

ML13: Assessment of Machine Learning Methods for Coding of Concomitant Medications in Clinical Trials



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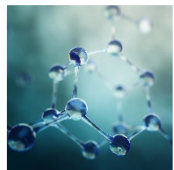
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Machine Learning in Clinical Trials



Drug Discovery

- Drug candidate identification
- Protein engineering



Drug Testing

- Trial recruitment
- Trial design and optimization - *Adaptive Clinical Trials*
- Clinical Processes - *Medical Coding*



Drug Repurposing

- Finding new therapeutic indications to already available drugs and chemical compounds

Assessment objective & scope

Objective

- Increase automation level in the medical coding process

Scope

- Coding of concomitant medications

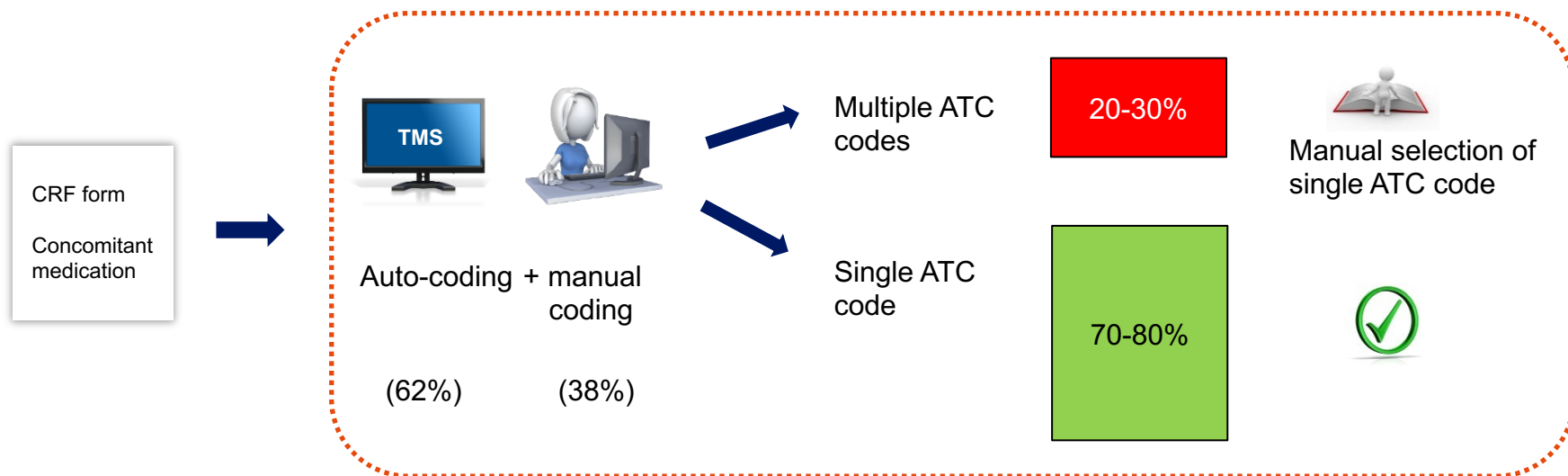
Example output from coding

Verbatim Term	Indication	Drug Name (coded)	Drug Code (coded)	ATC code (selected)
Aspirin 81 mg tablet	to help prevent heart attack and/or stroke.	ASPIRIN	00002701004	B01AC, Platelet aggregation inhibitors excl. heparin
Aspirin	Headache	ASPIRIN	00002701004	N02BA, Salicylic acid and derivatives

