



MRC e-Science featuring PsyGrid

www.psygrid.org

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MRC e-Science Projects

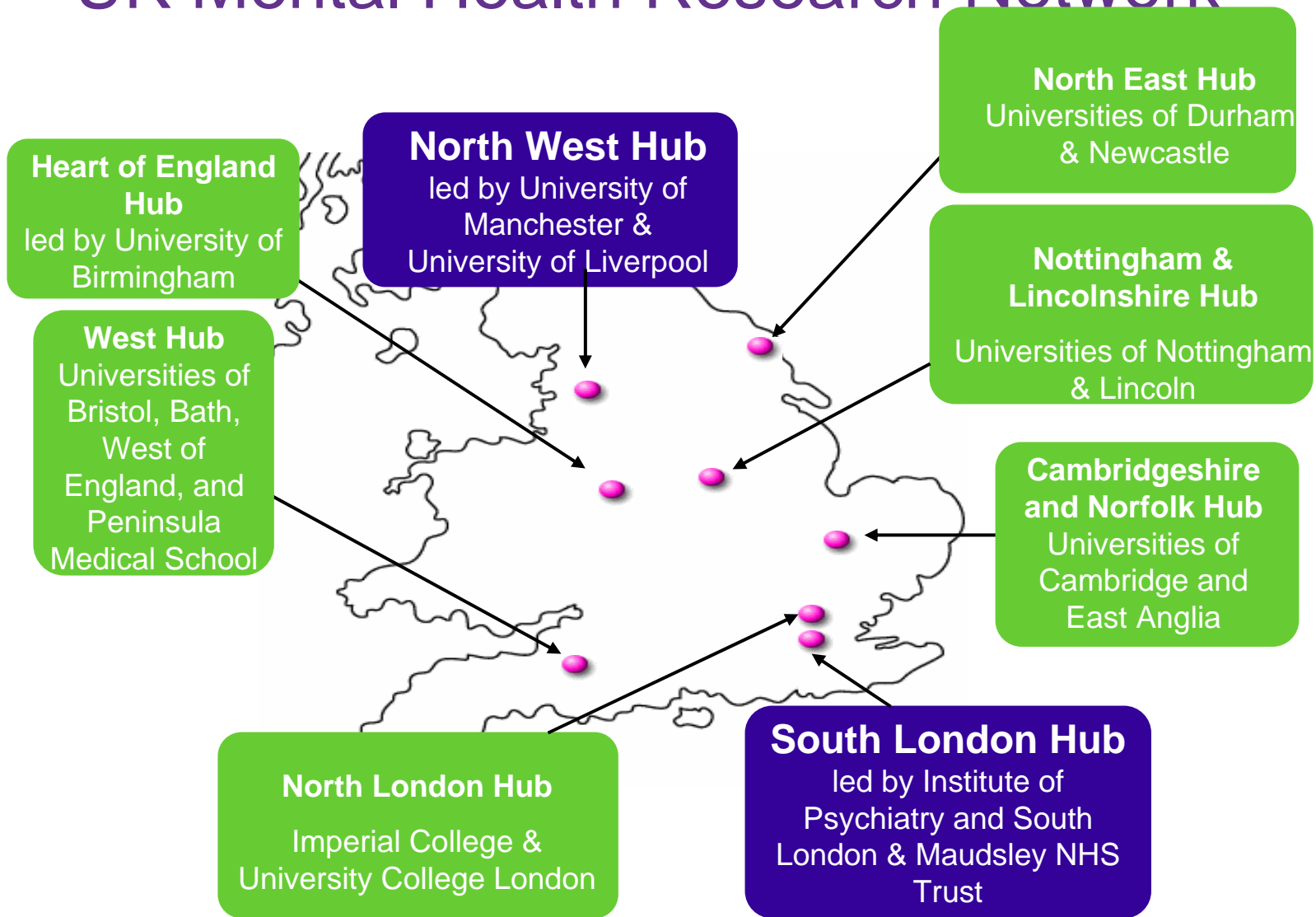
- NeuroGrid
 - Image storage, retrieval and analysis
- CLEF
 - Extraction, visualisation of routine medical data
- VOTES
 - Virtual Organisations for Trials and Epidemiological Studies
- CancerGrid
 - Clinical trial design and meta-data management
- ... and PsyGrid

PsyGrid Aims

- **Aim 1 (Technological):** Develop applications and middleware to support studies and clinical trials in mental health
 - Software
 - A supported operational system

