Current problems in diagnostic radiology

Dr Giles Maskell
President, Royal College of Radiologists
27 May 2016
outline

• Radiologists: who we are and what we do
• Our problems:
  – Increasing demand for imaging
  – Increasing complexity
  – Data overload
  – misinterpretation
What do radiologists do?

• Give clinical advice – eg what is the right test in a particular clinical scenario?
• Interpret medical images
• Carry out procedures using image guidance
Our tools

• X-Rays
• Fluoroscopy
• Ultrasound
• Computed tomography (CT)
• Magnetic Resonance imaging (MRI)
• Radionuclide imaging (“nuclear medicine”)
NHS patients facing ‘unacceptable’ wait for scan results
Radiologists warn shortage of specialists means many suspected cancer patients waiting a month to discover diagnosis

Denis Campbell, health correspondent
The Guardian, Thursday 13 November 2014
Jump to comments (29)
Our problems

– Increasing demand for imaging
– Increasing complexity
– Data overload
– Misinterpretation
Over the past 20 years there has been a steady increase in demand for imaging, particularly MRI and CT scans

**IMAGING ACTIVITY, ENGLAND**

<table>
<thead>
<tr>
<th>Modality</th>
<th>Annual growth over past 5 years</th>
<th>Annual growth over past 10 years</th>
</tr>
</thead>
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<tr>
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<td>CT</td>
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</tr>
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<tr>
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<tr>
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Overall annual growth is 3.6% over the past five years and 3.4% over the past ten years.

The increased complexity of modalities such as MRI and CT has compounded the increase in demand, leading to faster growth in reporting demand.

**IMAGING REPORTING DEMAND, ENGLAND**

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Overall annual growth is 5.8% over the past five years and 5.7% over the past ten years.

UK performs a low number of MRI and CT scans per million population compared to OECD peers.

The UK has a very low number of MRI and CT scanners for its population size, when compared with other OECD countries.

**SCANNER EQUIPMENT PER MILLION PEOPLE, OECD**

England has fewer radiologists per capita than peer group countries

Numbers of radiologists per million population in selected European countries

<table>
<thead>
<tr>
<th>Country</th>
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<tr>
<td>Italy</td>
<td>160</td>
</tr>
<tr>
<td>Belgium</td>
<td>134</td>
</tr>
<tr>
<td>Norway</td>
<td>125</td>
</tr>
<tr>
<td>Denmark</td>
<td>121</td>
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<tr>
<td>Austria</td>
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<tr>
<td>Sweden</td>
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<td>France</td>
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<tr>
<td>Switzerland</td>
<td>84</td>
</tr>
<tr>
<td>Germany</td>
<td>81</td>
</tr>
<tr>
<td>Romania</td>
<td>50</td>
</tr>
<tr>
<td>UK</td>
<td>46</td>
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Source: Dose Datamed 2 Survey 2010
Error rates in diagnostic radiology

- 3-5% in routine daily practice (= >1 million per annum in England)
- 20-30% in cross-sectional imaging
Abdominal and pelvic computed tomography (CT) interpretation: discrepancy rates among experienced radiologists
• 90 CT studies reported by 3 experienced radiologists were randomly selected
• Each of the 3 radiologists was asked to re-interpret 60 studies, 30 of his own and 30 reported by others.
• Reports were then compared and rated for discrepancy on a three point scale – none, minor or major
results

• Interobserver major discrepancy rate – 26%
• Intraobserver major discrepancy rate – 32%

• Major discrepancies were due to missed findings, different opinion regarding interval change or different recommendations

Abujudeh et al Eur Radiol 2010
Why do we get it wrong?

• Some of our tests are not that great
• Our eyes and our brains let us down
• We only see what we expect to see
• Sometimes our tests are too sensitive
• There is a considerable overlap between normal and abnormal
• We are only human
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6 months later found to have prostate cancer
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• There is a considerable overlap between normal and abnormal. Benign and malignant conditions can look the same
• We are only human
'Not cancer' patient claims costs

A man who spent his life's savings after learning that he had terminal cancer is seeking compensation from a hospital after his diagnosis changed.

John Brandrick from Newquay was first told by Royal Cornwall Hospital in Treliske that he had pancreatic cancer and later diagnosed with pancreatitis.

The 62-year-old said after "living life to the full" he has to sell his home.

The Royal Cornwall Hospital's NHS Trust sympathised with him but said there was "no clear evidence of negligence".

Mr Brandrick said his life had been turned "upside-down" as a result of the new diagnosis of pancreatitis, an inflammation of the pancreas.

"If they have made the wrong decision they should pay me something back."
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Data overload

• Mayo clinic study
• Cross-sectional imaging 1999-2010 (CT & MRI)
• No of studies performed each year doubled from 84500 to 147000
• No. of cross-sectional images increased 10-fold from 9.3M to 94.2M

• The average radiologist interpreting CT or MRI must now interpret one image every 3-4 seconds in an 8 hour day to meet demand.

McDonald et al Acad Radiol 2015
The relationship between reporting speed and accuracy

• Abdominal CT
• 4/5 readers increased serious error rate when reporting time halved
• Overall serious error rate increased from 10% to 27%

Sokolovskaya et al JACR 2015
Thank you very much

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