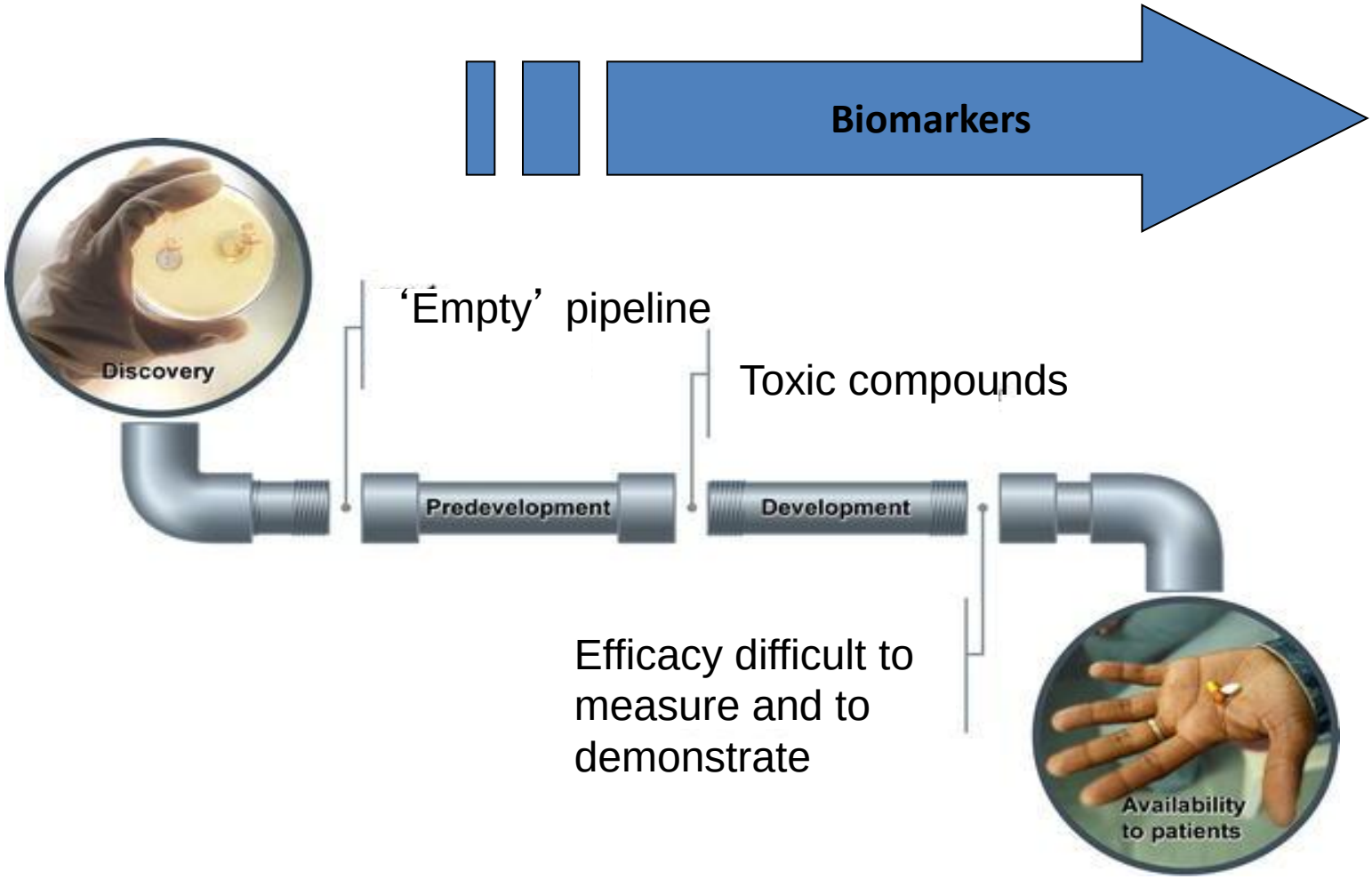
CRITICAL PATH INSTITUTE

Innovative Medicines Initiative

European Medical Informatics Framework (EMIF)

