

Applying non-invasive ventilation in MRI

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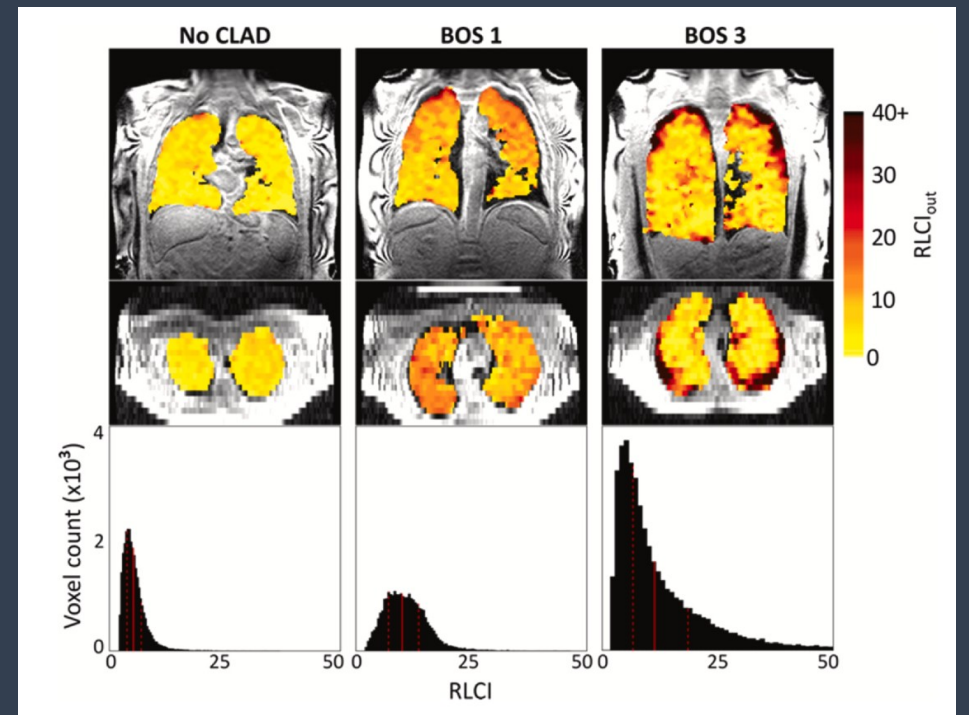
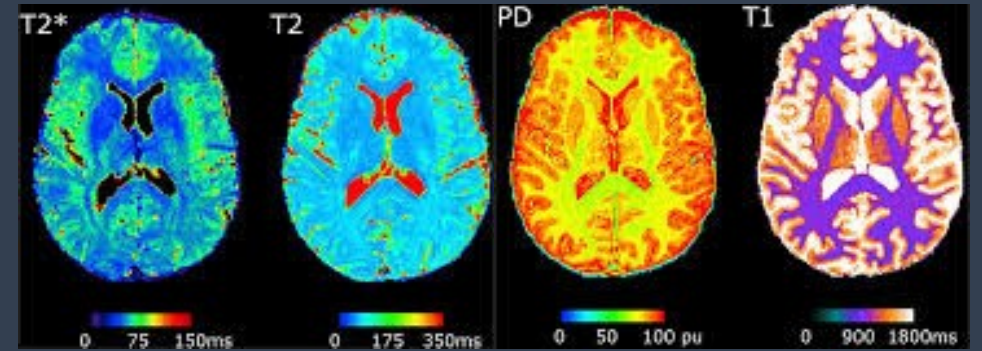


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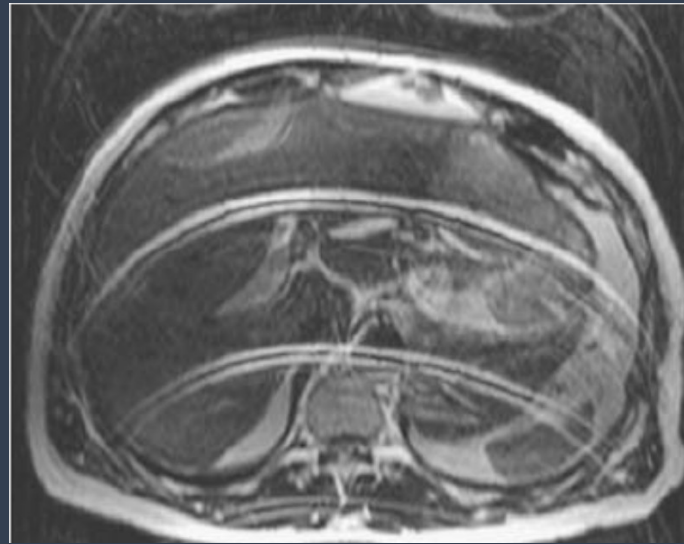
Anatomical MRI