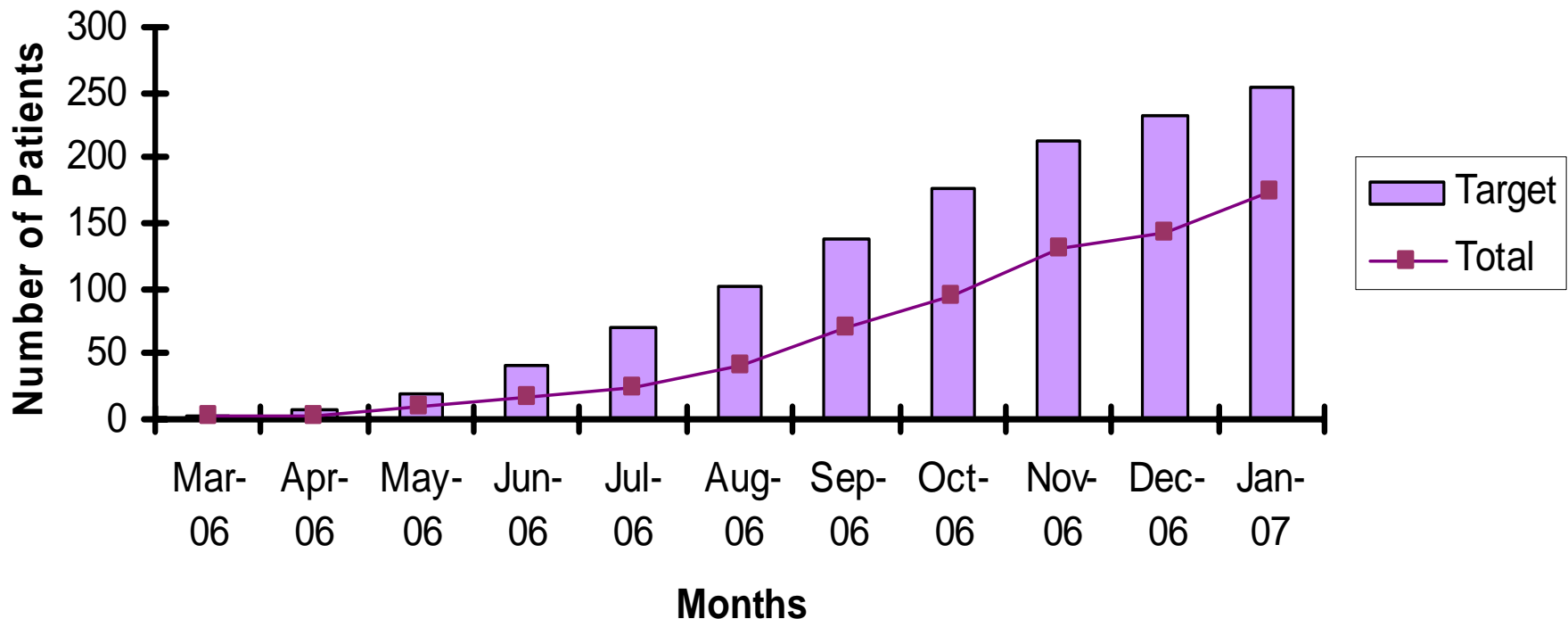
- **Aim 2 (Clinical):** Use outputs of 'Aim 1' to assemble longitudinal cohort study of patients with First Episode Psychosis over 2 years and study epidemiology of schizophrenia

