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The Society & College of Radiographers

Editorial

New environments and changing times

The UK Government's *Five Year Forward View* document[1] published in 2014, is a recurring theme in several papers featured in this year's issue of *Imaging & Oncology*, not least because there has now been sufficient time to start to get to grips with some of the recommendations on disease prevention, early diagnosis and new ways of delivering healthcare. Very different opinions are put forward on the following pages and, whilst some feel the standards and aspirations set within it are motivational and radical, others suggest a lack of substance and reality. Whose views align most with yours? Or perhaps you are more concerned with just trying to comply with some of the directives over the next few years. Maybe it all depends from where you are standing, but undoubtedly this document's influence will be felt in all our services for some time.

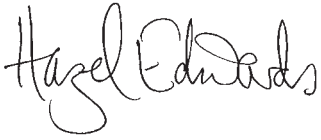
Articles by Higson and Rodgers offer methods to improve quality and efficiency. There are also further excellent papers on redesigning radiography education programmes, particularly in the light of financial changes; current imaging for endometriosis, a sometimes debilitating condition affecting women; and the important role of specialist therapeutic radiographers managing men with prostate cancer. These radiographers are a good example of new ways of working, which are likely to bring both financial and patient benefits.

Whilst on the subject of specialist and expanding roles, it's not just imaging and therapy practitioners continually adopting tasks more commonly associated with other healthcare groups. Of course, other professions are always on the look-out for the chance to buy imaging equipment and perform imaging procedures themselves as an adjunct to their own practice. A timely example featured on p28 discusses the increasing use of cone beam CT by dentists and dental surgeons.

Eight years on from an article describing radiotherapy provision in the independent sector, I'm pleased to welcome an update from the same team plus one. They shed new light on current activity and emphasise the continued and increasing collaboration between private services and the NHS.

Another strong theme this year is abuse, but again, articles are drawn from very different perspectives. However, I feel that both reflect a worrying and deteriorating change in our culture, for which there is no easy cure. That said, I'd welcome further papers on this subject from those of you who do believe you have ideas or solutions and how our role as imaging specialists, be it associated with elder abuse, child abuse, or as recipients of abuse in the workplace, may be affected.

In fact, I'd welcome a discussion with anyone thinking of writing for *Imaging & Oncology* to share innovation or to say what's bothering them or indeed if they wish to respond to a past article. Do please get in touch for an informal chat.



Hazel Edwards, Editor **hazeledwards@sor.org**

1. NHS England. Five Year Forward View (web version) 2014. https://www.england.nhs.uk/ourwork/futurenhs/nhs-five-year-forward-view-web-version/.

Foreword

Welcome to the 12th edition of *Imaging & Oncology*, a publication that spans all radiography and radiology practices, making it of interest to a wide range of professionals. This journal brings articles together from leaders within the professions, helping us to widen the lens of our knowledge and in turn, enhance our own practice.

Healthcare these days is an emotive subject and there is much debate in the media about the fitness of the NHS to continue to deliver high quality care to patients. However, with continued commitment and collaboration between professionals, I am sure the NHS will remain dependable.

The emphasis of care has shifted towards prevention of illness and earlier diagnosis, as it is well known that these strategies can reduce demand on our services and often improve outcomes. In the short-term this will put pressure on our already overstretched radiology services, but we have a good track record of meeting the challenge and providing innovative care pathways.

The *Five Year Forward View* sets out goals and aspirations, advocating a chance to introduce innovations in combination. This means that we will be asked to deliver services differently to ensure pathways are joined up. We now have the technology to achieve this but we urgently need the infrastructure to support this.

We are already seeing a shift in our practices when we are working with charities, which are able to commission pieces of research to find the gaps and to celebrate good practice. This has helped to bring about a better understanding of how radiography fits into the bigger picture of healthcare.

The ongoing challenges we are facing in the sonography workforce have resulted in recent high-level discussions, bringing together all stakeholders. From this piece of work, we will see innovative practice and new ways of doing things that will almost certainly have impact across the whole profession.