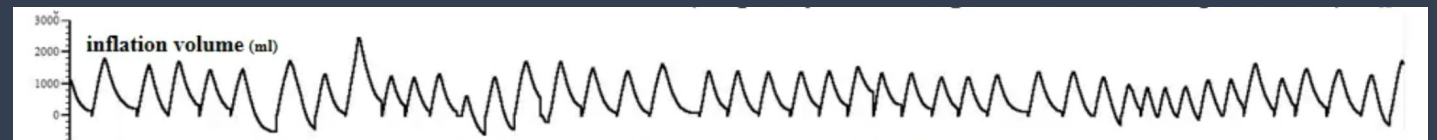
Quantitative MRI



MRI motion artefacts

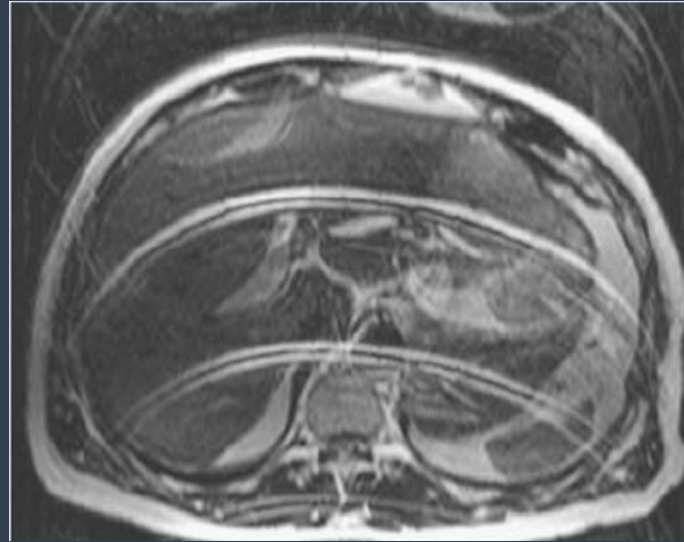


Free breathing

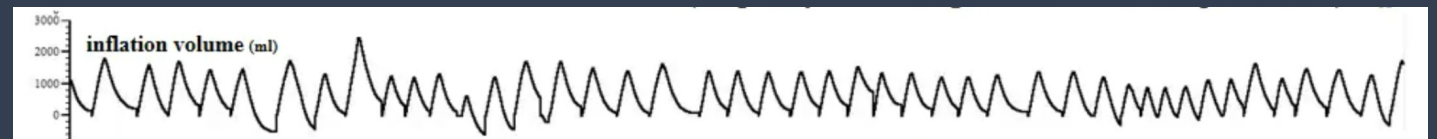


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MRI motion artefacts



Free breathing

