

# Are we too reliant on medical imaging?

Imaging technology has revolutionised modern medicine. It is difficult to imagine a time when we practiced without it, but have we become too reliant, and should we be aiming for more judicious use of imaging services?

Imaging is a cornerstone of modern medicine, with nearly all healthcare users undergoing at least one form of radiological examination during their patient pathway, whether for screening, diagnosis, treatment or surveillance. Clinicians in the NHS have access to modern scanning technology and a wealth of expertise, which together should offer the highest diagnostic accuracy in the quickest time, but increased imaging complexity has significant resource implications. Providing comprehensive imaging has created a reliance on imaging to the point where sometimes it is seemingly impossible to proceed without. What are the risks of the over-reliance on imaging and how will the NHS cope with the current and predicted increase in demand? Does non-judicious use lead to unintended mental and physical harm in those we are trying to help? What can we do to ensure that the right patients are getting the right test, at the right time?

There is no doubt that medical imaging improves healthcare. From a detailed antenatal ultrasound of a fetus checking for life-limiting anomalies, to head computed tomography (CT) looking for a therapy target following a stroke, advances in radiology have allowed monumental shifts in healthcare in the last two decades. It is now possible to literally image a patient from head to toe, 24 hours a day, 7 days a week, and the availability of modern imaging has resulted in measurable improvements in outcomes, for example reduced mortality following major trauma and lower negative appendectomy rates (Huber-Wagner et al, 2009; Raja et al, 2010). It is natural for a clinician to want to obtain as much information as possible before embarking on treatment, and radiology offers a simple, seemingly low risk and easy way of obtaining a detailed diagnosis, particularly when it does not involve ionising radiation, such as ultrasound. All clinicians would agree that an unnecessary scan is better than an unnecessary treatment or operation, but at what cost?

## Hidden burdens of imaging

Unfortunately, alongside the impressive benefits there are hidden burdens of overuse of imaging in the NHS, particularly in light of an already stretched skilled workforce. Hospitals are dealing with ever-increasing waiting lists for scanning and reporting, many breaching 2-week-wait cancer targets, with a mean waiting time for magnetic resonance imaging (MRI) of several weeks (NHS England and NHS Improvement, 2020). This backlog may have been exacerbated by the COVID-19 pandemic, which reduced outpatient hospital capacity and activity. In September 2022, there were 1 million more people awaiting MRI or CT scans than 10 years earlier (Halliday et al, 2020).

As a typical adult CT scan of the chest and abdomen includes 700 images, each of thousands of pixels, the 33% shortfall of radiologists in the UK (set to rise to 44% by 2025) means that there are insufficient radiologists to interpret these scans (Royal College of Radiologists, 2021). A full-time clinical radiologist reporting approximately 2000 CT or MRI scans a year, multiplied by the 4127 clinically active radiologists in the UK (Royal College of Radiologists, 2021), gives the NHS a maximum reporting capacity of approximately 8 million studies a year (Royal College of Radiologists, 2012). At the rate of over 820 000 CT and MRI scans performed in the NHS in March 2019, and with this number set to rise (Halliday et al, 2020), demand is already outstripping capacity. Many patients are waiting too long for essential imaging, and some of the waiting list will

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comprise patients who may not benefit directly from imaging. The solution cannot be simply to provide more scanners and imaging specialists; however, as the UK has one of the lowest rates of both of these key components of imaging service provision, it would be naive to plan for efficiency improvements without considering increasing the available infrastructure as well (Stokes-Lampard, 2022).

## Reducing the overuse of imaging

Imaging tests are not always necessary or diagnostically useful. The overuse of imaging alongside overwhelmed reporting lists is a risk to patient safety. Useful scans are those which influence or change the patient management pathway – for every ‘useful’ scan there may be 10–20 studies that do not show significant abnormalities. Without reviewing each scan, there is a danger that a scan with a significant finding is buried in a long reporting list of diagnostically unhelpful imaging tests.

Incidental findings are common in radiology, seen in up to a third of examinations (O’Sullivan et al, 2018), and often contribute only to anxiety rather than disease. Benign adrenal adenomas (‘incidentalomas’), for example, occur in approximately 5% of patients (Song et al, 2008) and may require further imaging, clinical review or even biopsy, with the associated patient anxiety and demand on healthcare resources. There are smaller potential risks of ionising radiation to be considered when determining whether a scan is really required, although the immediate benefits of making a diagnosis usually outweigh the negligible risks of future radiation-induced cancer.

## What can be done?

The Royal College of Radiologists has been calling for bolstering of government funding to enable the recruitment of more radiologists and radiographers, and evidence-based guidance for radiology referrals should be accessible as a clinical decision support tool for all referrers. Outsourcing imaging performance and/or reporting to private companies simply shifts a workforce problem into a different sector (effectively robbing Peter to pay Paul?), but more judicious use of artificial intelligence for some more mundane tasks, or in patient prioritisation, would facilitate workflow efficiency.

Only scanning patients for whom imaging will have the greatest clinical impact would take some pressure off an over-burdened system with a significant backlog of patients. Clinicians can all play a part in trying to achieve the right test for the right person at the right time, acknowledging the limitations of the system, and looking forward to innovative solutions being implemented.

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## Key points

- Imaging plays an important role in almost all patient pathways.
- Not all medical imaging will change the diagnosis or treatment options, and some may be unnecessary.
- Demand outstrips supply for imaging investigations within the NHS.
- The COVID-19 pandemic has made an already growing backlog for imaging worse.
- Careful application of evidence-based guidelines will help improve scanning efficiency.
- Other potential solutions include using artificial intelligence for workflow efficiency.

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