With the funding models of our training courses changing and financial support moving away from bursaries, we must observe carefully and ensure that the standard of education is not diminished. Perhaps greater use of innovative IT programs and simulation may be more cost-effective at supporting the future workforce.

I hope that you enjoy reading this edition of *Imaging and Oncology* and that you will discover something that encourages you in your work, and helps you to pause and reflect as to what your contribution should be. Don't just read those from your own professional perspective; within the other articles you may also find nuggets that will inspire you!

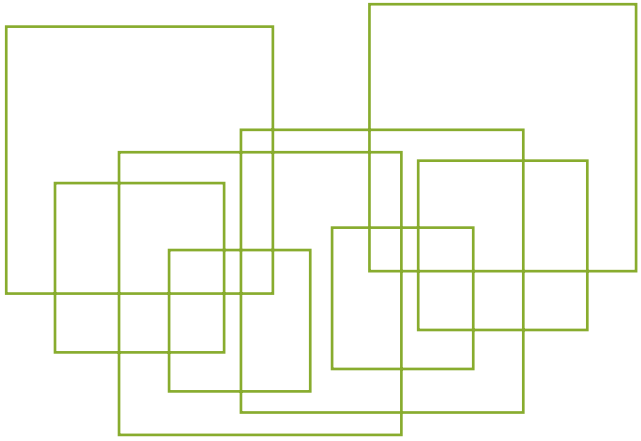
Sheila Hassan

Sheila Hassan
President
Society & College of Radiographers

Imaging and the *Five Year Forward View*

Erika Denton

Ever since the beginning of the NHS in 1948, the cost of providing healthcare has increased year on year. This is in part because of our ageing population, but more significantly because of increasing effectiveness and complexity of healthcare interventions.



In 2014, the *Five Year Forward View* for the NHS was published and this was followed by NHS planning guidance[1,2]. In a change from previous eras of organising healthcare, the *Five Year Forward View* and the subsequent planning guidance are published collaboratively by NHS England, NHS Improvement[3] (NHS Trust Development Authority and Monitor together), the Care Quality Commission[4] (CQC), Health Education England[5] (HEE), the National Institute for Health and Care Excellence[6] (NICE) and Public Health England[7] (PHE). Jointly, these organisations set out the steps required to deliver a sustainable and transformed health service within the current financial constraints. The key priorities described in the *Five Year Forward View* and the subsequent planning guidance, have significant potential impacts on imaging services.

Vanguard sites for new models of care

One of the first steps towards delivering the *Five Year Forward View* is the new care model vanguards, which will form an essential part of redesigning care and improving value[8]. These vanguards comprise 50 partnerships and organisations that have been selected to share models of good practice and process, that will act as a blueprint to which the rest of the NHS can aspire. One of the successful vanguard proposals is the East Midlands Radiology Consortium[9] (EMRAD), which is a partnership of seven NHS Trusts working together and hosted by Nottingham University Hospitals NHS Trust. Their aim is to create a clinical network to provide timely and expert radiology services for patients across their geography, regardless of the location of the patient. This has the potential to provide a national benchmark for new models of clinical collaboration for NHS radiology services. They will utilise a shared technical platform, allowing access to patient radiology images at the point of clinical need, no matter where they have been acquired. They are establishing new regional systems for governance and patient consent, and have extensive commissioner and educational support from the organisations within the consortium. This vanguard will bring work back into the NHS which is currently being delivered by other sectors, particularly private teleradiology providers. This cross-trust expert radiology network will also resolve some of the human resources and contractual issues which have prevented consortia of this type developing previously. It is highly likely that other areas of geography will follow a similar pathway in the future.

Networked services

Networked services have already been established in some areas for interventional radiology. It is anticipated that these will be extended, so that the improvements seen in 'out of hours' provision of interventional radiology services for patients across England over the last six years will continue. The delivery of modern stroke services should include the provision of clot retrieval, as well as thrombolysis, and these services will need to be provided by networks of clinical teams as the workload is too small for all hospitals to deliver this care.