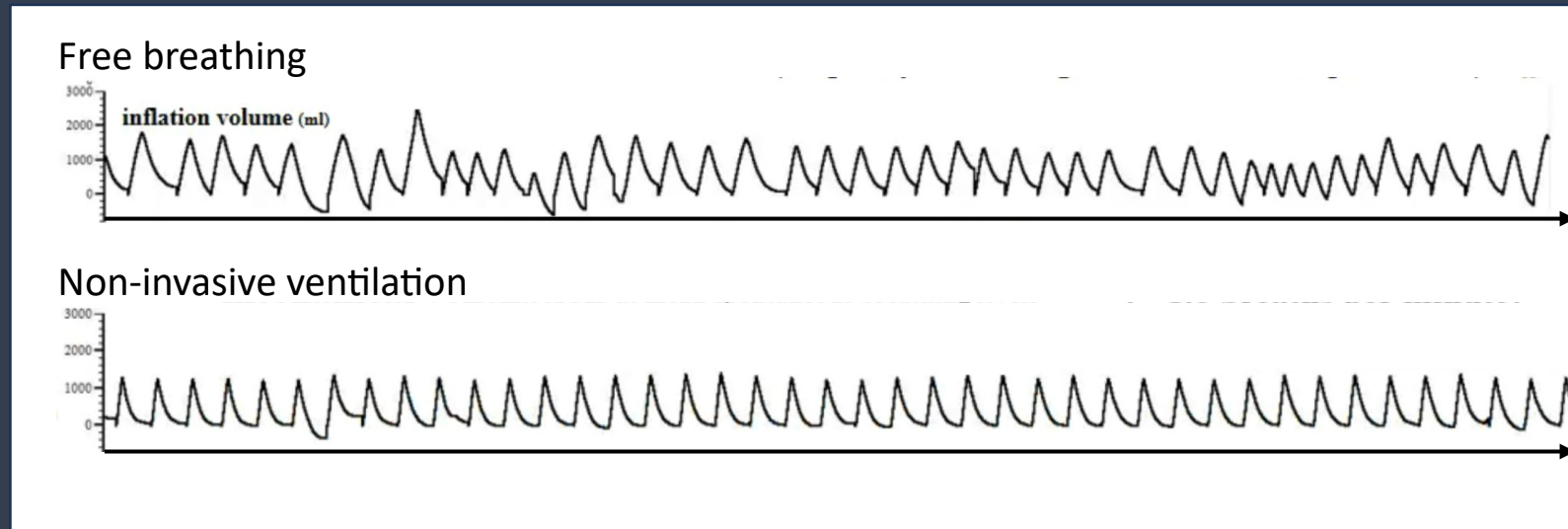


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Improving experimental design with NIV

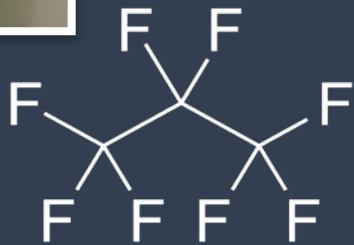
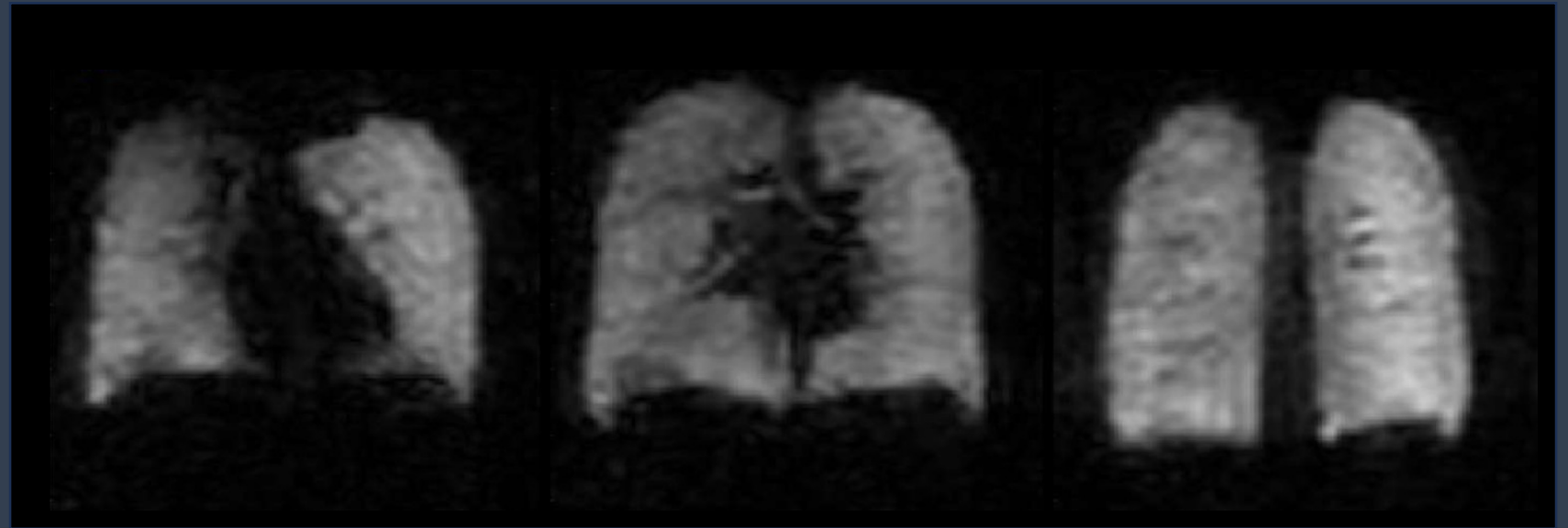
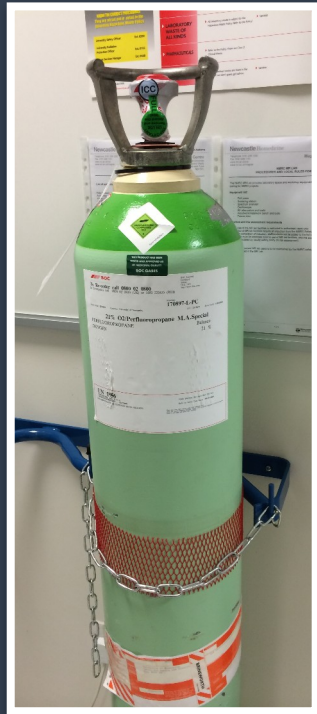
Irregular depth and timing of breaths:

- Intra-individual variability
- Inter-individual variability

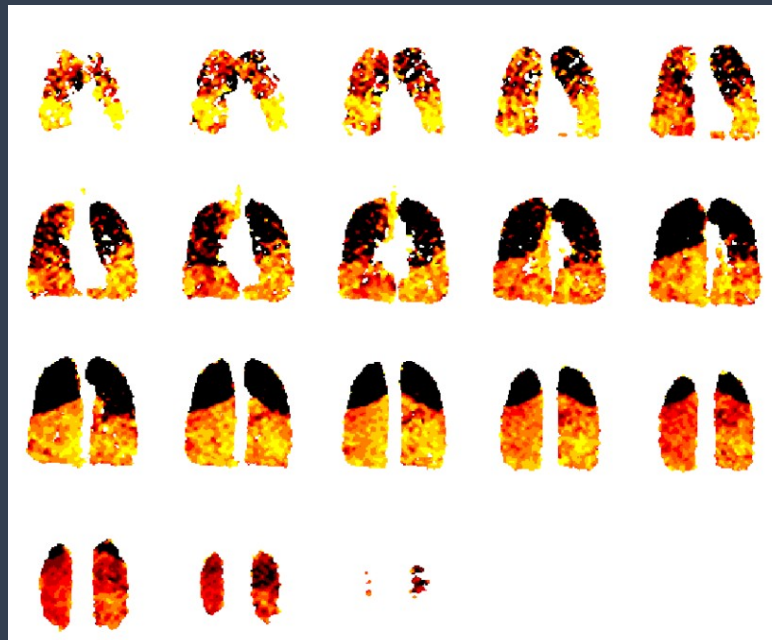
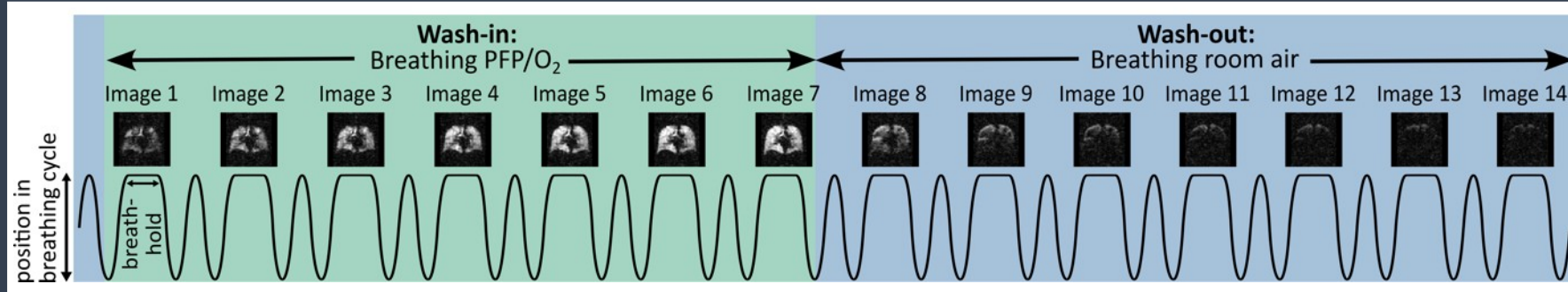


