Mahidol University
Faculty of Medicine Ramathibodi Hospital

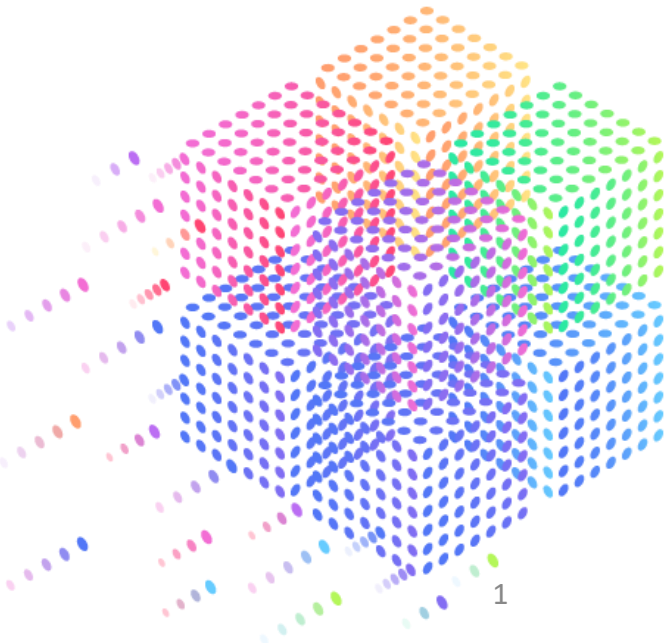
CEB

Local Perspectives and Consideration on RWD/RWE

Wednesday, 24th April 2024

Dr. Panu Looareesuwan, Ph.D.

Prof. Dr. Ammarin Thakkinstian, Ph.D.



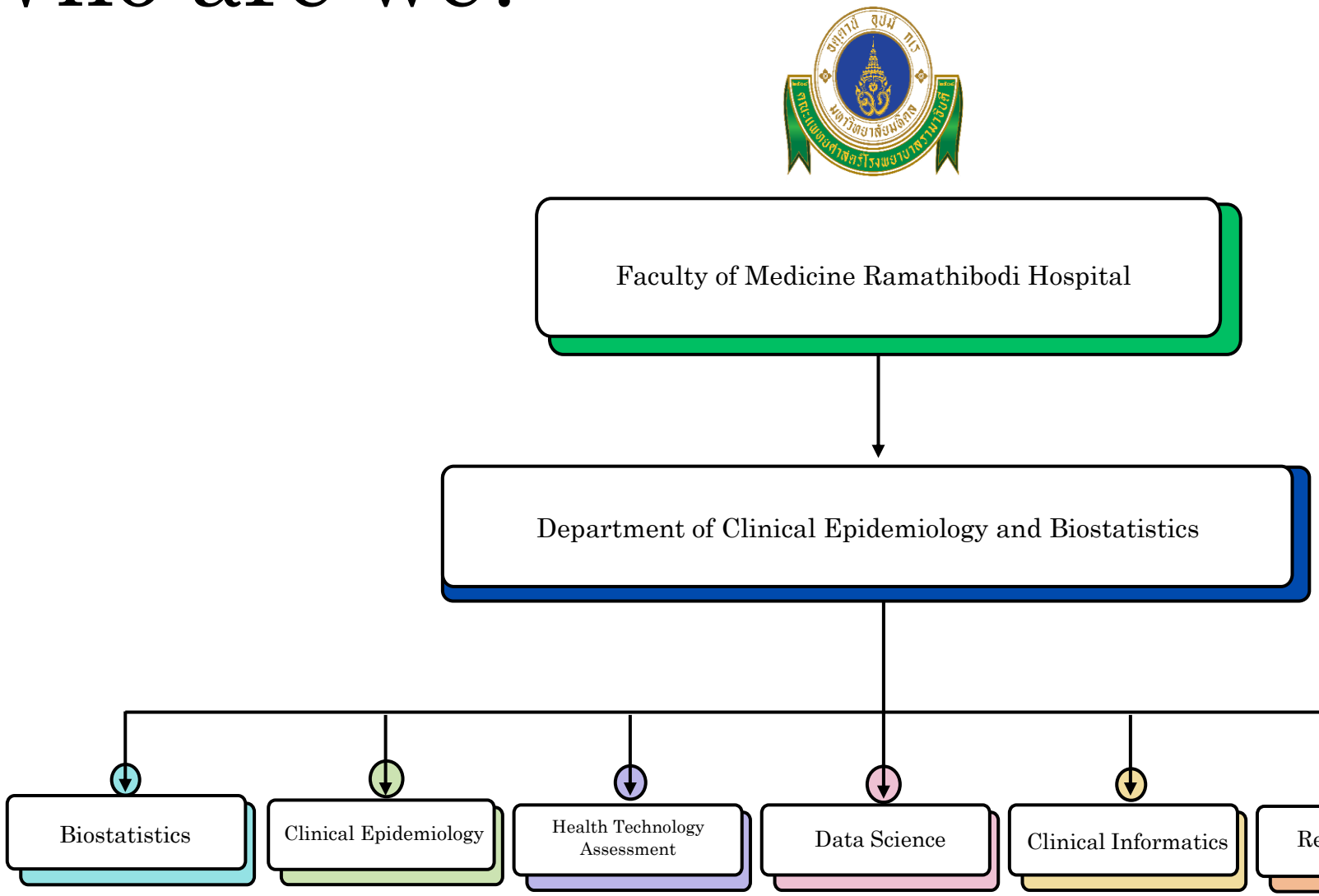
Outline

- Department of Clinical Epidemiology and Biostatistics (CEB).
- Real-world data (RWD).
  - CEB data warehouse
  - How it was created
- Our projects.

About me

- Graduate with Ph.D. in Data Science for Healthcare from Mahidol university in 2022.
- Work as Data Analyst / Informatician for 4 years at Thai Health Information Standards Development Center (THIS) and now CEB as lecturer / Data scientist.
- Focus on Applied Research, Machine Learning, Tabular data, Computer Vision, Natural Language Processing.

Who are we?



