Digital Governance of Smart Healthcare

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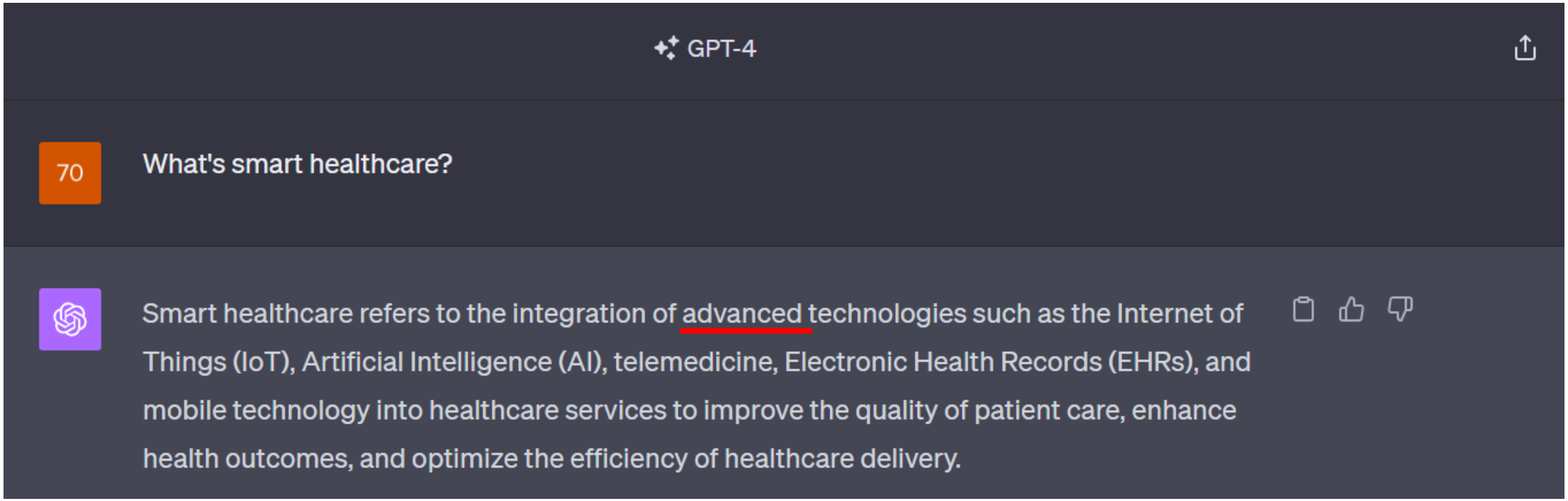
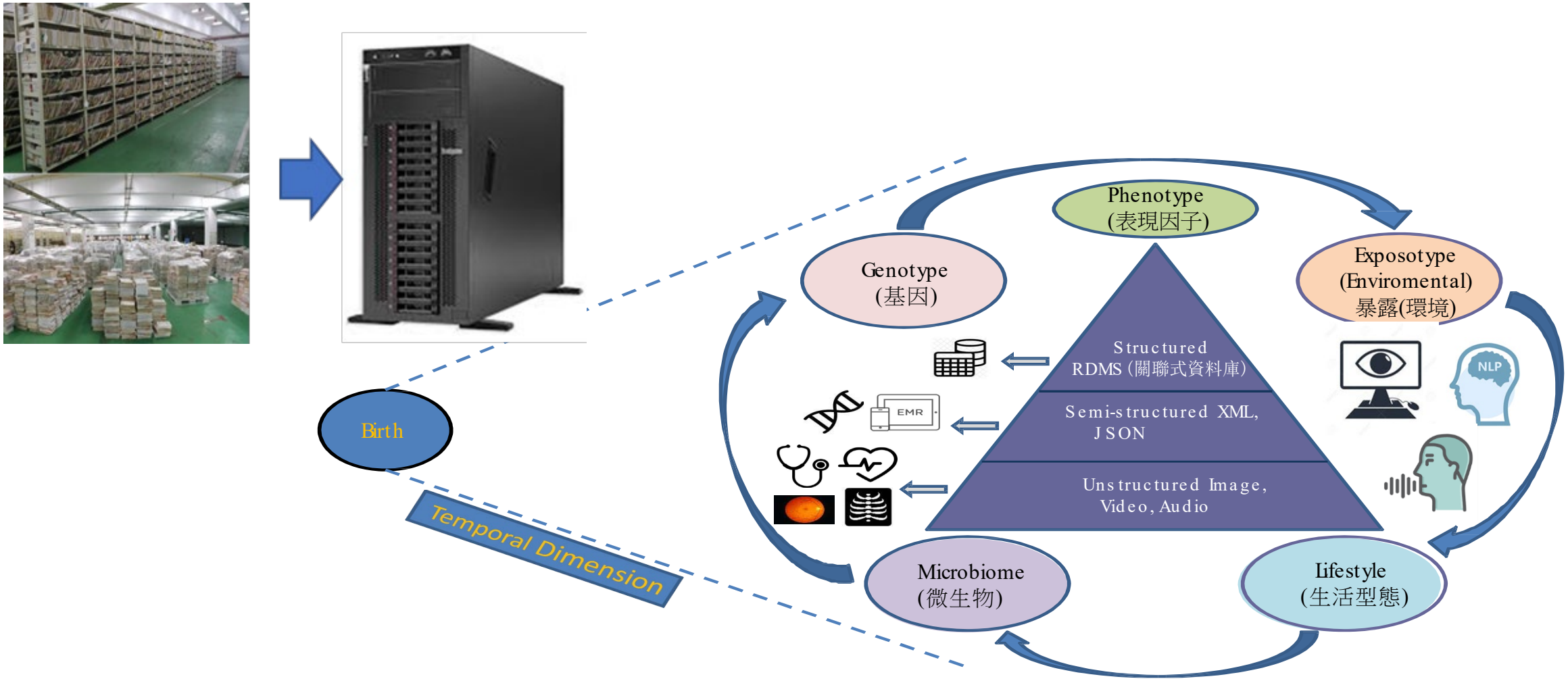

GPT-4
70
What's smart healthcare?
Smart healthcare refers to the integration of advanced technologies such as the Internet of Things (IoT), Artificial Intelligence (AI), telemedicine, Electronic Health Records (EHRs), and mobile technology into healthcare services to improve the quality of patient care, enhance health outcomes, and optimize the efficiency of healthcare delivery.

