



Equipped for the future

Diagnostics equipment in NHS England: the case for investment

Clinical radiologists use imaging techniques to diagnose, monitor and treat diseases and injuries. However, they can only do as much good for patients as they are equipped to provide. Across England, there are problems with the supply of imaging equipment, and some machines are obsolete and lacking the latest capabilities. This hampers radiologists' work at a time when there is unprecedented demand for diagnostic imaging. If not addressed, this issue risks the NHS falling behind on the latest technological advances and standards of care – which would have a devastating impact on patients.

Diagnostic services are included in 85% of clinical pathways, and the NHS in England carries out an estimated 1.5 billion diagnostic tests per year.¹ Most of these tests are reported by clinical radiologists. Diagnostic imaging is frequently the rate limiting step – it can either speed up or slow down the whole clinical pathway. NHS England has set targets for 99% of patients to undergo a diagnostic test within 6 weeks of a referral and of diagnosing 75% of cancers at stages 1 or 2 by 2028. Clinical radiologists are essential for meeting these targets. However, without modern, fully functioning equipment that is stationed in the right places, the chances of the NHS doing so are slim.

Recommendations

To provide the best possible service to patients, clinical radiologists need to be properly equipped. The RCR recommends that:

- Imaging networks should increase the practice of centrally commissioning equipment
- Trusts should implement processes to regularly update equipment fleets, in line with demand and agreed unit lifetimes
- Government should protect NHS capital budgets and NHS England should support trusts and imaging networks to use them for their intended purpose
- NHS England should publish a single, comprehensive, and publicly available equipment dataset
- NHS England should progress towards a robust and connected IT infrastructure across the NHS
- Government should maximise the diagnostic radiology workforce and fully implement the Long-Term Workforce Plan.

The Challenge

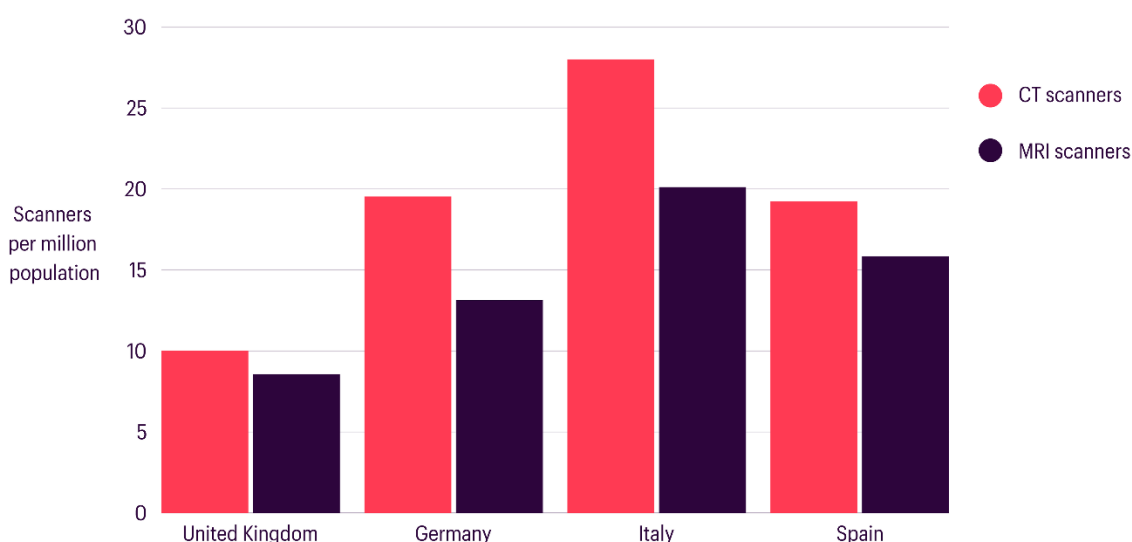
There is a shortage of diagnostic equipment in the UK.

Data shows that the NHS has far fewer diagnostic imaging machines than is needed, as well as far fewer than other comparable countries. Without investment in this part of the service, the NHS risks being left behind international comparators in terms of both service provision and patient outcomes.