Their aim is to create a clinical network to provide timely and expert radiology services

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Radiology services will have to change in order to deliver care in this proposed new system

The planning guidance expects commissioners to plan in detail to transform urgent and emergency care services. It is likely that some radiology services will shift towards fewer tertiary or large district general centres, and more diagnostic services will be provided closer to home. The new urgent and emergency care system will require more straightforward diagnostic interventions and tests to be undertaken in the community wherever possible, and is also likely to see a reduced number of large fully functioning accident and emergency departments. This will support the delivery of services which currently are not available to the whole population. An example is thrombectomy for the treatment of stroke as already described. It is clear that radiology services will have to change in order to deliver care in this proposed new system.

Seven day services and clinical standards

The planning guidance also asks commissioners how they will achieve the full roll-out of seven day services for the four priority clinical standards. Two of the clinical standards relate directly to diagnostic and imaging services; clinical standard five is that hospital inpatients must have scheduled seven day access to diagnostic services, including all imaging services within one hour for critical patients, 12 hours for those who are urgent, and within 24 hours for non-urgent patients. It is expected that the NHS will comply with this standard by 2020 and will have plans in place as to how this will be delivered this year. Standard six relates to consultant directed interventional services including interventional radiology, which should be available for hospital inpatients 24 hours a day, seven days a week, either on-site or through formerly agreed networked arrangements with clear protocols. As I write this at the start of 2016, it is clear that these standards as described for seven day services have to be phased in by the NHS, but that the NHS and its radiology services should be working towards them.

Planning guidance and cancer

The third area within the planning guidance, which will have a big impact on radiology services, is that all patients should be given a definitive cancer diagnosis or an all clear within 28 days of being referred by a general practitioner. This is, of course, on a background of an already stretched system trying to deliver waiting times of no more than six weeks from referral to test. Commissioners are asked to agree a trajectory for increases in diagnostic capacity required to 2020, in order to deliver this new timeframe for referrals. Figure 1 shows the increase in imaging activity over recent years. The apparent reduction in activity overall in 2013-14 is due to a change in the way we collect data centrally, rather than a true reduction in activity. The commissioning system must now look at other new ways to deliver yet further increased capacity, in order to meet the aspirations of the 28 day standard.

Accreditation

The NHS England business plan in 2014 set a target for the system to increase the number of diagnostic services which are accredited and in imaging this means full Imaging Service Accreditation Scheme (ISAS) compliance[10]. Accreditation schemes have been described by Sir Mike Richards at the CQC as central to future inspections and have clear evidence of quality service provision. Nationally it is absolutely agreed that accreditation for radiology services will be used by commissioners and patients alike when looking for confirmation that service is being provided to the highest quality.

Personalised medicine

NHS England has announced a programme to focus on personalised medicine, which will include the highly acclaimed and very successful Genomics England work[11]. Within personalised medicine, imaging will have a significant role to play in stratifying patients who might be able to receive personalised and specific treatment, for example using molecular diagnostics and also risk stratified screening. Imaging may also be undertaken in different pathways depending on genomic information. For example, those patients who are extremely radiation sensitive as a result of genetic abnormalities will have breast MR rather than mammography. A further example from the breast imaging world would be the possibility to stratify the breast screening programme, so that women at higher genetic risk of breast cancer would have more frequent imaging tests and have MR, as well as or instead of mammography, whereas those at much lesser risk would perhaps have less frequent screening or have no screening at all.

Data

The new diagnostics data service, to begin later this year at the Health and Social Care Information Centre[12], brings welcome cohesion to the services run from the centre, which collect data and provide knowledge and information using those datasets on diagnostics. This will include the diagnostic imaging data service which now collects information at a patient level on every imaging test undertaken in England and will enable, once this is linked fully to hospital episode statistics and cancer registry data, full examination of where imaging sits in patient pathways. It will be possible as a result, for us to tell whether doing more imaging actually results in earlier stage of diagnosis of cancer, as we will have the data to support or refute these hypotheses.

