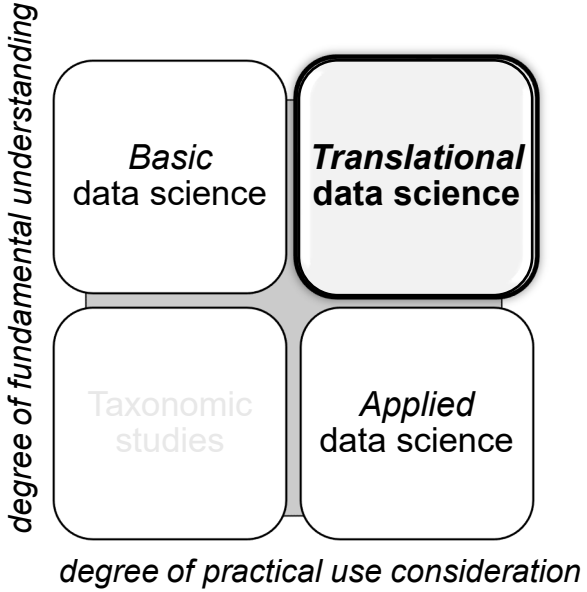
Health Campus Den Haag

Translational Data Science in Population Health

…Data Techniques and Methodology for Violence as a Public Health Problem

KIEM Pressure Cooker Workshop, 11 March 2024, **Marco Spruit**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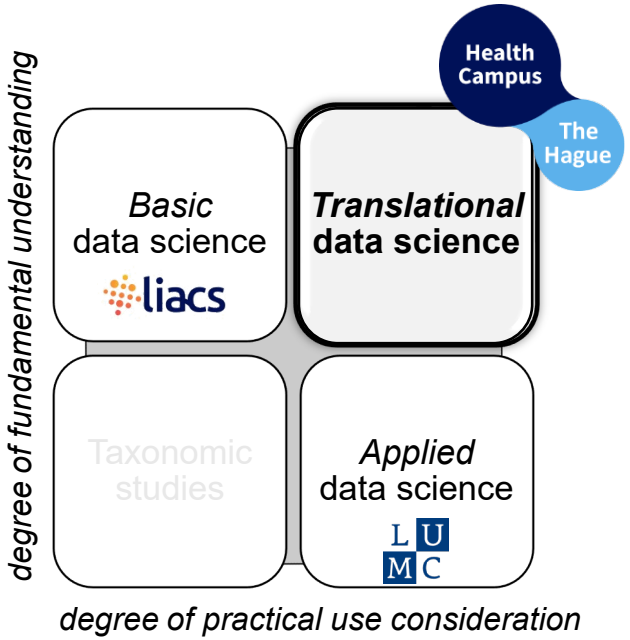
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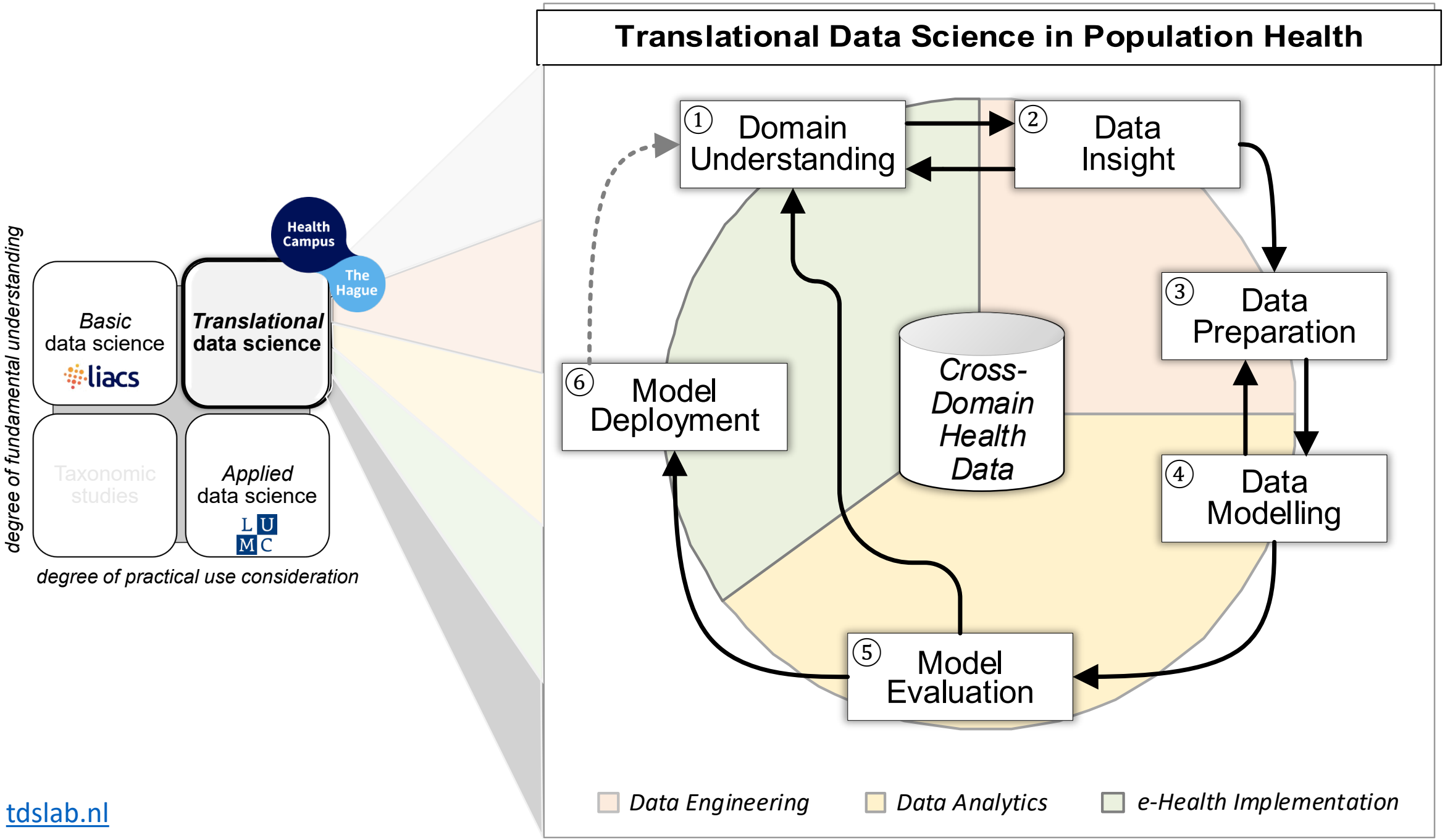
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⑤ Model Evaluation
⑥ Model Deployment
Cross-Domain Health Data
Data Engineering
Data Analytics
e-Health Implementation