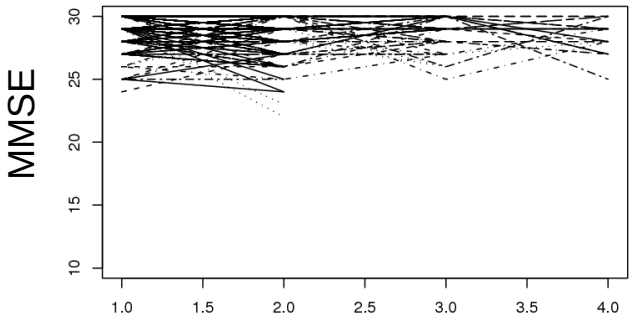
Simon Lovestone
KCL

Problems in the pipeline

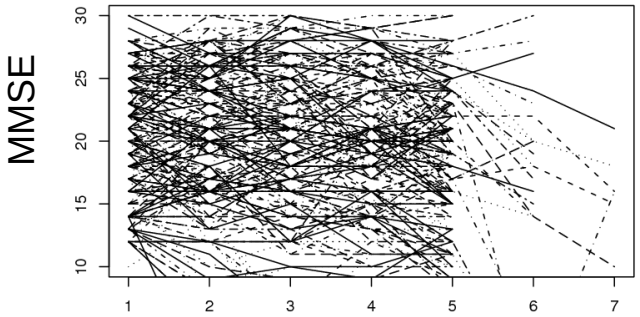


The difficulty in monitoring and in predicting progression in Alzheimer's

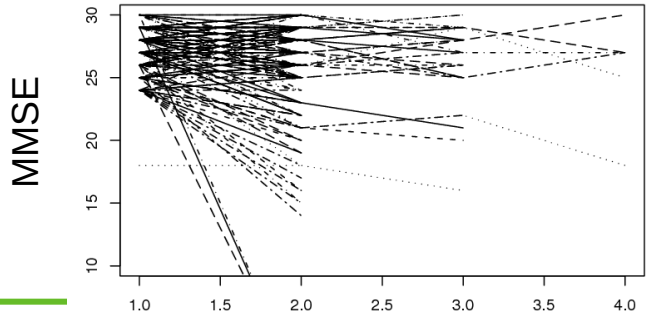
Controls

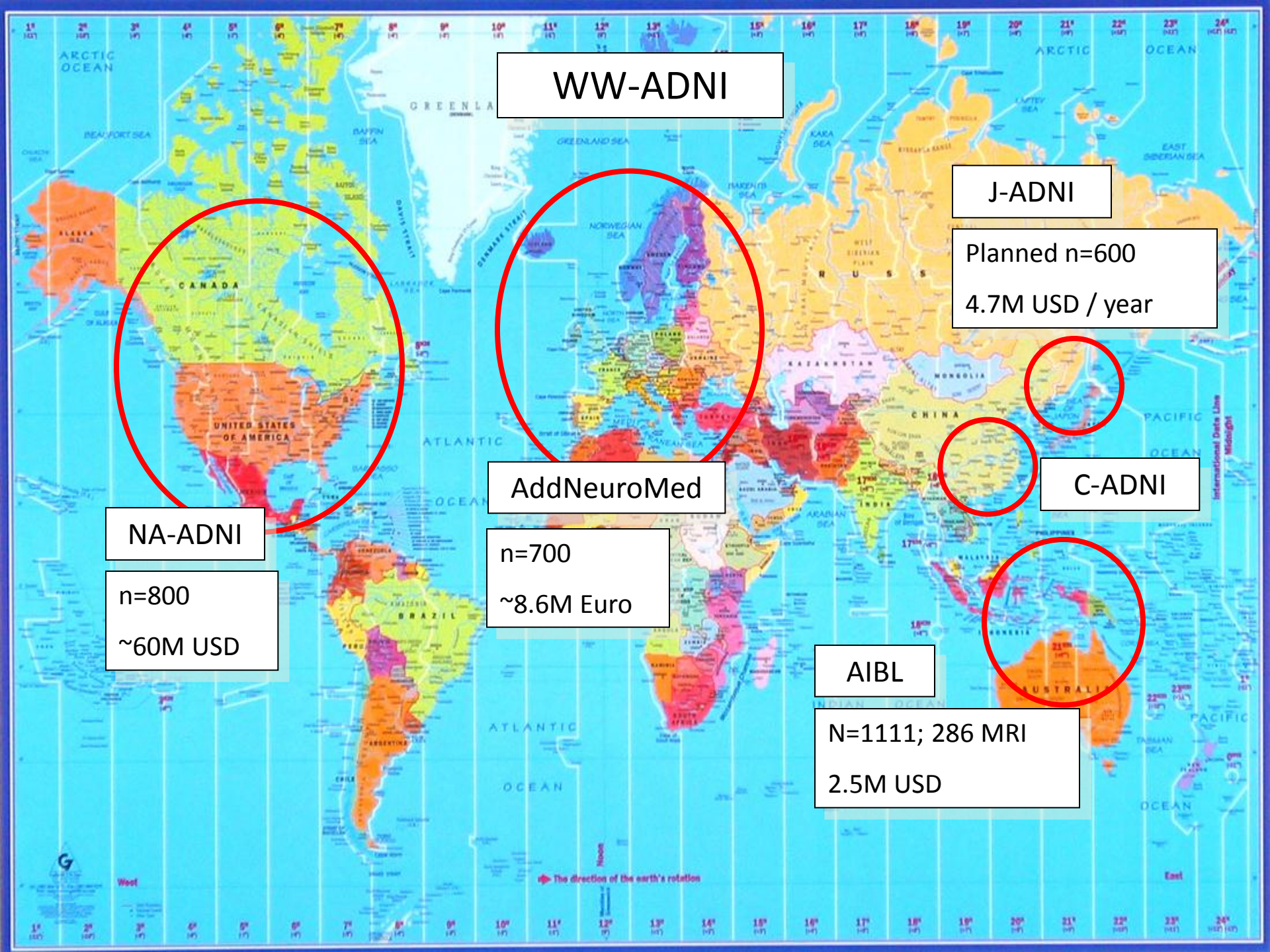


Alzheimer's disease



Mild cognitive impairment




WW-ADNI
J-ADNI
Planned n=600
4.7M USD / year
AddNeuroMed
n=700
~8.6M Euro
NA-ADNI
n=800
~60M USD
C-ADNI
AIBL
N=1111; 286 MRI
2.5M USD

Project Vision

To enable and conduct novel research into human health by utilising human health data at an ***unprecedented scale***

'Think Big'