UK Mental Health Research Network



PsyGrid clinical science progress: first episode psychosis recruitment

PsyGrid Targets vs Recruitment

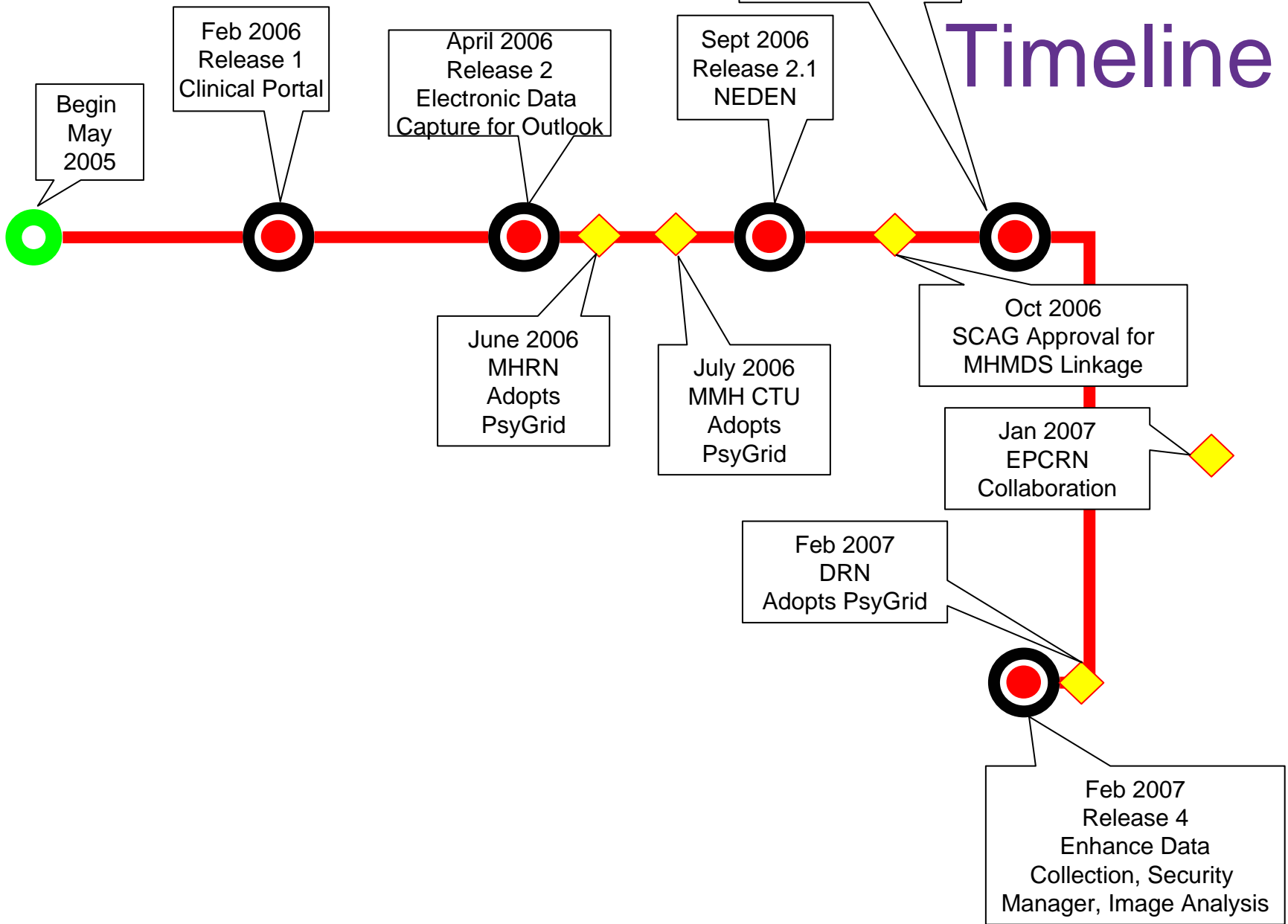


Informatics Initial Focus

- Development of a stable, reliable data collection system for longitudinal studies and clinical trials
- Meet the immediate needs of the clinical team
- Operational and supported
- Data quality and usability
- Create a solid foundation on which to build



Timeline



Design Principles

- **Generic**
 - Nothing specific to psychiatry except configuration
- **Modular**
 - Reuse all or part of the system
- **Secure**
 - Communications, access
 - What you see is what you can access (WYSIWYCA) paradigm
- **Reliable**
 - No single point of failure
- **Customisable**
 - Per project security, dataset, by clinical researchers
- **Easy to use**
 - Uncluttered, intuitive user interface
- **Open Source**



Components

- Security - PsyGrid employs a role-based access control system based around the SAML standard. All communications are secure using PKI. Services are provided for authentication, privilege management and policy enforcement.
- Data Repository - a central database for storing clinical information, uses the Hibernate ORM layer and can be used with most RDBMS systems.
- Electronic Screening Log (ESL) - a separate database used for storing patient identifiable information, which can be configured with an independent security policy.
- CoCoA - a Java application interprets the data set and renders the data collection interface to the user.

Components

- ESL Web Interface - provides browser based access to the ESL for looking up patient study numbers from identifiable details or vice-versa. Only provides access to the results of randomisation for non-blind users.
- Randomisation - a service which implements a configurable multi-site, stratified, permuted random block length randomiser.
- Data Management Web Interface - provides browser based access to data export, reporting and document viewer functions.
- Security Management - a graphical tool which simplifies user account and privilege management



Study number results

User: CPM One Project: EDIE 2 Group: Birmingham Role: ClinicalResearchManager

ED2001001-24

PsyGrid Security Manager

File Tools Help

Modify User Wizard

Summary of User Account Information

User Details

First name: Helen
Last name: Roberts

Assigned Projects

The following projects will be assigned to the user
Outlook

Assigned Groups

The following groups will be assigned to the user

- Outlook - Bristol Avon-Avon and Wiltshire Mental Health Partnership
- Outlook - East Anglia-Norfolk and Waveney Mental Health Partnership Trust
- Outlook - East Anglia-Cambridge CAMEO
- Outlook - East Midlands-Nottinghamshire Healthcare NHS Trust
- Outlook - East Midlands-Lincolnshire Partnership Trust
- Outlook - North East-Newcastle, Northumberland and North Tyneside Mental Health Trust
- Outlook - North London-South West London and St. Georges Trust
- Outlook - North London-Central and West London Trust
- Outlook - North West-Manchester Mental Health and Social Care Trust
- Outlook - South London-South London and Maudsely Trust
- Outlook - West Midlands-Birmingham and Solihull Mental Health Trust
- Outlook - East Anglia-Peterborough NHS Trust
- Outlook - North West-Bolton, Salford and Trafford Mental Health Trust