Real world data. Real world evidence.



What is health data?

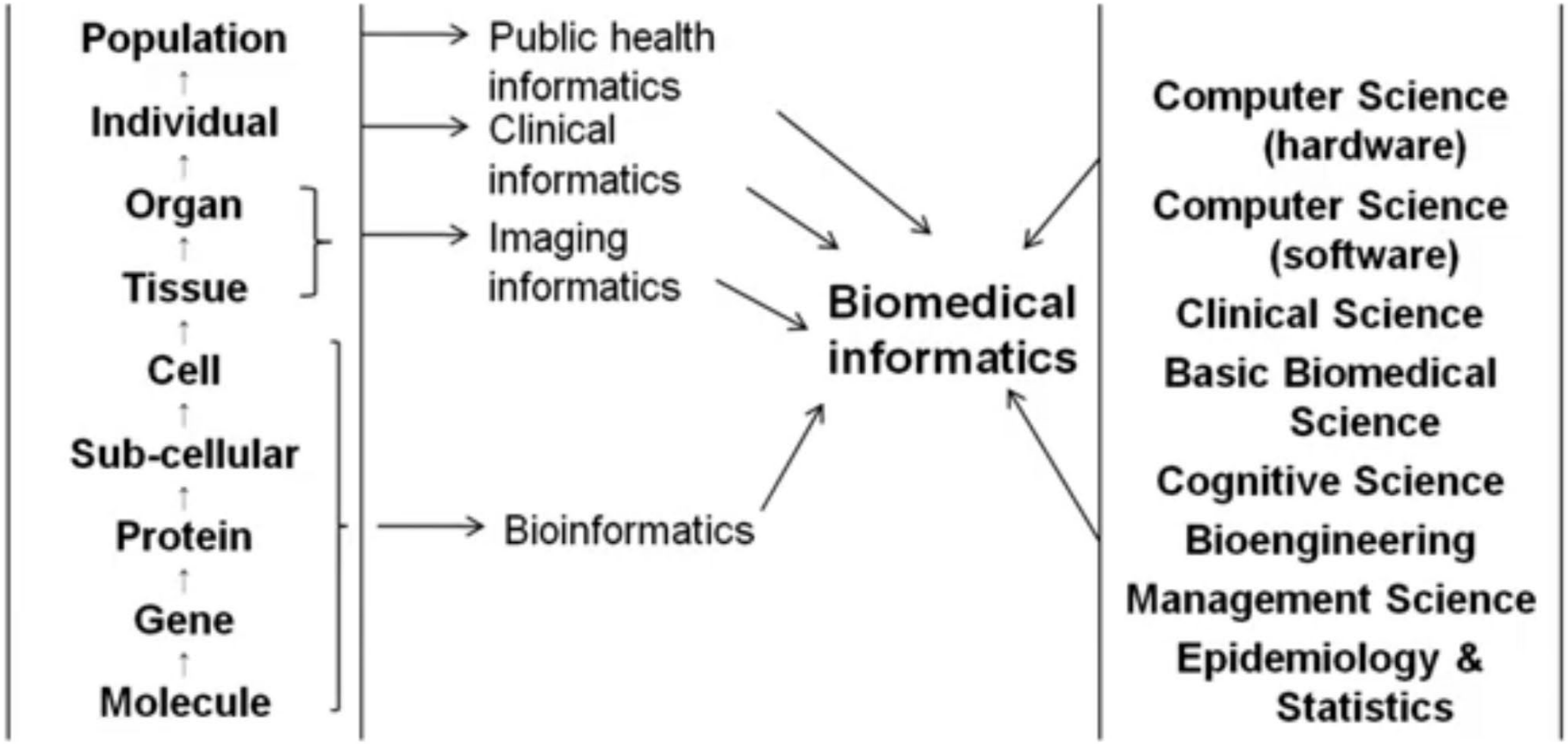
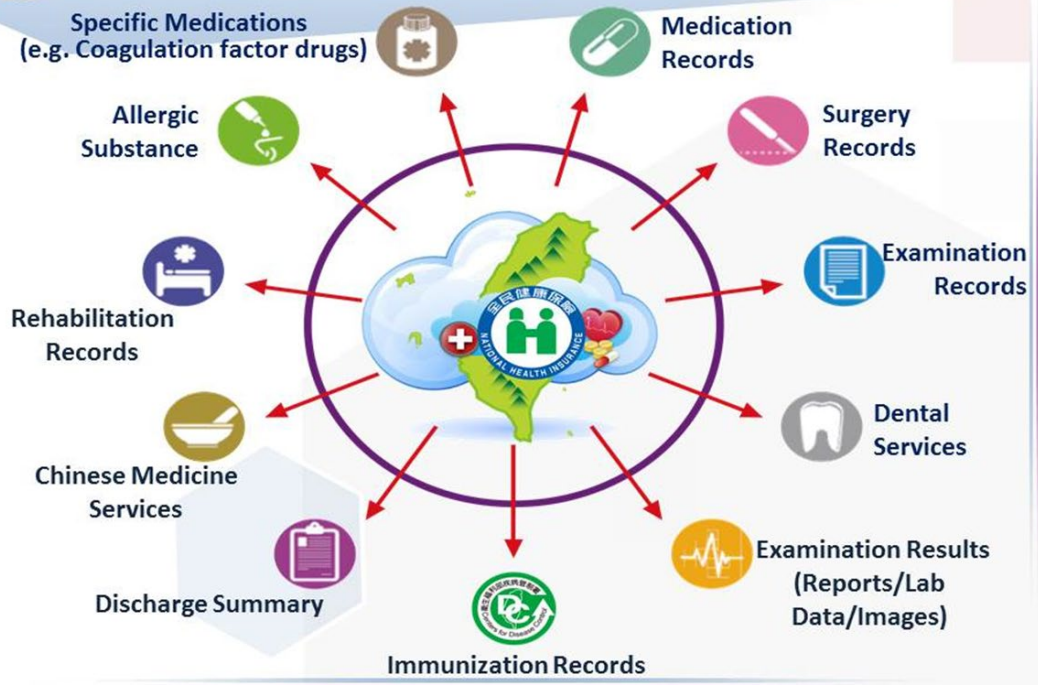