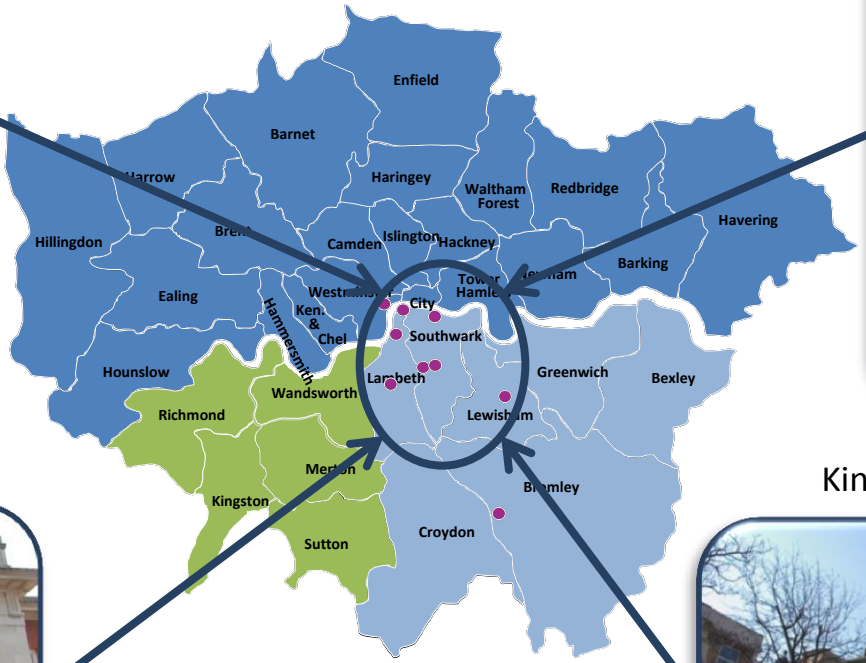
- Access to information on 40 million patients
- AD research on 10-times more subjects than ADNI
- Metabolics research on > 20,000 obese & T2DM subjects
- Linkage of clinical and omics data
- Development of a secure (privacy, legal) modular platform

- Continue to build a network of data sources and relevant research

King's Health Partners

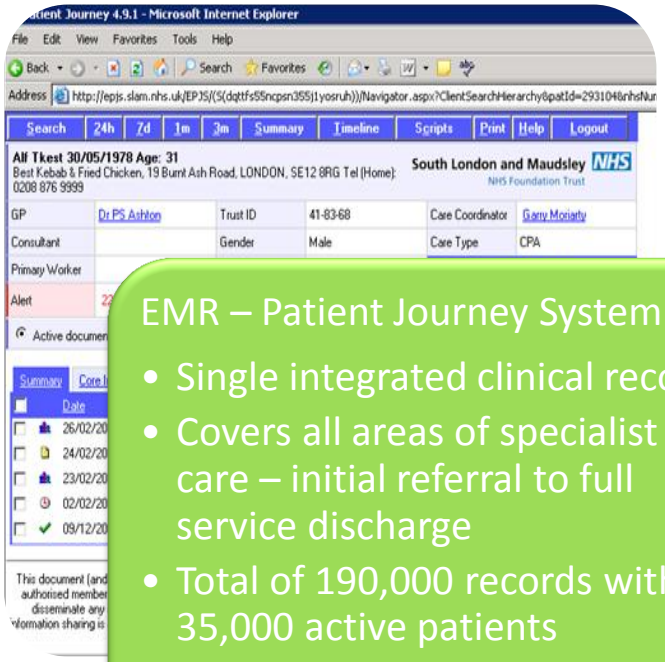
Guy's and St. Thomas'