Written by Investigator on
Concomitant Medication Form

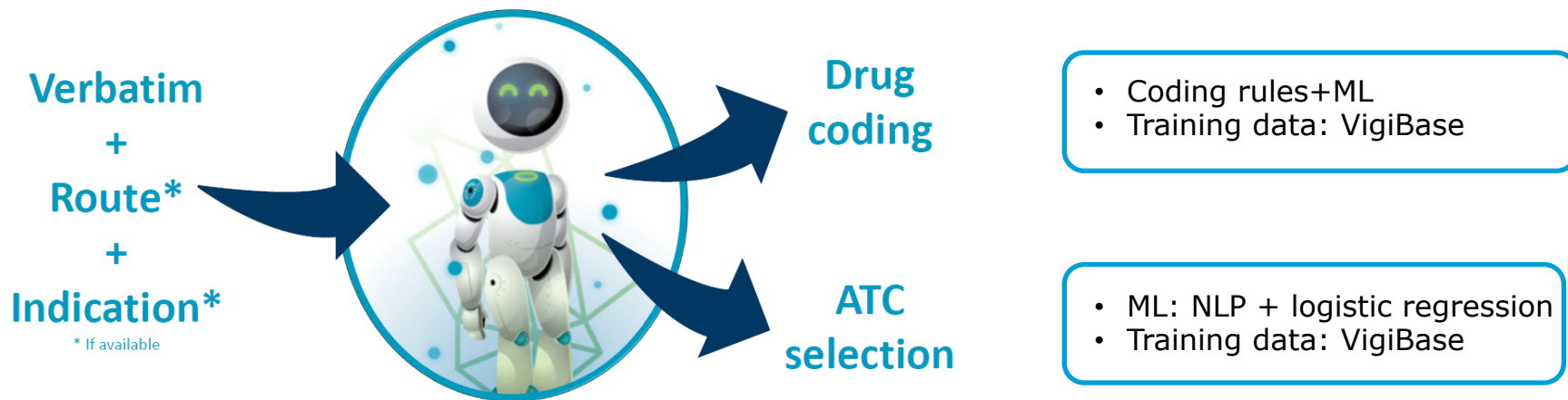
Outcome from coding

Current concomitant medication coding process at Novo Nordisk

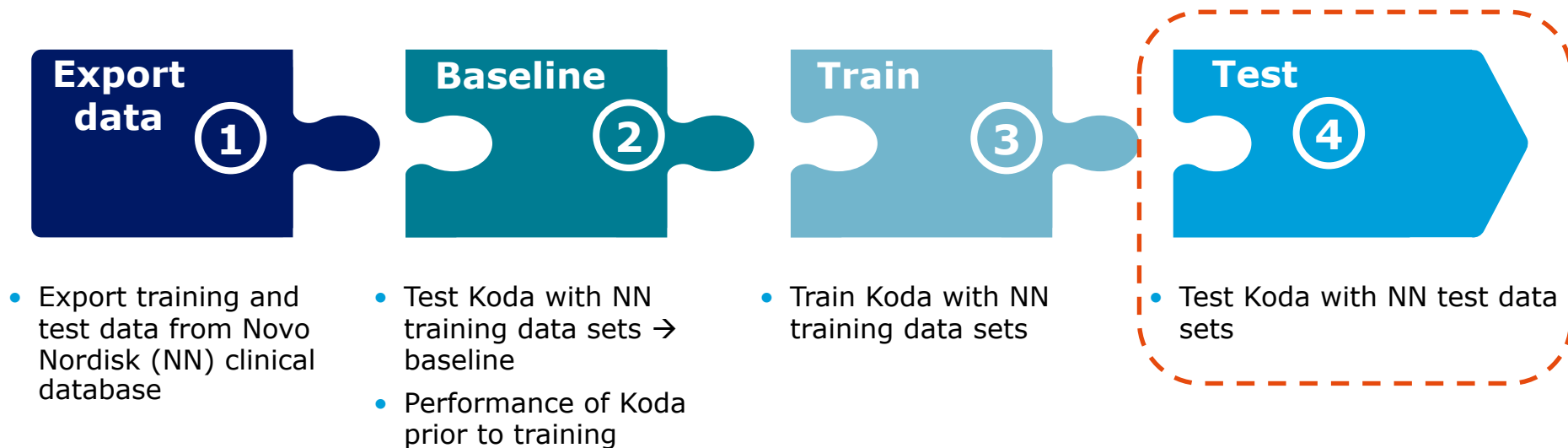


Challenge: How to automate the entire process?