Figure 1.2 Biomedical Informatics: Modified by Dr. Jiajie Zhang, The University of Texas at Houston, School of Biomedical Informatics from Shortliffe & Blois, 2001

NHI MediCloud System

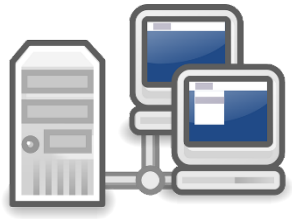


My Health Bank

- Heightening the awareness of self-care
- Reaching self-data anytime anywhere

Taiwan National Health Insurance(Since 1994)

Researchers



NHIRDB

NHIA

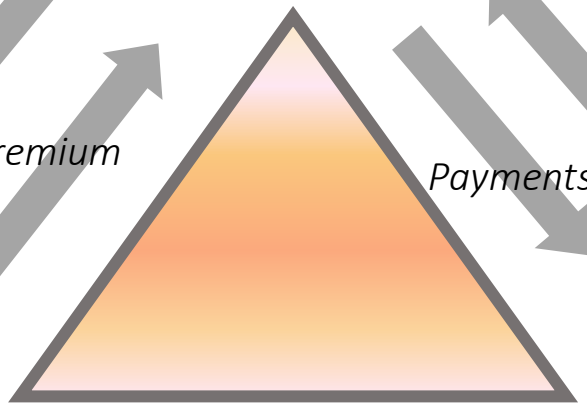
Single-payer payment system

NHI IC Card

Premium

Claims Data