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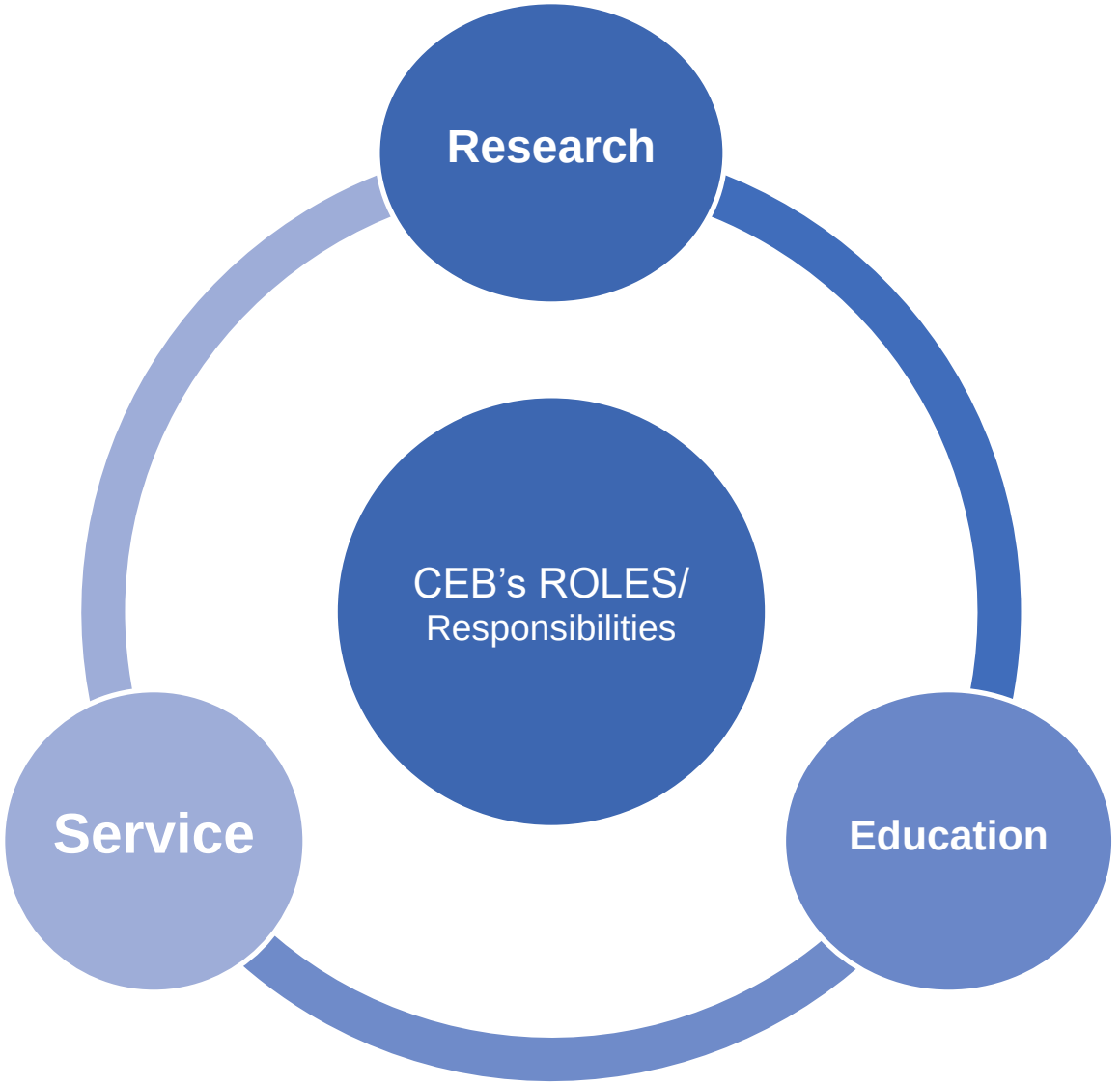
Data Warehouse

Our roles



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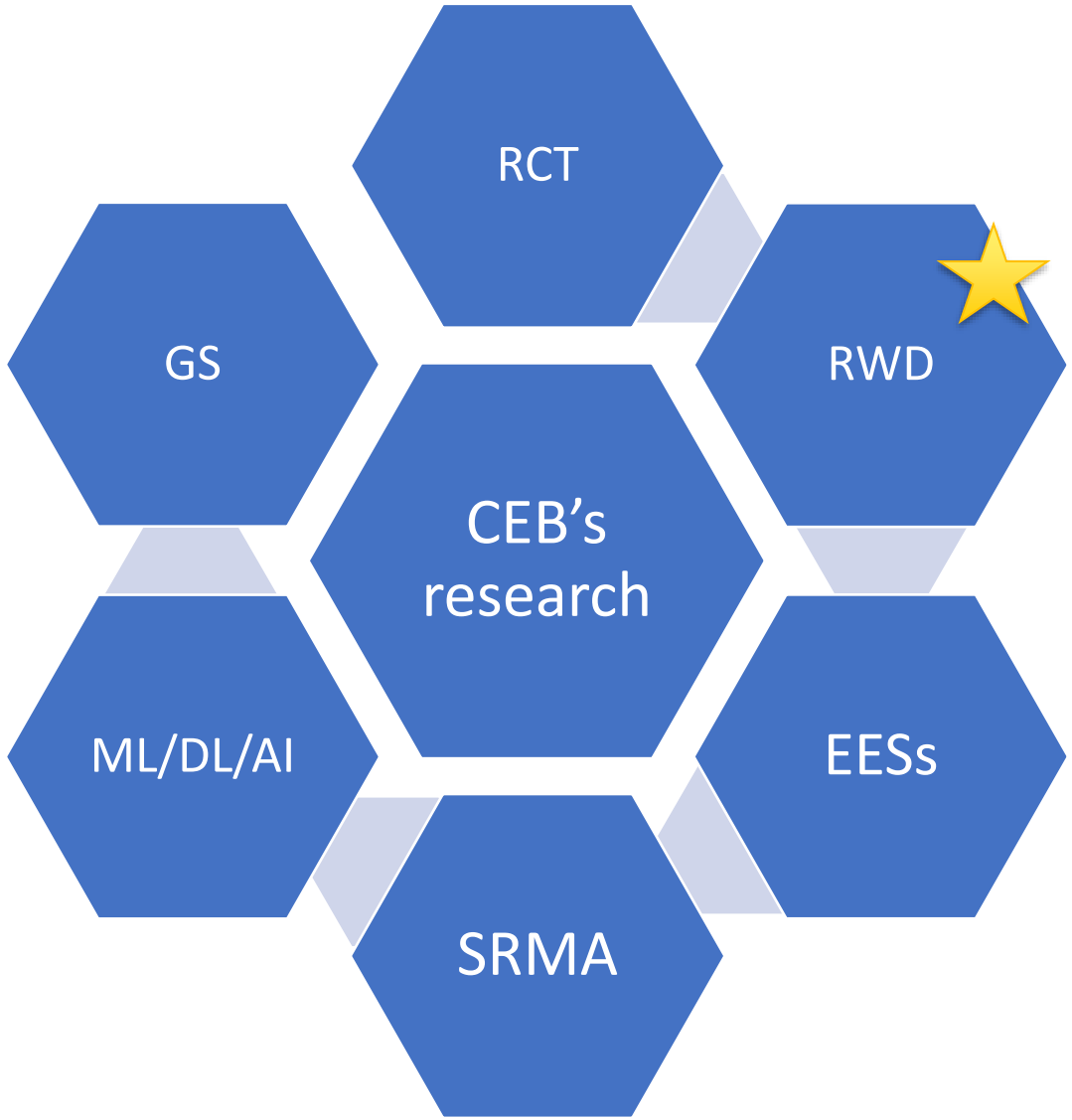
Our research



