How I Spend my FLARE Fellowship (2008-2010)
An Integrated Investigation of Vascular Cognitive Impairment (VCI) in Europe

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Spain 2011
Overview

1. Background
2. Research Outcomes
3. Operational Arrangements for Mobility
4. Next Steps
Background: What is VCI?

- Group of cognitive disorders that share a presumed vascular cause
  - Vascular Disease Factors (e.g., diabetes, hypertension & obesity)
  - Lifestyle Factors (e.g., tobacco use, dietary factors, physical inactivity)
  - Stroke Factors (e.g., site and extent of lesion)

Vascular risk factors can impact anywhere along the trajectory.

Stephan et al., Alzheimer’s Research & Therapy, 2009
Research Objectives

• Explore the interrelationships between vascular factors, cognitive decline and dementia using a population based approach

• Develop a predictive model (incorporating vascular markers) for identifying individuals at high risk of future dementia
Data Resources

- UK
  - N=13,004
  - 65 years +
  - Cognition, health, blood biomarkers & neuropathology

- France
  - N=3,442
  - 65 years +
  - Cognition, vascular related disease, MRI & blood biomarkers
Health Co-morbidity in Individuals with Mild Cognitive Impairment
Findings From MRC CFAS

• Most individuals with MCI have medical co-morbidity

10 Conditions (self/informant report)
Anaemia, Parkinson’s disease, breathing difficulties, angina, hypertension, diabetes mellitus, peripheral vascular disease, transient ischemic attack (TIA), stroke or heart attack
Risk Factors for Progression

• Does disease co-morbidity increase risk of dementia in MCI?

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Unadjusted OR</th>
<th>Adjusted* OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anaemia</td>
<td>13.5 (2.6-71.3)</td>
<td>10.6 (2.3-48.7)</td>
</tr>
</tbody>
</table>

*Adjusted for age, sex and education (years)

• Overall, medical co-morbidity does not appear to help identify individuals with MCI who are a high risk of future dementia

Stephan et al., Age and Aging, 2011
Risk Models for Mass Prediction
Mobility Research Project

• Focus on the whole non-demented population

• **Research Question** Can we develop a simple tool that can identify those individuals at high risk of future dementia?
## Potential Predictors
### 4 Year Incident Dementia in the 3-City Study

<table>
<thead>
<tr>
<th>Easily Obtainable</th>
<th>Moderately Easily Obtainable</th>
<th>Difficult to Obtain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographics (e.g., age, gender)</td>
<td>Psychiatric Co-morbidity (e.g., depression)</td>
<td>MRI and Ultrasound (e.g., WMLs, atrophy, IMT)</td>
</tr>
<tr>
<td>Lifestyle (e.g., smoking and alcohol use)</td>
<td>Vascular Health (e.g., stroke, obesity, CHD)</td>
<td>Blood/Serum (e.g., glycaemia, cholesterol)</td>
</tr>
<tr>
<td>Cognition (e.g., memory and non-memory)</td>
<td>Medication History (e.g., psychotropic or statins)</td>
<td>Genetics (e.g., APOE e4)</td>
</tr>
<tr>
<td>Functional/Motor Status</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Stephan et al., Nature Reviews Neurology, 2010
The Model

- **Simple Risk Model**: Age, cognition, functional performance, motor performance and psychotropic medication use
  - 3 risk categories: low (2.2% incident cases), moderate (18.3% incident cases) and high (56.3% incident cases)
  - Area Under the Curve (AUC)=0.81 [95%CI: 0.78-0.84]

- Discriminative accuracy was not improved with the addition of MRI, blood or genetic risk markers

Stephan et al., in preparation
Conclusions

• Relatively simple measures can be used to identify individuals at high risk of dementia with reasonable accuracy

• Identification of high-risk individuals is important to better focus prevention and early intervention efforts
Where to Next ...

- **Senior Research Associate (Risk Prediction)**
  - New post 2012 as a Lecturer (Newcastle University, UK)

- **Extended my research collaborations**
  - **3-City Study** Develop a risk model where all components are modifiable
  - **EPIC-Norfolk** Undertake an MRI programme to determine the association between brain structural changes, health status and cognitive impairment
Advice for Mobility Period

• Organize start dates and accommodation as soon as possible

• Language courses

• VISA and residence permit (?)

• Go beyond your project: future projects for funding and continuing new collaborations
Acknowledgements

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• Thank you to collaborating studies and researchers:
  • MRC CFAS (Bond, Brayne, Matthews, McKeith)
  • EPIC-Norfolk (Hayat, Khaw)
  • 3-City Study (Dufouil, Kurth)
Good Luck!

• Questions?