King's College London



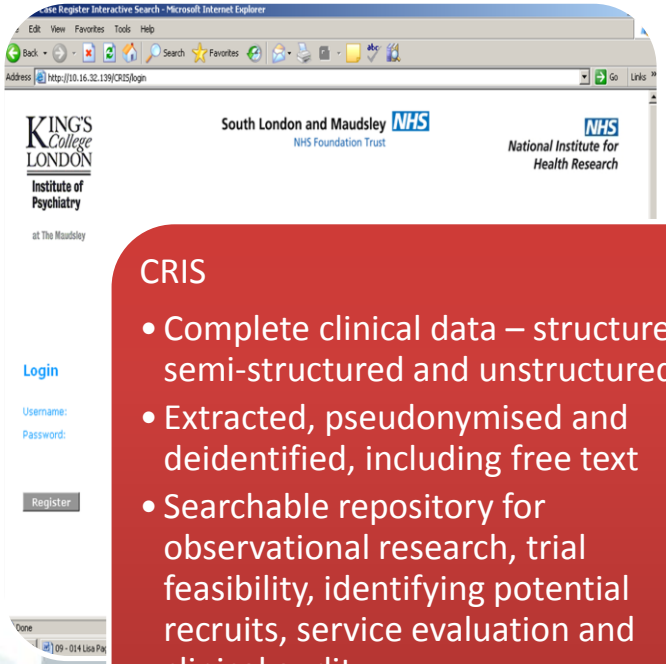
South London and the Maudsley

King's College Hospital



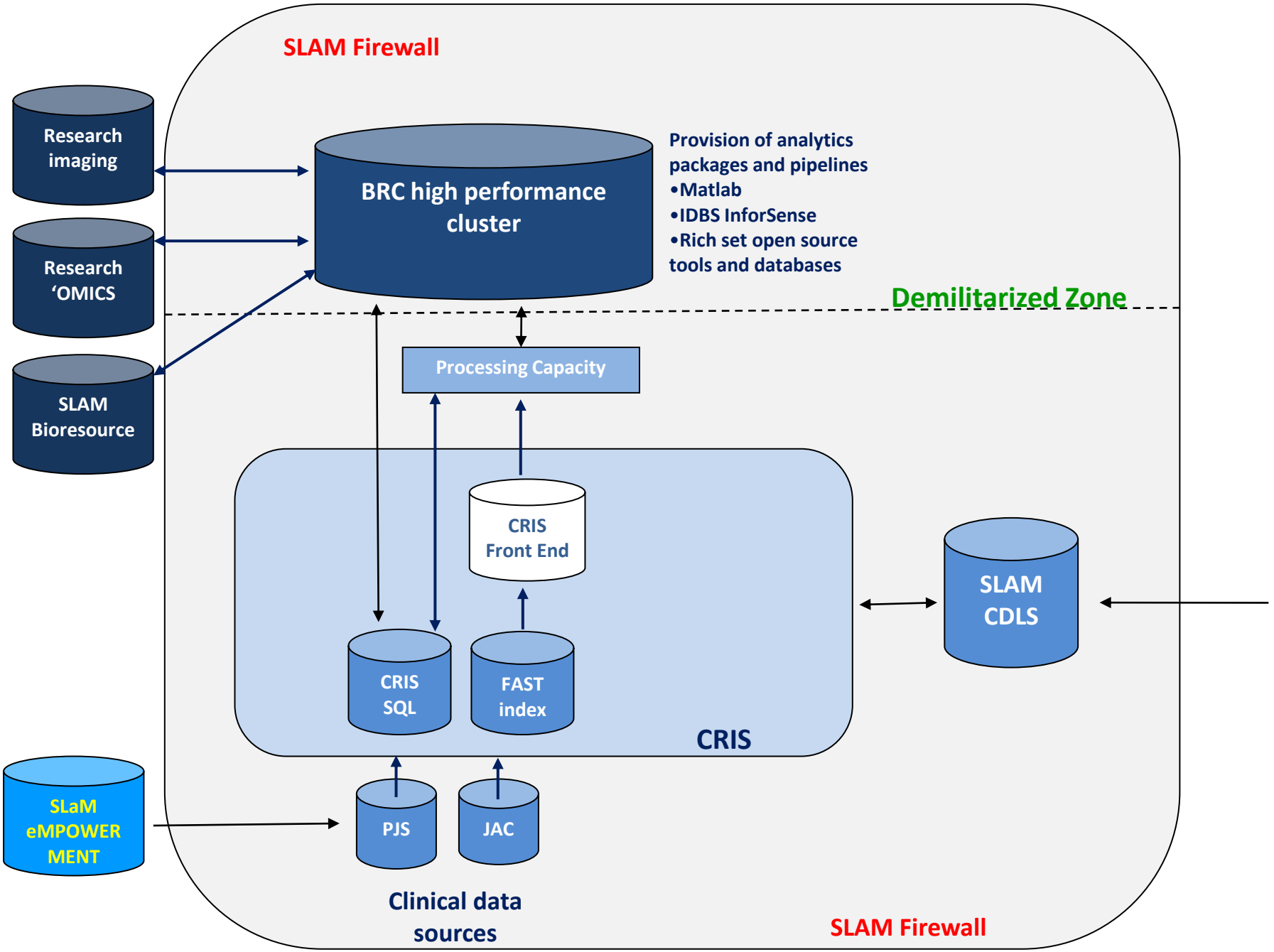
EMR – Patient Journey System

- Single integrated clinical record
- Covers all areas of specialist MH care – initial referral to full service discharge
- Total of 190,000 records with 35,000 active patients
- 5,000 unique users log-in per month
- 300,000 documents created per month