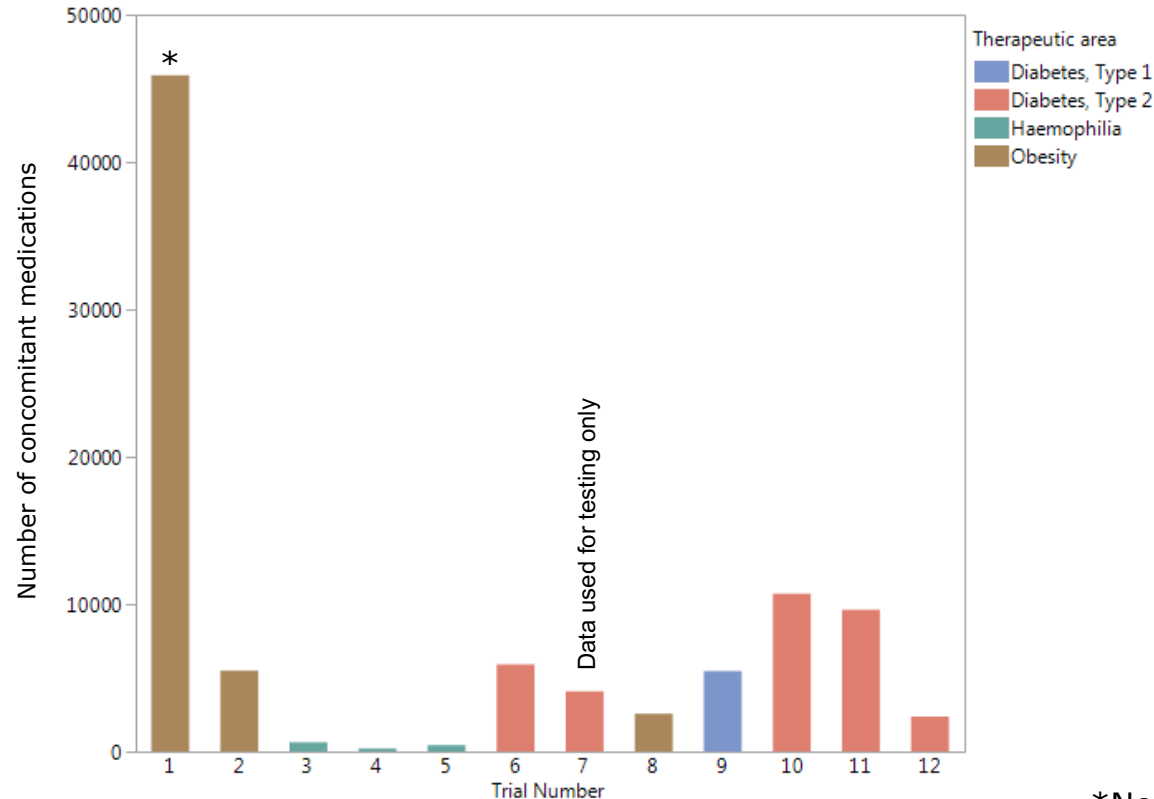
Assessment of Koda – an automated coding engine from Uppsala Monitoring Centre



