

# EzeCHiel: an Evaluation-Prediction Engine for Medical Drug Concentrations

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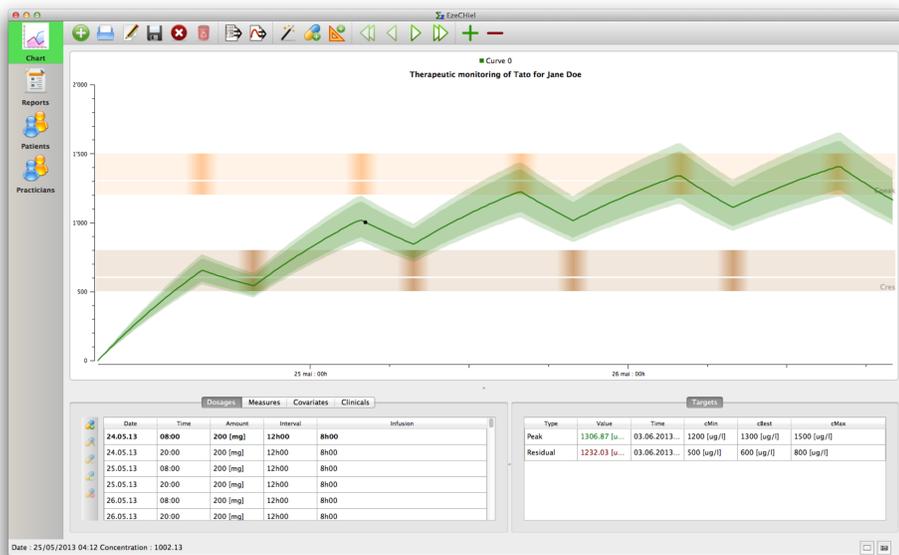
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## Goal

EzeCHiel is a flexible, user-friendly software designed to help both pharmacologists and medical doctors with the interpretation of drug concentration results in terms of prediction, evaluation of normality and posology adjustment.



## Prediction

To answer the question « *What will be the future concentration profile, given the patient's specific set of parameters ?* », EzeCHiel uses extrapolation to peak and through time in order to produce concentration curves.

Time is decomposed into dosage cycles, the concentration calculation of each cycle starting at the residual concentration left by the previous cycle. It is therefore possible to track and adapt the concentration profile from the very start of the treatment to its end, changing the patient's covariates such as the weight, at any time. It is also possible to create predictions directly at steady state (on-the-fly predictions).

The computing methods are a composition of:

- Elimination: *Linear, Michaelis-Menten*
- Intake: *Bolus, Infusion, Extravascular*
- Number of compartments: *1, 2 or 3*

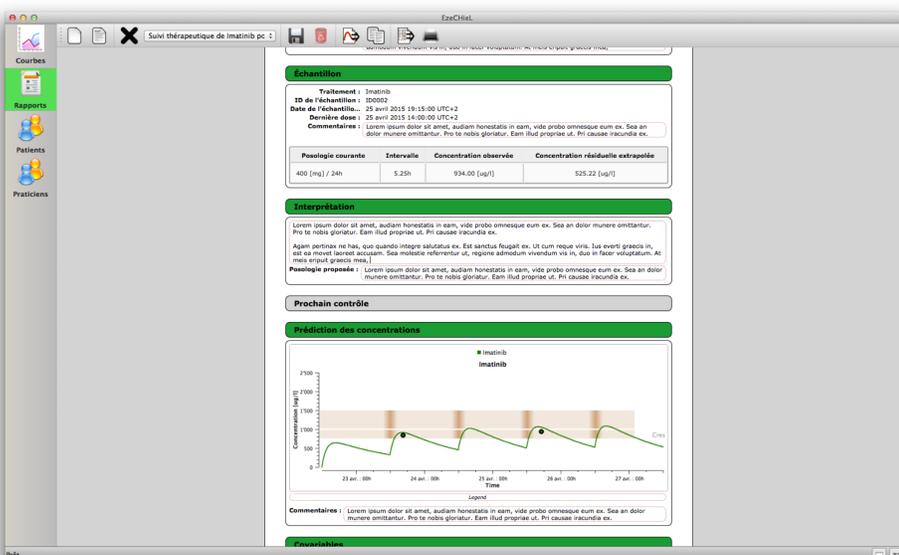
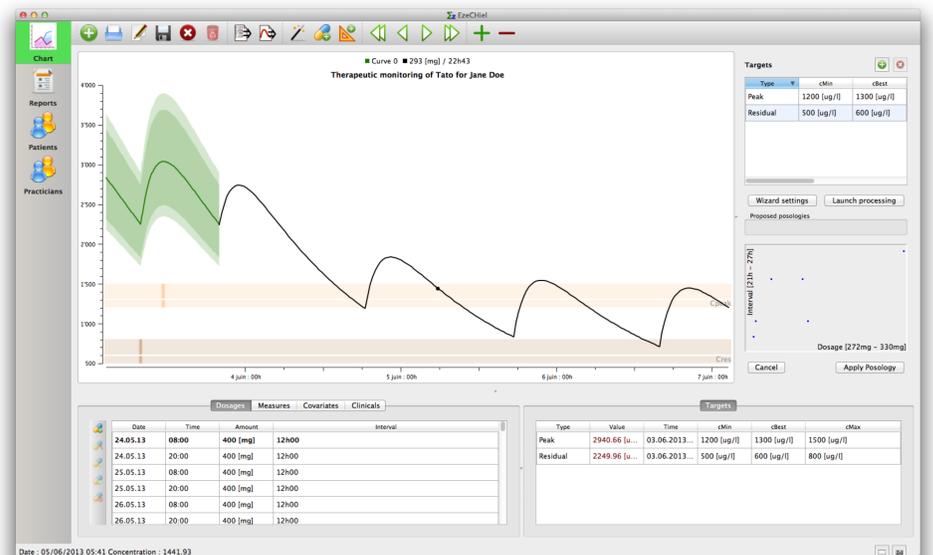
## Evaluation of normality

To answer the question « *Is the observed concentration normal, i.e. expected with regard to population data ?* », EzeCHiel provides customizable percentiles based on pharmacokinetic parameters and their known variability. The computing methods used are:

- Monte Carlo
- Taylor (first and second order)
- Analytic approach based on error estimation

Moreover, the software will determine the most likely values of a patient's individual parameters based on population data and individual drug concentrations obtain through blood samples. The computing methods used are:

- Maximum likelihood and Bayesian approach
- FOCE



## Posology adjustment

To the question « *Knowing the observed concentration, what posology adjustment is required to attain the appropriate target range ?* », EzeCHiel answers by providing visual markers of a specific drug's targets, as well as a dosage wizard for finding out the optimum doses and intervals of a given treatment. The computing methods used are:

- Continuous and discrete CSP (Constraint Satisfactory Problem)
- Genetic algorithms

Once the adjustments are made, the practitioner has the possibility to fill out a report, publish it and send it to the relevant individuals or institutes. The report is built around HTML5 and CSS3 technologies, which allows for a high degree of layouts and templates customization, as well as pre-filing the report with all the treatment available data.

## And much more...

Amongst other features, EzeCHiel is extremely modular (plugin based computing modules and databases, XML based drugs files), secured (user management and per-field encryption systems) and will be able to interact with a given institution's medical database as well as collect data in order to enhance and create new pharmacokinetic models.