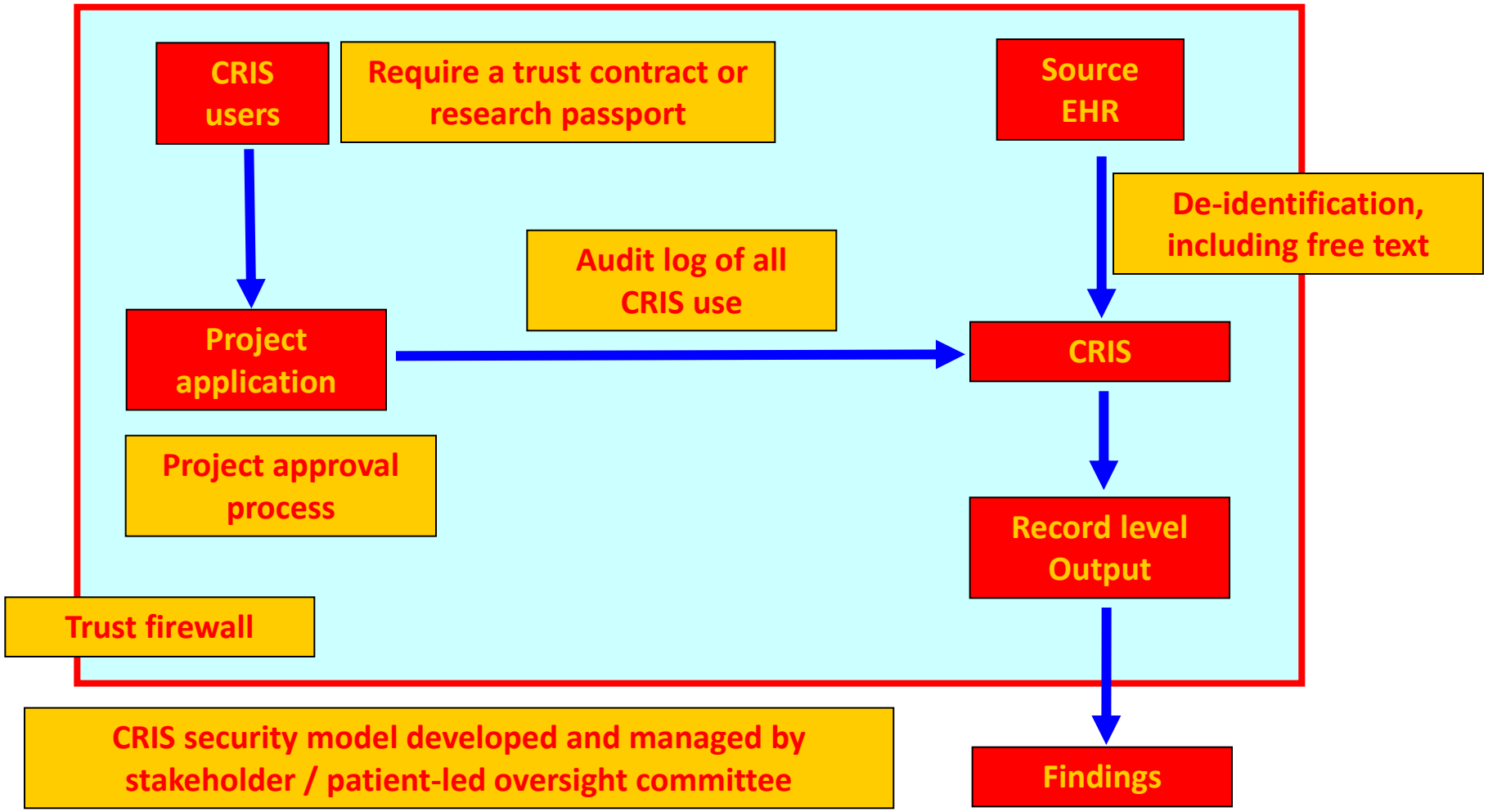


CRIS

- Complete clinical data – structured, semi-structured and unstructured
- Extracted, pseudonymised and deidentified, including free text
- Searchable repository for observational research, trial feasibility, identifying potential recruits, service evaluation and clinical audit
- Pseudonym attached to samples
- Linked to imaging and biological datasets


SLAM Firewall
Research imaging
Research 'OMICS
SLAM Bioresource
BRC high performance cluster
Provision of analytics packages and pipelines
•Matlab
•IDBS InforSense
•Rich set open source tools and databases
Demilitarized Zone
Processing Capacity
CRIS Front End
CRIS SQL
FAST index
CRIS
SLAM CDLS
SLaM eMPOWERMENT
PJS
JAC
Clinical data sources
SLAM Firewall

CRIS Security Model



Data processing

GATE text parsing software (**G**eneral **A**rchitecture for **T**ext **E**ngineering) is used for 'information extraction', e.g. to generate structured data from free text, e.g.

- **to extract MMSE score and date from text entries**

Run across all CRIS free text – produces **35000** validated structured scores/dates

Turning words into data

01-25	
2006-04-06	[10007204] visited him at ZZZZZ on 6th April 2006. Continues to have good and bad days. MMSE score dropped from 17/30 in November 2005 to 10/30 in April 2006. Receiving Venlafaxine XL 225 mgs mane. Plan: To continue on same meds and review in six weeks. Please see correspondence for a detailed letter to GP. ---------- 20/04/2006 19:55 , Sri Perecherla/PJS

1	MMSE ID	Table	Date Process	BrcId	CN_Doc_i	Numerator	Denominat	Date
2	1	event	21/09/2010	10007134	15229144	15	25	01/12/2009
3	2	event	21/09/2010	10007202	17749381	29	30	02/06/2008
4	3	event	21/09/2010	10007204	21280391	10	30	15/04/2006
5	4	event	21/09/2010	10007204	21280391	17	30	15/11/2005
6	5	event	21/09/2010	10007205	18799205	12	30	01/07/2008
7	6	event	21/09/2010	10007286	18528591	10	30	06/09/2005
8	7	event	21/09/2010	10007294	24880515	11	20	03/04/2011