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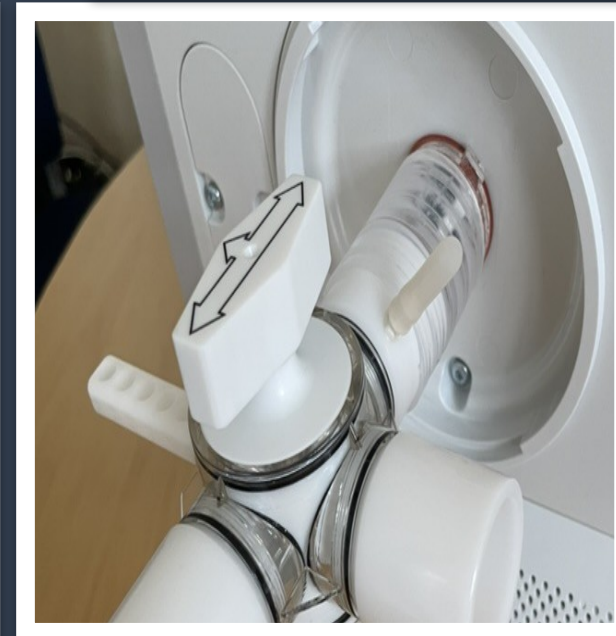
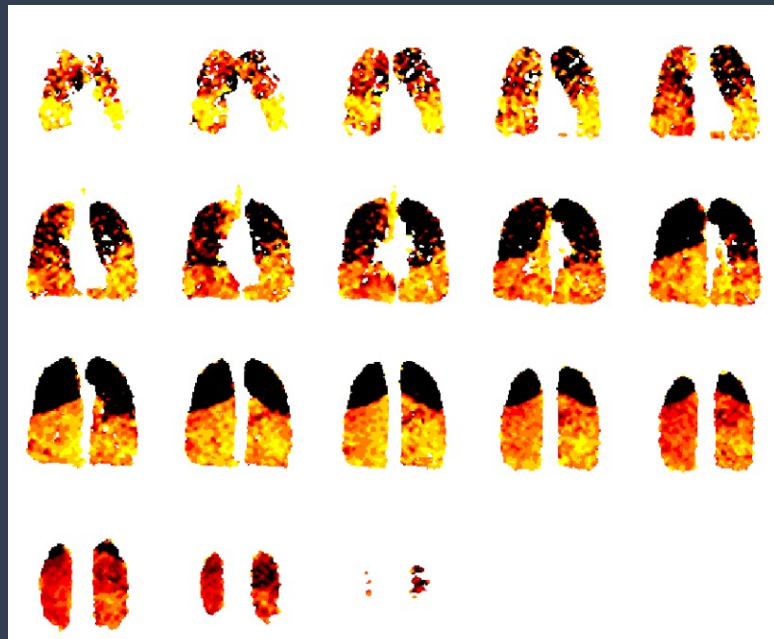
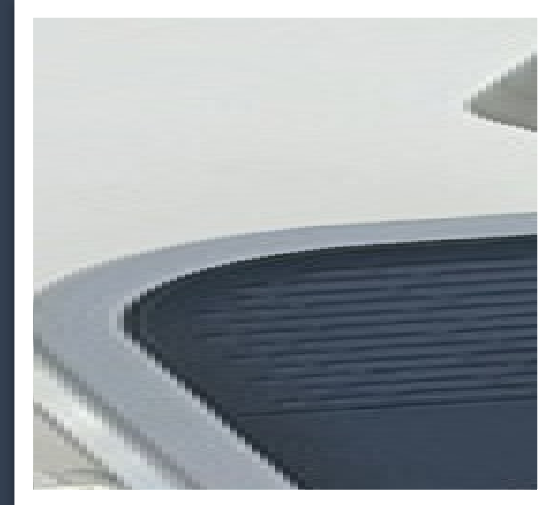
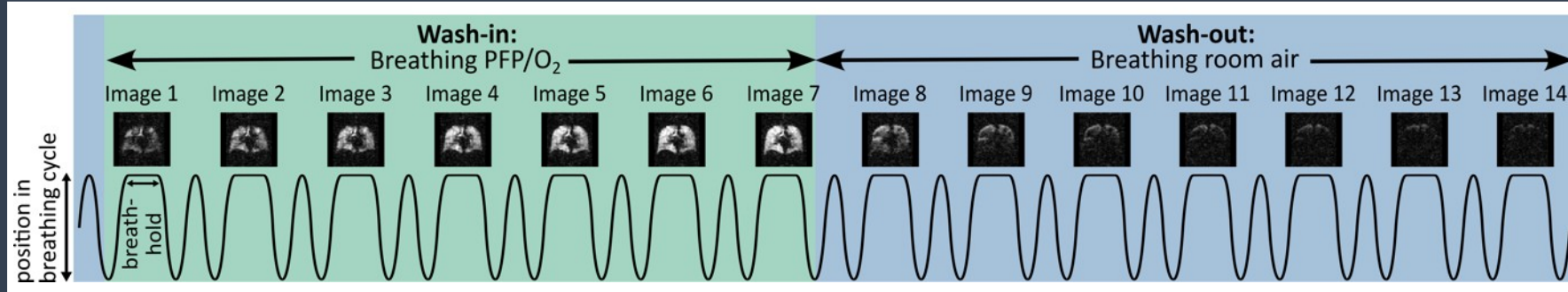
Quantitative imaging of lung ventilation



