Common Data Models
for
Observational Research

Christian Reich

1) A research question
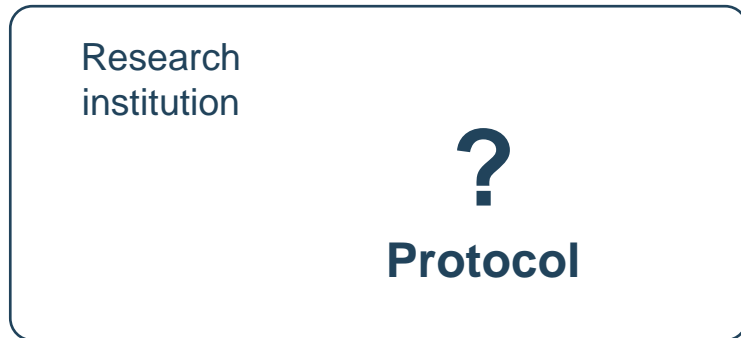
Research
institution

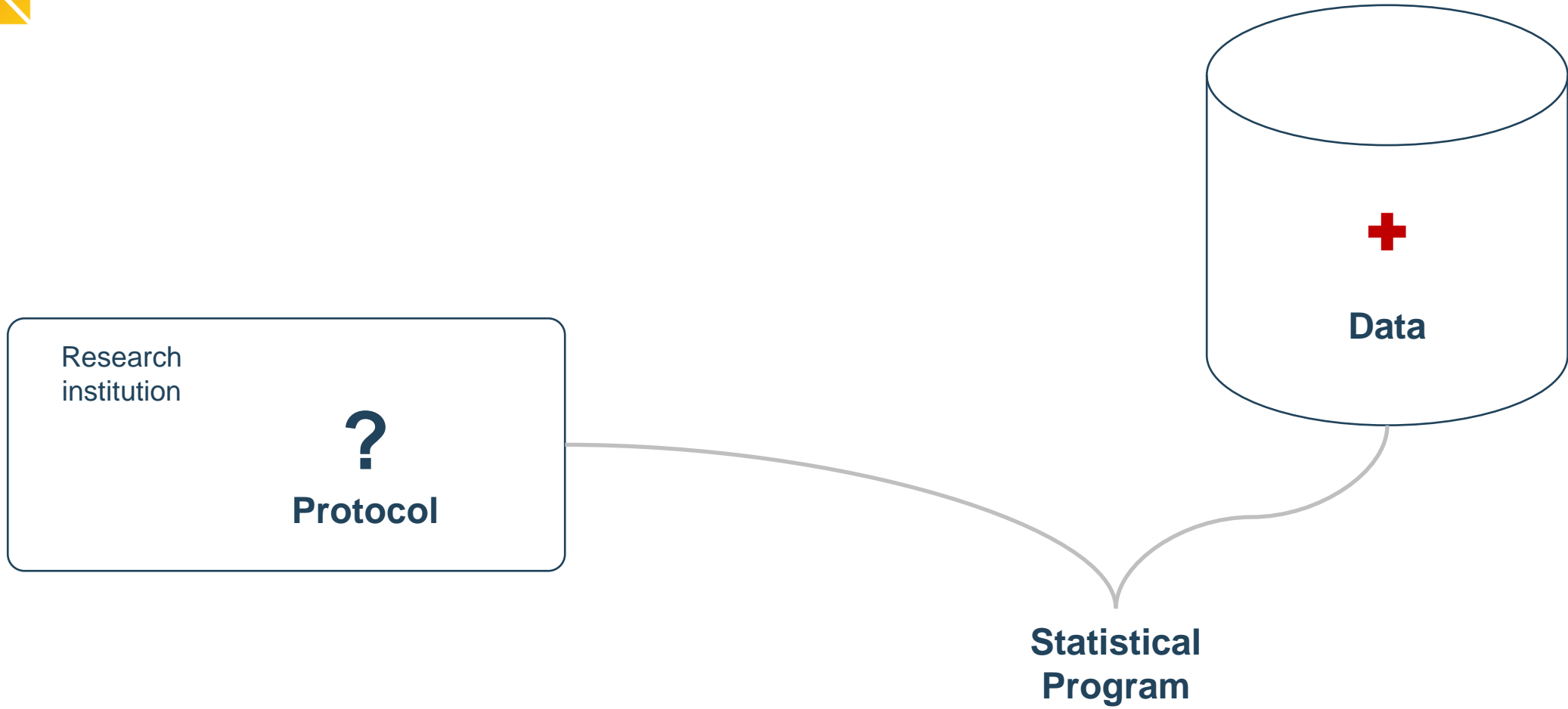**?**

Protocol

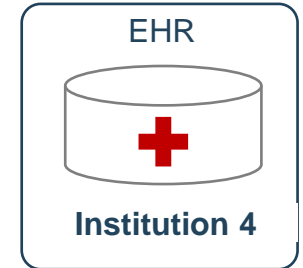# 2) The statistical program to answer it

Research institution

?

Protocol

Statistical Program

3) Data

Research institution

?