Open source PACS (picture archiving and communication systems)

As we move forward over the coming five years, open source software is likely to have a significant effect on the future procurement of imaging PACS, with freely available PACS enabling network services in a far more efficient way than the traditional provision.

Conclusion

There has probably never been a more exciting time to be involved in providing, managing or procuring imaging services and the coming five years will see significant changes to the way we deliver excellent radiology.

Acknowledgement

The author is very grateful for help from colleagues in NHS England and especially Dan Gosling in preparing this article.

Professor Erika Denton is a Consultant Radiologist in Norwich. She publishes and speaks widely on breast imaging and healthcare policy related to diagnostics. Erika was the National Clinical Director for Diagnostics at NHS England with responsibility for clinical leadership, advice and guidance across the NHS and covering all diagnostic services from 2013-2016, and before that held numerous national roles in imaging.

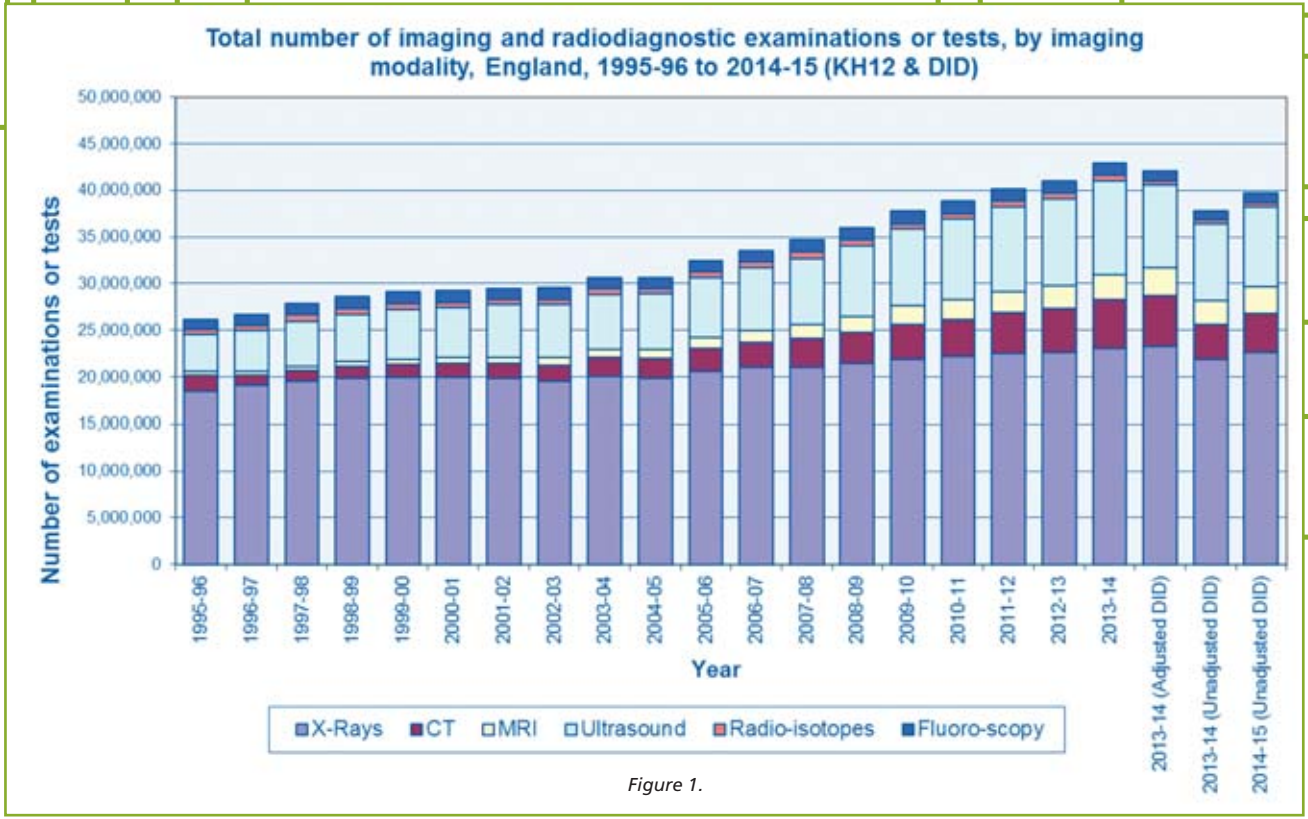

Figure 1.

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Elder abuse: Our responsibilities in society and in healthcare

Emily Faircloth

Non-accidental injury is often related to the physical abuse of children, first described by Kempe et al in 1962 as 'battered child syndrome'[1]. More than a decade later, other forms of abuse and violence towards vulnerable people in the domiciliary setting were highlighted.

The term 'granny-battering' was first used by Baker in 1975 and described in a letter dated the same year to the *British Medical Journal* which sought to raise awareness of this growing issue[2].

Over the past 30 years, academics and policy makers have paid increasing attention to the incidence, detection, management and prevention of the abuse of elders and its wider impact on society[3,4]. The Human Rights Act 1998, which came into force in 2000, ignited statutory guidance from the Department of Health in the form of *No Secrets*, a framework for partnership working across local authority, healthcare, police and other agencies in order to prevent abuse and neglect in vulnerable adults[5].

Defining elder abuse

The perception and definition of elder abuse varies internationally to include ethnic and religious factors, as well as age and cultural context. In 2002, the World Health Organisation (WHO) in partnership with the International Network for the Prevention of Elder Abuse, challenged existing opinion in its definition of elder abuse as 'a single or repeated act, or lack of appropriate action, occurring within any relationship where there is an expectation of trust which causes harm or distress to an older person'[6].

