KSA Kantonsspital Aarau

Update:
Development and Implementation of a Multi-Agent-System for the Detection of Medication Errors and Reduction of Adverse Drug Events

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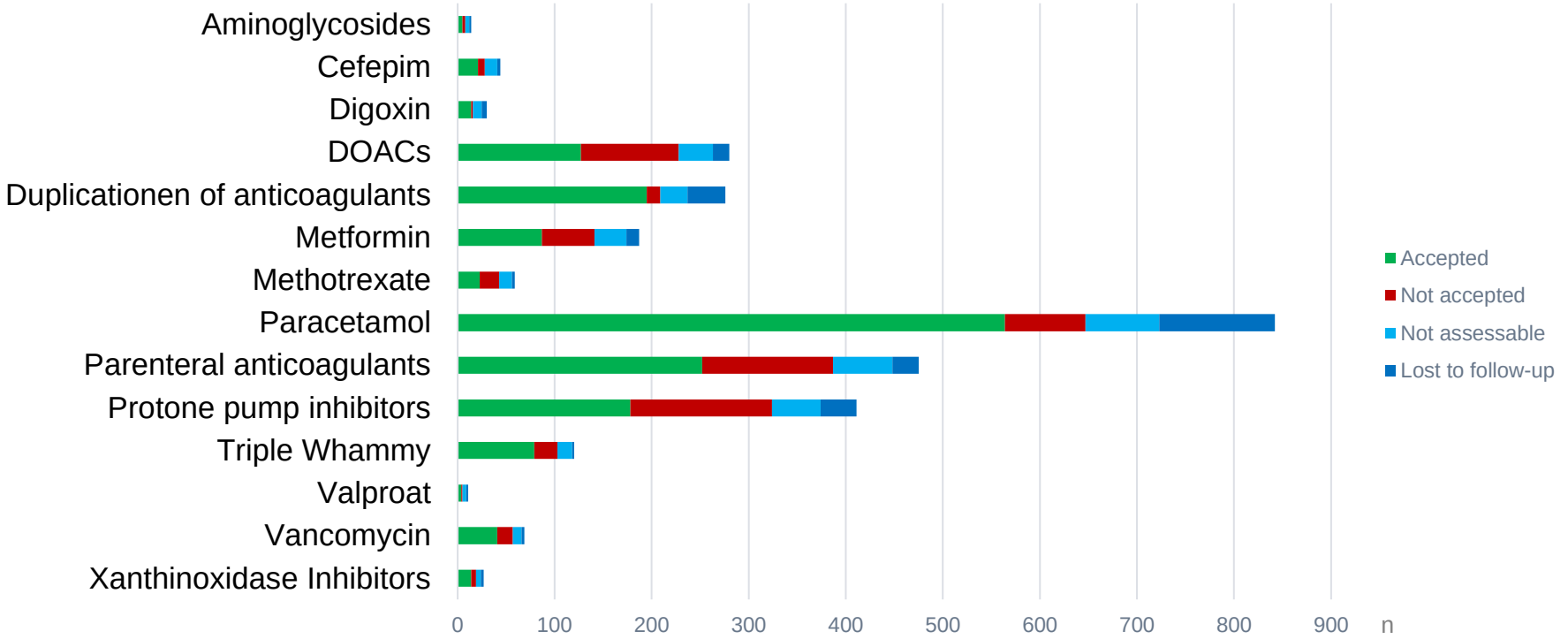
Refresher

What is KPharm?

