

## **Facilitating the reuse of brain imaging and clinical data from completed studies across the life course: the Brain Images of Normal Subjects (BRAINS) Imagebank.**

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### **Abstract**

#### **Introduction.**

An essential part of increasing value and reducing waste is ensuring that data collected are archived and shared. This can allow the data to be reused for other research outside the scope of the primary purpose of which the data was collected. This is particularly important in imaging research which can be expensive and time consuming process from both researcher's and volunteers' perspectives. Consequently, principal investigators are being encouraged to share research data. We describe an ongoing project with the main purpose of creating a platform for archiving and reusing normal human brain images, phenotype, clinical and neuropsychological tests data already collected as part of cohort studies.

#### **Methods.**

Datasets from completed cohort studies of healthy volunteers carried out across Scotland are being integrated and archived. A web interface is also being developed which will allow the integrated imagebank to be searchable and downloadable by a range of linked data such as age blood pressure, medications, other risk and lifestyle factors, and several MRI sequences, including T1, T2, T2\*, FLAIR, and DTI. Ethical approval was obtained from Caldicott Guardian which was described as 'a model of good practice'. Use of the imagebank is under the supervision of a multidisciplinary steering group.

#### **Results.**

BRAINS currently contains 537 subjects (average age: 61.3, SD: 15.7, range: 19 - 81) from projects in 3 centres. A further 2119 subjects (prenatal to 90 years) from 15 other projects in Scotland and many more are expected to be added (see [www.brainsimagebank.ac.uk](http://www.brainsimagebank.ac.uk)).

#### **Conclusion.**

BRAINS provides a resource that offers numerous opportunities to reuse already collected data for studies across the life span with no additional data acquisition cost required. Examples of potential studies include:

- As a reference atlas, for interpretation of brain images in clinical diagnosis, such as having access to healthy subject reference images and linked data closely matched to a patient's scan, to improve diagnostic accuracy (Farrell, C. et al., 2009)
- For the biomedical research community to develop and test new methods, e.g. machine learning, to detect brain pathology and associated clinical manifestations such as early markers of neurodevelopmental impairment or dementia; and precise estimates of disease risk and developmental ranked atlases across the life-course (Dickie, D.A., et al., 2013).