The chart below shows the latest Organisation for Economic Cooperation and Development (OECD) data (figures from 2021, counting scanners in hospitals only).ⁱⁱ

International comparisons can be misleading, since different countries submit data at different times, have larger or smaller private care sectors, staff their machines in different ways, and so on. Nonetheless, the UK is clearly falling behind other, similar nations.

IMAGING MACHINES PER MILLION POPULATION BY COUNTRY, OECD DATA 2021



The UK has an ageing fleet of diagnostic equipment.

An often-quoted measure is that, ideally, no more than 10% of the NHS's diagnostic imaging equipment should be older than 10 years.^{iii,iv,v} Equipment older than 10 years often still works, but is often technologically obsolete. This is because the rate of technological innovation exceeds the rate of equipment replacement. Older equipment may produce lower quality images, making cancer or other abnormalities harder to identify. Older machines are also slower, which reduces the number of patients who can be scanned in a day. It may also mean that very young or very old patients need to be sedated for a scan, which carries risks. Older machines may deliver greater radiation doses than are now necessary. Under the Ionising Radiation (Medical Exposure) Regulations IR(ME)R, there is a duty to ensure that radiation exposure for patients is minimised as much as possible.^{vi} Industry surveys have revealed that the UK's equipment fleet is showing signs of aging. Estimates vary, but all agree that more than 10% of the UK's CT and MRI machines are over a decade old.^{vii,viii} If technological advancements leave the NHS behind, patients risk receiving less effective treatment or greater adverse effects.

Equipment can break down, and often goes unrepaired for long periods.

Complex equipment inevitably breaks down and must be repaired. The repair of faulty equipment can be expensive and must come out of a trust's budget for maintenance. 29% of radiology departments reported that their equipment breaks down most months. 14% of radiology departments reported that their equipment breaks down most weeks.^{ix} The frequency of equipment breakdown correlates with equipment age. Broken machines, especially in smaller trusts, reduce the capacity of radiology services, resulting in increased delays for patients.

There is a lack of funding for commissioning and purchasing equipment.

Replacing obsolete equipment and repairing faulty equipment is expensive. A high-specification MRI machine costs on average £1 million, and a high-specification CT scanner costs £900,000. This does not include the cost of installing the machines, which often includes expansive building works that can cost as much as the purchase of the machine itself.

The NHS's budget is under significant strain, at a time when the national finances are tight and demand for healthcare is rising. Moreover, capital investment forms only a small fraction of the total NHS budget – just 6% in 2020/21.^x From 2014/15 to 2018/19, funding was routinely transferred from the capital budget to meet day-to-day spending. NHS funding has increased in the past few years. However, there are still instances of capital budgets being raided.^{xi,xii} Tight finances also create an environment in which spending on capital projects is disincentivised in favour of day-to-day spending. Managers may be reticent to commit to expensive capital projects like replacing obsolete CT or MRI machines that are nonetheless still functional, albeit sub-optimally.

With the advent of imaging networks, there is greater opportunity to explore centralised commissioning and bulk purchasing of equipment, which could result in significant cost savings. Imaging network coordination can also help with regional-level service planning. Currently, just 57% of trusts' spend on consumables and equipment is made via NHS Supply Chain, suggesting there are significant gains still to be made in terms of collective buying power.^{xiii} The RCR's Quality Standards for Imaging Networks (QSIN) states that one indicator of network quality is an agreed, network-wide asset replacement programme.^{xiv} The larger the network, the greater the potential for cost savings.

Incomplete data means that we have an incomplete picture of what equipment needs to be replaced.

Existing, publicly available datasets that report on the number, age and locations of diagnostic imaging equipment provide only a general picture. They are often outdated and lacking in important metrics. For example, the National Imaging Data Collection reports annually, but only reveals the total number of each type of machine in the NHS – not their ages. The NHS in England has established processes for collecting more comprehensive equipment data, but these are not made public.