- Clinical Decision Support System: Algorithm-based Multi-Agent-System for the electronic surveillance of medication orders
- Interdisciplinary team (pharmacists, physicians, IT)
- Currently 20 Algorithms implemented in KISIM by CISTEC
- Good example about how we develop, implement and evaluate the algorithms: Diploma thesis Lee Flückiger (available via GSASA Homepage)

2021: Alerts per Algorithm

Total: n = 2850, Acceptance rate = 72.8%



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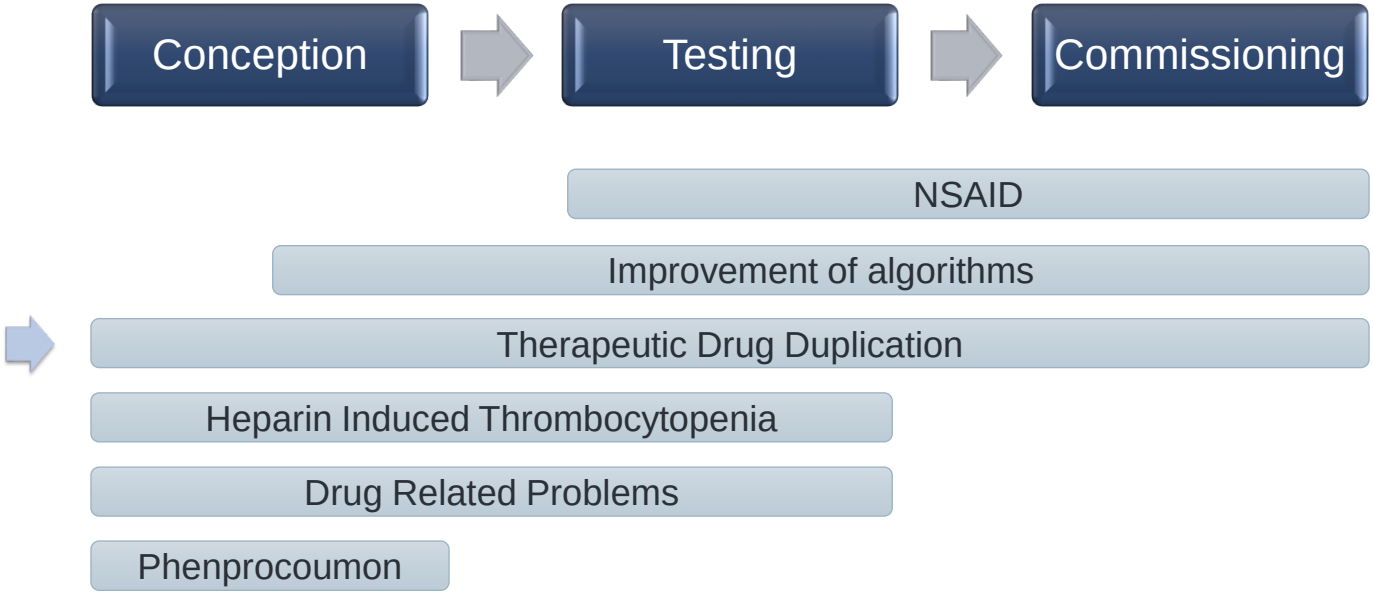
2022: Development of new algorithms



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Therapeutic Drug Duplication

Definition:
Unintentional duplication of prescriptions, either at the level of the **active ingredient** or the **therapeutic class**

One would think that the detection of such duplications is easy to program, but:

- Recent data from ESCP 2022: Duplication alerts after switch to a commercial system: over 300 alerts/Day, Bypass rate: 85.6%[1]

Why is it so hard to automatically detect drug duplications?

[1]Ennader N, Bouyakoub Y, Marien S, Dalleur O. Analysis the use of drug alerts after conversion to a commercial electronic health record [Poster], ESCP 2022, Prague

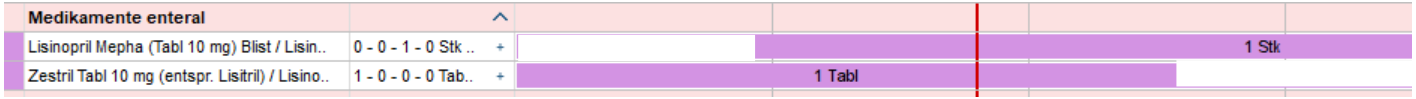
What is a Therapeutic Drug Duplication?

