

Integration of mathematical model predictions into routine workflows to support clinical decision making in haematology

Additional file 1 - List of necessary software features

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The following list enumerates the necessary software features of the presented web application.

1. Only authorized persons will be able to access to the database application.
2. Only authorized persons will be able to access patient identifying data in dependency of their permissions.
3. The software needs to provide the functionality to define user permissions. This needs to be implemented as a role-based user access control.
4. Medical data has to be stored/kept separately from identifying patient data (Pseudonymization).
5. There has to be a functionality to reconnect medical and simulation data to recover patient identifying information (De-pseudonymization).
6. Authorized users should be able to search for patients by identifying data (e.g. Name, Date of birth) or pseudonymized data (e.g. global or study internal patient identifier).
7. Following pseudonymized data should be managed by the software.
 - Diagnostic procedures with diagnostic parameters
 - Diagnoses and other results from clinical examinations
 - Treatments
 - Any other freely definable patient data
8. Authorized users should also be able to add, modify or delete data.
9. The software / database design should be developed such that different studies with different clinical data can be handled.
10. Redundancies have to be avoided.
11. The data quality has to be ensured by defining global master data. This includes the used-based definition of e.g. trial information, diagnostic parameters, drugs, units.
12. The application has to be implemented with an audit trail / data version control system to trace every data modification.
13. The application needs to provide the following data visualizations:
 - time course for BCR-ABL1 transcript levels with treatment details for patients with CML.
 - Platelet dynamics with treatment details for NHL patients.
14. The application needs to integrate different computer models by interacting with appropriate model servers. The following model-based predictions need to be included in the demo server:
 - prediction of treatment-response dynamics in patients with CML
 - prediction of thrombocytopenia under cytotoxic chemotherapy for NHL patients
15. Simulation calls and results from model simulations need to be stored and recalled, if necessary. Patient specific model simulations shall only be initiated if there are any updates in the medical data or changes in the parameter sets.
16. The user interface should be easy and intuitive to use.