

Swiss Initiatives for Adverse Drug Events' Detection in Hospitalized Patients: Focus on Antithrombotics in Aged Patients

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Background

- Medication safety in aged patients is a burning area of concern in Switzerland. Adverse drug events (ADEs) are observed in approximately one third older inpatients
- To limit ADEs, ADE reporting systems have been implemented at the national, regional, or provider level
- Because of their well-known limitations, automated detection technologies based on electronic medical records are currently developed to detect routinely or predict ADEs.

Objectives

The main objective of the project is to develop and validate an electronic application for the automated detection of ADEs related to antithrombotics based on structured data and free texts mining to quantify the prevalence of ADEs associated with and caused by antithrombotic drugs and to assess the causality, severity and preventability of detected ADEs induced by antithrombotic drugs

Method

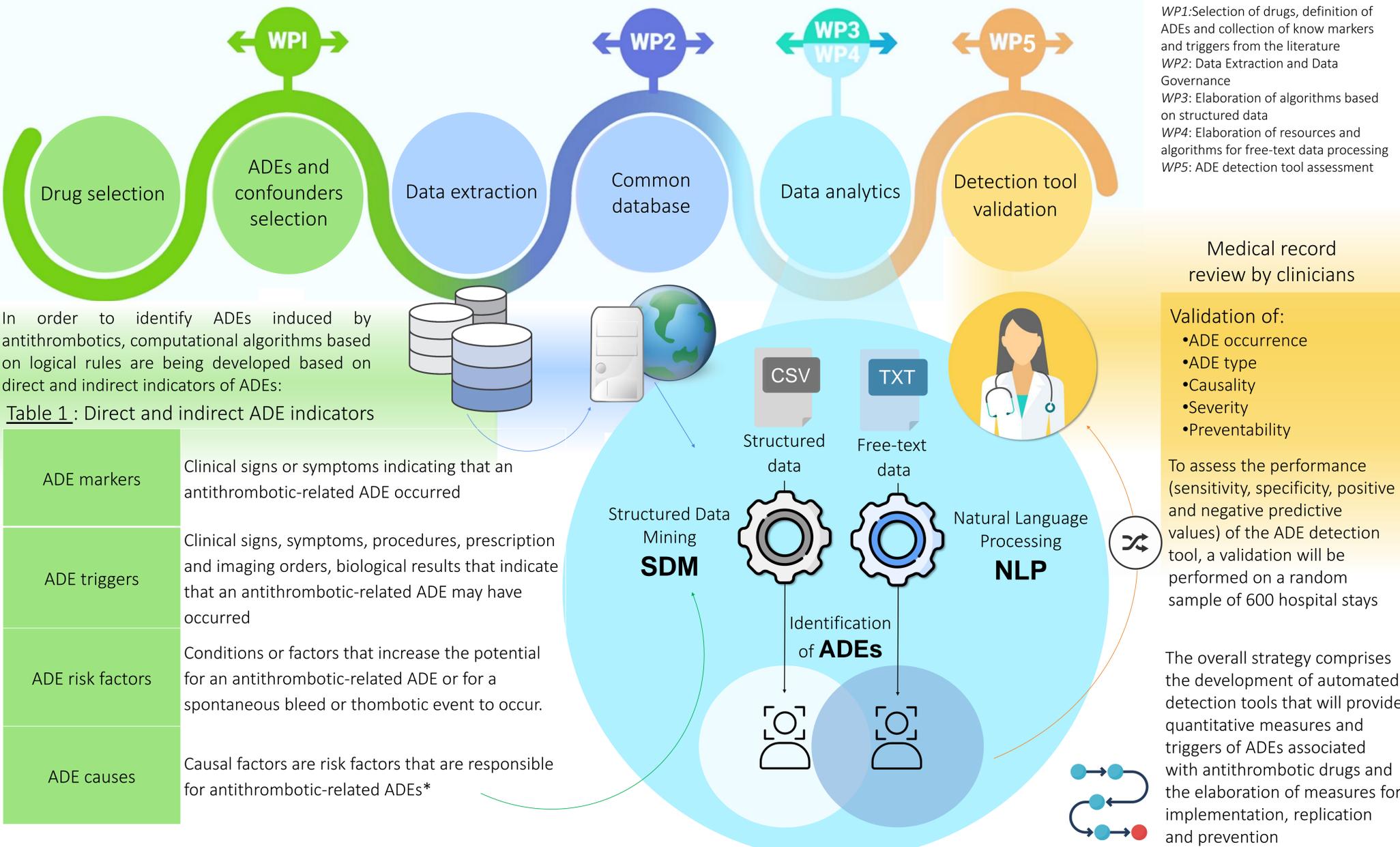
A multi-center retrospective observational study using routinely collected health-related personal data. The project is being conducted by an **interdisciplinary team** at four hospitals in German and French-speaking Switzerland .



Inclusion criteria:

- Patients ≥65 years
- A hospital admission between 01.01.2015-31.12.2016
- At least one antithrombotic drug prescription during each stay
- Hospital stays >24 h

Figure 1: The global approach of the SwissMADE Project.). Five work packages (WP) will provide answers to the objectives.



In order to identify ADEs induced by antithrombotics, computational algorithms based on logical rules are being developed based on direct and indirect indicators of ADEs:

Table 1: Direct and indirect ADE indicators

ADE markers	Clinical signs or symptoms indicating that an antithrombotic-related ADE occurred
ADE triggers	Clinical signs, symptoms, procedures, prescription and imaging orders, biological results that indicate that an antithrombotic-related ADE may have occurred
ADE risk factors	Conditions or factors that increase the potential for an antithrombotic-related ADE or for a spontaneous bleed or thrombotic event to occur.
ADE causes	Causal factors are risk factors that are responsible for antithrombotic-related ADEs*

Preliminary results:

Administrative, clinical, prescription, and laboratory data available in the form of free texts and structured data have been extracted from study participants' EMRs (Lausanne number of stays n=8590, Geneva n=21397, Zürich University hospitals n=19472 and Baden Cantonal hospital n=14567). The SDM and NLP algorithms are currently under development. The SDM and NLP algorithms are currently under development. Three different machine learning models are being tested for NLP analyses: a) Linear model, b) Naïve Bayes and c) Support Vector Machine (SVM)

Relevance/Application:

The project will allow the introduction of measures aiming at improving safety when prescribing anti-thrombotic medication. The findings will be implemented in clinical practice by means of indicators of adverse events for risk management, and training for healthcare professionals; the tools and methodologies developed will be disseminated for new research in this field.