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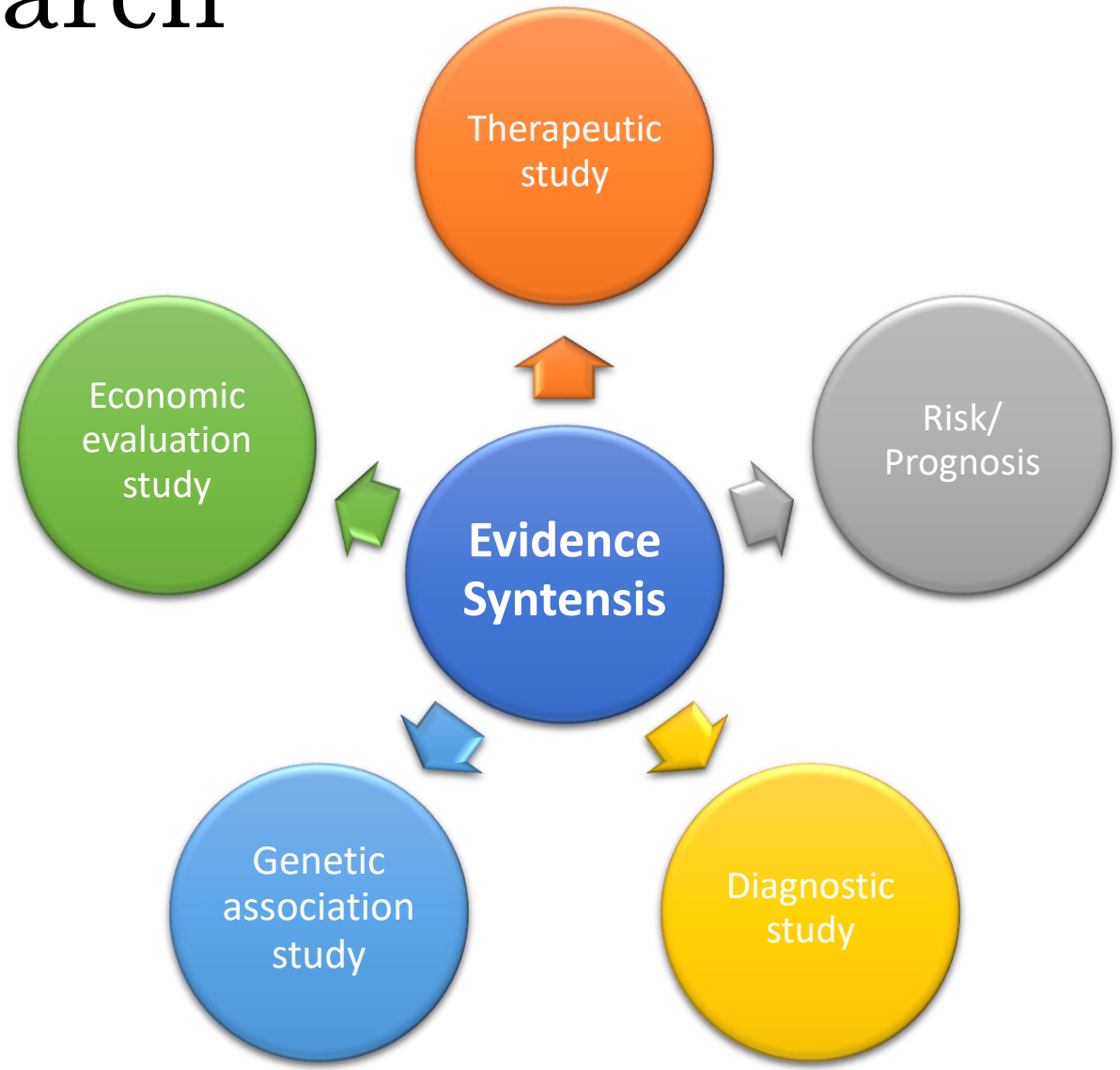
Our research



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Importance of RWD

- Cost efficiency.
- Rich datasets, rich set of features and datapoint.
- Generate RWE.
- Enhanced external validation and increase reliability.
- Improve patient outcome.