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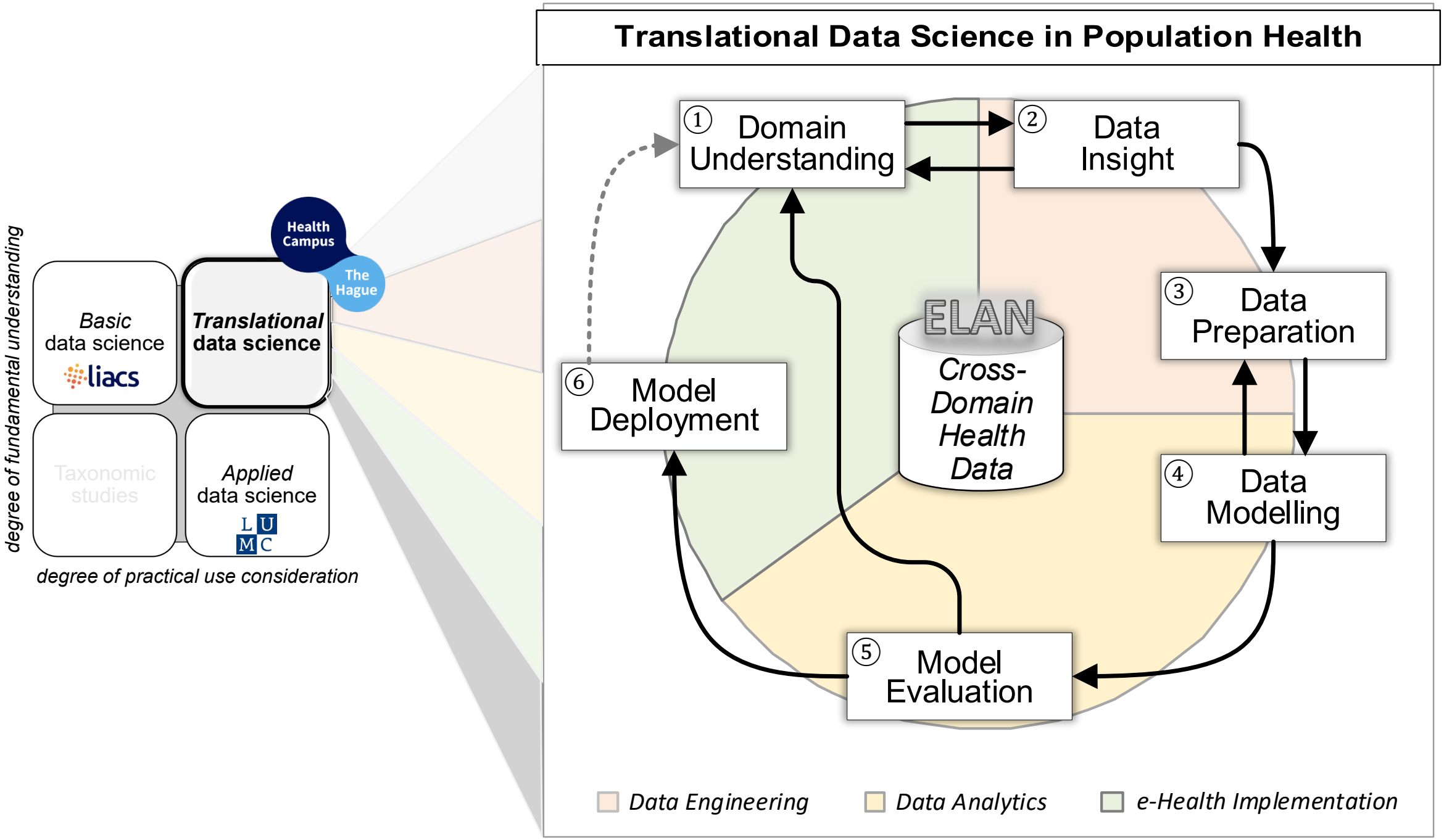
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