Protocol

Data

Statistical Program

The Reality: Data is spread
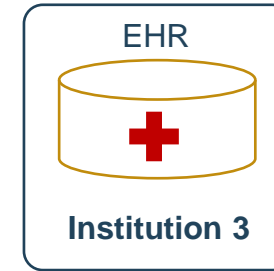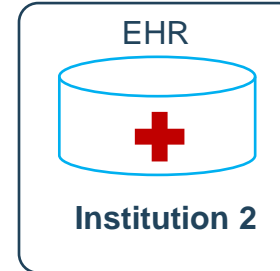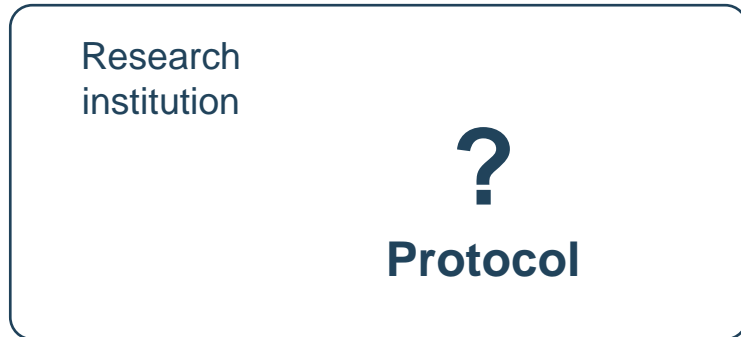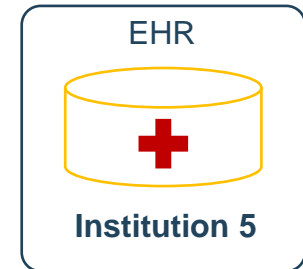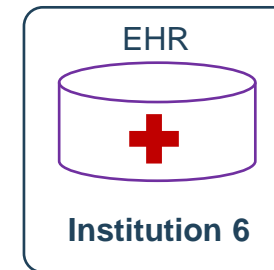