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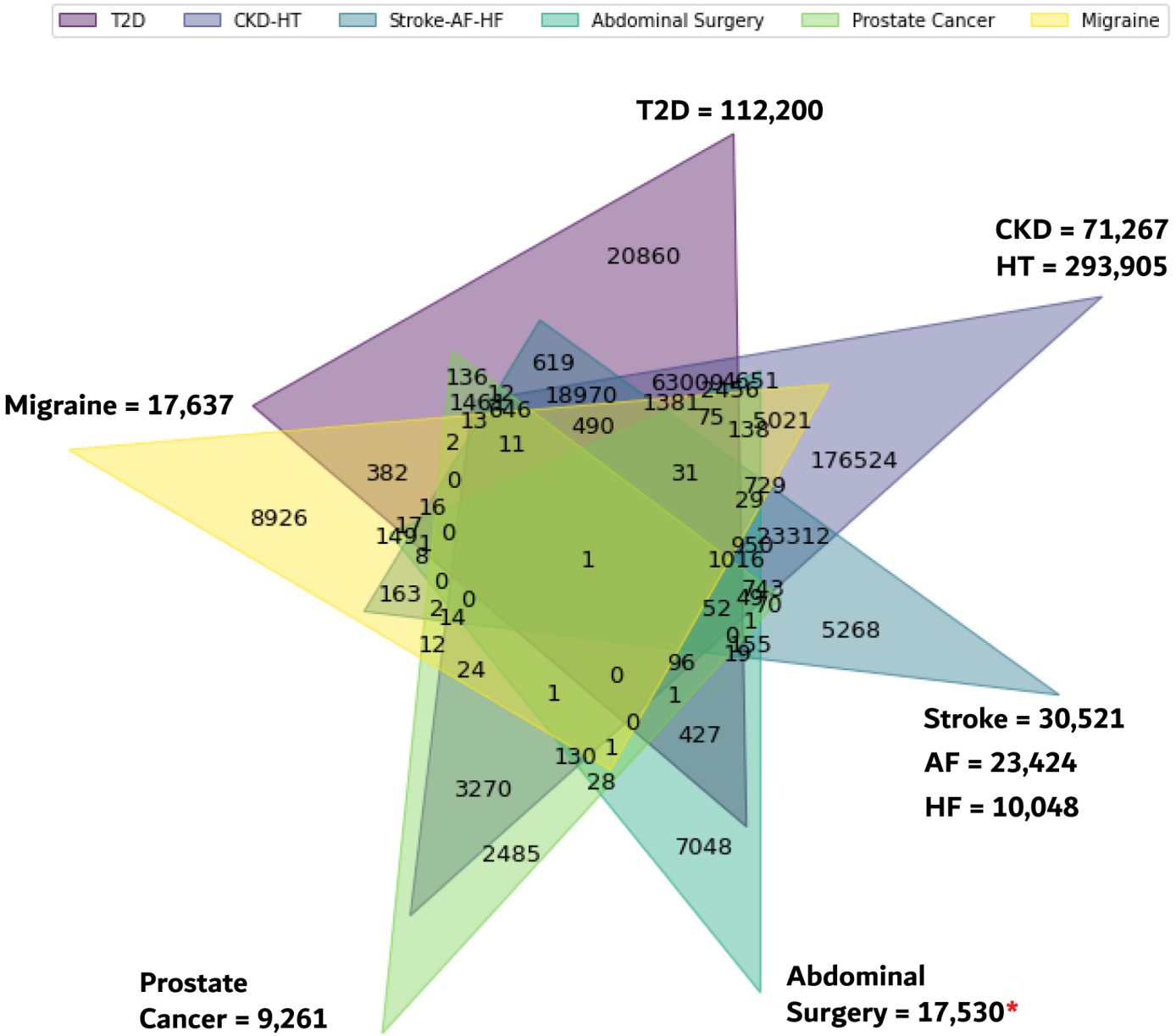
Data Warehouse

https://www.rama.mahidol.ac.th/ceb/CEBdatawarehouse/Overview



All cohorts = 352,101 subjects Jan 2010 - Dec 2023

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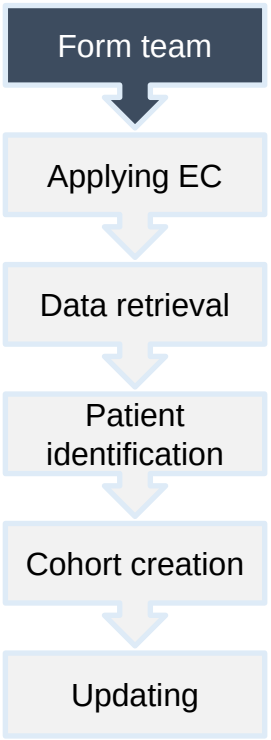

To form cohort data requires

- Principal investigator
  - ➢ Coordinating all participants.
- Physicians/Specialists
  - ➢ Providing content expertise.
- Epidemiologists/Biostatisticians
  - ➢ Developing research framework and statistical analysis.
- Data scientists
  - ➢ Handling big data and provide machine learning analysis.
- Data engineers
  - ➢ Designing database architecture and managing/maintaining data warehouse server for cohort data.

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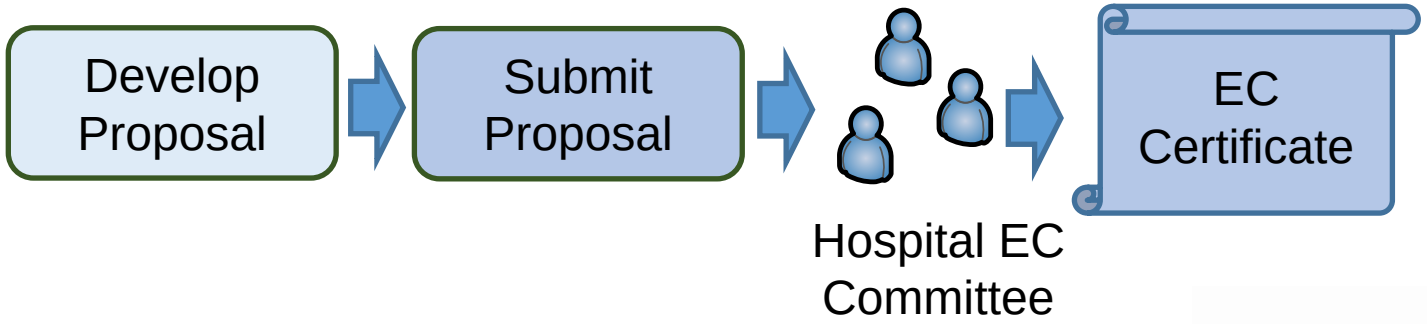
- Form team
- Applying EC
- Data retrieval
- Patient identification
- Cohort creation
- Updating



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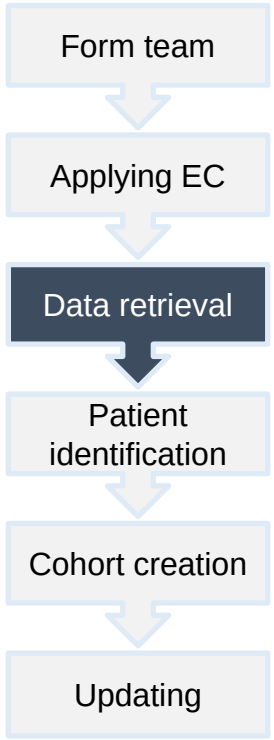