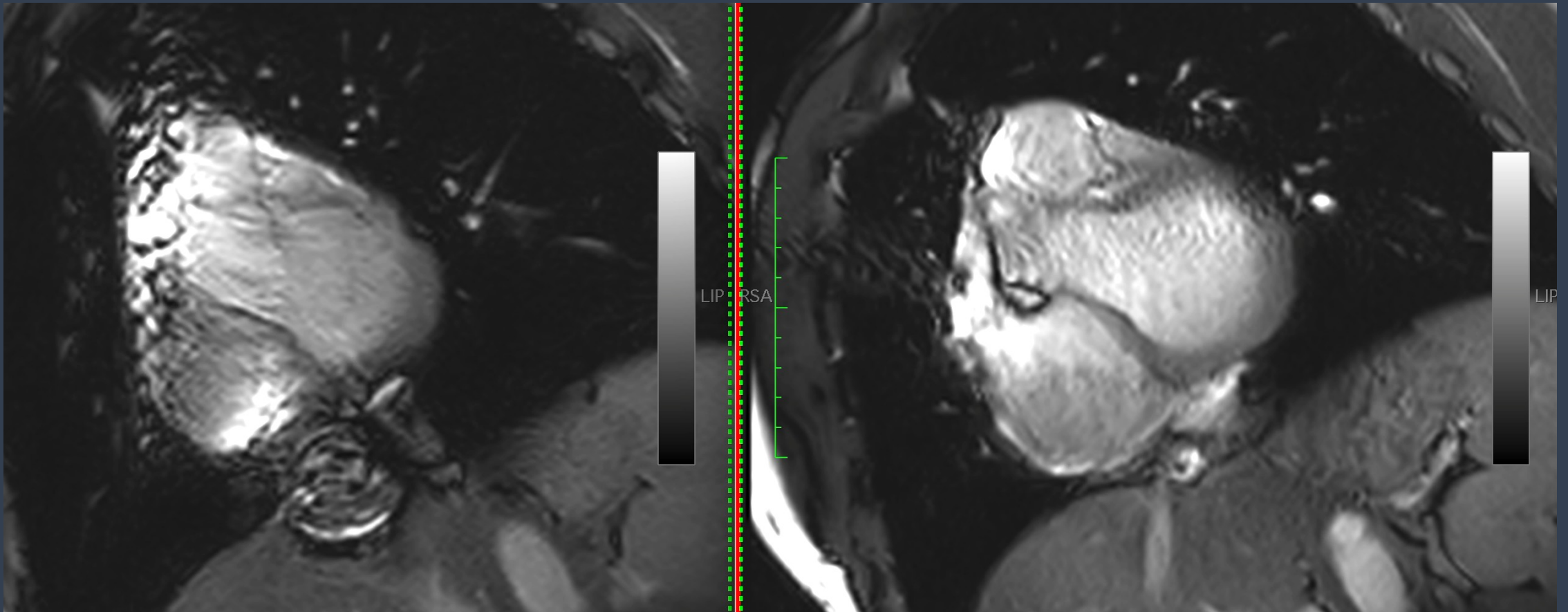
Quantitative imaging of lung ventilation