Cholinesterase inhibitors and Alzheimer's disease

Phase IV of AChEI

> 2500 patient years of therapy

> 8 fold dataset compared to Cochrane

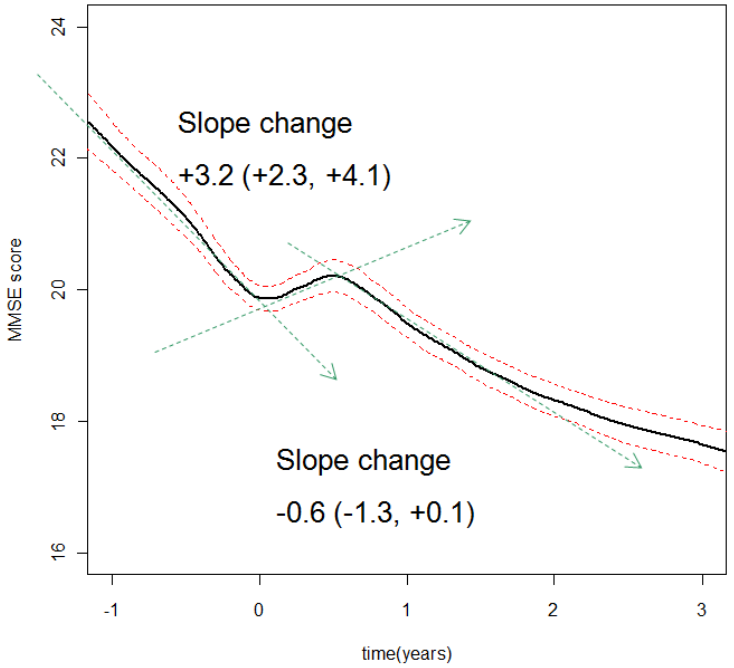
Costs and effectiveness

precompetitive collaboration with pharma

Text mining derivation of service utilisation and costs

Predictors of response

Biomarkers and clinical



CRITICAL PATH INSTITUTE

NHS National Institute for Health Research

Secure Network

Data Interchange with GP and other health care systems

Trust Electronic Patient Record

ePJS

Research Information System

CRIS

BioResource

'My SLaM' Portal…..

…including Patient Reported Outcome Measures, trials information, engagement ….