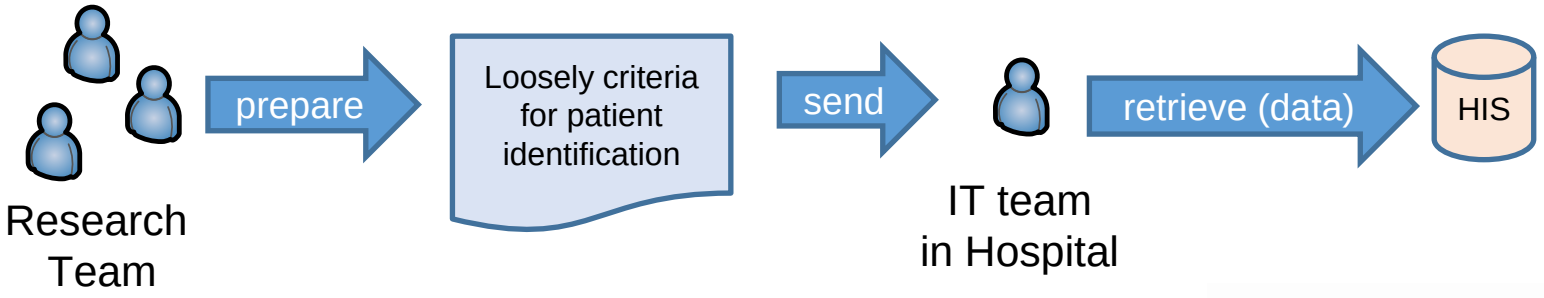

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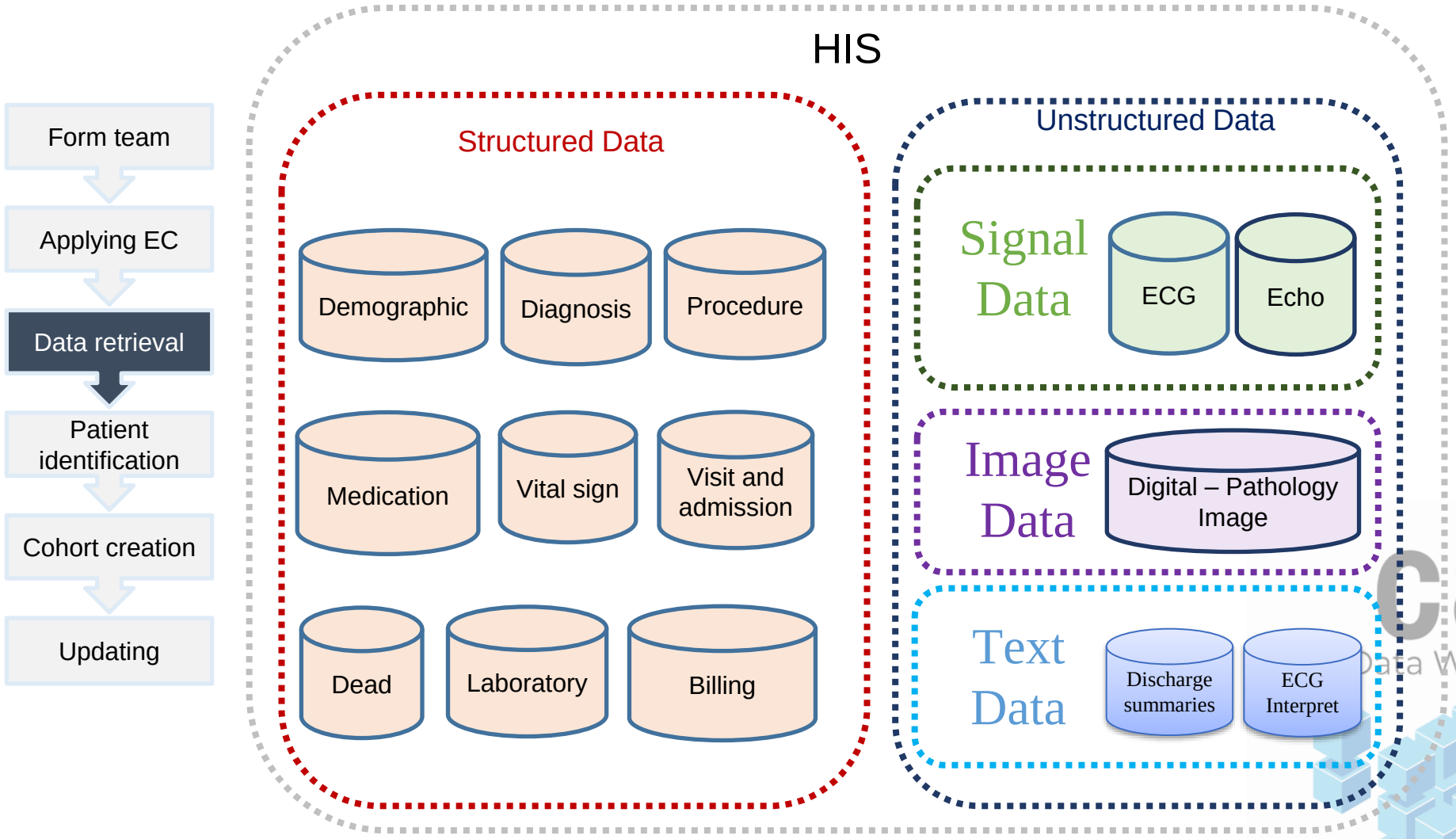
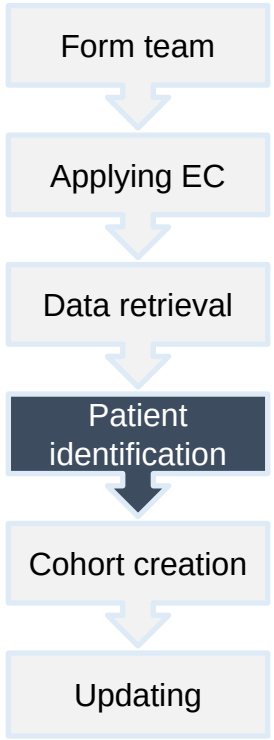

Form team
Applying EC
Data retrieval
Patient identification
Cohort creation
Updating
HIS
Structured Data
Demographic
Diagnosis
Procedure
Medication
Vital sign
Visit and admission
Dead
Laboratory
Billing
Unstructured Data
Signal Data
ECG
Echo
Image Data
Digital – Pathology Image
Text Data
Discharge summaries
ECG Interpret



Exact criteria for T2D patient identification

Inclusion:

Patients identified with ICD-10 of E11*.