Assigned Roles

The following roles will be assigned to the user

- Outlook - ClinicalResearchManager
- Outlook - RecruitmentManager

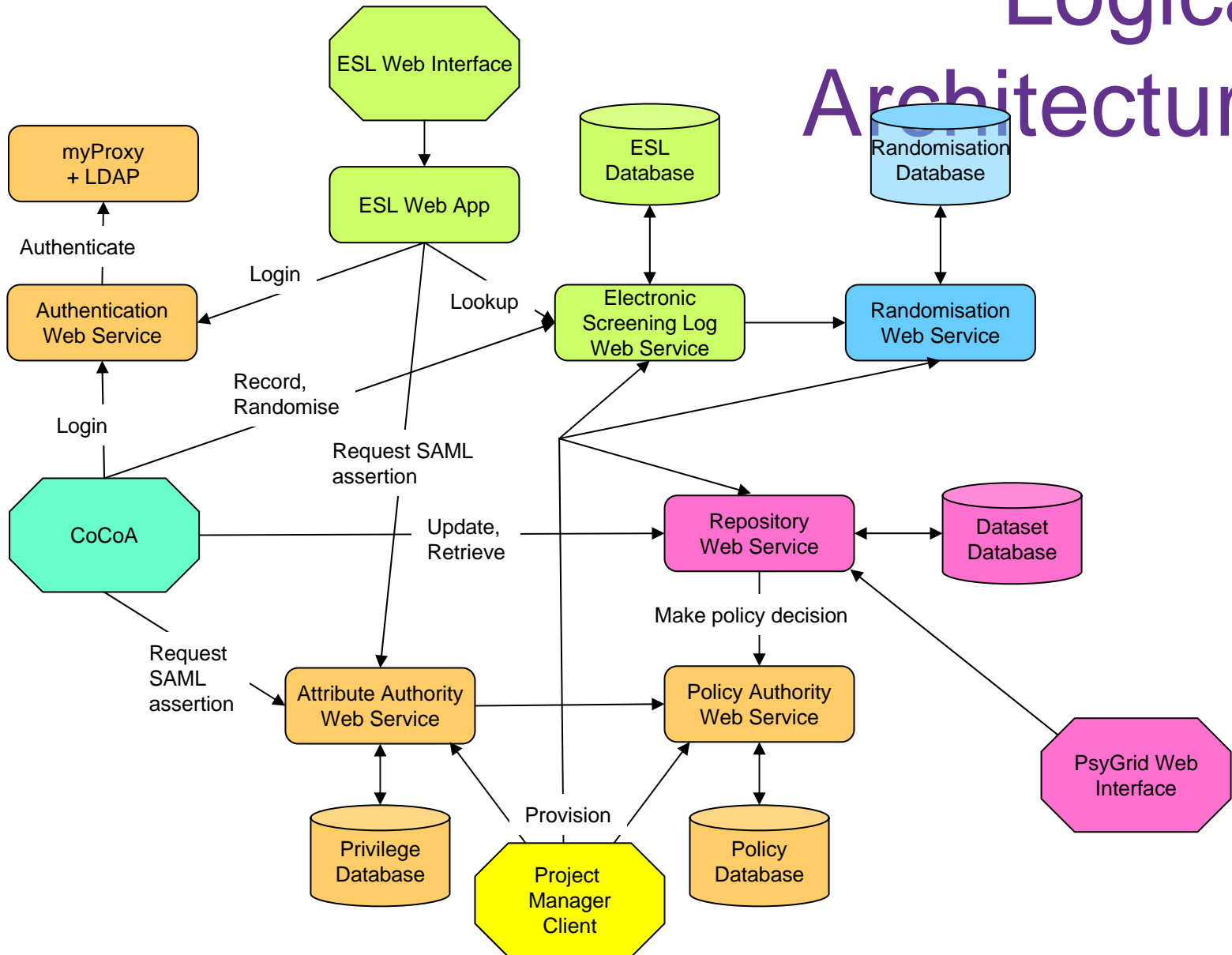
Roles

- ChiefInvestigator
- ProjectAdministrator
- ProjectManager
- PrincipalInvestigator
- ClinicalResearchManager
- ClinicalResearchOfficer
- ScientificResearchOfficer
- TreatmentAdministrator
- RecruitmentManager