Assessment of Koda – project plan

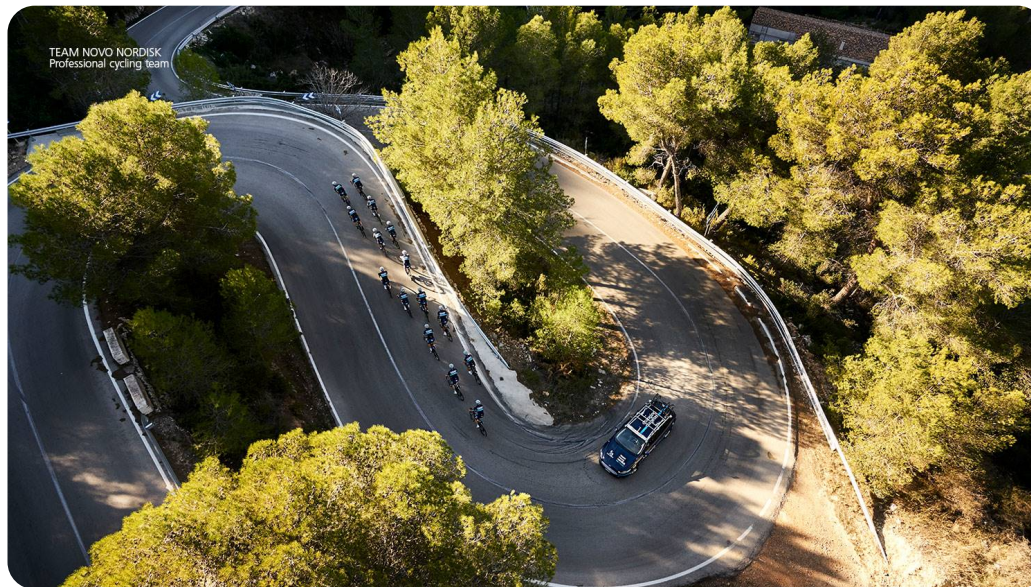


Data sets used for training and testing of Koda

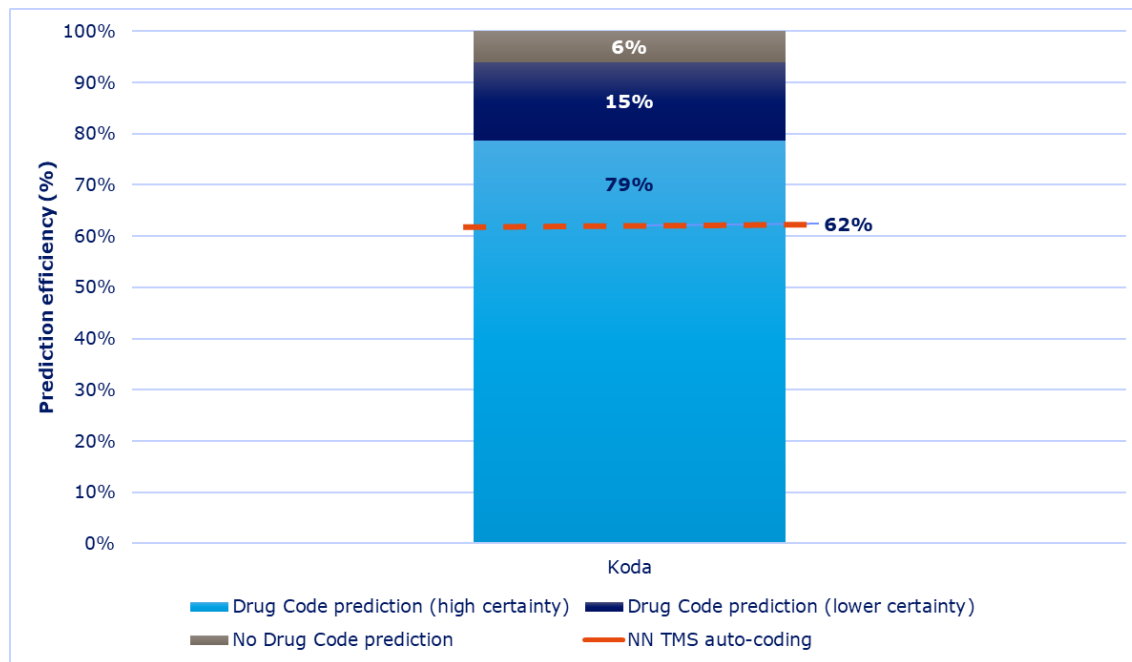


- Data from 12 different trials
- Different therapeutic areas
- 70% of data used for training
- 30% of data used for testing

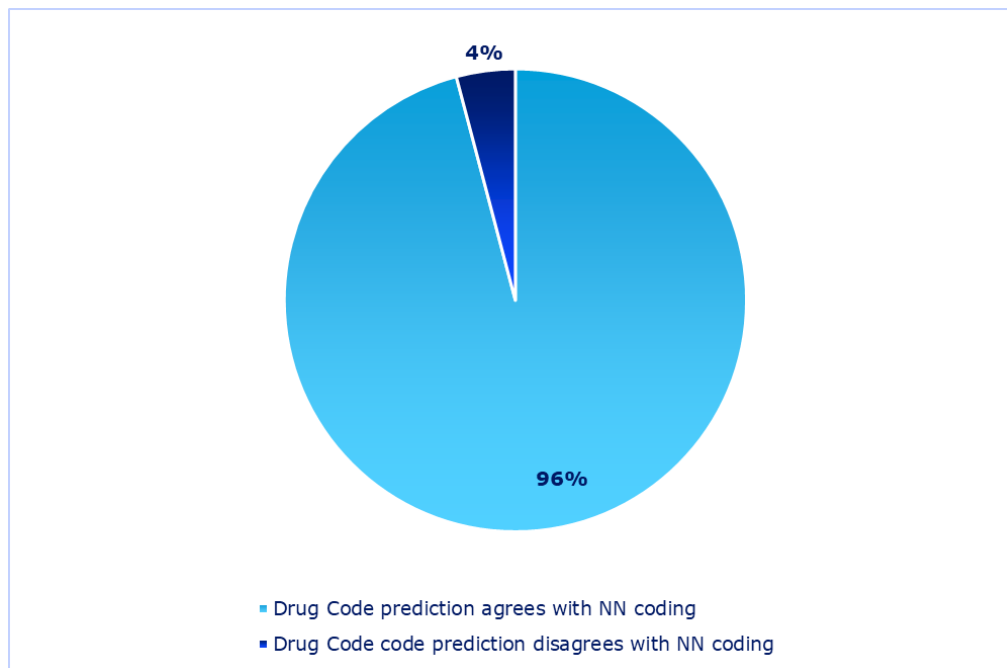
Results from Koda after training with Novo Nordisk data



