Translational research – facilitating experimental medicine in dementia in the UK

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Route Map for Dementia Research

June 2011; Ministerial Advisory Group on Dementia Research
• effective collaborations and best use of existing resources
• patient involvement in research
• building national capacity and capability in dementia research
• launch of significant new Government funding opportunities for applied health research on dementia
• > £22 million of research; twenty-one research projects

March 2012; Prime Ministerial challenge to deliver major improvements in dementia care and research by 2015.
one year into three-year programme to address this challenge.
Translational Research Collaboration in dementia

Six Biomedical Research Units in dementia and centres with dementia themes
Newcastle, Cambridge, Oxford, UCLH, Imperial HC and Maudsley/King’s

Expertise and facilities for biomarker studies and experimental medicine

Cohorts and samples
Cohorts of patients and controls including access to electronic medical records
Biological fluids and tissues including iPSC banks

Single point of contact through NOCRI or via TRC-D lead
Streamlined contract negotiation and study start-up
Infrastructure for translational science

- Target identification
  - Preclinical studies
- Animal model
  - Biomarker discovery
- Proof of concept
  - Phase I and Phase II
- Discovery, validation and qualification
- Phase III
- Cost effectiveness
- Phase IV
- Clinical utility

- Cohorts and technologies for biomarker research
- Support for early phase clinical studies
- Translational Research Collaboration in dementia
Value from clinical informatics

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 – EMR research tool

- Complete clinical data – structured, semi-structured and unstructured
- Extracted, pseudonymised and deidentified, including free text
- Searchable repository
- Pseudonym attached to samples
- Linked to imaging and biological datasets
Response to cholinesterase inhibitors

Four years of data
Real world patients
3500 patient years of treatment
Combining medical and patient records - eMPOWERMENT

Secure Network

Data Interchange with GP systems (EMIS)

Trust Electronic Patient Record ePJS

Pseudonymisation

Research Information System CRIS

BioResource

Personal Health Record (HealthVault)

MyHealthLocker

HealthVault Connection Centre

PROMs  My Care Plan  Rate My Day  Resources
MRC investment in dementia

Major expansion of neuroscience programmes at the Medical Research Council (MRC) Laboratory of Molecular Biology (LMB)

~ 50% increase in resource

MRC/TSB Biomedical Catalyst programme

£3.4m project led by Ixico ltd. to generate a digital healthcare platform for early dementia diagnosis using automated MRI analysis and computerised neuropsychometric testing

UK BioBank enhancements for dementia

MRI on 8000 in pilot phase; scaling to 100,000

£20m for genotyping

UK Platform for dementia research
UK BioBank

• One of the most detailed large-scale health resources ever

• Now open for use by academic and industry researchers in UK & overseas

• >1,000 separate pieces of information already available on each of the 500,000 UK men and women participants aged 40-69 years at time of the baseline assessment in 2006-2010
  • Extensive baseline assessments, stored samples
  • Follow-up to disease outcomes by linking to health record systems and direct contact
  • Continual added value to be accrued through further tests/assays
Brains for dementia research

Network of brain banks

Longitudinal assessment in life
- Minimum dataset including cognition
- Now to incorporate blood sampling
- Funded by Alzheimer’s Society and Alzheimer’s Research UK
- Access via centralised, web based database

MRC network of brain banks including PD and MS
Fostering collaborations

October 2012, Dementia showcase; engaging with industry

MRC discussing new public-private partnership focussed on target validation and experimental medicine

ENRICH, a toolkit for care home research providing advice for researchers, care home staff and others

Creation of a ‘consent-for-approach’ register for interest in trials participation

Considerable investment in social science for care and carer-related research
Leadership of European biomarker studies

The GENetic Frontotemporal Dementia Initiative (GENFI): multi-centre platform for the study of frontotemporal lobar degeneration
Lead: Martin Rossor, UCL

The European Medical Informatics Framework
Joint leads: Simon Lovestone, KCL and Bart Vannieuwenhuyse, J&J
EMIF Project Vision

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

- 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
EMIF – platform for modular extension

Research Topics

- EMIF - Metabolic
  - Metabolic
  - Patient generated data
  - Risk stratification

- EMIF - AD
  - EMIF - AD
  - Risk factor analysis
  - Prevention algorithms
  - Predictive screening

Data Privacy

Analytical tools

Semantic Integration

Information standards

Data access / mgmt

EMIF governance

IMI Structure and Network

Call 5

TBD

Risk stratification
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
IMANova – a shared PET facility

Radioactivity generation
  Cyclotrons

Chemistry labs
  12 production, 12 research “hot cells”

Imaging equipment
  2 PET-CT scanners
  2 MRI scanners

Associated radiation detecting equipment
  Blood samplers – measure activity in blood
  Well counters – measure activity in blood fractions

Analysis computation
MRC-NIHR National Phenome Centre

- Joint facility between KCL and Imperial
- Builds on Olympics 2012 anti-doping facilities
- GSK & Brukers and Waters Corporation
- State of art metabolomics and deep phenotyping
- Deep phenotyping coupled with exome sequencing in the NIHR BioResource
Excellence in translational research

- Internationally leading scientists
- World class facilities
- Outstanding opportunities for research in the NHS
- Infrastructure to support collaborations with industry
Next steps

- through basic and translational research, deliver effective therapies to stem the rising tide of dementia
- develop our research community by attracting and training more postgraduate students to dementia research
- develop and disseminate best practice in data integration
- collaborate effectively with industry
- working through the Organisation for Economic Co-operation and Development (OECD), become a driving force for global collaboration in research.
We will use our Presidency of the G8 to help shape an effective international response to the rising tide of dementia