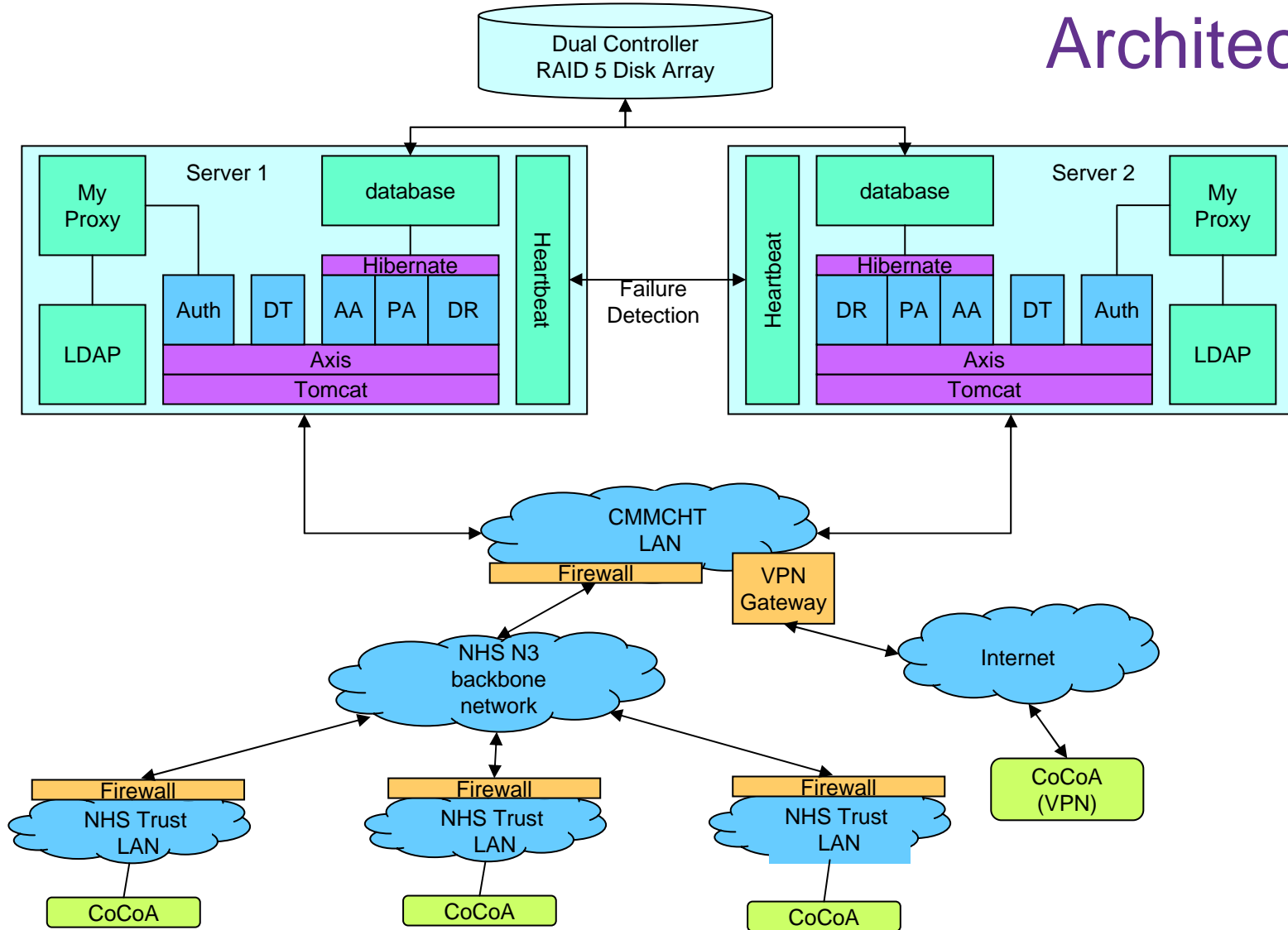
Features

- Off-line and on-line data entry
- Email notification of follow-ups due
- PKI secured with role-based access control
- Trend analysis reports
- Support for multiple independent projects
- Data anonymisation on import or export
- Model driven data set definition
- Data import from file or URL
- Data entry forms dynamically rendered from data set definition
- Open Source
- Data set versioning, publication and resynchronisation
- Data review and approve capability
- Recruitment reports
- Multi-centre remote data entry
- Audit trail and data provenance
- NHS N3 compatible
- Call out to 3rd party application data processors
- UKCRN accrual reports
- Conversion of documents to PDF format for printing
- Fully customisable data set definition including data elements, validation rules and scheduling