Equipping radiologists for the future

To deliver the best possible care for patients, the NHS needs to invest in expanding and upgrading its diagnostic equipment. The RCR recommends that:

1. **Imaging networks** should increase central commissioning and bulk purchasing of equipment. This would enable cost savings to be made, alongside planning of services at the regional level to meet patient needs.
2. **Trusts** should ensure they have put in place processes for regularly updating their fleet of diagnostics equipment. Equipment replacement intervals must be agreed and then adhered to.
 - 2.1 This should be in accordance with agreed equipment lifetimes, such that technological obsolescence is avoided as much as possible. They must balance cost against providing the best possible care to patients.
 - 2.2 These processes should consider demand for diagnostic services – noting that, in most instances, this demand will increase over time. Increased demand will require some arrangement of increased capacity (more scanners) and adapted patterns of use (e.g. increasing the ‘uptime’ of each scanner).
 - 2.3 Managed Equipment Service (MES) contracts are just one method by which trusts can ensure their equipment is up-to-date. These are agreements reached between a vendor and a healthcare provider in which, for a fixed annual fee, the vendor agrees to supply the provider with equipment and service, repair, and upgrade that equipment over time. They are increasingly popular with radiology departments. They have the potential to ensure trusts have a guaranteed fleet of modern, functioning equipment with minimal downtimes.^{xv} Their cost-effectiveness will vary according to the initial contract negotiation, which can be complex. **Trusts** should investigate whether an MES contract would be beneficial to them. **Imaging networks** should coordinate trusts’ efforts step up the use of MES contracts, where appropriate. **NHS England** should provide greater support to trusts to negotiate the best possible deal from vendors.^{xvi}
3. More broadly, it is essential that capital budgets are protected and not used to subsidise day-to-day spending. The **government** should ensure this is the case and **NHS England** should support **trusts** and **imaging networks** to use their capital budgets for their intended purpose.
4. **NHS England** should publish a single, comprehensive, and current equipment dataset. This would give a high-resolution snapshot of the current NHS equipment fleet, and would enable policymakers to effectively plan for the future.

Wider considerations

The issue of equipment supply cannot be considered in isolation. The following must also be factored into policy making and service planning processes.

- **Workforce shortfalls:** The clinical radiology workforce is chronically understaffed, with a consultant shortfall of 30%.^{xvii} However many machines the NHS has, if it does not have the staff to interpret the images produced, there will be no benefit to patients. The NHS Long Term Workforce Plan is a welcome step forwards.^{xviii} But further action is needed to improve the retention of NHS staff. Plus, the number of foundation and speciality training posts must be expanded commensurately.
- **IT infrastructure:** The NHS' ageing IT base is a consistent source of lost time. Many trusts still use legacy IT systems, leading to frequent failures. NHS England should produce an NHS-wide strategy for modernising and unifying its IT systems. The Government should support the NHS to recruit and retain more Digital, Data and Technology (DDaT) staff, including software engineers, systems architects, and data scientists.
- **Artificial intelligence:** Modern IT systems are a prerequisite for more innovative tools, such as many artificial intelligence (AI) applications. AI applications often cannot be integrated with legacy software. Large maintenance backlogs constrain trusts' capital allocations, which can also discourage investment in new AI tools. It is important that barriers to their implementation are removed.
- **Physical space:** A lack of space limits trusts' ability to expand their complement of machines. MRI and CT units are huge pieces of equipment, requiring entire rooms to house. There is also a shortage of Picture Archiving and Communication System (PACS) workstations for radiologists. This hampers efforts to bring down diagnostic waiting lists.^{xix}

Conclusion

Investing in capital is essential if the NHS is to improve its productivity – the amount of care it can provide, given the resources available. The upfront cost to expanding capacity and tackling the maintenance backlog in equipment will be rapidly offset by the cost savings to be had from increased throughput and freed up time for clinicians to identify and treat illnesses earlier. Investing in the capital budget now would prevent the revenue budget from expanding further.^{xx}

NHSE should develop a more comprehensive, joined-up approach to equipment procurement by supporting trusts and imaging networks to centrally commission equipment to a greater extent than is currently practiced. Government and NHSE should protect capital budgets, provide expertise, and publish a rich equipment dataset to facilitate rational service planning.

Not investing in equipment now comes with the price of suffering much greater costs in the future. The UK risks being left behind if technological innovations are made available in other jurisdictions, but not to patients in the NHS. It is essential that the NHS makes sustainable, long-term investment in its diagnostic services, for the good of its patients.

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