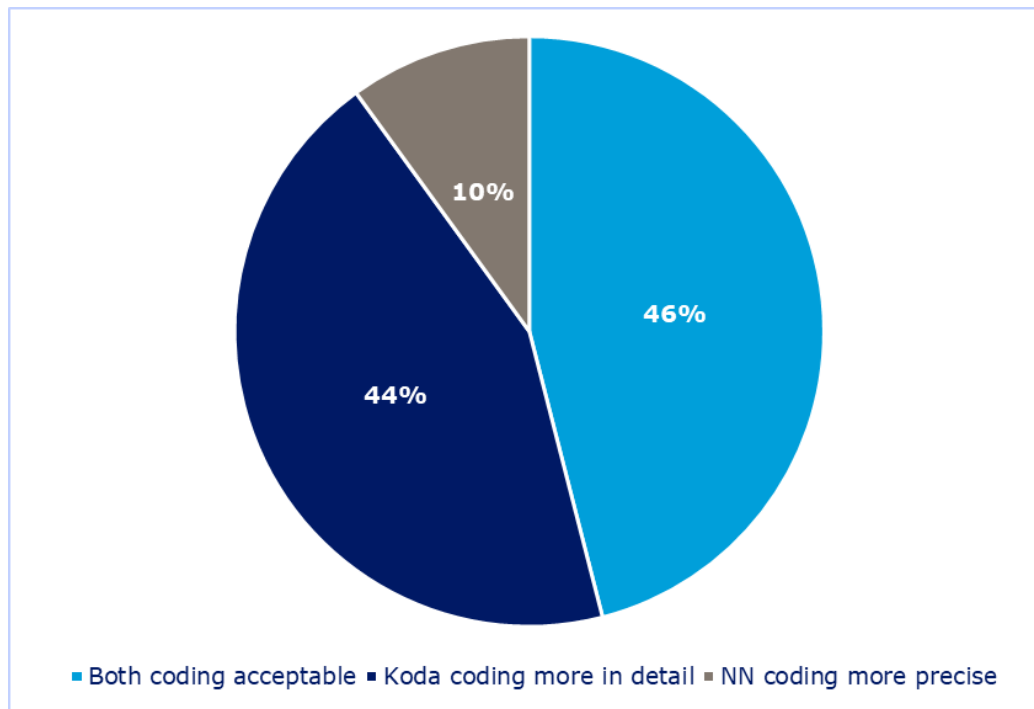
Drug Code coding efficiency



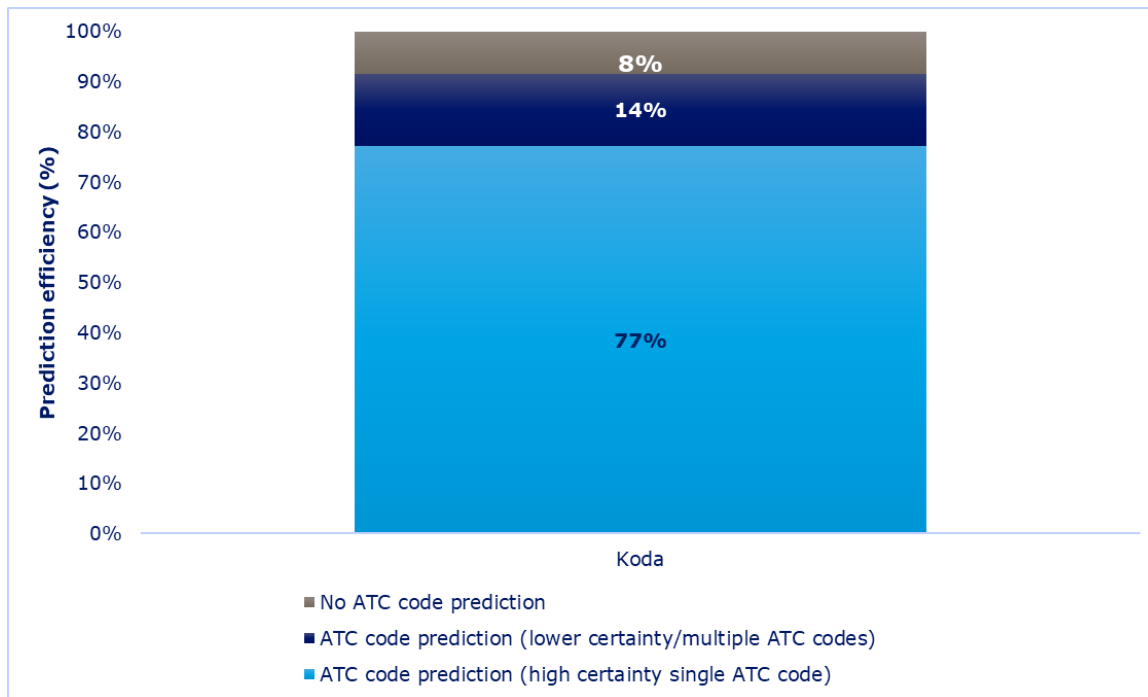
Conformance of Drug Code coding with NN coding – high certainty predictions