Patients who was prescribed with anti-diabetic medications.

Patients who have high glycemic level.

Exclusion

Patients age less than 18 years.

Patients identified with ICD-10 of E10*.

Patients with GDM.

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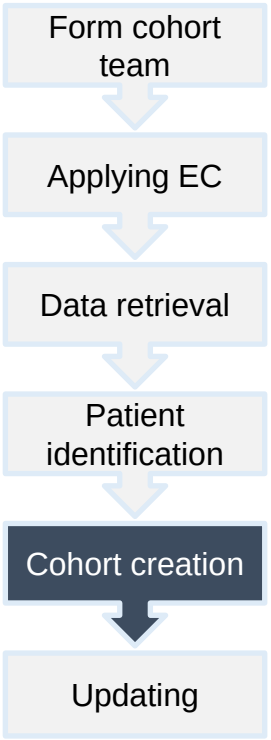

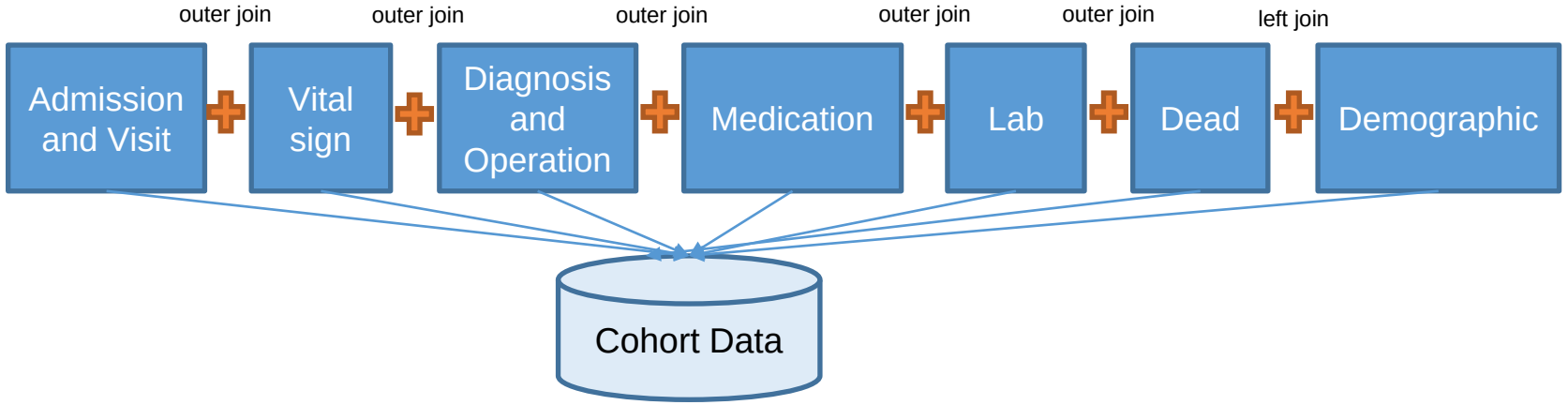

ID	Date	ICD10	Gender	……
001	01-01-2011	….	….	….
001	26-10-2012	….	….	….
001	12-12-2012	….	….	….
002	03-01-2011	….	….	….
002	15-06-2011	….	….	….
….	….	….	….	….