Finding Duplications via:

- **ATC-Code**

L3: Dalteparin (**B01A**B04) and Apixaban (**B01A**F03): undesired duplication
L3: Metformin (**A10B**A02) and Empagliflozin (**A10B**K03): desired duplication
BUT: Enalapril (**C09AA0**2) and Lisinopril (**C09AA0**3): undesired duplication

- **Chronological Order**



Overlap in prescriptions, but not in drug administration

- **Prescription types (fixed, demand)**

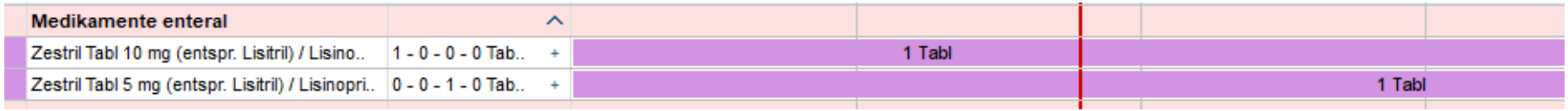
Example: desired duplication of pain medication on demand
CAVE: Only if Daily Dose < maximal Daily Dose

- **Combinated Medication**

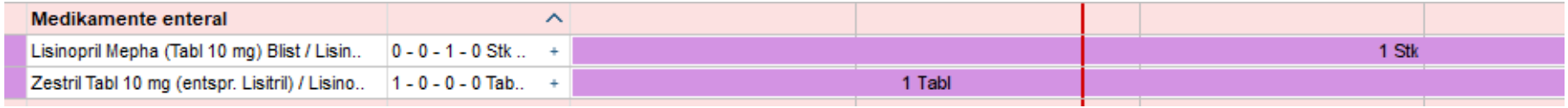
Example: Zestril® (Lisinopril) + Zestoretic® (Lisinopril, Hydrochlorothiazid)
May be desired or accidental

What is a Therapeutic Drug Duplication?

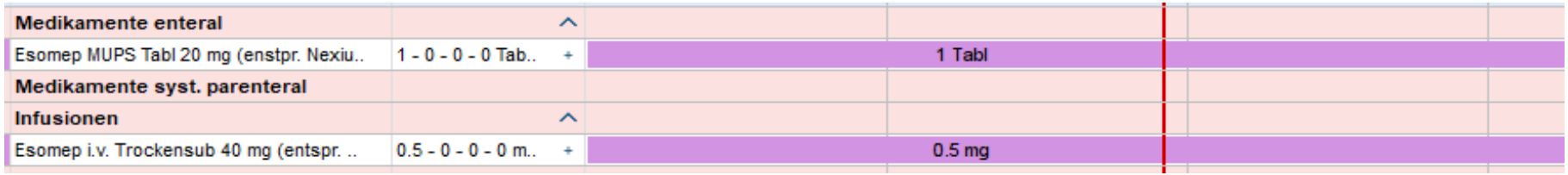
Same ATC and Fix Dose:



Desired Combination of two preparations to reach the required dose



Same ATC, same Dose, different Brand Names: likely an error



Different routes of application, same time of application: likely an error
BUT topical and oral: not an error