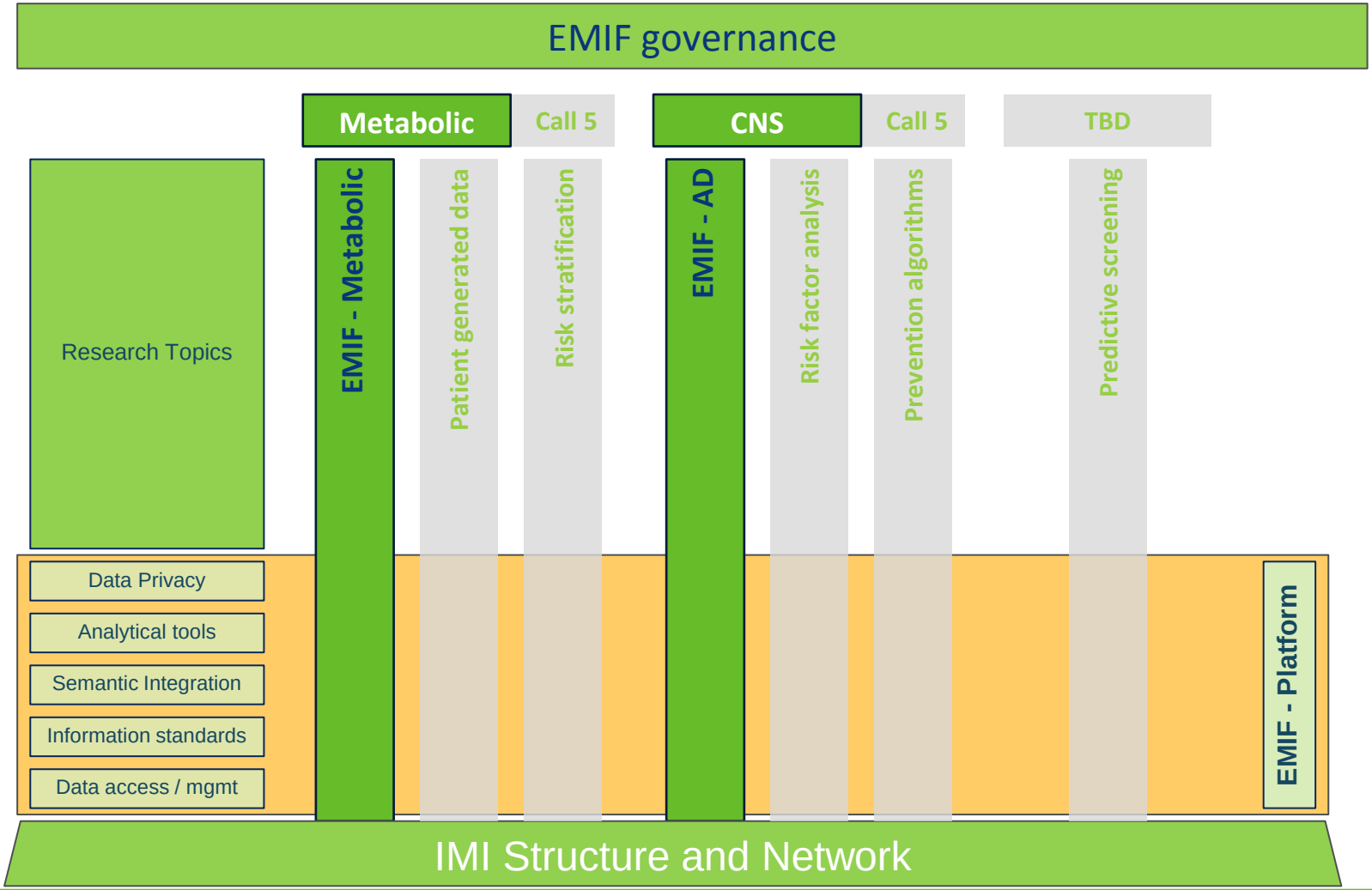
Personal Health Record - HealthVault

Mobile Device Connection Center

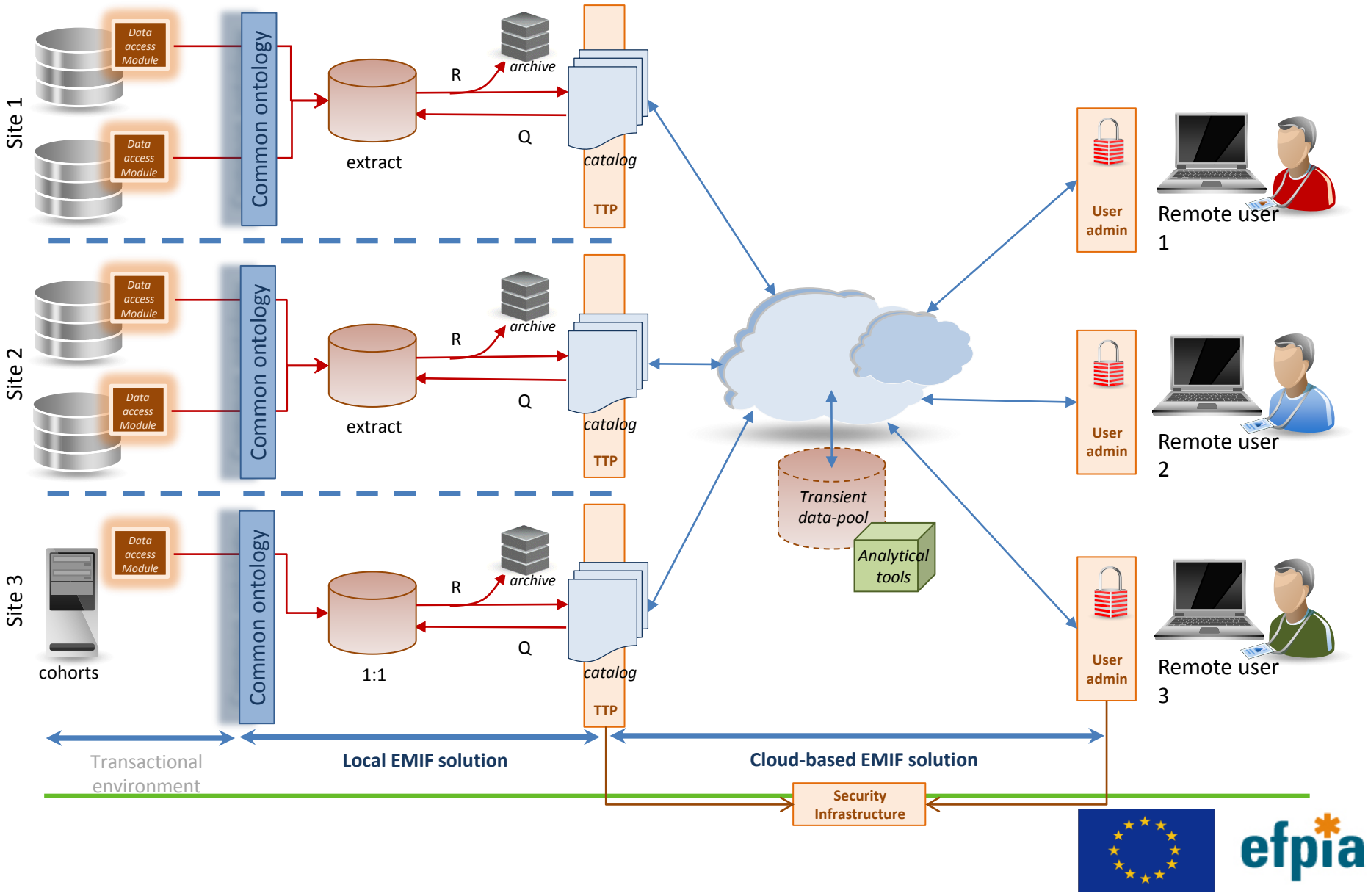
Partner Devices

efpia

EMIF – platform for modular extension



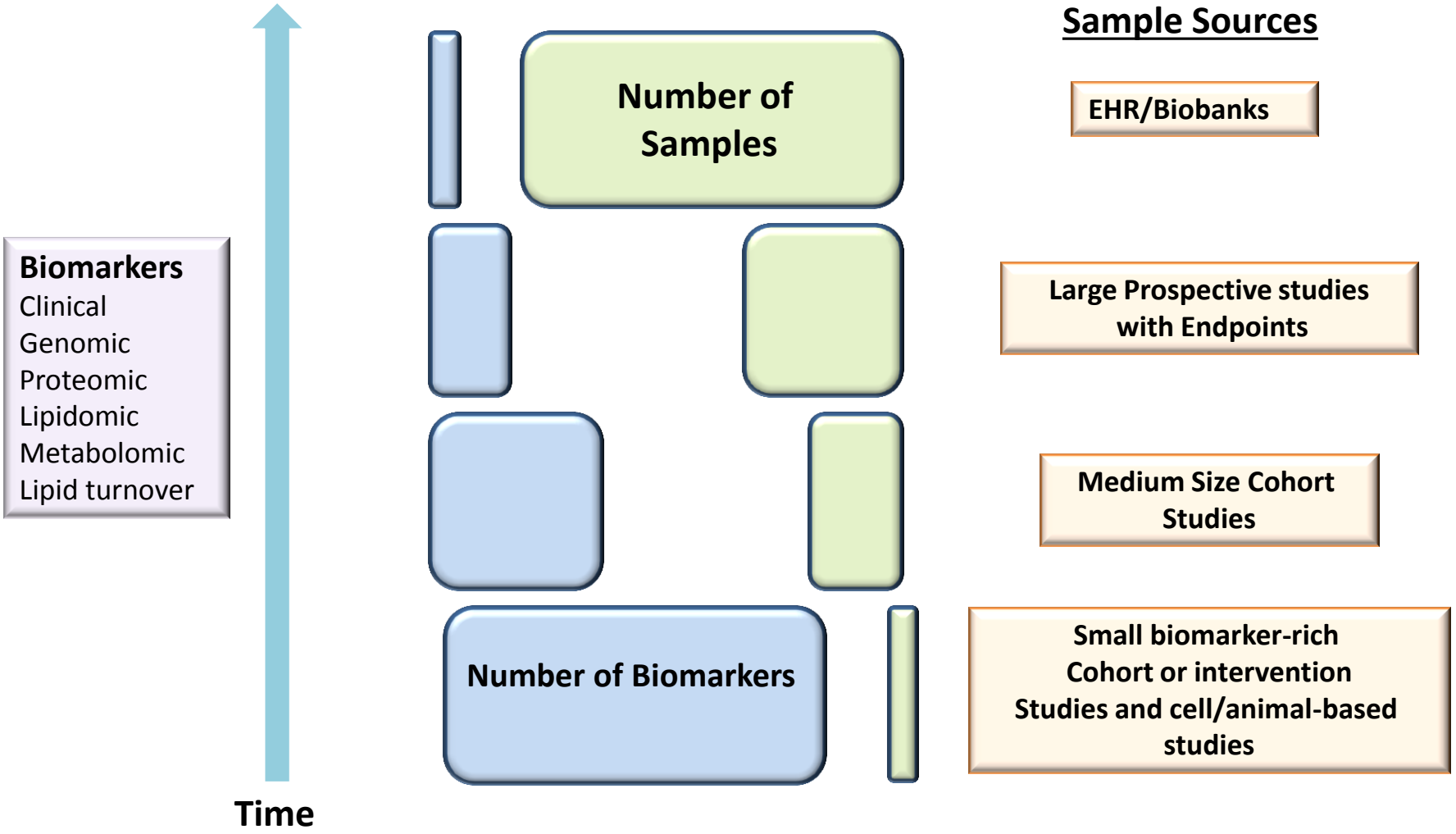
EMIF systems view



Key objectives – EMIF-Platform

- Access to harmonised data
  - Access to harmonised patient medical information from different data sources across Europe
  - comprehensive health data comprising clinical, biomarker and other detailed health information on a number of populations and specific cohorts (pediatrics, adults, including vulnerable groups).
- Governance
  - Procedures and SOPs that govern access and utilisation of patient level data
  - Robust measures to enable linkage and sharing whilst preserving privacy
- Tools
  - Solutions in the areas of data privacy and ethics, standards and semantic interoperability
  - patient health data linkage and access to a combined patient health information base
- Business Model
  - That governs the use of the project output as well as the support for future research projects

EMIF-biomarkers



Key objectives – EMIF-AD

1. Collection of data required for the development and validation of new biomarkers for AD
2. Characterisation of study population and definition of extreme phenotypes
3. Discovery of new biomarkers for the diagnosis and prognosis of predementia AD
4. Validation of new biomarkers and development of strategies for selection of subjects in AD prevention trials