Payments



- 23 million population

Insured

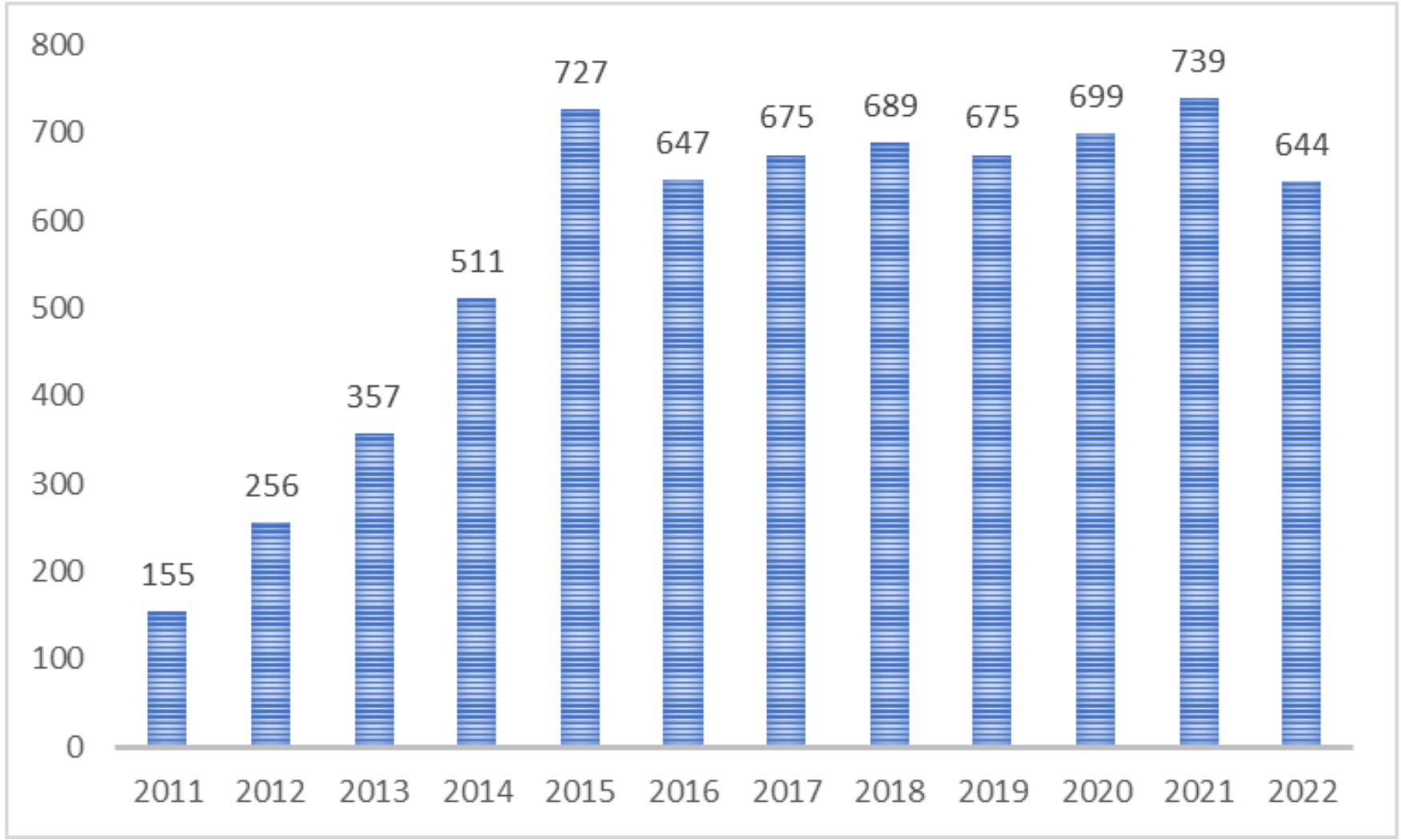
Healthcare Services

Copayment

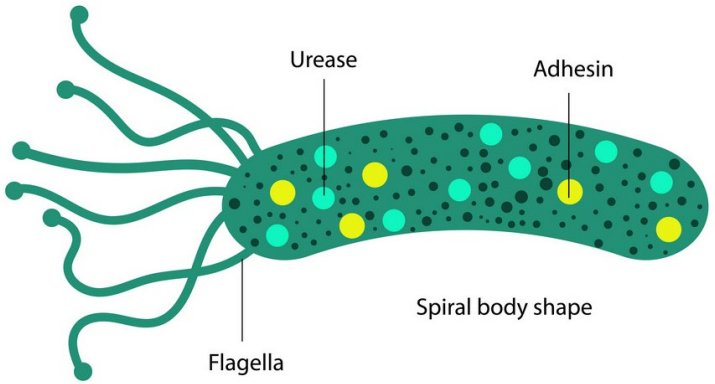
- 496 hospitals
- >20,000 clinics

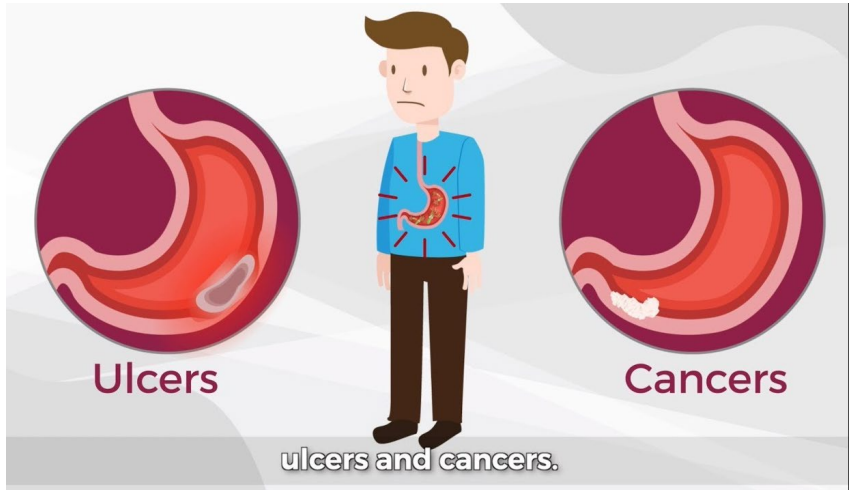
Providers

Publications Using NHIRDB Indexed by PubMed



Helicobacter pylori



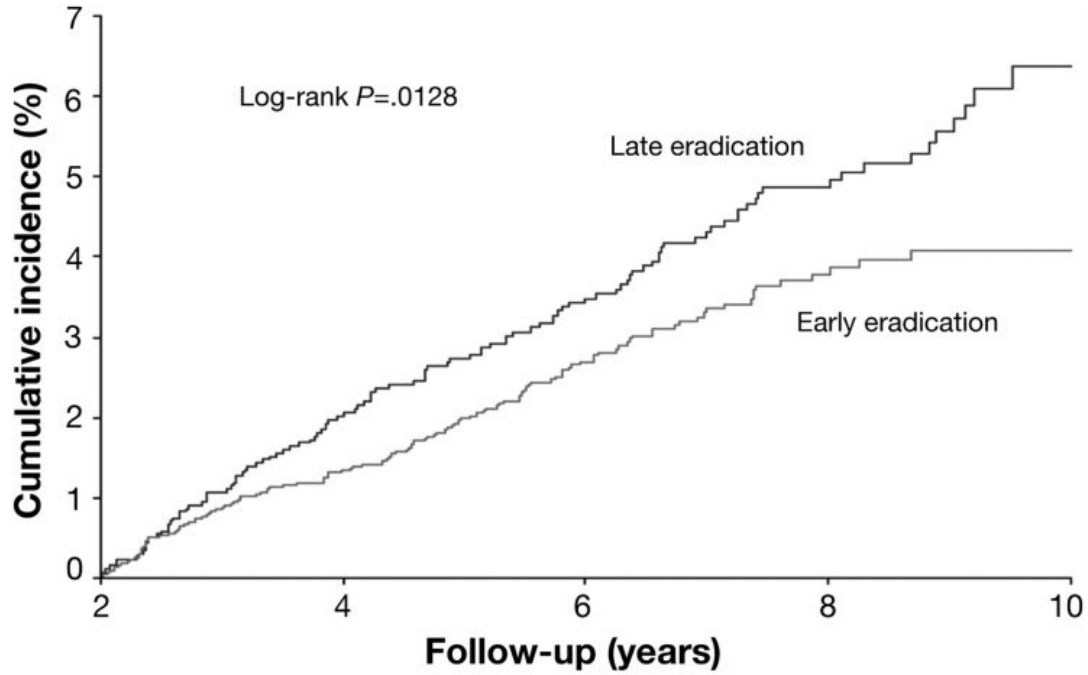


GASTROENTEROLOGY 2009;137:1641–1648

Early *Helicobacter pylori* Eradication Decreases Risk of Gastric Cancer in Patients With Peptic Ulcer Disease