The traditional way
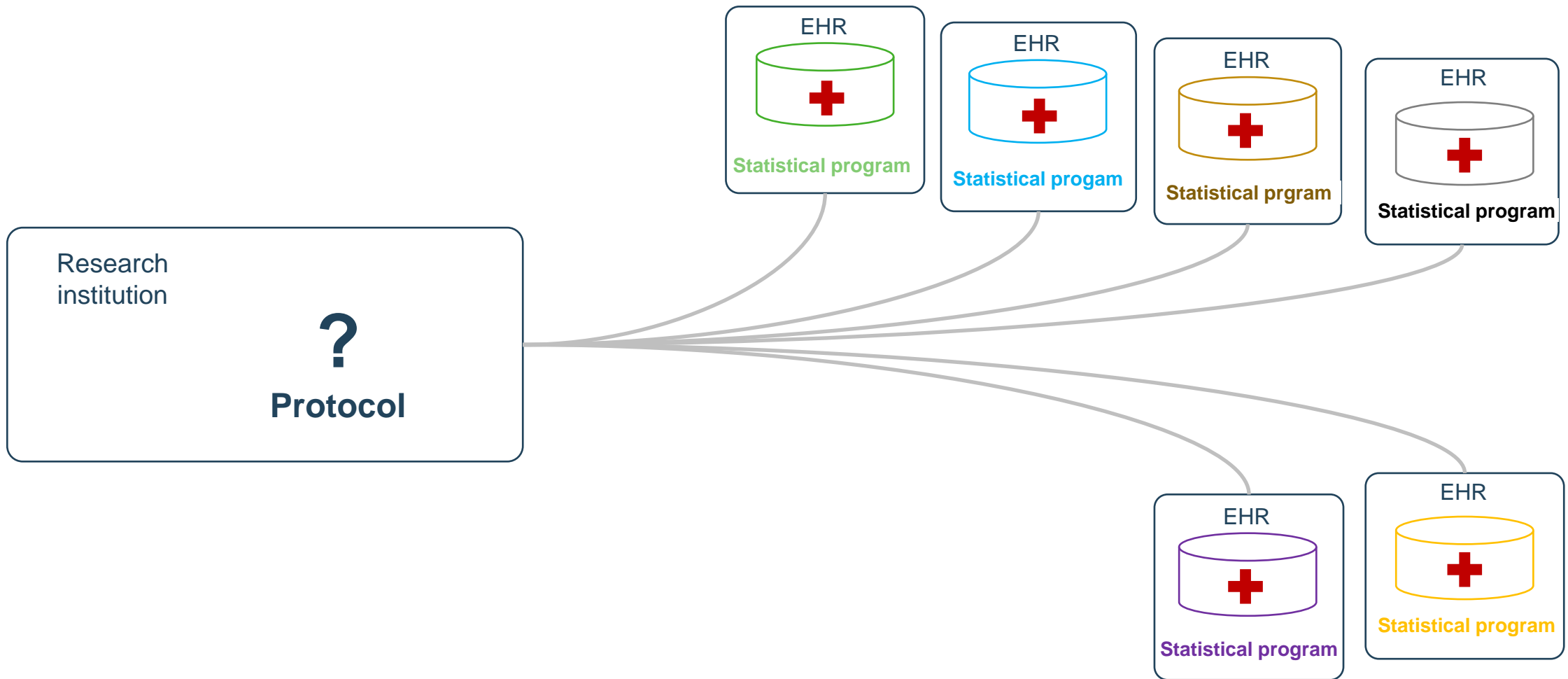
The better way: the **Research Network**
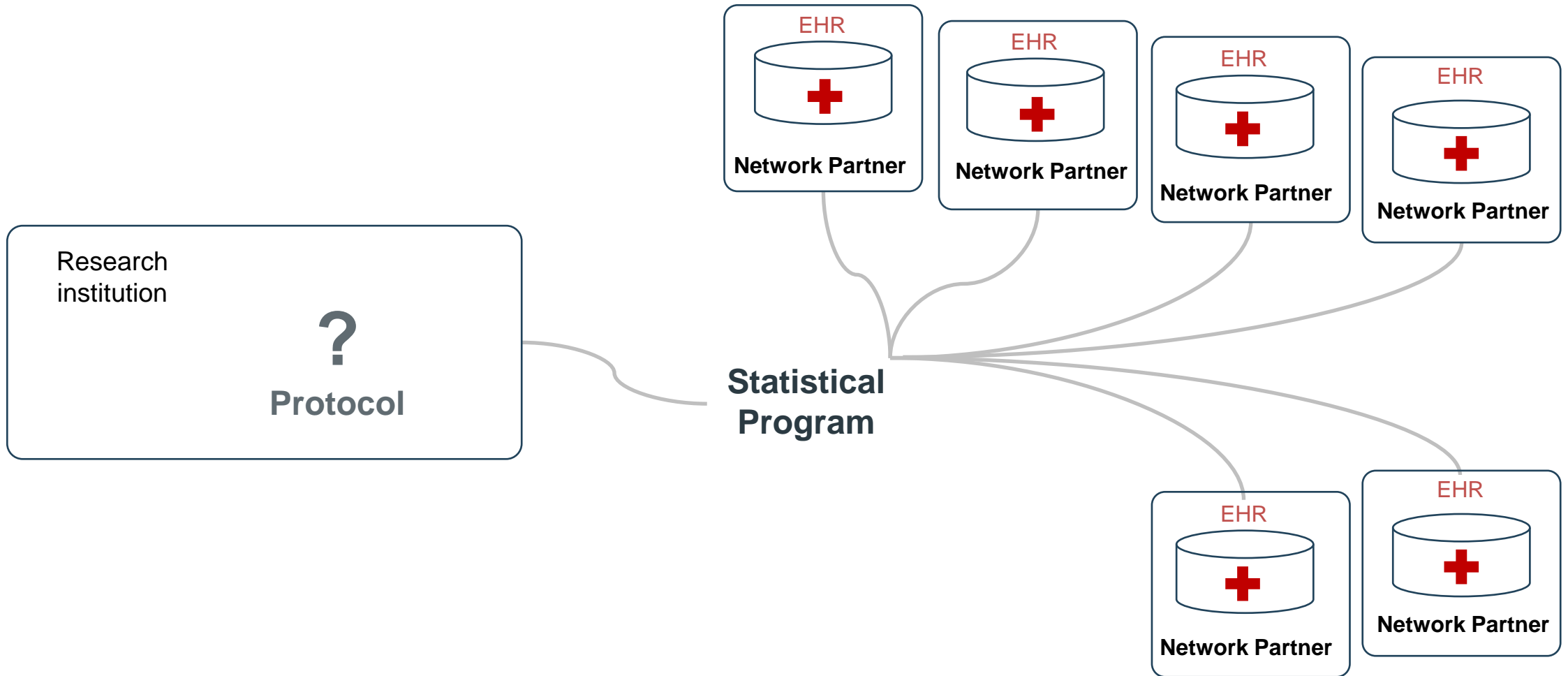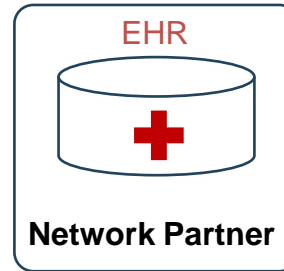
How much can we standardize?
What do we get from it?