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Form cohort team

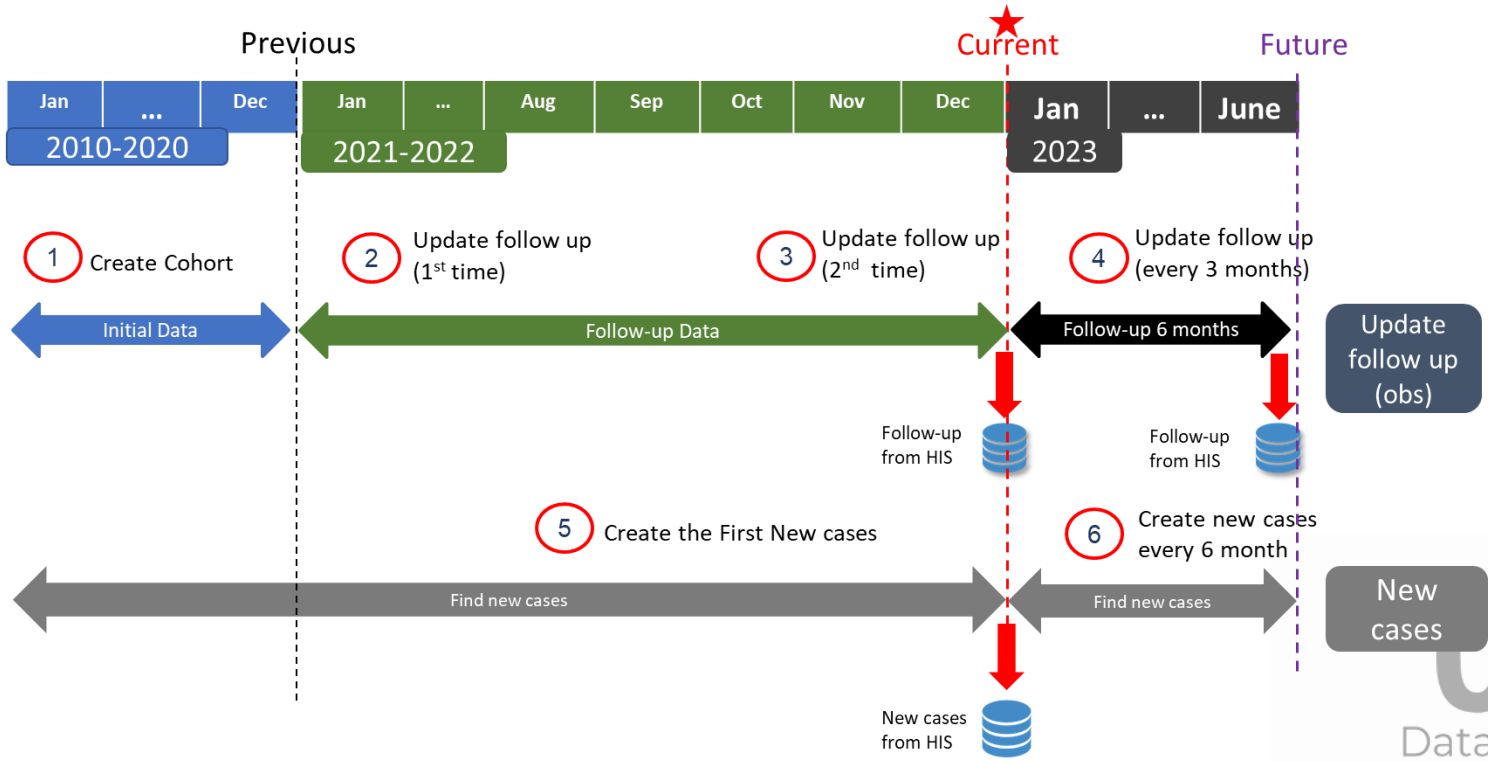
EC Applying

Data retrieval

Patient identification

Cohort creating

Cohort creation



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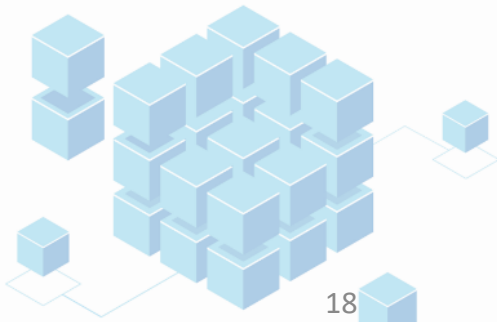
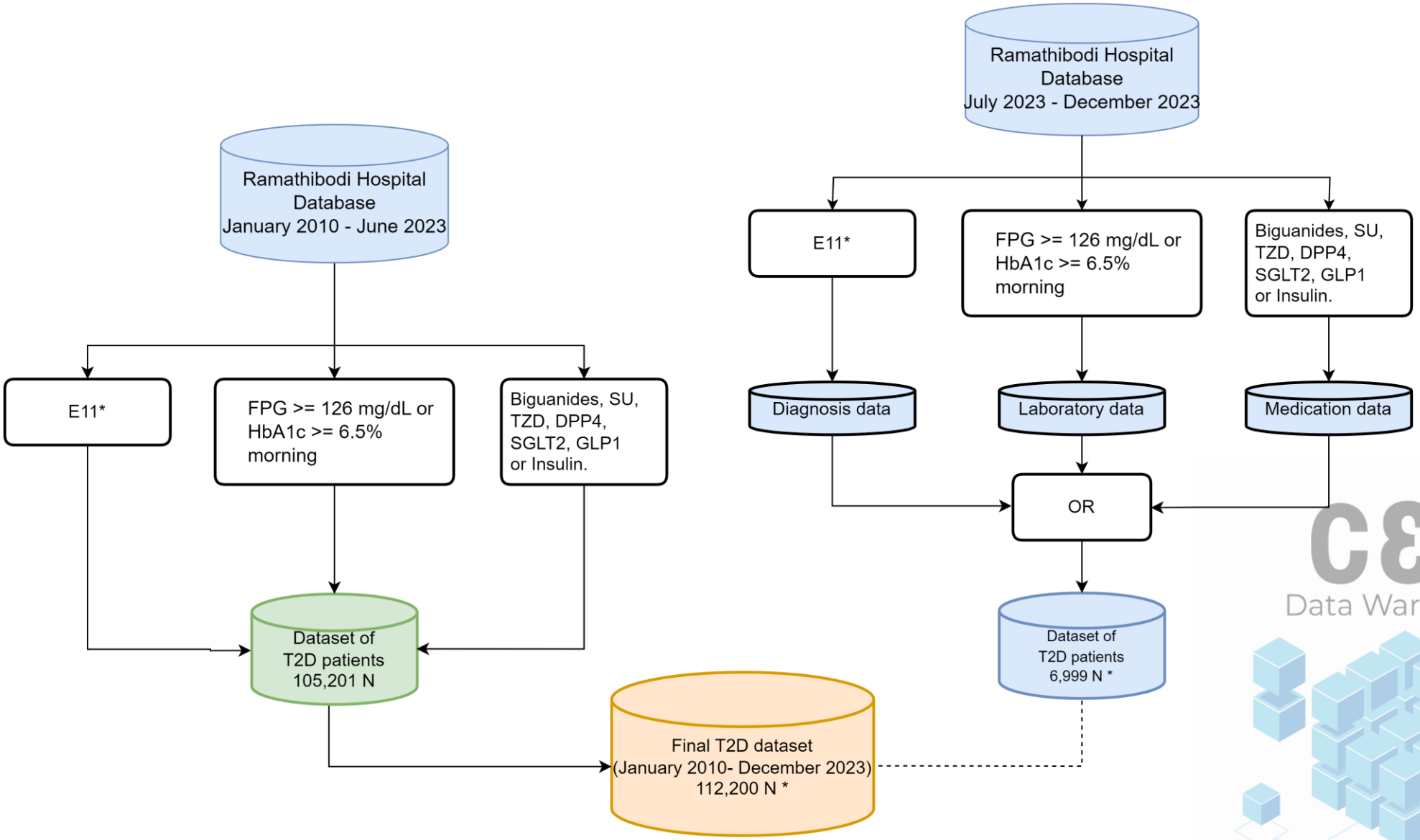
T2D cohort



Target subjects between 1 July 2023 to 31 December 2023



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Variables (Features)

- ~300 variables from various data domains (e.g., patients' demographics, physical examinations, medications, diagnosis, laboratory tests, and etc.)
- Longitudinal data

Laboratory tests	Demographic	Medications	Comorbidities / Complications
Albumin Urine, mg/dL	BMI, kg/m2	Alpha glucosidase inhibitors	Hypertension
Blood urea nitrogen, mg/dL	Height, cm	Beta blockers	Dyslipidemia
eGFR (CKD-EPI), ml/min/1.73 m\S\2	Weight, kg	Biguanides	Diabetic Retinopathy (DR)
Creatinine, mg/dL	Insurance Scheme	Sulfonylureas	Chronic Kidney Disease (CKD)
FPG, mg/dL	SBP, mmHg	Insulin	Peripheral Vascular Diseases (PVD)
HbA1C (EDTA-blood), %	DBP, mmHg	SGLT-2i	Cardiovascular Disease (CVD)
Cholesterol, mg/dL		DPP-4i	Heart Failure (HF)
HDL Cholesterol, mg/dL		GLP1-RA	Fracture
LDL Cholesterol, mg/dL		Meglitinides	Death
Triglyceride, mg/dL		Thiazolidinediones	
Troponin T, ng/L		Calcium channel blocker	
Uric acid, mg/dL		Calcium phosphate binders	
AST, U/L		Diuretics	
ALT, U/L		Statins	
GGT, U/L		ACE inhibitor	