CHUN–YING WU,[*,‡,§] KEN N. KUO,[‖] MING–SHIANG WU,[¶] YI–JU CHEN,[§,#] CHANG–BI WANG,[*] and JAW–TOWN LIN[¶,**]

**Division of Gastroenterology, Taichung Veterans General Hospital, Taichung; ‡Department of Public Health, College of Public Health, China Medical University, Taichung; §Faculty of Medicine, School of Medicine, National Yang–Ming University, Taipei; ‖Center for Health Policy Research and Development, National Health Research Institutes; Miaoli; ¶Division of Gastroenterology, National Taiwan University Hospital, Taipei; #Department of Dermatology, Taichung Veterans General Hospital, Taichung; and **Department of Internal Medicine, E–Da Hospital and I–Shou University, Kaohsiung County, Taiwan*



From Cradle to Grave
Disease migration through generations

Birth circumstances
Family circumstances

Change in environment (address)
New family circumstances
Vaccinations
Medication

Diagnosis
Medication

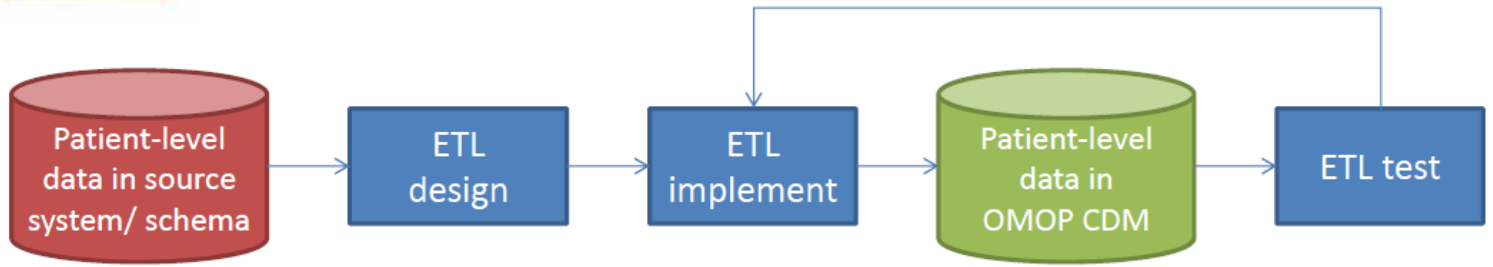
Cause of death

Strategy
Steering Committee
Steward
Service
Security
Data Governance

OHDSI(The Observational Health Data Sciences and Informatics)

- >300 collaborators from 30 different countries
- Experts in informatics, statistics, epidemiology, clinical sciences
- Active participation from academia, government, industry, providers
- Records on about 600 million unique patients in >100 databases

Tools to help you map data



OHDSI tools built to help

WhiteRabbit: profile your source data

RabbitInAHat: map your source structure to CDM tables and fields

ATHENA: standardized vocabularies for all CDM domains

Usagi: map your source codes to CDM vocabulary

CDM: DDL, index, constraints for Oracle, SQL Server, PostgresQL; Vocabulary tables with loading scripts

ACHILLES: profile your CDM data; review data quality assessment; explore population-level summaries

OHDSI Forums:
Public discussions for OMOP CDM Implementers/developers

OHDSI Taiwan Chapter

OHDSI Research Article

- 8 countries, 11 hospitals
- JAMA Netw Open. 2022 Mar 1;5(3):e223877.