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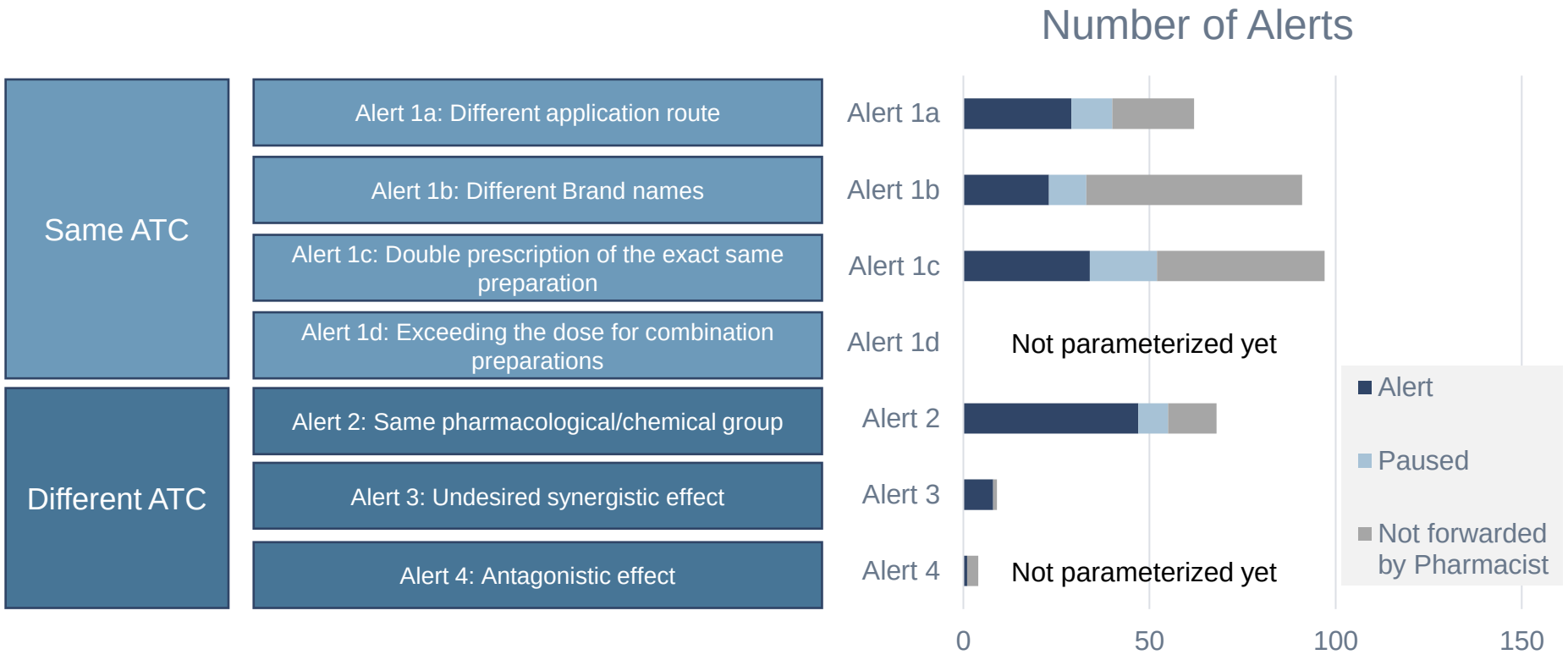
New Algorithm: Therapeutic Drug Duplication



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Evaluation of algorithms

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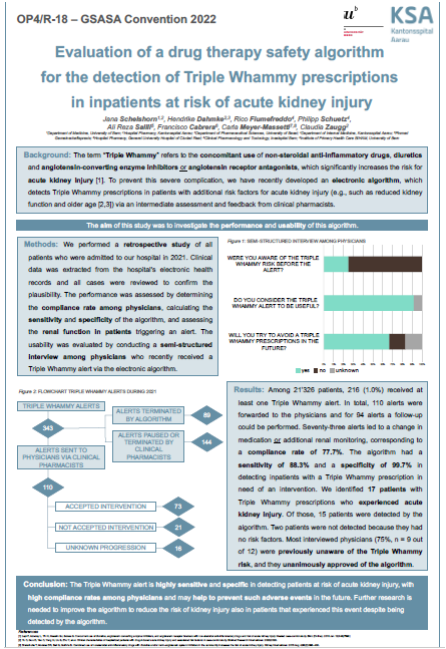
R18

Triple Whammy Algorithm

Masterthesis
Jana Schelshorn



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Duplication of Anticoagulants

Masterthesis
Sophie Stoop

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Thank you