Practicalities and Safety

Semester 2 / January 10 Credits

Each Course is composed of Modules & Activities.

Modules:
- MR Health and Safety
- Practical MR for Humans
- Ethics and Good Clinical Practice
- MR scanners 1.5T versus 3.0T
- fMRI Practicalities
- Data Protection
- Contrast agent safety
- Practical ultrasound imaging

Each Module is composed of Lectures, Reading Lists, MCQ self-assessments, & Discussion Boards.

These Modules are taught on the following Programmes, or are incorporated into blended Courses which teach students enrolled outwith the Edinburgh Imaging Academy:
- NI4R - Neuroimaging for Research programme
- IMSc - Imaging programme
- NBSc – Neuroimaging - course for BSc(Hons) Neurosciences
- NRGN - Neuroimaging Research for Graduate Neuroscientists - course for MSc Integrative Neurosciences
Practicalities and Safety – Module details:

MR Health and Safety:
  - MR Health and Safety
  - Safe running of an MR unit

Practical MR for Humans:
  - Screening for contraindications and safety
  - Having an MR scan

Ethics and Good Clinical Practice:
  - Ethics of MR imaging in research

MR Scanners 1.5T versus 3.0T:
  - Patients and normal subjects

fMRI Practicalities:
  - fMRI Practicalities

Data Protection:
  - Privacy and data protection

Contrast agent safety:
  - Contrast agent safety

Practical ultrasound imaging:
  - Practical ultrasound imaging
  - Safety in ultrasound imaging

These Modules are taught on the following Programmes, or are incorporated into blended Courses which teach students enrolled outwith the Edinburgh Imaging Academy:

- NI4R - Neuroimaging for Research programme
- IMSc - Imaging programme
MR Health and Safety

Lecture 1
Title: MR Health and Safety
Description: Health and safety aspects of working within high magnetic fields and other aspects of MR safety
Author(s): Mrs. Iona Hamilton, Mrs. Elaine Sandeman
Learning Objectives
- Explain how to work in a high magnetic field safely
- Describe differences in safety aspects of different types of MR scanner
- List items which may cause hazard in a magnetic field
- Discuss subject-specific factors that may affect safety

Lecture 2
Title: Safe running of an MR unit
Description: Key factors in running a safe and effective human MR scanning facility
Author(s): Prof. Joanna Wardlaw
Learning Objectives
- Outline the key factors involved in setting up and running an MR scanning facility for research in people
- Describe how to ensure safety of staff and subjects or patients being scanned
- Discuss current areas of debate concerning safety of magnetic fields and contrast agents

Practical MR for Humans

Lecture 1
Title: Screening for contraindications and safety
Description: To outline the relative and absolute contraindications to MR imaging and ensure safety while having an MR scan
Author(s): Mrs. Iona Hamilton, Mrs. Elaine Sandeman
Learning Objectives
- Describe the individual steps in preparing for an MR examination
- Summarise the major contraindications to MR
- Summarise the key things to watch out for to ensure safety

Lecture 2
Title: Having an MR scan
Description: A description of the steps involved in having an MR scan
Author(s): Mrs. Iona Hamilton, Mrs. Elaine Sandeman
Learning Objectives
- Explain what it is like to have an MR scan, from start to finish
Edinburgh Imaging Academy – online distance learning courses

Edinburgh Imaging
www.ed.ac.uk/edinburgh-imaging

Ethics and Good Clinical Practice

Lecture 1
Title: Ethics of MR imaging in research
Description: Review ethical considerations of scanning humans in research
Author(s): Prof. Joanna Wardlaw
Learning Objectives
- Discuss ethical issues surrounding research scanning
- Describe frequency of incidental findings
- Discuss opinions about how to deal with incidental findings
- Explain current best practice for handling medical content of research scans

MR scanners 1.5T versus 3.0T

Lecture 1
Title: Patients and normal subjects
Description: A comparison of 1.5 versus 3T MR systems in human clinical and research scanning
Author(s): Dr. Katherine Lymer
Learning Objectives
- Explain theoretical advantages of 3T compared to 1.5T
- Outline practical considerations of higher field strengths
- Describe examples of imaging techniques translated from 1.5T to 3T
- Discuss disadvantages of 3T versus 1.5T

fMRI Practicalities

Lecture 1
Title: fMRI Practicalities
Description: A practical overview of how fMRI experiments are prepared, conducted and analysed
Author(s): Liana Romaniuk
Learning Objectives
- Describe the initial administrative steps of fMRI
- Compare the various hardware/software options
- Describe scanning parameters for fMRI
- Explain the procedure of a normal experiment
Data Protection

Lecture 1
Title: Privacy and data protection
Description: Rules and regulations around using imaging data in research
Author(s): Dr. Andrew Farrall

Learning Objectives
- Describe what data is associated with images
- Distinguish between personal data, sensitive personal data and non-personal data
- List the eight (8) UK Data protection act 1998 principles and specific exceptions for research
- Define the various terms in Basic interpretive provisions section (1(1)) of the UK Data protection act 1998
- Explain anonymisation and pseudonymisation
- Outline principles behind sharing data

Contrast agent safety

Lecture 1
Title: Contrast agent safety
Description: Adverse effects of contrast agents in particular considering intravascular agents
Author(s): Michael Jackson
Editor(s): Andrew Farrall

Learning Objectives
- Describe the tri-iodinated molecular structure of common intravascular x-ray contrast agents
- Relate the different molecular structures of contrast agents to their pharmacokinetic profiles
- List adverse effects associated with contrast use
- Assess risk factors for acute reactions & nephropathy
Practical ultrasound imaging

Lecture 1
Title: Practical ultrasound imaging
Description: Description of knobs & settings, what they do and how image quality can be optimised.
Author(s): Dr Scott Inglis
Editor(s): Dr Andrew Farrall
Learning Objectives
- Identify the correct scanner, probes and presets of a specific clinical application
- Identify the main controls of the ultrasound scanner and know what they do
- State how the main scanning modalities affect the ultrasound image
- Use the scanner settings and discuss how they affect the displayed ultrasound image

Lecture 2
Title: Safety in ultrasound imaging
Description: Ultrasound safety terminology, mechanisms of harm, consequences, & safe scanning techniques
Author(s): Dr Scott Inglis
Editor(s): Dr Andrew Farrall
Learning Objectives
- Know the terminology used in safety
- List the main mechanisms for harm associated with ultrasound, and their consequences
- Identify what is available on the ultrasound scanner to allow for safe scanning
- State the recommended limits for safe scanning