JAMA Network | Open

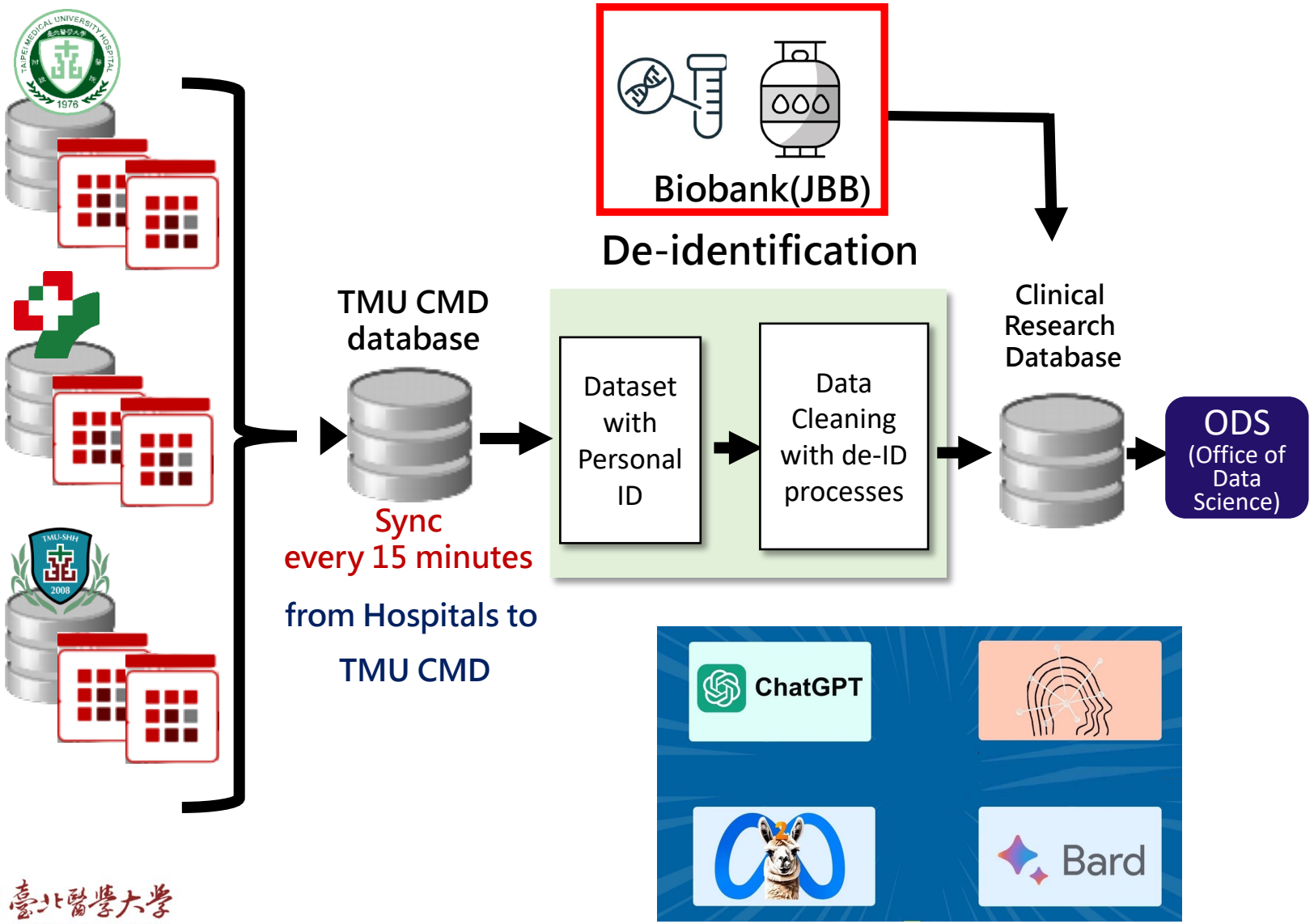
OHDSI

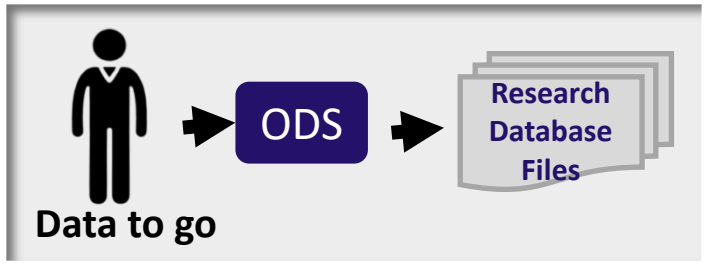
Original Investigation | Cardiology

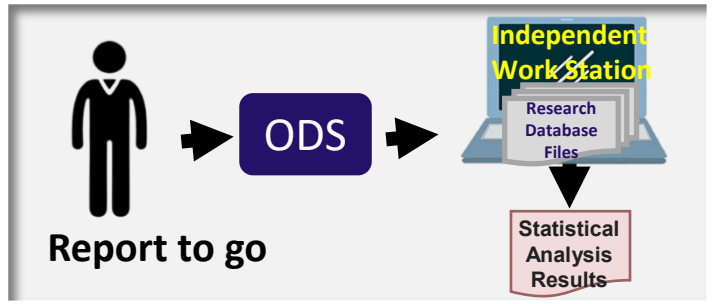
Analysis of Dual Combination Therapies Used in Treatment of Hypertension in a Multinational Cohort

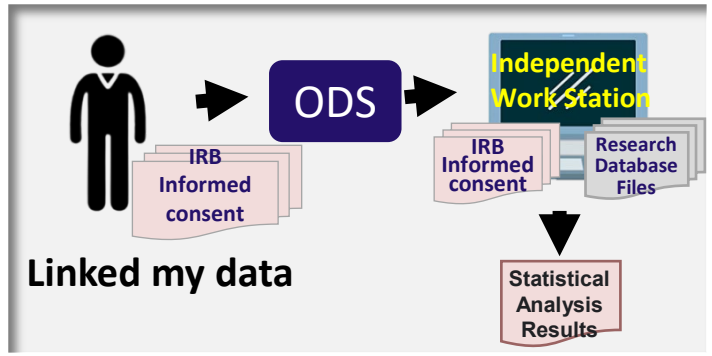
Yuan Lu, ScD; Mui Van Zandt, BS; Yun Liu, PhD; Jing Li, MS; Xialin Wang, MS; Yong Chen, PhD; Zhengfeng Chen, MBBS, MMed; Jaehyeong Cho, PhD; Sreemanee Raaj Dorajoo, PhD; Mengling Feng, PhD; Min-Huei Hsu, MD, PhD; Jason C. Hsu, PhD; Usman Iqbal, PharmD, MBA, PhD; Jitendra Jonnagaddala, PhD; Yu-Chuan Li, MD, PhD; Siaw-Teng Liaw, MBBS, PhD; Hong-Seok Lim, MD, PhD; Kee Yuan Ngiam, MBBS, MMed; Phung-Anh Nguyen, PhD; Rae Woong Park, MD, PhD; Nicole Pratt, PhD; Christian Reich, MD, PhD; Sang Youl Rhee, MD; Selva Muthu Kumaran Sathappan, MSc; Seo Jeong Shin, PhD; Hui Xing Tan, MTech; Seng Chan You, MD, PhD; Xin Zhang, MS; Harlan M. Krumholz, MD, SM; Marc A. Suchard, MD, PhD; Hua Xu, PhD

