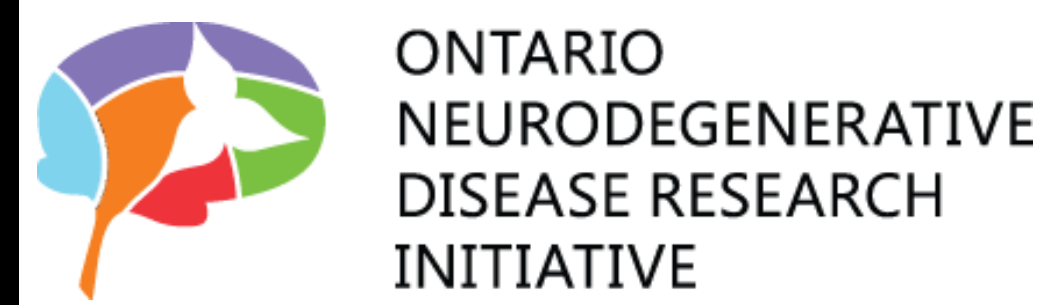


An overview of the Ontario Neurodegenerative Disease Research Initiative (ONDRI) pipeline development and neuroinformatics for quality assurance and quality control of magnetic resonance imaging data



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BACKGROUND

- Large multi-centre studies are becoming more common, generating “big data”, such as the Alzheimer’s Disease Neuroimaging Initiative ¹
- Tools, techniques and processes for quality control and data management vary greatly between studies²
- The Ontario Neurodegenerative Disease Research Initiative (ONDRI)³ is a provincial study funded through the Ontario Brain Institute (OBI)⁴ to study amyotrophic lateral sclerosis (ALS, N=90), fronto-temporal dementia (FTD, N=60), Parkinson’s disease (PD, N=150), vascular cognitive impairment (VCI, N=150) and Alzheimer’s disease and amnesic mild cognitive impairment (AD/MCI, N=150).

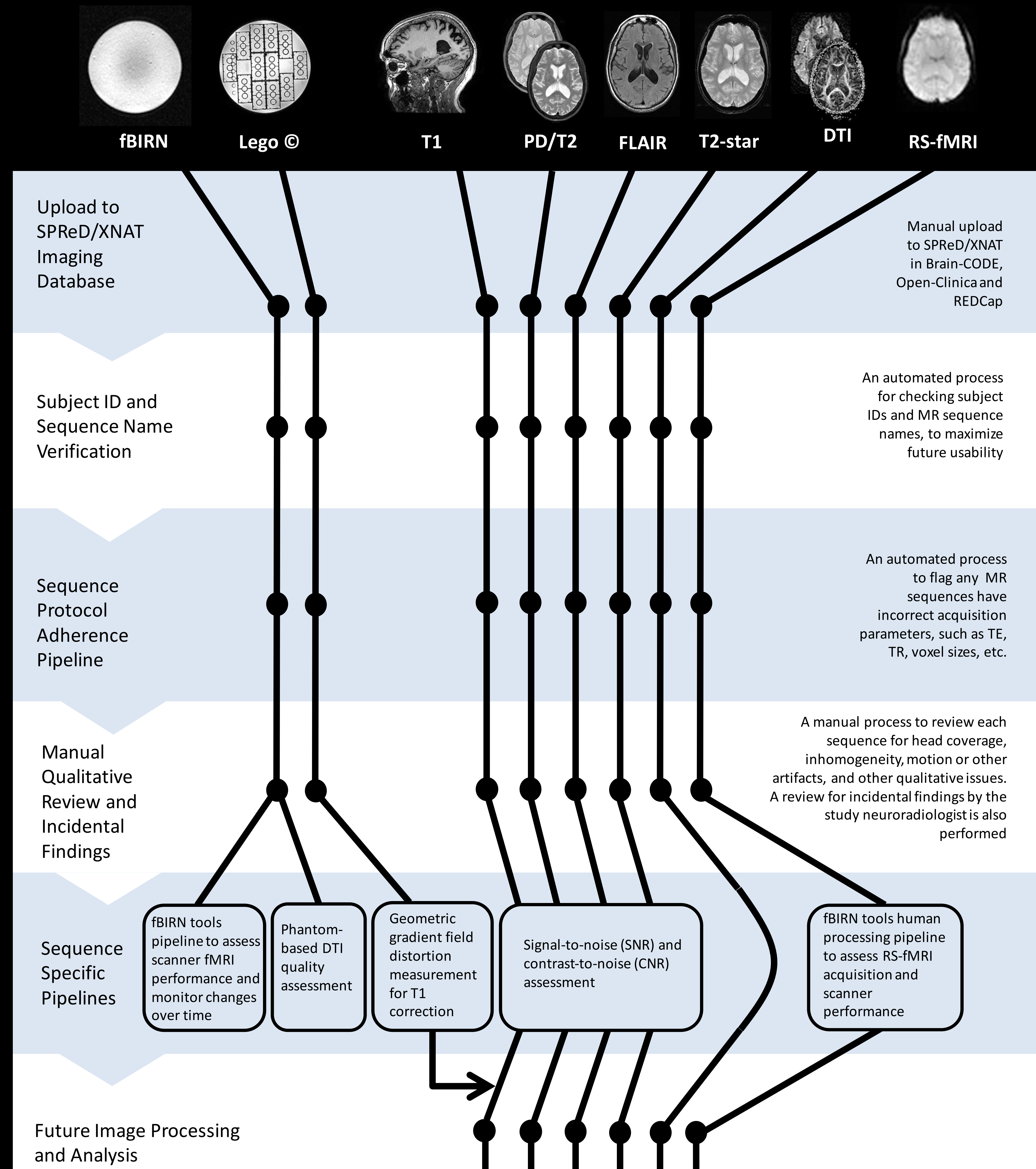
PURPOSE

- To describe the tools, techniques and processes of ONDRI’s quality control procedures for imaging data

METHODS

- 3T MR images are being acquired at 10 sites from across Ontario, on General Electric, Siemens and Philips platforms
- The multi-platform harmonized Canadian Dementia Imaging Protocol (CDIP)⁵ is being followed for ONDRI
- Sequences include 3D T1-weighted, interleaved Proton Density and T2-weighted, Fluid-attenuated Inversion Recovery (FLAIR), T2-star gradient echo, 10 min Resting State functional MRI (RS-fMRI), and 30 direction Diffusion Tensor Imaging (DTI)
- Monthly scans of the fBIRN⁶ phantom and Lego[®] phantom are performed at each site

METHODS



DISCUSSION

- These pipelines and procedures have been successfully implemented over the past 14 months with more than 250 subject datasets acquired
- They have assisted in the identification of manual QC failures due to motion (8 failures identified, 7 subsequently reacquired successfully) and numerous minor protocol parameter deviations which have subsequently been remedied at the respective acquisition site
- These pipelines have allowed for timely interventions to remedy various issues and ensure the acquisition and databasing of quality data
- These pipelines are also instrumental for monitoring scanner performance across sites and tracking performance over time

REFERENCES

- ¹ <http://adni.loni.usc.edu/>
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- ³ <http://ondri.ca/>
- ⁴ <http://www.braininstitute.ca/homepage>
- ⁵ <http://www.cdip-pcid.ca/>
- ⁶ Keator et al., The Function Biomedical Informatics Research Network Data Repository, *Neuroimage*, 2015 Sep 11. pii: S1053-8119(15)00799-5

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