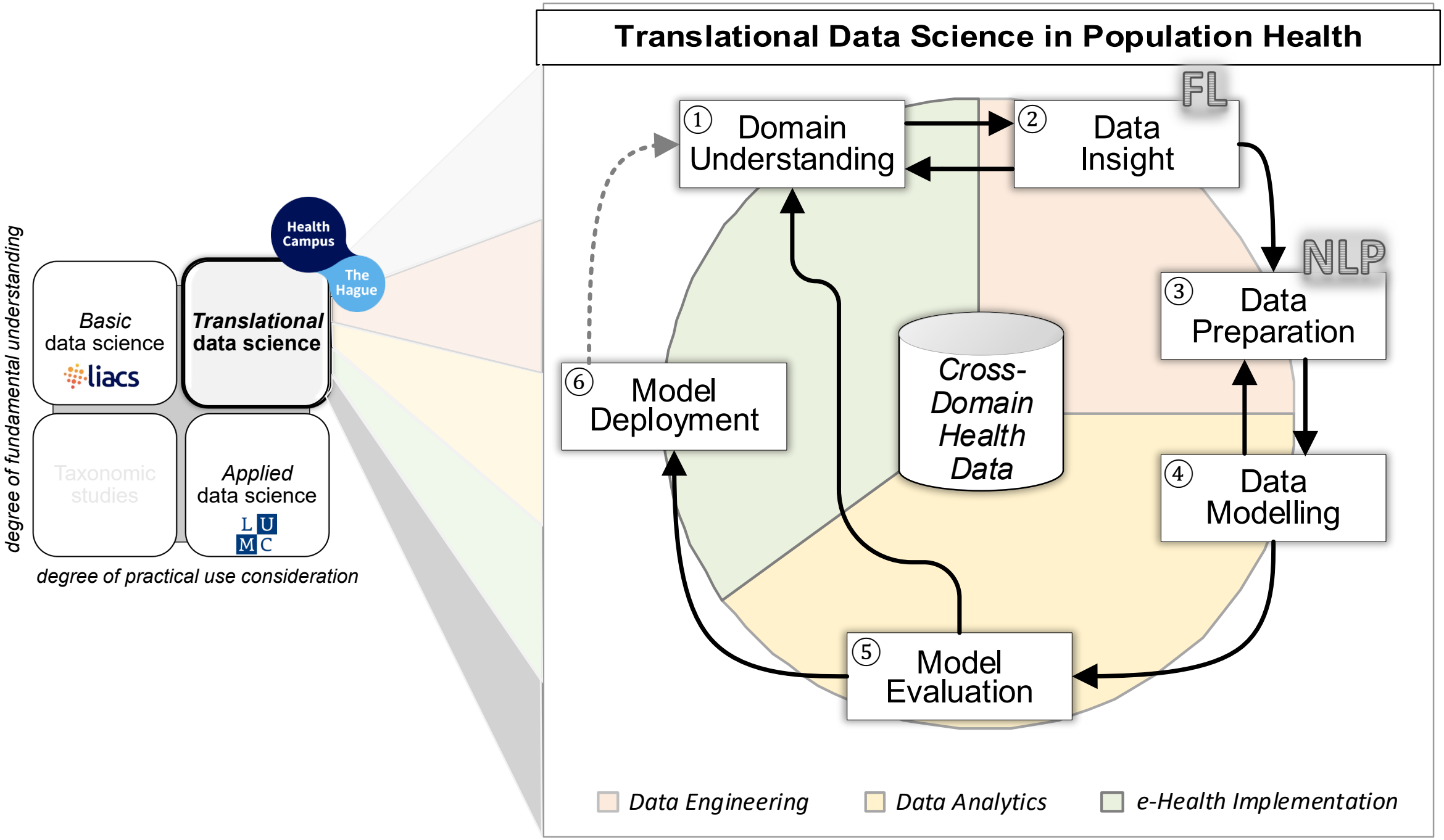
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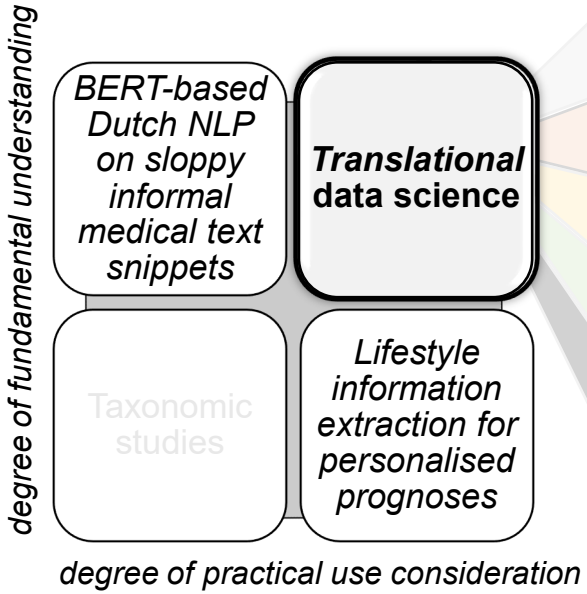
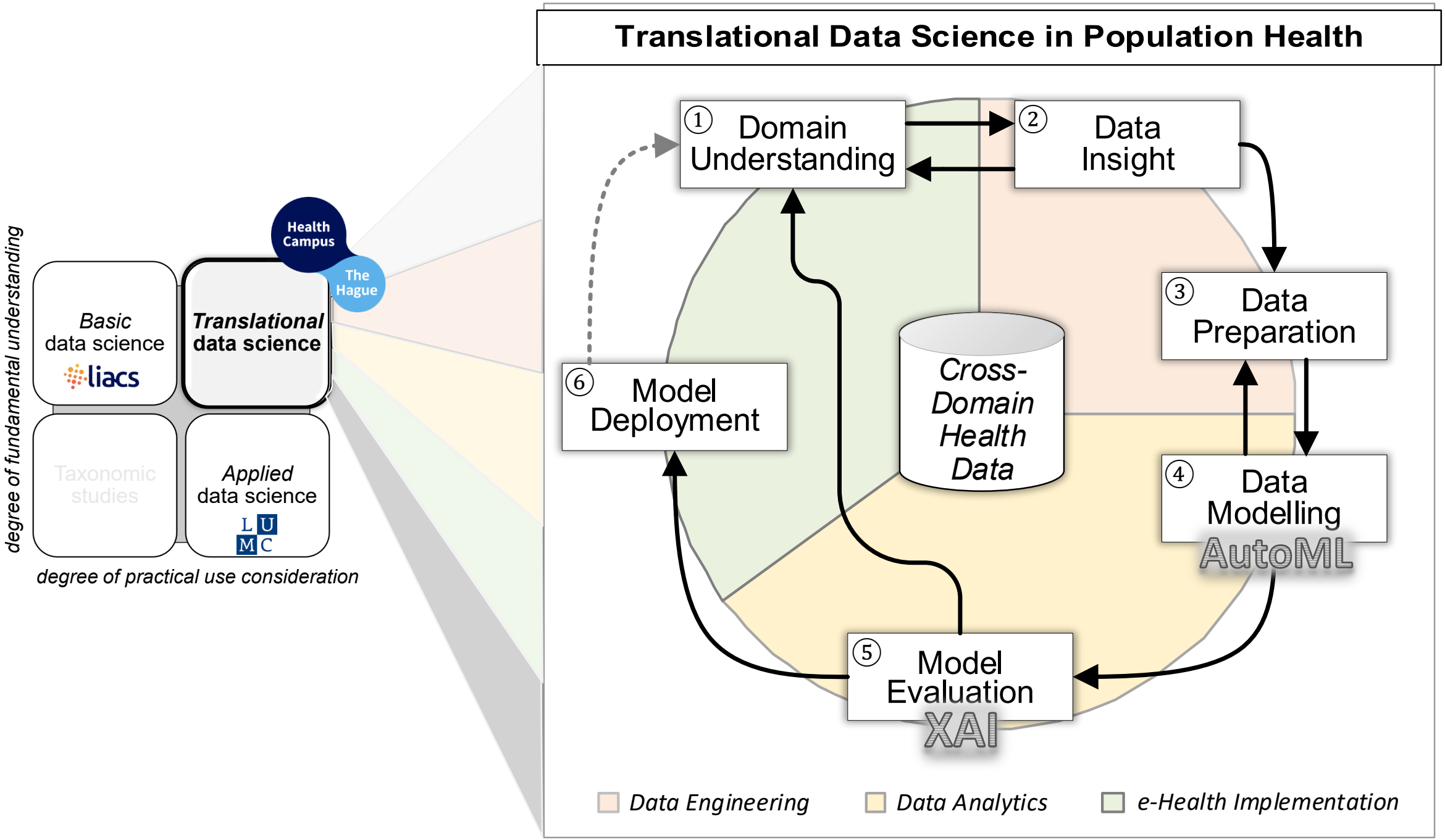