TMUCRD integrated with TMU Biobank









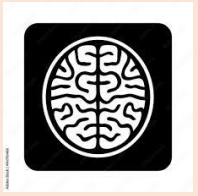
Taipei Medical University Clinical Research Database (TMUCRD)

4M+
Patients

15 Years
Follow-up

61M+
OPD

805K+
Admission



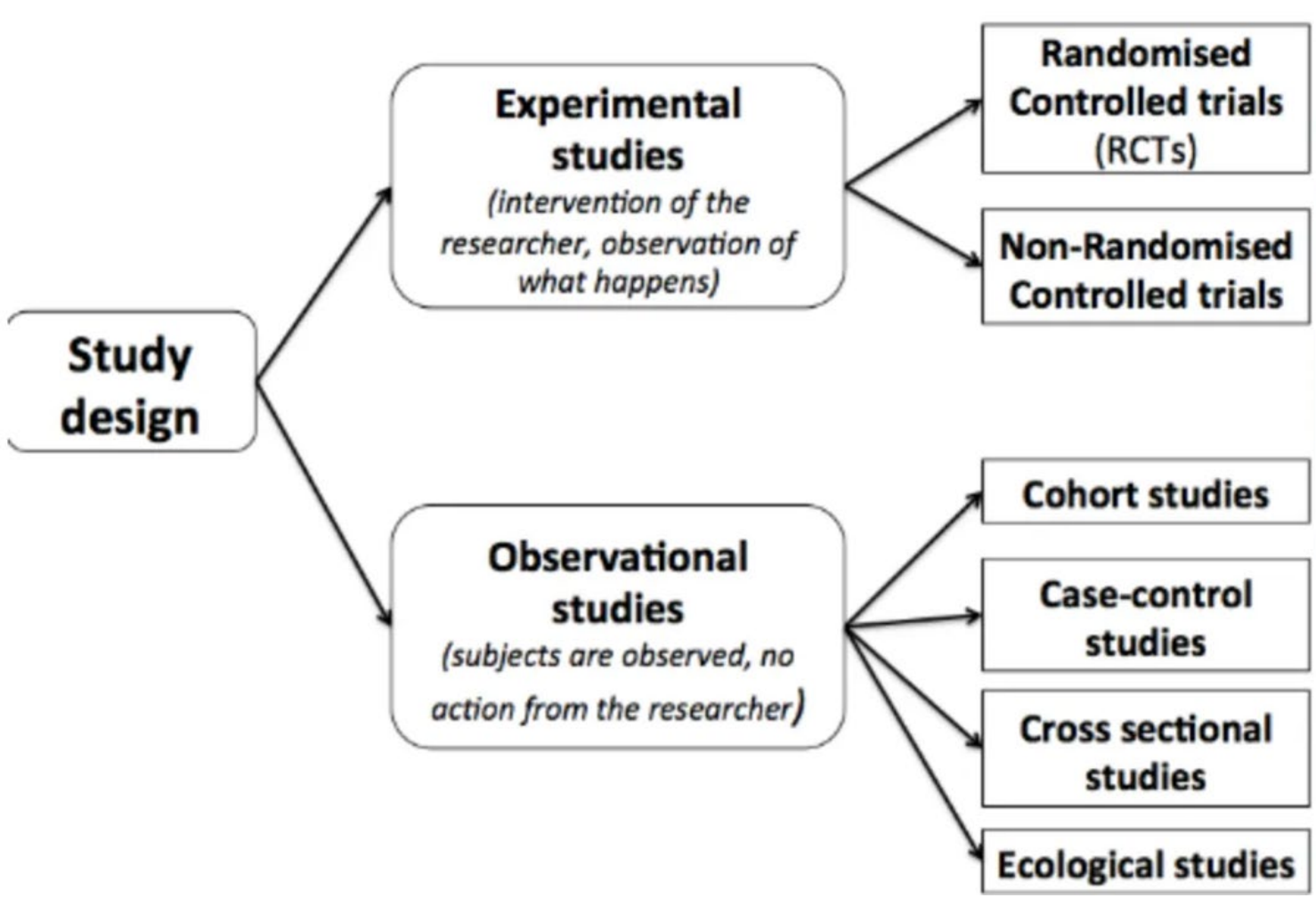
1PB
Image

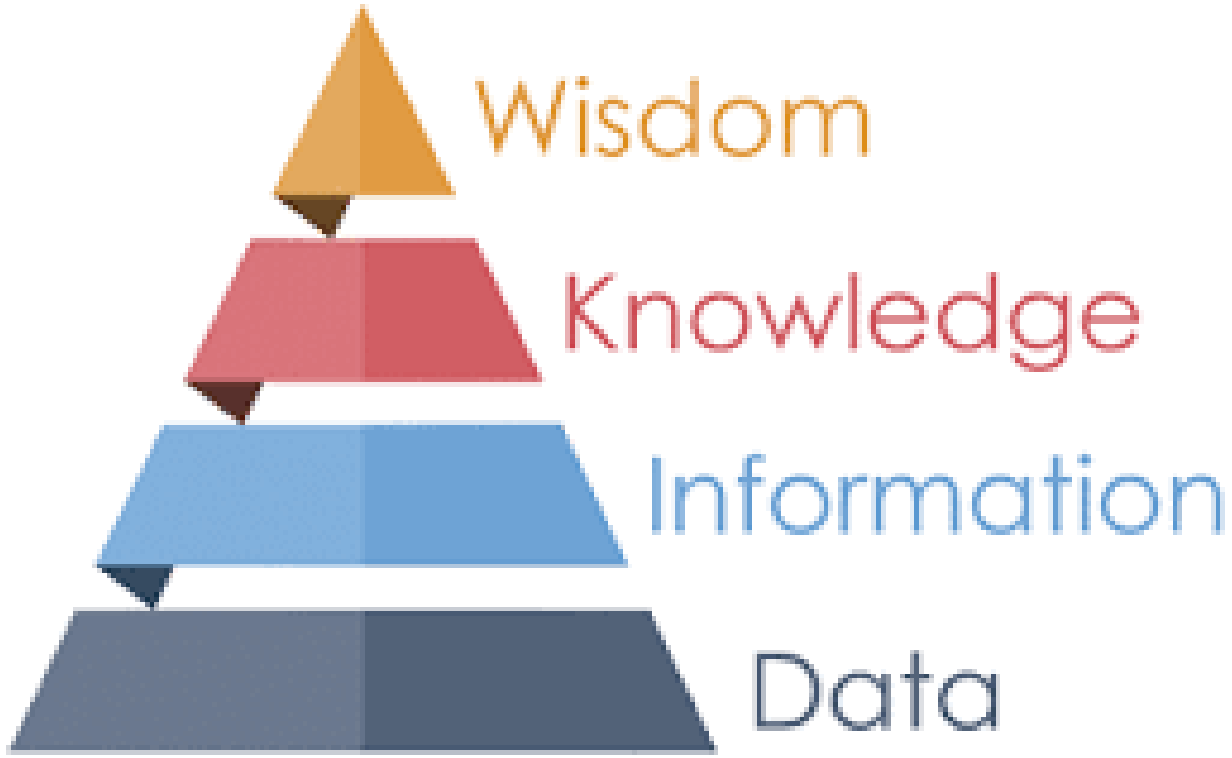
30TB
EMR

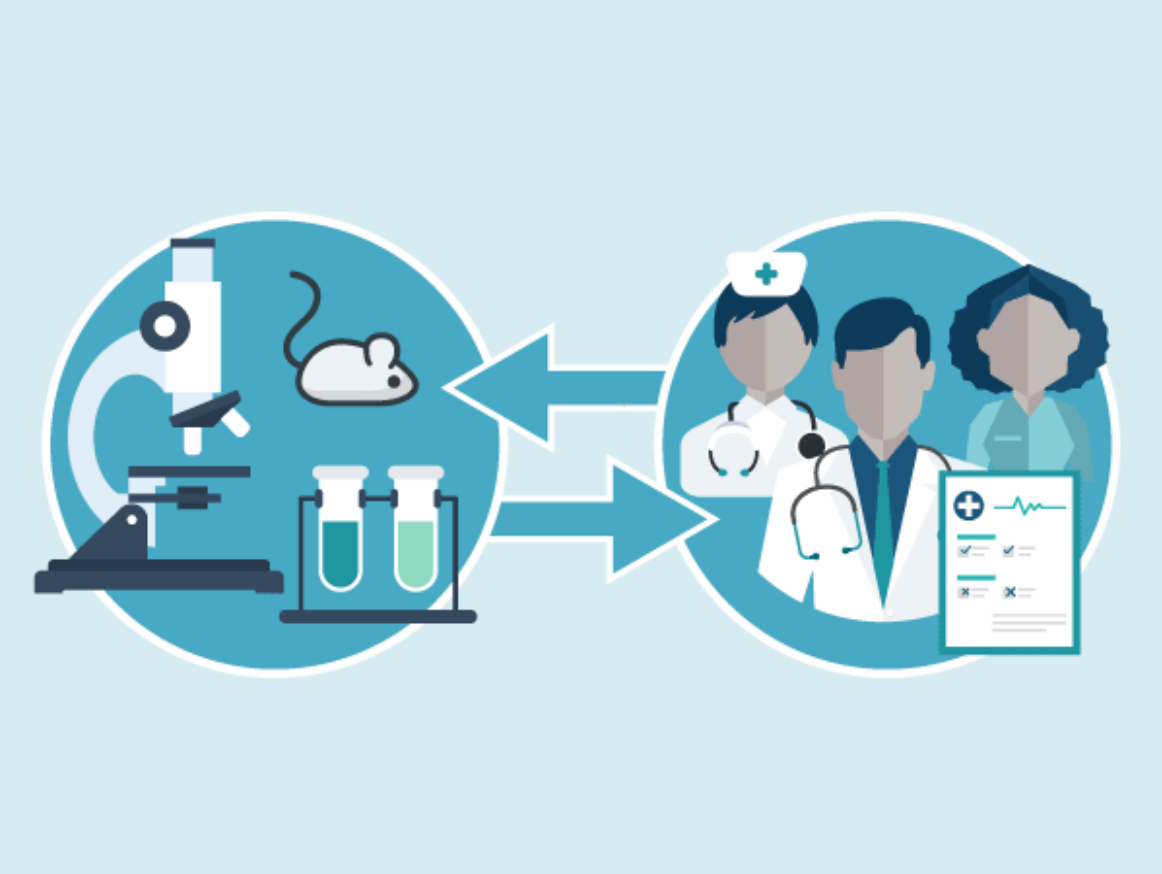
72K
Cancer

50K+
Tissue

Thank you. Comments?


Study design
Experimental studies
(intervention of the researcher, observation of what happens)
Randomised Controlled trials (RCTs)
Non-Randomised Controlled trials
Observational studies
(subjects are observed, no action from the researcher)
Cohort studies
Case-control studies
Cross sectional studies
Ecological studies


Wisdom
Knowledge
Information
Data



- Bench
- Bytes
- Bedside
- Business