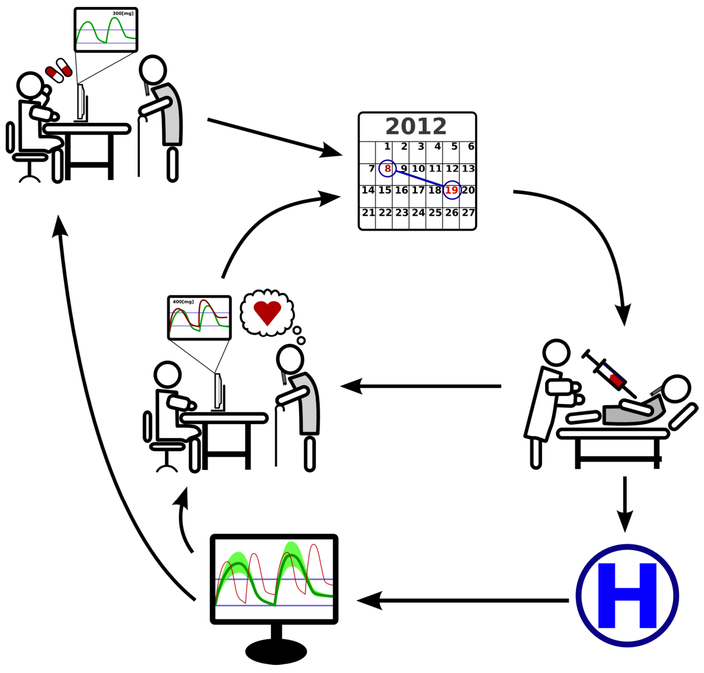
- To support physicians to optimize dosage regimens by providing an easy-to-use but powerful software
- To promote the use of sophisticated and robust statistical and pharmacokinetic methods
- To enhance prediction models through automated statistics gathering
- To provide automatic reports generation to physicians
- Adaptive in terms of drugs, route of administration and pharmacokinetic models

Background

Dosage individualization is part of the growing field of personalized medicine. Currently, the dose optimization based on blood drug concentration is a complex and time-consuming task for practitioners:

1. Define an *a priori* dosage, based on drug recommendations, without any prior blood drug concentration.
2. Introduce the drug and wait until the drug concentration stabilizes (“steady-state”).
3. Measure the blood drug concentration of the patient.
4. Adjust the dosage regimen using empirical methods or the recommendations of a pharmacologist





Solution

EzeCHiel will support physicians both:

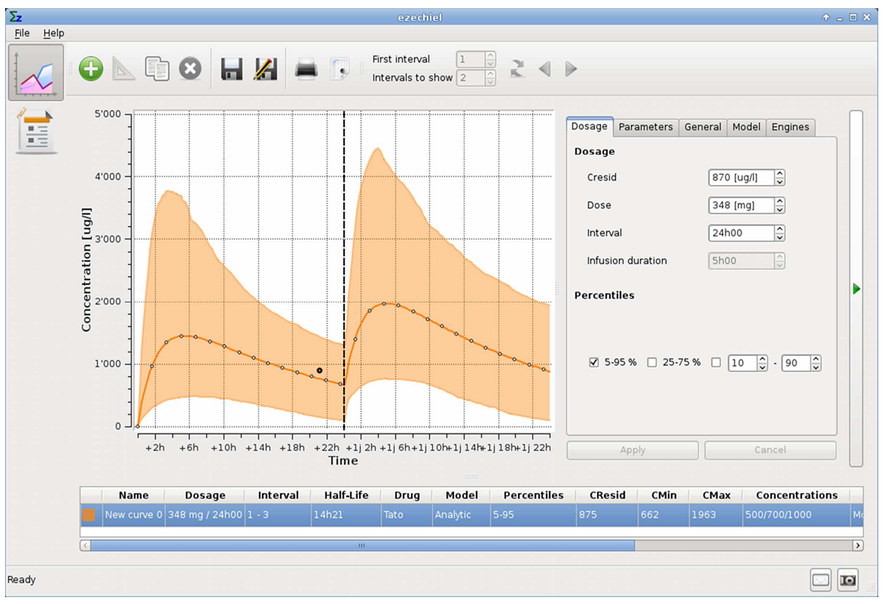
• to choose a rational initial dosage (*a priori*) by adapting the generic population parameters to the patient's individual data (such as weight, height, sex, other diseases) and

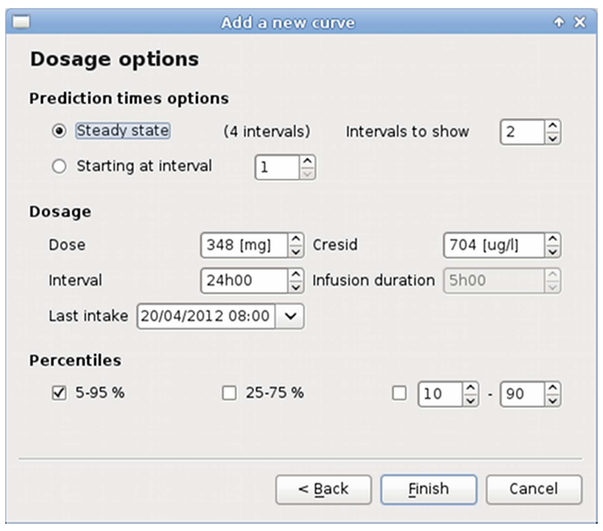
• to adapt drug dosage regimen based on individual blood drug concentration (*a posteriori)* to target a desired therapeutic range

In addition, EzeCHiel will support the pharmacological research, by enabling to further use stored data to define new population and drug models. This, in return, will be brought to practitioners in EzeCHiel updates, for new dosage optimization.

Software Features

- Easy to use and complete GUI in Qt (C++)
- Multi-OS (MacOS, Windows, Linux)
- Modular through plug-ins and XML
- Prediction algorithms used:
  - analytic and differential (Runge-Kutta method) calculation based on pharmacokinetic compartmental models
- Bayesian method used for individual curve fitting, on the basis of population pharmacokinetic models
- Percentile calculation algorithms :
  - Taylor approach
  - Monte-Carlo simulation approach
- Anonymous patient data storage for research purposes in a remote central database
- Easily interfaceable with laboratory information systems and other monitoring tools





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