



Streamlining Quality Assurance for MRI in Scotland

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Introduction Reproducibility of MRI data is a key challenge (1). For multi-centre studies in particular, the data should be as independent of scanner characteristics as possible to reflect only the state of the subject at the time of scanning (2). MRI data reproducibility can be monitored using a Quality Assurance (QA) program but typically QA programs are individual to each centre and do not assess between-scanner characteristics. The Scottish Imaging Network: A Platform for Scientific Excellence (SINAPSE), is a neuro-imaging pooling initiative between the Scottish Universities and provides a framework for MR physicists to design a common QA program.

Method Information regarding the existing QA protocols and % scanning time for each MR sub-modality (e.g. fMRI, DTI, MRS) was collected from each SINAPSE MRI centre and used to produce a new streamlined and harmonised QA protocol.

Results 1 The range of imaging applications and neuro-imaging sub-modalities from each SINAPSE centre are shown in Figs 1a & 1b.

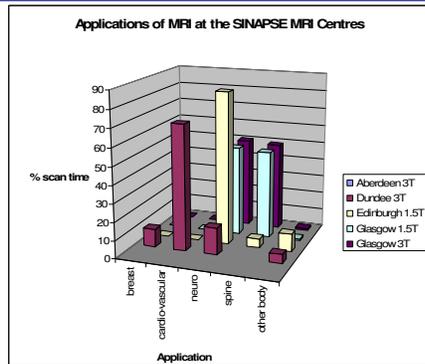


Fig 1a

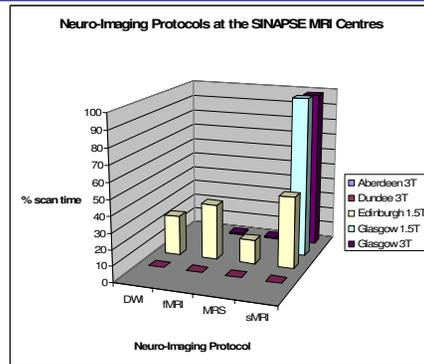


Fig 1b (NB 3T MRI scanner in Dundee only just installed so final protocols unknown)

Results 2 A set of “core” measures were agreed for the imaging application / neuro-imaging sub-modality and coil combinations using a mixture of “at console” and “off-line” analysis protocols. These are being formalised into protocol sheets and on-line tutorials (Fig 2) to ensure standard QA practises across Scotland.

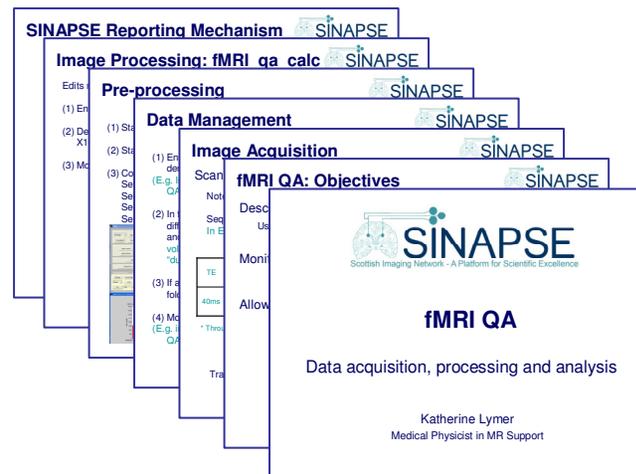


Fig 2. Selection of slides from the SINAPSE fMRI QA on-line tutorial

Conclusion Through a unique, trans-national cooperation, we have designed a QA protocol to allow the reproducibility of the SINAPSE MRI scanners to be assessed over many scanning interests. Thus, we are able to attribute variation in patient data in our multi-centre studies to genuine, subject-specific changes and not the equipment or analysis protocols. These protocols will be adapted to NHS scanners also.

References (1) Advanced MR in Clinical Neuroscience, Morning Categorical Courses, ISMRM 2007; (2) Tofts, P. S. Journal of Neurol, Neurosurg & Psych 64: S37-S43, 1998.

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