Degrees of Standardization

Local

i2b2 workbench

Common
structure

Degrees of Standardization

Country

pcornet

Sentinel

Local

Common
structure +
conventions

i2b2
workbench

Common
structure
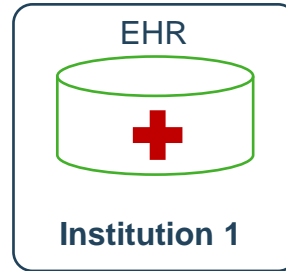
Degrees of Standardization

World

Country

Local

Common
structure +
conventions +
vocabularies

Common
structure +
conventions

Common
structure
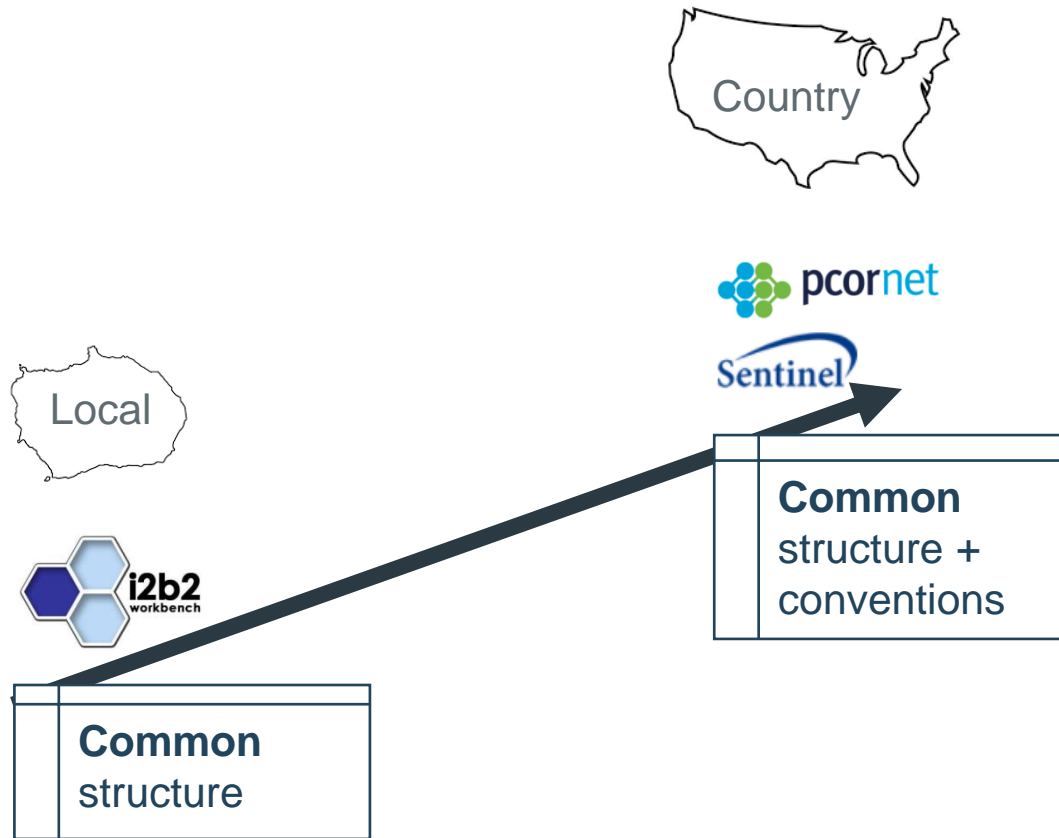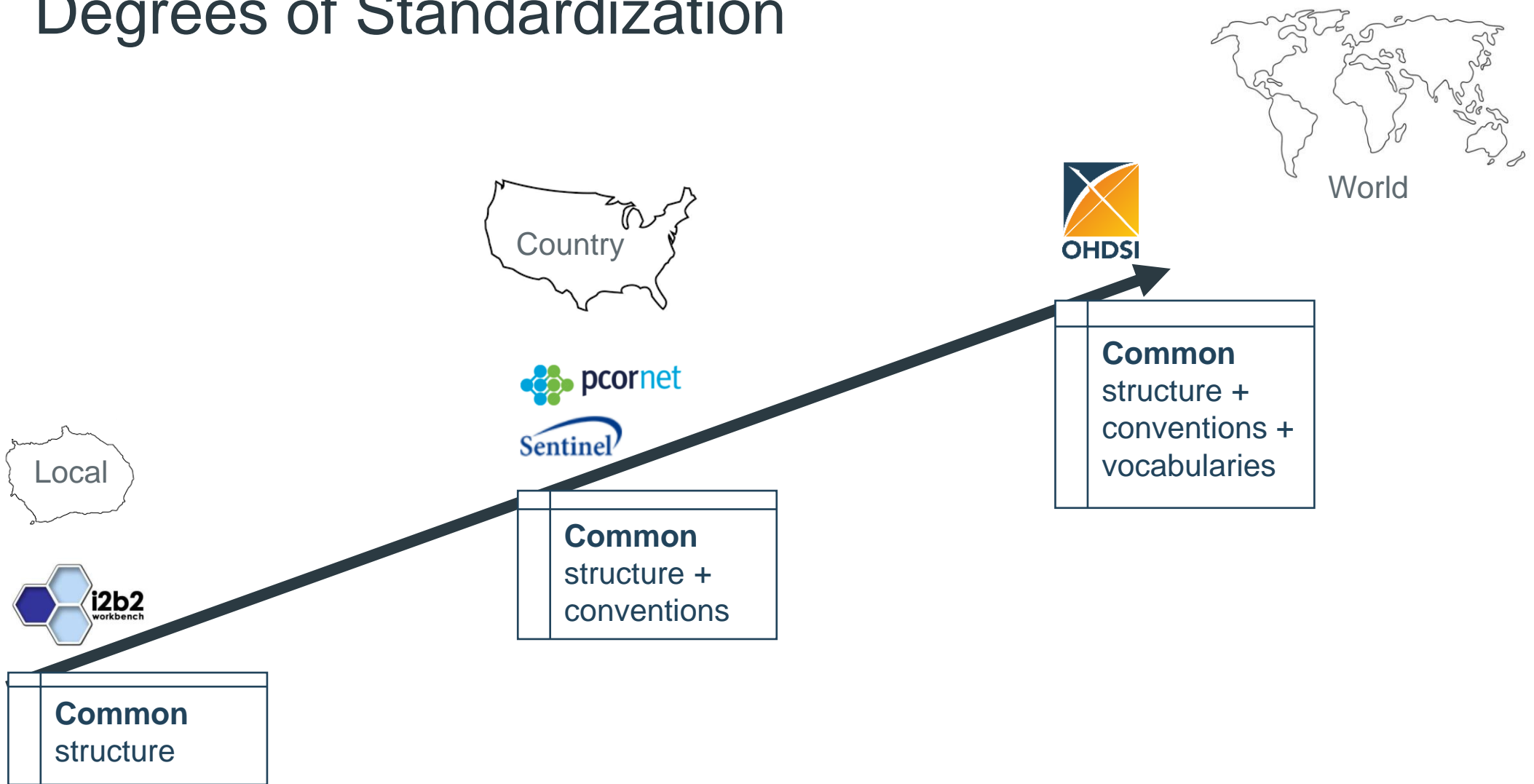
Seoul National University Bundang Hospital
Seoul National University Hospital
Severance Hospital
Soonchunghyang University Hospital (Bucheon)
Soonchunghyang University Hospital (Chonan)
Soonchunghyang University Hospital (Gumi)
Soonchunghyang University Hospital(Seoul)
The Catholic University of Korea, Seoul ST.
  Mary's Hospital
The Catholic University of Korea, ST. Vincent's
  Hospital
The Catholic University of Korea, Uijeongbu
  ST. Mary's Hospital
The Catholic University of Korea, Yeouido ST.
  Mary's Hospital
Ulsan University Hospital
Wonju Severance Christian Hospital
Wonkwng University Hospital
Yongin Severance Hospital

