Real-world SGLT2i utilization and cardiorenal diagnostic patterns in patients with heart failure: a multicenter OMOP-CDM and NLP-enabled study in Belgium

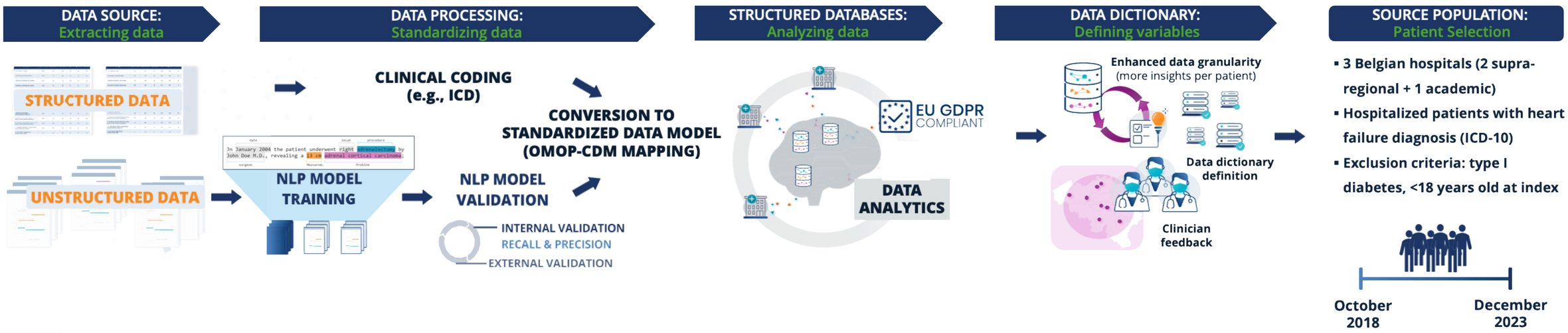
This was an observational, retrospective study using secondary data extracted from Electronic Health Records of patients hospitalized with heart failure in three Belgian hospitals between October 2018 and December 2023.

Background: Heart failure (HF), type 2 diabetes (T2D) and chronic kidney disease (CKD) frequently co-occur as cardiorenal syndrome, driving substantial morbidity and mortality. Real-world evidence (RWE) is essential to characterize evolving cardiorenal diagnostic trajectories in routine care and to monitor treatment patterns across diverse patient profiles, beyond trial populations.

Objectives: Characterize cardiorenal diagnostic patterns along the natural disease course in patients hospitalized with heart failure and describe the prescription patterns of sodium-glucose co-transporter 2 inhibitors (SGLT2i) relative to the cardiorenal diagnostic status in the real-world.

Methods

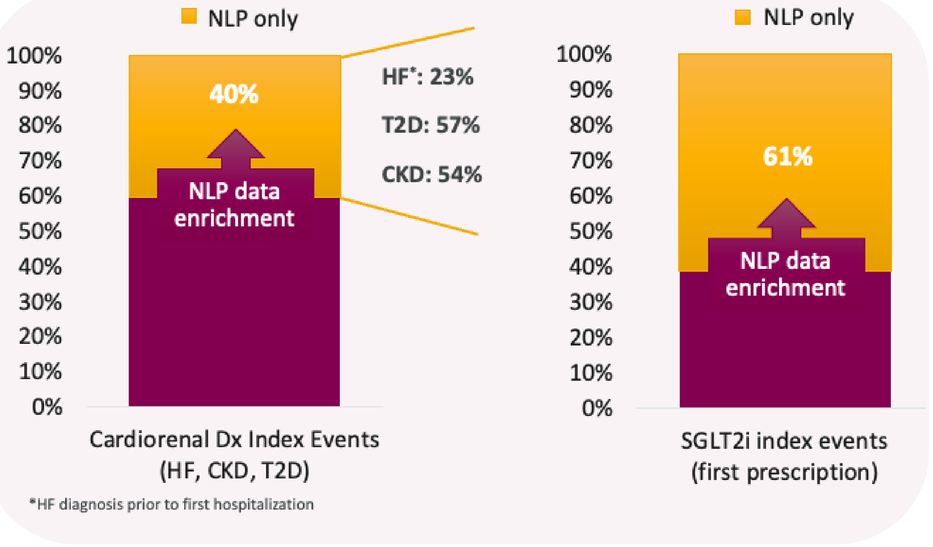
Semi-automated data pipeline for federated analytics:



