**Towards Personalization of the Treatment**

Why do we need personalization?

- Some drugs have a narrow therapeutic range and a poorly predictable relationship between the dose and the blood drug concentration, that may also vary greatly among individuals.

**Therapeutic Drug Monitoring (TDM)** aims at improving patient care by monitoring drug levels in the blood to individually adjust the dosage in order to target drug concentration in the therapeutic interval. Bayesian TDM ensures a better prediction of the relationship between dose and drug concentration and is based on studies in the general or special populations. This requires population health data (covariates, dosages, drug concentrations) to be collected and analyzed by the researchers.

**Challenges**

- Achieving interoperability in the distributed environment
- Dynamicity of the data
- Regulations and standards
- Different interfaces
- Protection of patients’ privacy
- Sensitivity of medical data
- Aggregation of the distributed data about the patient (can reveal sensitive information!)
- Consent management
- Access control policy requirements

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**Privacy Preserving Interoperability for Personalized Medicine**

A. Dubovitskaya\(^1,2\), V. Urovi\(^1\), M. Vasirani\(^2\), K. Aberer\(^2\), A. Fuchs\(^3\), T. Buclin\(^3\), Y. Thoma\(^4\), M. I. Schumacher\(^1\)

\(^1\)Applied Intelligent Systems Laboratory, HES-SO VS
\(^2\)Division of Clinical Pharmacology, CHUV and University of Lausanne
\(^3\)Reconfigurable and Embedded Digital Systems Institute, HEIG-VD

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**How to share and aggregate medical data for research purposes while preserving the patients’ privacy?**

**Dataflow Overview**

- Personalized recommendations
- Caregiver
- TDM Software
- Cloud storage
- Researcher

POC – Point-Of-Care system, that will be able to:
- Perform and collect measurements of the drug concentration in the blood samples
- Provide the medical doctor with all necessary data about the patient
- Share drug intake information and concentration measurement records for research purposes

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**Ongoing Work**

- Developing an interface for the TDM software compliant with HL7 and integrating it with the laboratory system in CHUV (Lausanne)
- Constructing a secure and scalable architecture of an eHealth system for primary and secondary use of the health data:

**Architecture Model**

- **Access control management**
  - Caregivers and Patients have their secret keys and corresponding public keys certified by CA
  - Patient generates from her secret key a shared key with each caregiver she visits
  - The sensitive data are encrypted with the shared key and signed with the public key of a caregiver
  - De-identified data are signed and sent to RSDB

**References**