Quantitative imaging of lung ventilation



Motion artefact

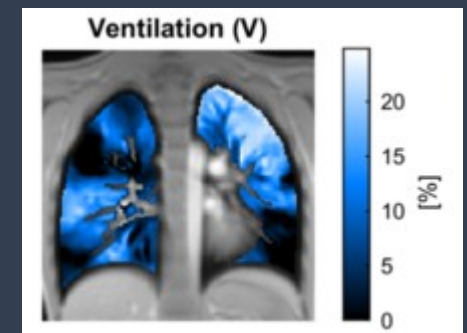
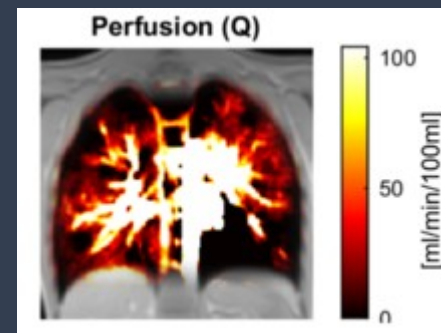
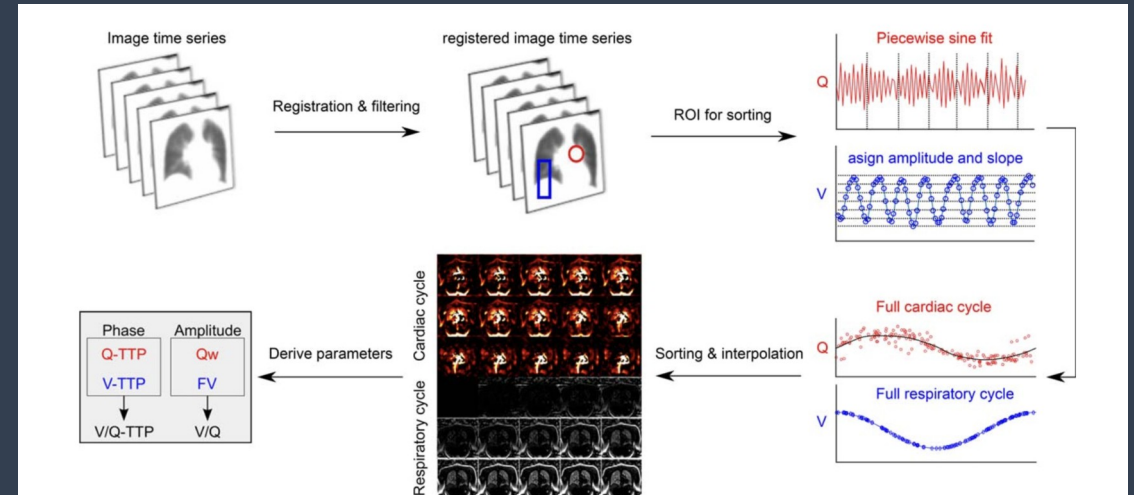


Breath-held scans

Scan acquisition synchronised with NIV breath-hold

Measuring lung ventilation and perfusion

- MRI signal amplitude affected by:
 - *Lung inflation*
 - *Blood volume and flow rate*
 - *Blood oxygenation*
- Model changes in signal over time to estimate lung *ventilation* and *perfusion* from **dynamic MRI scans**
- With NIV:
 - Control ventilation with *precise and purposeful* changes
 - Probe & understand relationships between physiology and MRI signal



Respiratory motion:

- Problematic confound?
- Physiological parameter of high value in assessing function?



NIV & well-synchronised MRI:

- Control in experimental design

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