Example: EHR Lifestyle Characteristics Extraction

- Muizelaar, Haas, Dortmont, Putten & Spruit. Extracting Patient Lifestyle Characteristics from Dutch Clinical Text with BERT Models (under review)

Example text data	Smoking	Alcohol	Drugs
Patient smokes, does not drink or use drugs	Current user	Non-user	Non-user
Patient used to smoke, drinks 1 beer a day	Former user	Current user	Unknown
Patient used to smoke, uses marihuana daily	Former user	Unknown	Current user

Model	Smoking	Alcohol	Drugs
String Matching	0.84	0.74	0.68
Machine Learning (SGD)	0.85	0.71	0.60
HAGALBERT	0.66	0.54	0.43
RobBERT-HAGA	0.87	0.71	0.63
belabBERT-HAGA	0.48	0.64	0.57
MedRoBERTa.nl-HAGA	0.93	0.79	0.77
BioBERT (translated)	0.91	0.72	0.52
ClinicalBERT (translated)	0.92	0.80	0.61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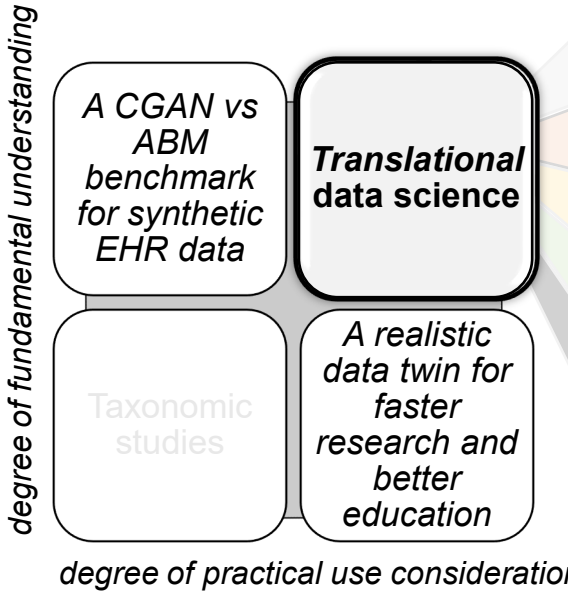
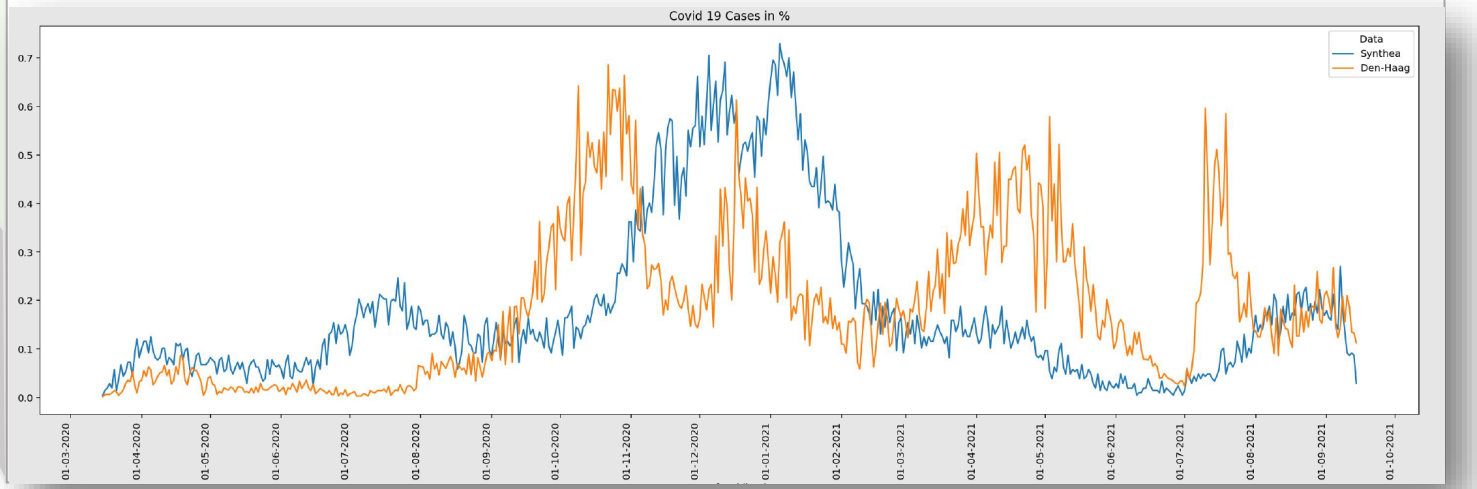
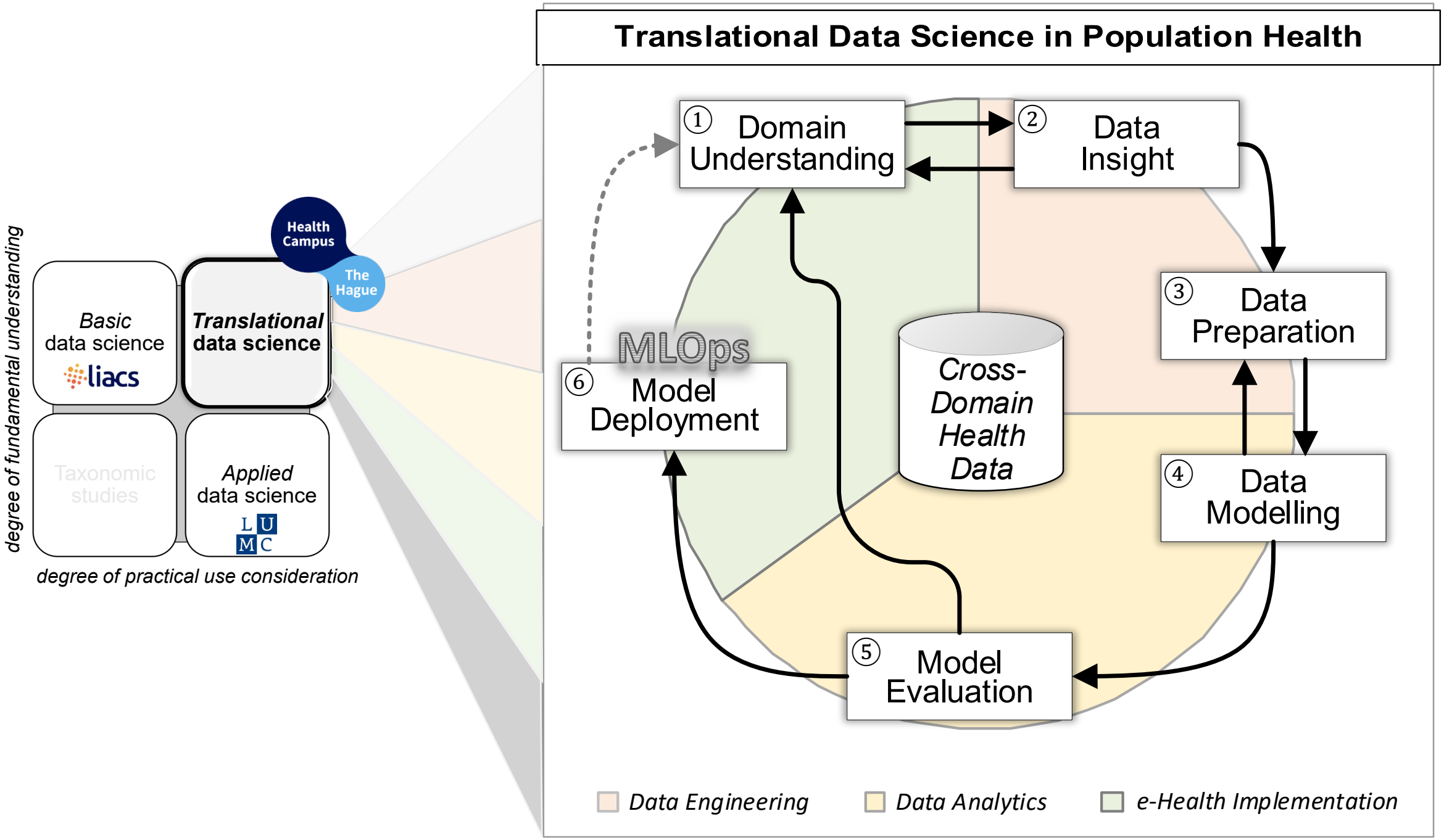