Logical Architecture



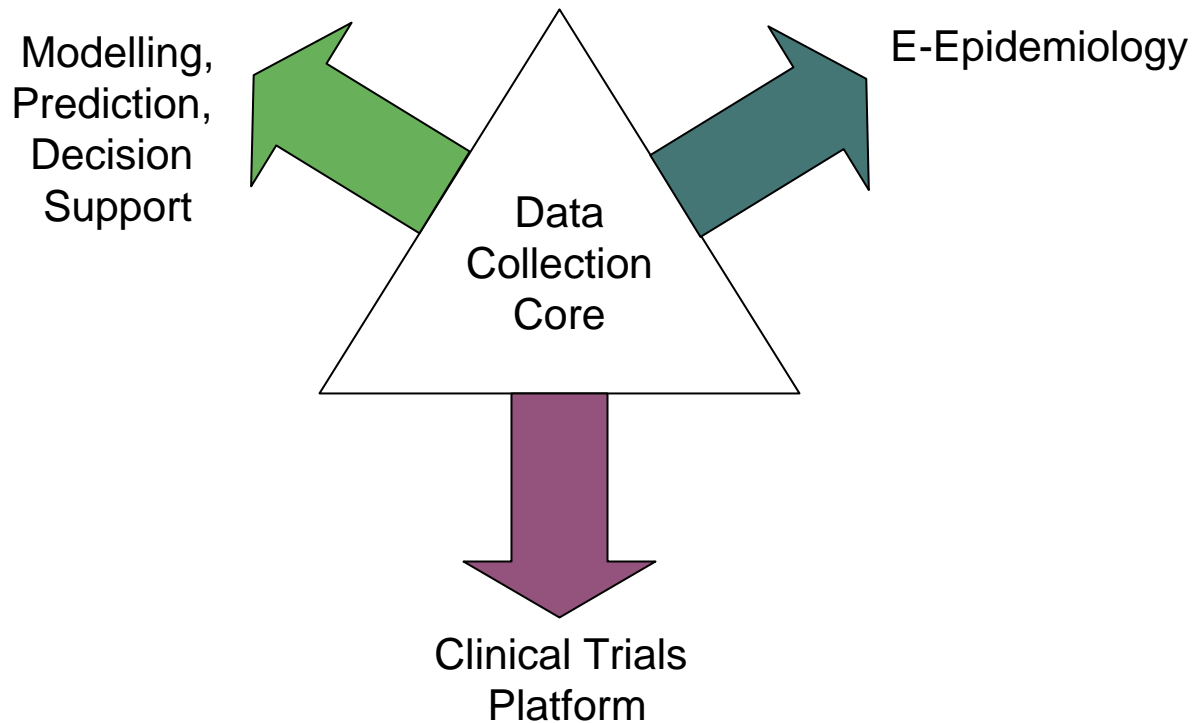
Deployment Architecture



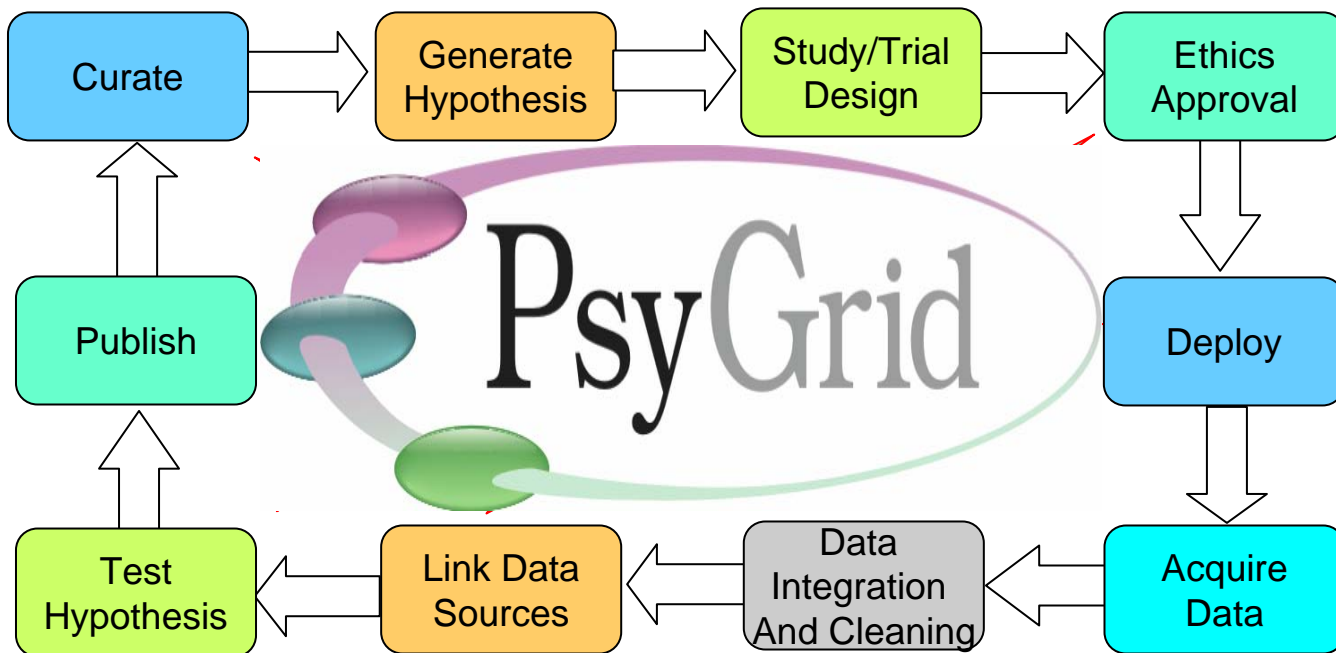
Perfect timing

- **New models of scientific cooperation promoted:**
 - Clinical science ↔ informatics ↔ computer science
 - Multi-centre national and international collaborations
- **Input into new NHS R&D informatics programme**
 - UK CRN; NIHR
- **New methods of clinical research data archiving**
 - UK CRN portfolio tracking
 - MRC Data Curation initiative
- **Leveraging further research support**
 - MRC; DH programme grants; FP7; US NIH