Romania (1)
Thin Ro

Saudi Arabia (1)
Saudi Food and Drug Authority

Scotland (1)
HIC Dundee

Serbia (5)
Clinical-hospital center Zvezdara
Kliničko-bolnički centar Zvezdara (Clinical-
  hospital center Zvezdara)
Primary Healthcare Center Zemun
University Clinical Center of Niš
University Clinical Center of Serbia

Singapore (3)
Growing Up in Singapore Towards healthy
  Outcomes (GUSTO)
Khoo Teck Puat Hospital (SG_KTPH)
National University Hospital Singapore

Spain (37)
Agencia Española de Medicamentos y
  Productos Sanitarios, AEMPS
BIOCRUCES BIZKAIA HEALTH RESEARCH
  INSTITUTE
Conselleria de Sanidade
Consorci Corporació Sanitària Parc Tauli
Consorci Mar Parc de Salut de Barcelona
  (PSMAR)
CORPORACIÓ SANITARIA PARC TAULI
FISABIO-HSRU
Fundació Institut d´Investigació Sanitària Illes
  Balears
Fundació Institut d'Investigacions Mèdiques
  (FIMIM)
Fundacion de Investigacion Biomedica del
  Hospital Universitario 12 de Octubre
Fundación para la Investigación Biomedica
  INCLIVA
FUNDACION PARA LA INVESTIGACION DEL
  HOSPITAL UNIVERSITARIO LA FE DE LA
  COMUNIDAD VALENCIANA (HULAFE)
Fundación para la Investigación del Hospital
  Universitario La Fe de la Comunidad
  Valenciana (HULAFE)
Fundación para la Investigación e Innovación
  Biosanitaria en Atención Primaria (FIIBAP)
Healthcare Service of the Principality of
  Asturias
HM Hospitals
Hospital del Mar (HMAR)
Hospital Sant Joan de Déu
Hospital Universitario 12 de Octubre
INFOBANCO12
Information System of Parc de Salut Mar
  (IMASIS)
Institut Català d'Oncologia
Instituto Aragonés de Ciencias de la Salud
  (IACS)
IQVIA Spain LPD
Marina Salud (Hospital de Denia)
Parc Sanitari Sant Joan de Déu
Pedro Mallol
Research Institute - Hospital de la Santa Creu
  i Sant Pau

Data2time
Geneva Cancer Registry
HUG and SCQM
Institute of Social and Preventive Medicine,
  University of Bern

Taiwan (5)
NHIRD
Shuang Ho Hospital
Taipei Medical University Clinical Research
  Database (TMUCRD)
Taipei Medical University Hospital
Wanfang Hospital