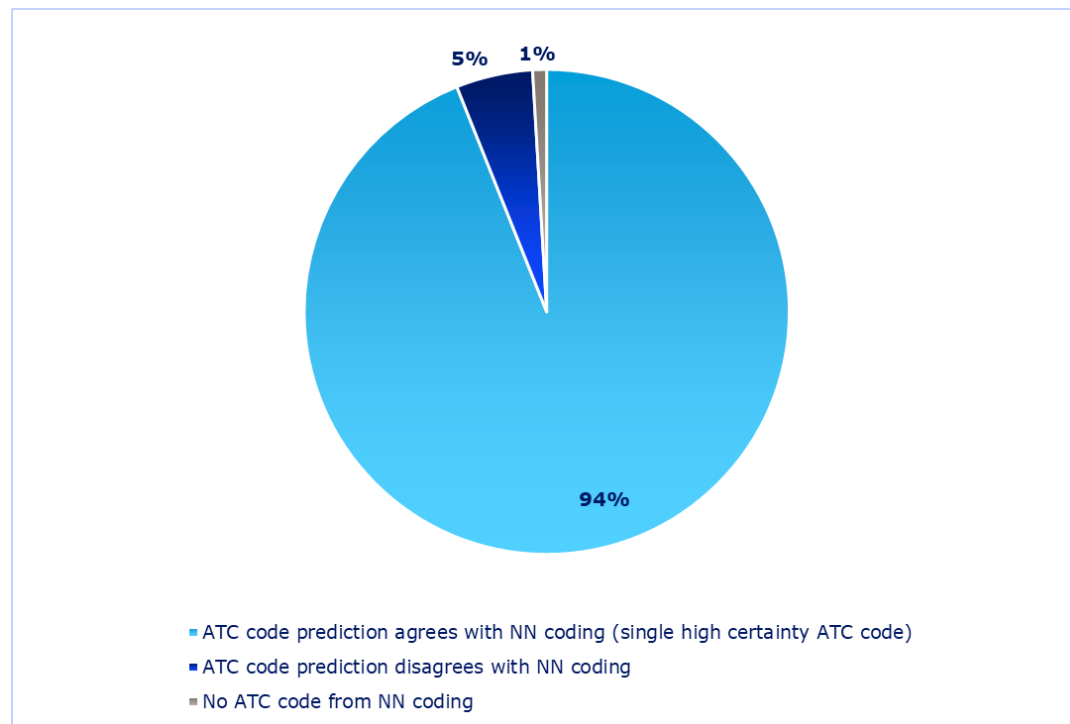
Analysis of disagreeing coding (sample of 181 conmeds with disagreeing coding)



ATC coding efficiency of Koda



Conformance of ATC code coding – high certainty predictions



Summary from Koda assessment

- ML supports automation of concomitant medication coding
 - Koda would enable NN to increase auto-coding rate from 62% to 79%
 - Koda provides single or multiple suggestions for additional 15%
 - Koda would enable NN to automate ATC selection
- High conformance with NN coding



Learnings

- Understanding your data is critical when applying ML in clinical trials
 - Looking into percentages not enough
 - Understand where your method may go wrong and address issues