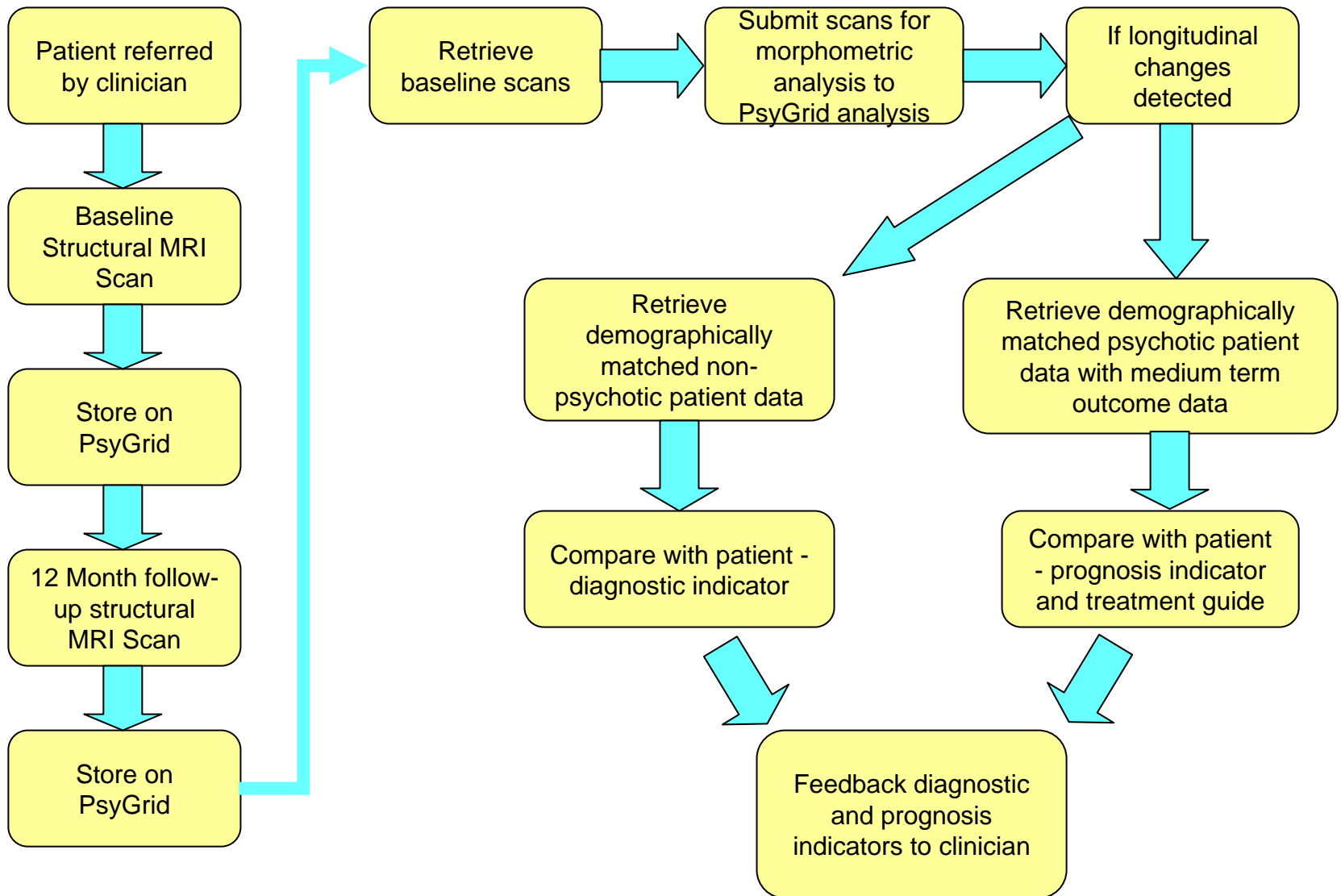
Directions



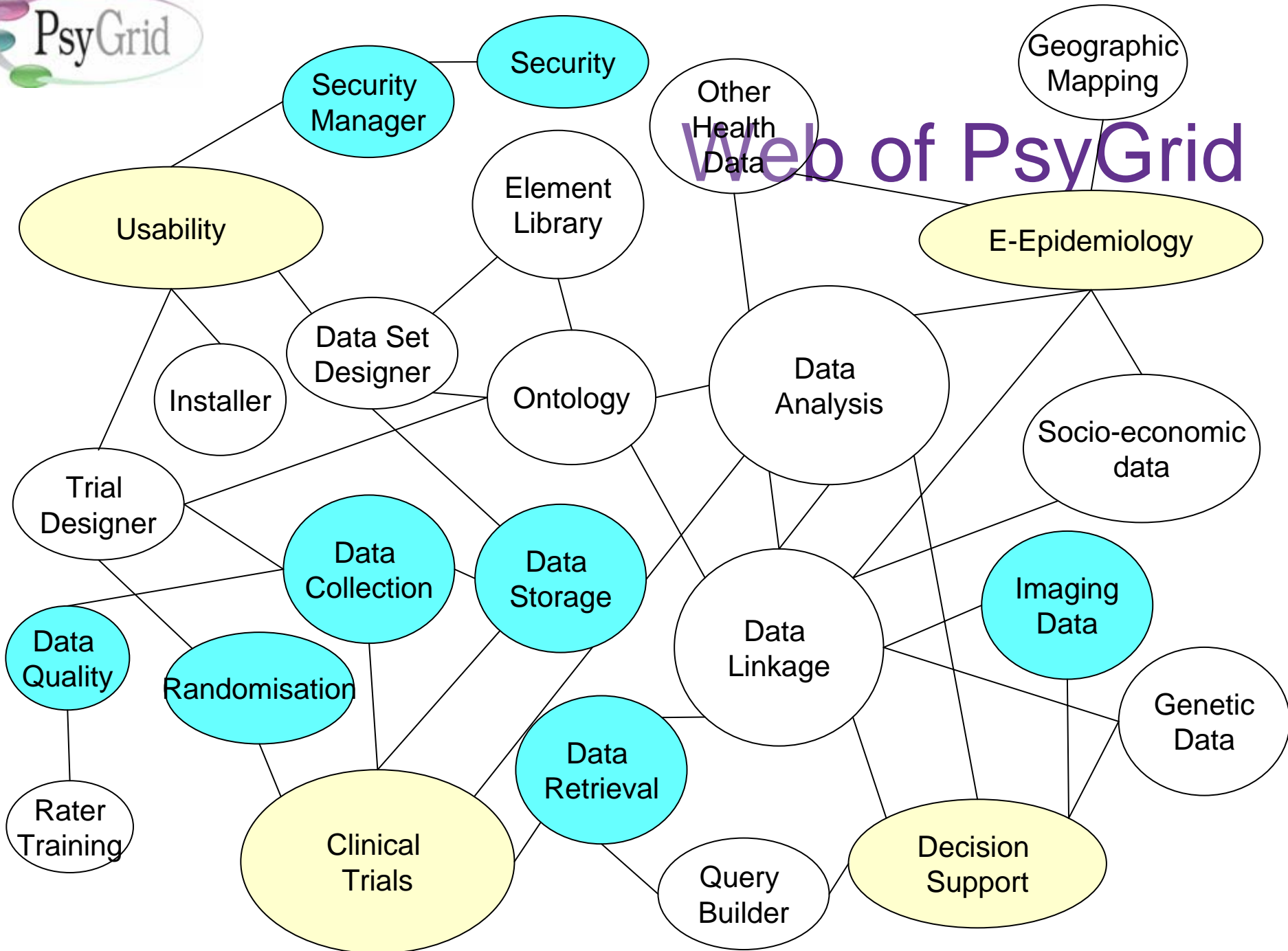
E-epidemiology



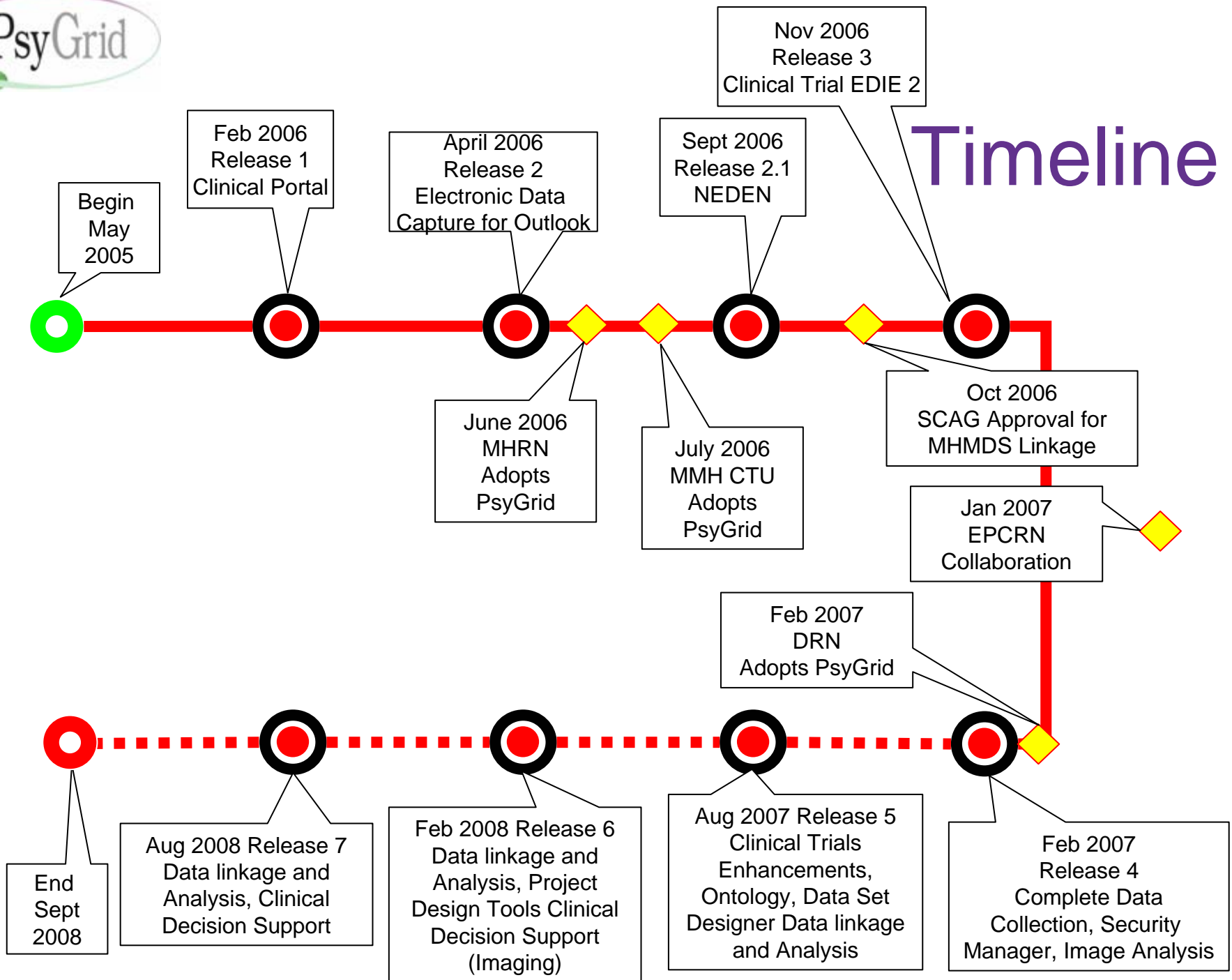
Using imaging for prediction



Web of PsyGrid



Timeline





PsyGrid

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*<http://www.psygrid.org/technology>
<https://developers.psygrid.org>*

*<http://atisha.smb.man.ac.uk:8181/psygrid-data-client>
<http://atisha.smb.man.ac.uk:8080/eslweb>
user "DRN", Password "sausages"*