Turkey (2)
Istanbul University Istanbul Faculty of Medicine
IUC Cerrahpaşa TIP Fakületesi
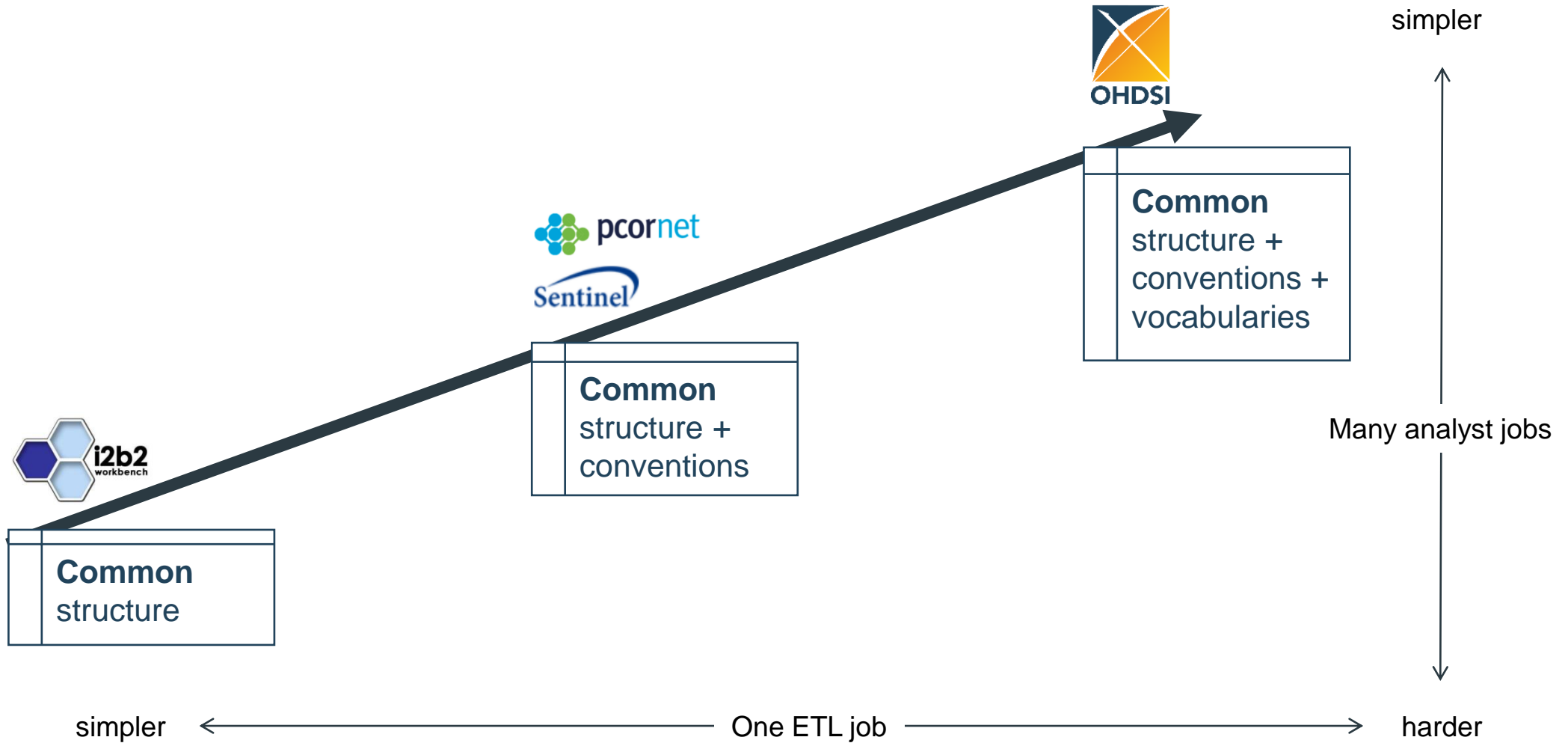
United Kingdom (26)
Akrivia Health
Barts Health NHS Trust
Clinical Practice Research Datalink (CPRD
  GOLD)
Clinical Practice Research Datalink Aurum
  (CPRD Aurum)
Connected Bradford
DataLoch
GOSH
Harvey Walsh Ltd
King's College London
Leeds Teaching Hospitals
OPEN Health
Optimum Patient Care Limited
Queen Mary University of London
Royal College of General Practitioners
  Research and Surveillance Centre
SAIL Databank
THIN UK
UCL
UK Biobank
UK Integrated Medical Record Database
  (IMRD) THIN
UK National Neonatal Research Database
UKCRIS
University College London CALIBER
University College London Hospitals
University College London Hospitals NHS
  Foundation Trust
University of Edinburgh
University of Edinburgh DataLoch