Example: Virtual Patients and Population dataset

ABM approach *(Ammar Faiq)*	**CGAN** approach *(Jim Achterberg)*
• Synthea-based dataset An ELAN 'digital twin' is already being used in the PHM Fundamentals master course to let students analyse COVID outbreaks in The Hague region (see below) • Joint research with Statistics Netherlands (CBS) & Syntho • Workshop 'Guidance Ethics': many stakeholders, 50+ effects	• Thesis Evaluation Framework for synthetic EHR data (supporting heterogeneous types, time series, unpredictable quality) - tSNE extension - two-sample GoF test - evaluation metric for privacy risk through AiAs • Horizon Europe, NWO OSF

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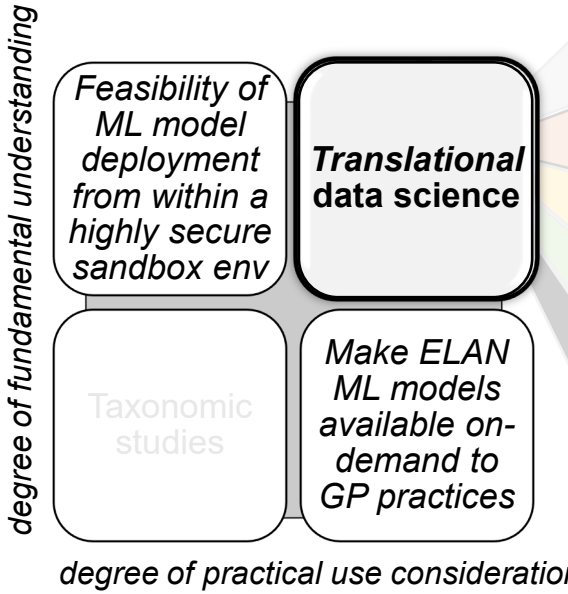
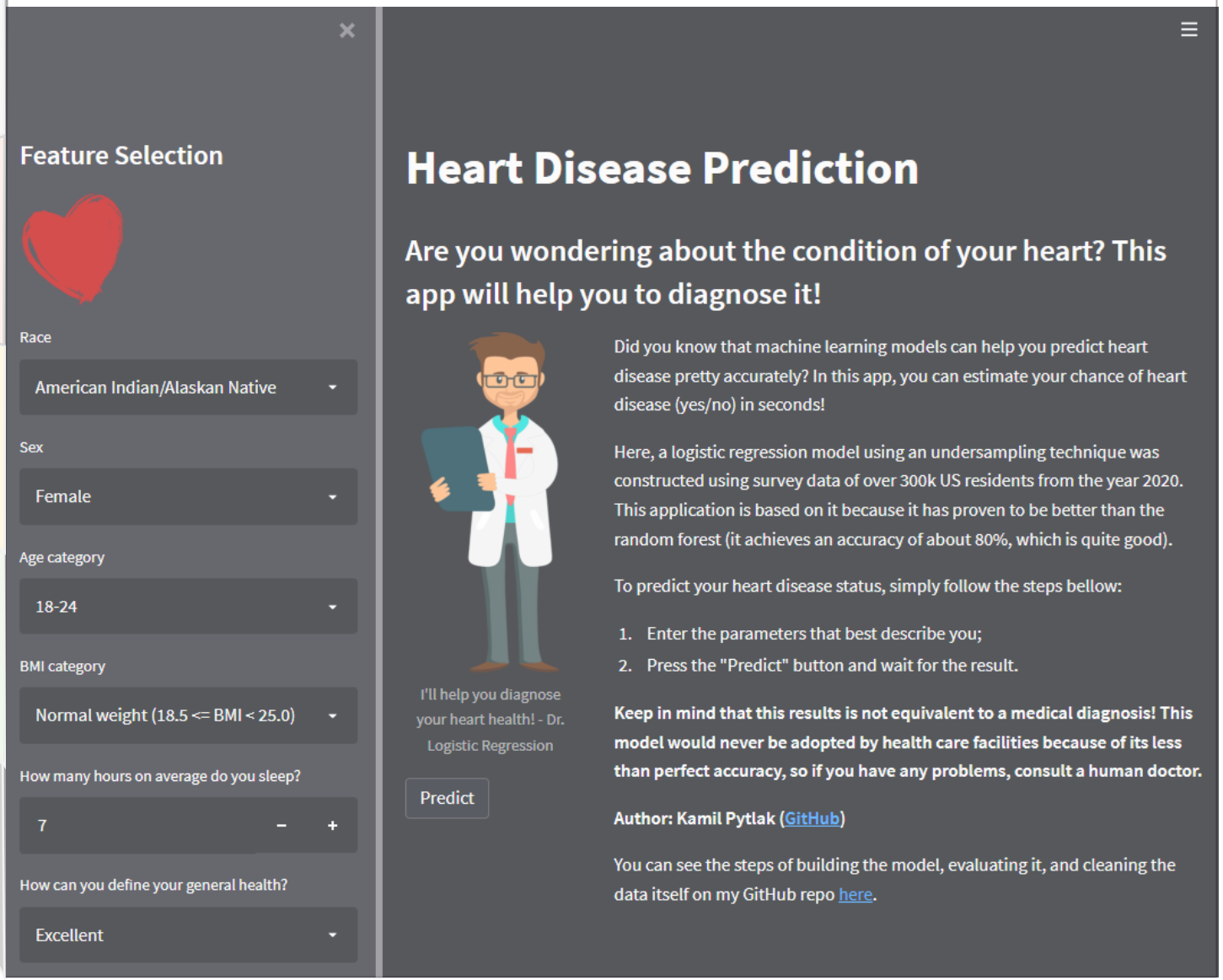
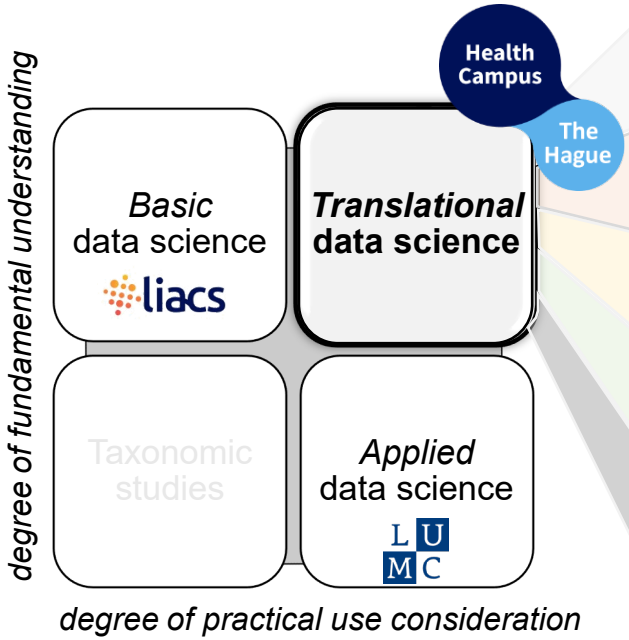
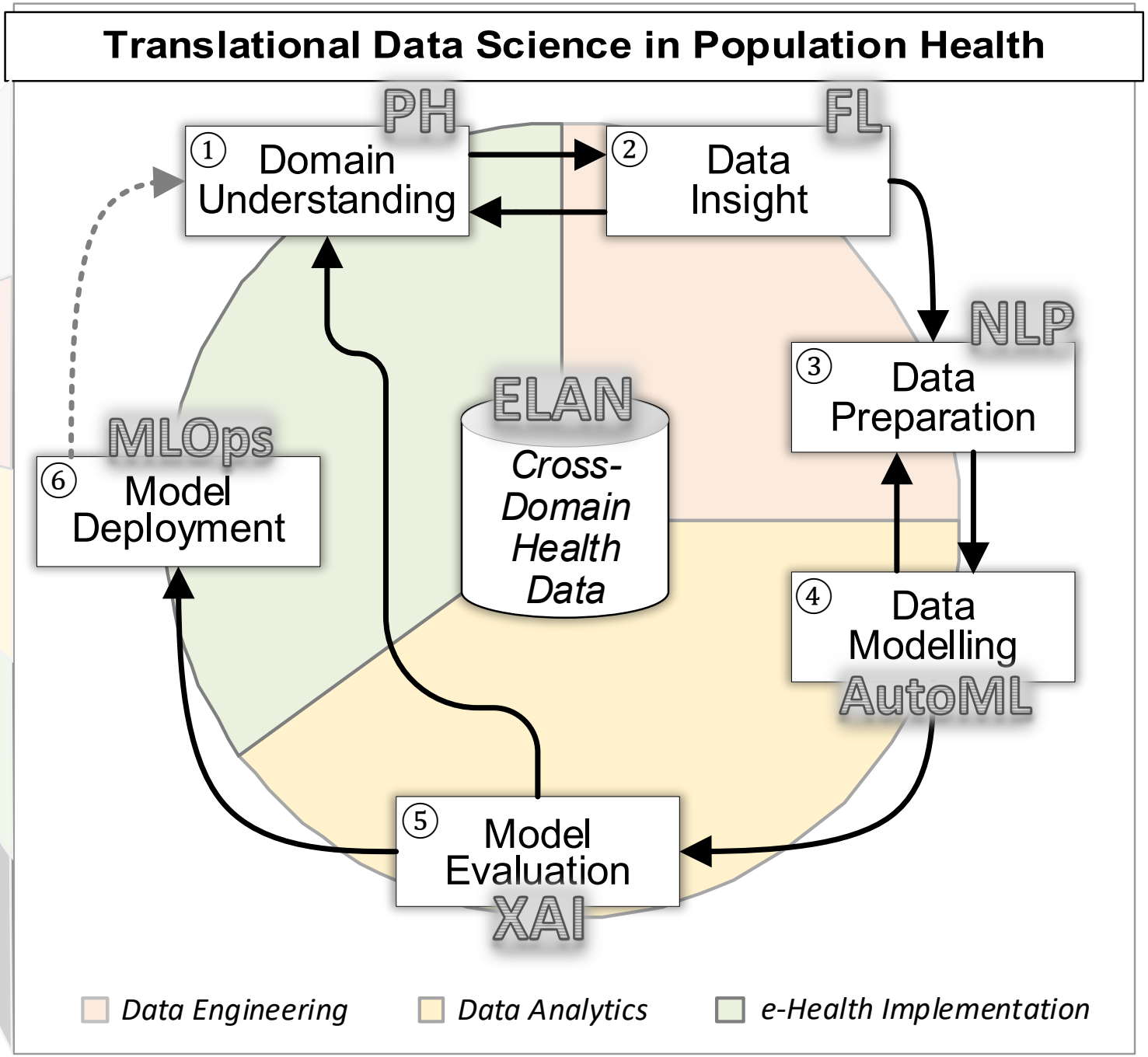
Example: Prediction Model Deployment for CDSS