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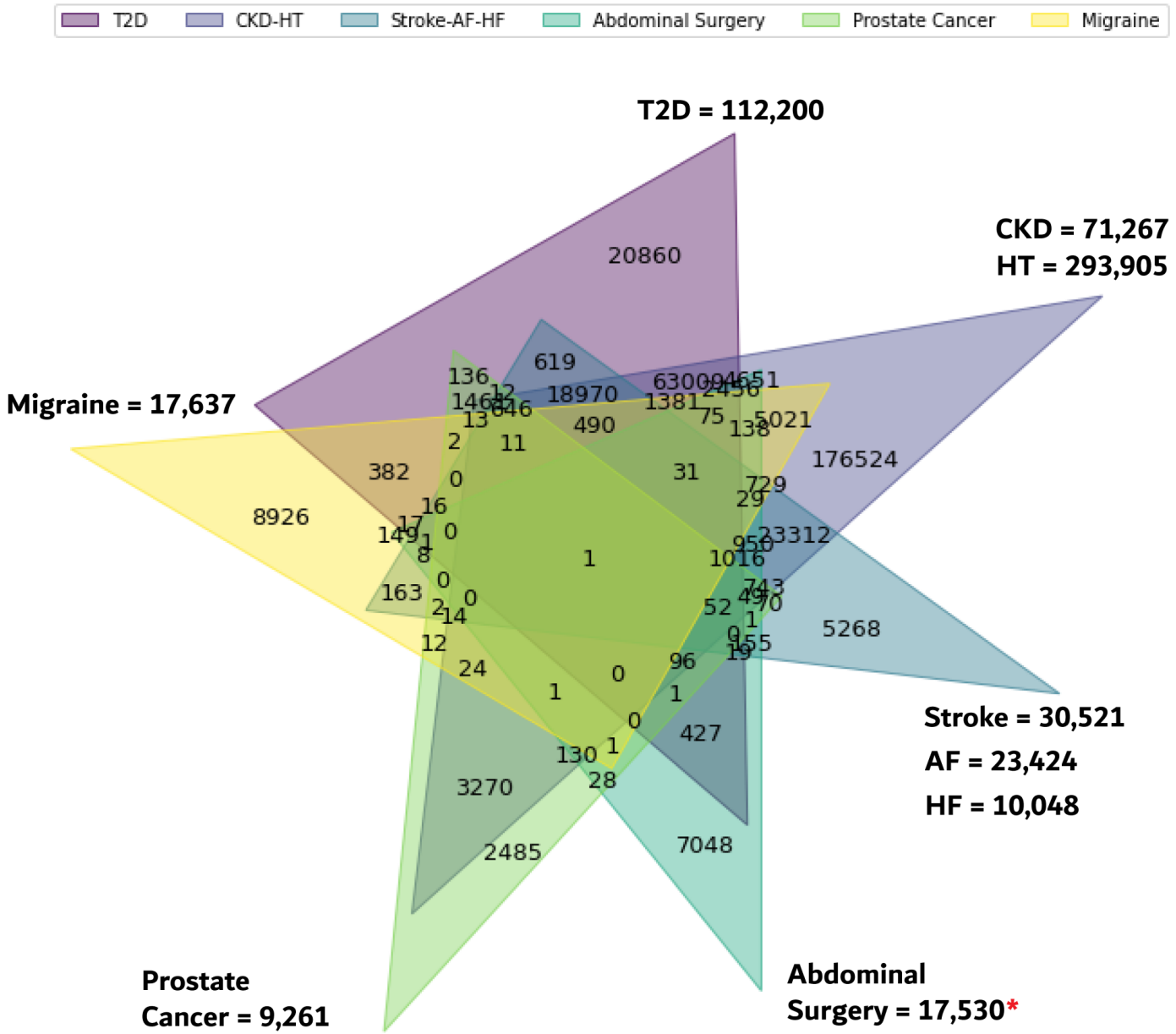

All cohorts = 352,101 subjects Jan 2010 - Dec 2023

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Our productivity

Clinical effectiveness of second-line antihyperglycemic drugs on major adverse cardiovascular events: An emulation of a target trial

Sukanya Siriyotha [1], Thitiya Lukkunaprasit [2], Teeranan Angkananard [3], Panu Looareesuwan [1], Gareth J McKay [4], John Attia [5], Ammarin Thakkinstian [1]

Effects of second-line antihyperglycemic drugs on the risk of chronic kidney disease: applying a target trial approach to a hospital-based cohort of Thai patients with type 2 diabetes

Sukanya Siriyotha, Thitiya Lukkunaprasit, Panu Looareesuwan, Hataikarn Nimitphong, Gareth J. McKay, John Attia & Ammarin Thakkinstian

IQVIA

A multicentre retrospective study of characterization of treatment intensified (add on to metformin) real world adult population with type 2 diabetes mellitus in India, Pakistan, and Thailand

Retinopathy prediction in type 2 diabetes: Time-varying Cox proportional hazards and machine learning models

Panu Looareesuwan [a], Suparee Boonmanunt [a], Sukanya Siriyotha [a], Thitiya Lukkunaprasit [b],

Our productivity

- Collaboration between Siriraj, Khon Kaen University and Ramathibodi hospital, multicenter study.

Our team
















Additional information

https://www.rama.mahidol.ac.th/ceb/

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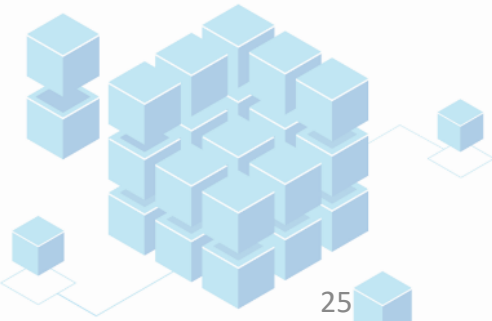

Thank you

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