PRESENTATION TITLE
Radiologist led training and its effect on inter-observer variation in OAR and GTV delineation in MRI of lung cancer patients.

AUTHOR(S)

ABSTRACT
Purpose
One of the potential benefits of MR-image guided radiotherapy (MR-IGRT) in lung cancer is the reduction of treatment related uncertainties through improved soft tissue contrast. However, this benefit may be obscured if there are substantial variations in the way that patient images are contoured, either at the time of initial simulation or at each treatment fraction.

A workshop will be held where a radiologist will provide training in Organ At Risk (OAR) and Gross Target Volume (GTV) delineation using MR lung datasets. Inter-observer variation in OAR and GTV delineation will be assessed before and after the training. It is hypothesised that inter-observer variation will decrease following radiologist led training.

Methods
Planning CT, PET-CT and MRI have been acquired in four lung cancer patients. CT and MR images were acquired with patients in the treatment planning position using a flat table top and coil supports. A prioritised list of MR sequences was acquired in each patient (see table 1). CT, MR and PET data sets were rigidly registered and imported into Big Brother software. The workshop will be divided into two sessions.

<table>
<thead>
<tr>
<th>MR Sequence Number</th>
<th>MR Sequence</th>
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<tbody>
<tr>
<td>1</td>
<td>3D Radial Gradient Echo (GE) – with Joint MoCo HDTV reconstruction [3]</td>
</tr>
<tr>
<td>2 (if tumour above aortic arch)</td>
<td>T2 DIXON Turbo Spin Echo (TSE)</td>
</tr>
<tr>
<td>2 (if tumour below aortic arch)</td>
<td>T2 TSE Fat Sat</td>
</tr>
<tr>
<td>3</td>
<td>T2 TSE no Fat Sat</td>
</tr>
</tbody>
</table>

Table 1. MR sequences acquired in lung cancer patients
**Morning Session**
An MR lung atlas (produced by this group) will be presented by a radiologist accompanied by instructions on how to outline OARs and GTV on MRI. Radiation and clinical oncologists will then contour; the brachial plexus, proximal bronchial tree, oesophagus, coronary space and GTV-tumour on two MR datasets. Inter-observer variation will then be assessed using Big Brother software and fed back to the group.

**Afternoon Session**
The radiologist will deliver focused training based on the structures associated with the largest inter-observer variation. The same five structures will be contoured in two additional MR image datasets and the inter-observer variation will again be determined. The difference in the inter-observer variation in the morning session will then be compared to the afternoon session.

**Summary**
A contouring workshop will take place to assess the inter-observer variation in OAR and GTV delineation on MR in lung cancer patients. Differences in inter-observer variation in OAR and GTV delineation will be assessed pre and post radiologist led training. Following the workshop additional data-sets will be provided such that inter and intra-observer variation can be assessed in 10 additional cases. We are assessing observer variation associated with the use of MR in lung cancer patients as we plan to introduce MR in the radiotherapy treatment planning and adaptive pathway in the near future.