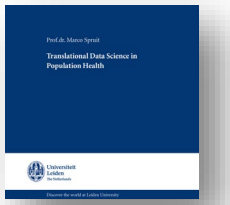


Lisanne Wallaard GitHub Thesis **Demo**



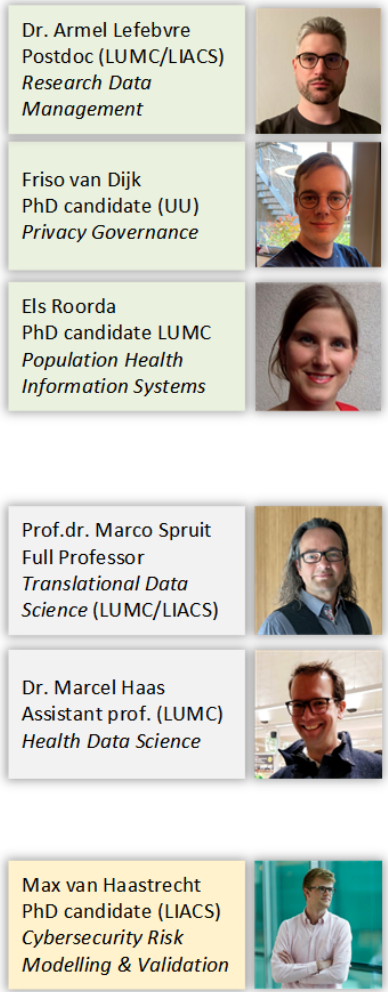






Spruit, Marco. (2022). *Translational Data Science in Population Health* (p. 20). Inaugural lecture. Leiden University. https://doi.org/10.5281/zenodo.7665858

Translational Data Science LAB : members *d.d. 14-12-2023*



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Risk Prediction of Diabetes progression

Jim Achterberg
PhD candidate (LUMC)
Synthetic HTA data Generation & Validation

http://tdslab.nl