EMIF: one project – three topics

1. EMIF-Platform: Develop a framework for evaluating, enhancing and providing access to human health data across Europe, to support the two specific topics below as well as research using human health data in general
2. EMIF-Metabolic: Identify predictors of metabolic complications in obesity, with the support of EMIF-Platform
3. EMIF-AD: Identify predictors of Alzheimer's Disease (AD) in the pre-clinical and prodromal phase, with the support of EMIF-Platform

Thinking – and doing - Big

- 58 partners (3 consortia + Efpia)
- >200 individuals involved
- 14 European countries represented

  (14 - UK, 8 - Germany, 6 - Belgium, 6 - Italy, 5 - France, 5 - Sweden, 4 - Netherlands, 3 - Denmark, 3 – Finland, 2 – Spain, 2 – Switzerland, 1 – Portugal, 1 – Estonia, 1 – Luxembourg) [# partners – country]
- ~56m € worth of resources (in-kind / in-cash)
- “3 projects in one”

- EMIF general
  - Bart Vannieuwenhuyse (bvannieu@its.jnj.com)
  - Simon Lovestone (simon.lovestone@kcl.ac.uk)
  - Johan van der Lei (j.vanderlei@erasmusmc.nl)
- EMIF-Platform
  - Johan van der Lei (j.vanderlei@erasmusmc.nl)
  - Patrick Genyn (pgenyn1@its.jnj.com)
- EMIF-Metabolics
  - Ulf Smith (ulf.smith@medic.gu.se)
  - Dawn Waterworth (Dawn.M.Waterworth@gsk.com)
- EMIF-AD
  - Pieter Jelle Visser (pj.visser@maastrichtuniversity.nl)
  - Mike Krams (mkrams@its.jnj.com)

- ww.w.emif.eu (coming soon)