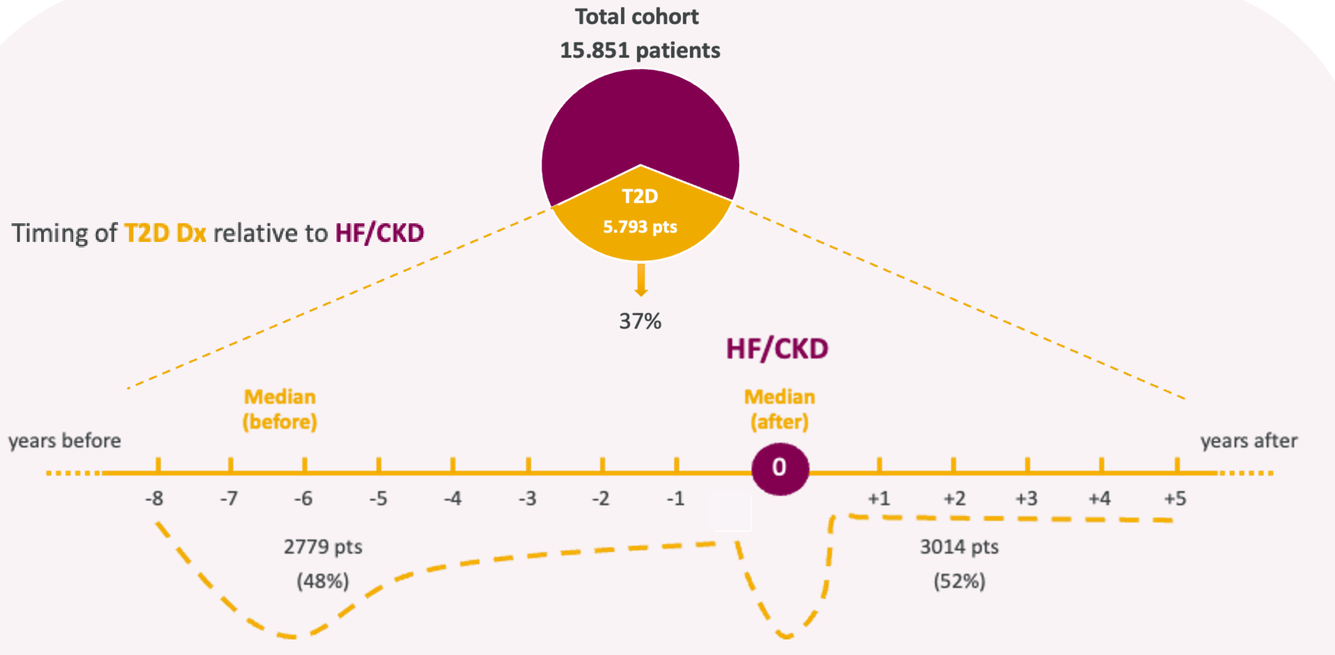
Results

Essential role of clinical natural language processing (NLP); missed opportunity for cardiorenal protection and potential gender inequality in SGLT2i initiation