Children's Hospital of Philadelphia
Children's National
Columbia University Irving Medical Center
CRHFEI
DARTNet Institute: CER2 Study
Decision Resources Group (DRG)
Department of Health Services - Los Angeles
Duke University
Eau Claire Cooperative Health Center
Flatiron - OSCER
Geisinger Health System
George Washington University
Georgetown University ARIA
Georgia Tech Research Institute
GeriOMOP
Harvard University Mass General Brigham
HealthVerity
IBM(R) MarketScan(R) Commercial Claims
  (CCAE)
IBM(R) MarketScan(R) Medicare Supplemental
  Database (MDCR)
IBM(R) MarketScan(R) Multi-State Medicaid
  Database (MDCD)
Icahn School of Medicine at Mount Sinai
Indiana University School of Medicine /
  Regenstrief Institute
Inova Health System
IQVIA US Ambulatory EMR
IQVIA US Hospital Charge Data Master (CDM)
IQVIA US Oncology EMR
IQVIA US Open Claims
IQVIA US PharMetrics Plus
Johns Hopkins Unversity
Keck Medicine of University of Southern
  California
Loyola University New Orleans
Maine Medical Center
Mayo Clinic
Medical University of South Carolina
Medicare Research Identifiable Files
MedStar Health
Memorial Sloan Kettering Cancer Center
Momentum AD
Montefiore Medical Center (Albert Einstein
  College of Medicine)
N3C
Nemours Children's Health System
NorthShore University HealthSystem
Northwestern Medicine Enterprise Data
  Warehouse (NMEDW)

Rutgers
Shriners Children's
Spectrum Health West Michigan
STAnford medicine Research data Repository
  (STARR)
Stony Brook
Surveillance, Epidemiology, and End Results
  Program (SEER): B-Cell
TCC - Los Angeles
The Healthcare Cost and Utilization Project
  (HCUP), Nationwide Inpatient Sample (NIS)
The National Health and Nutrition Examination
  Survey (NHANES)
The Ohio State University Medical Center
TrialSpark
Tufts MC Research Data Warehouse (TRDW)
Tulane
UMass Memorial Medical Center
UNC Chapel Hill
University Medical Center New Orleans
University of Alabama at Birmingham
University of Arkansas
University of Buffalo
University of California Health
University of California, Davis
University of California, Irvine
University of California, Los Angeles
University of California, Riverside
University of California, San Diego
University of California, San Francisco
University of Chicago
University of Cincinnati
University of Colorado
University of Colorado, Anschutz Medical
  Center
University of Illinois Chicago
University of Iowa
University of Kentucky
University of Miami
University of Michigan
University of Minnesota
University of Mississippi Medical Center
University of Nebraska Medical Center
University of New Mexico Health Sciences
  Center
University of Pittsburgh
University of Pittsburgh - Banner
University of Rochester
University of Texas Houston
University of Texas Medical Branch

Data Partner Map
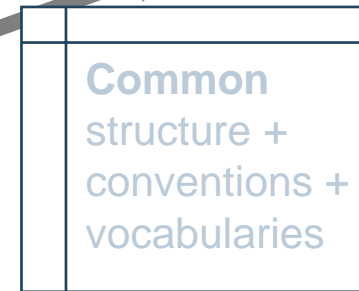
Who benefits how?

simpler

Common
structure +
conventions +
vocabularies

pcornet

Sentinel

Common
structure +
conventions

i2b2
workbench

Common
structure

Many analyst jobs

simpler — One ETL job — harder

Other standards

cdisc

Higher flexibility
Definition syntax + some common model
Each trial different

OHDSI

No flexibility

pcornet

Sentinel

Common
structure +
conventions +
vocabularies

Common
structure +
conventions

i2b2
workbench

Common
structure

HL7 FHIR

Higher flexibility
Definition syntax + some common model
Each patient different

Summary

- A Common Data Model needed for standardization
- There are different degrees of standardization
- The higher the standardization
  - The easier it is to run observational studies
  - The harder it is to transform data
  - The less flexible the model becomes

Use the OMOP CDM and the OHDSI Network
for global observational research!