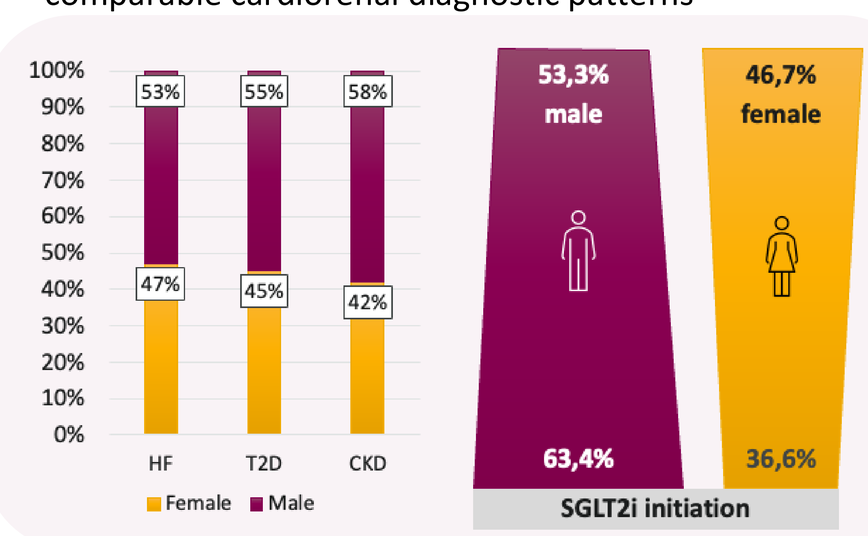
1 NLP significantly enhanced detection of key clinical events and characterization of disease trajectories

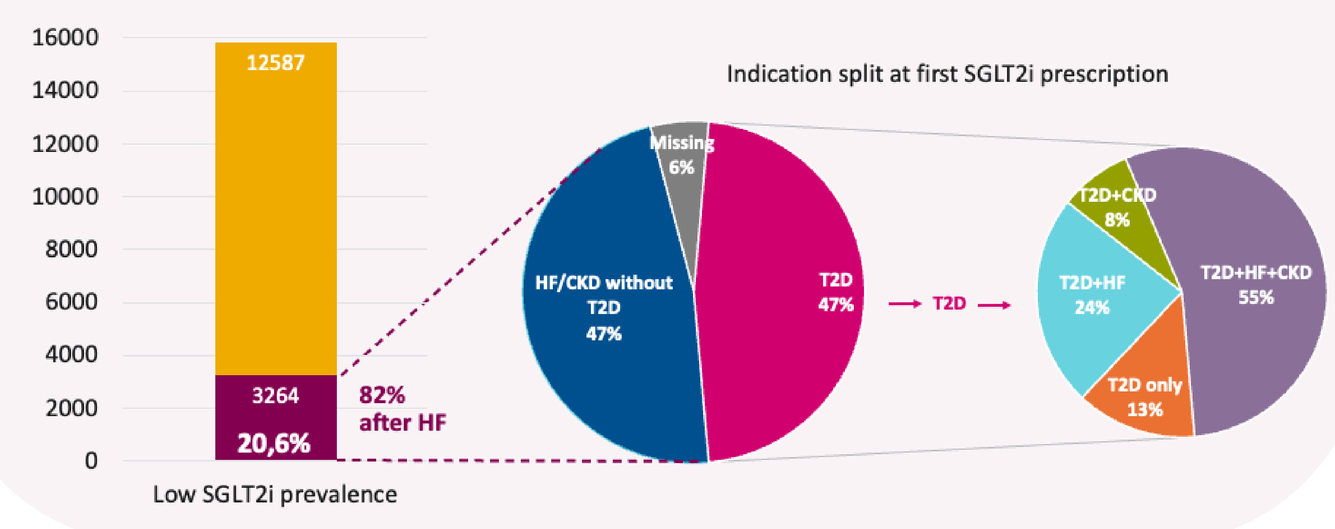


2 Overall low and delayed SGLT2i initiation, despite early T2D diagnosis in almost half of the cases



3 SGLT2i prescriptions less common in women, despite comparable cardiorenal diagnostic patterns





Conclusion

Our federated OMOP-CDM approach with advanced NLP and strong standardization reveals new, cross-institution insights into real-world heart failure (preventive) care. We found that SGLT2 inhibitors were started infrequently and mostly late in patients with advanced cardiorenal disease, even though many had prior T2D diagnosed. These patterns point to missed diagnoses and potential treatment gaps. Starting SGLT2i earlier in the natural disease course could reduce heart failure burden.

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