Abuse has also been described as a 'violation of an individual's human and civil rights by any other person or persons' which can take place in a number of settings[7]. Safeguarding in this context, therefore, relates to protecting an elderly individual's right to live in safety, free from abuse, exploitation and neglect. There is a general consensus that elder abuse is an act or failure to act, and that it may be intentional or unintentional, manifesting in various forms of abuse *(figure 1)*[8].

The abuse of an ageing UK population

The Office for National Statistics has long reported an ageing UK population with increasing numbers and proportions of older people[9]. Due to factors such as a post-World War II spike in births and the prolonged 'baby-boom' of the 1960s, the population of people aged over 65 is expected to increase by 12%, with the fastest population growth in those aged over 85 showing an 18% increase by 2020. This appears to correlate with a disturbing 4% rise in the incidence of elder abuse[10]. While the WHO estimates that around one in ten older people experience abuse every month, the rates of abuse are still likely to be underestimated[11]. Complicating issues such as self-neglect, unclear designation of carer responsibility and cognitive impairment, also make accurate analysis of elder abuse a challenge. Studies in the UK and United States of America show that around 50% of people with dementia experience some kind of abuse at the hands of those they depend on for their care[12,13].

In 2014, the Health and Social Care Information Centre reported on the mandatory collection of benchmarking data relating to the abuse of vulnerable adults in England[10]. This included older adults at risk of harm, from whom, and the locations in which they are most vulnerable to abuse. Physical abuse, neglect and institutional abuse were the most common classifications of abuse reported in referrals for vulnerable adult safeguarding investigations *(figure 2)*.

For the older cohort, abuse was more likely to take place in a residential or care home rather than the individual's own home. The source of harm was notably higher (ie twice as likely) to be from domiciliary and residential social care workers/managers than family members, which appears contrary to previously published evidence from a range of sources, suggesting higher levels of abuse occurred in the elderly person's own home *(figure 3)*[10].

Radiology plays a key part in the recognition of elder abuse and yet the evidence-base remains under-represented

Figure 1: Types of elderly abuse.

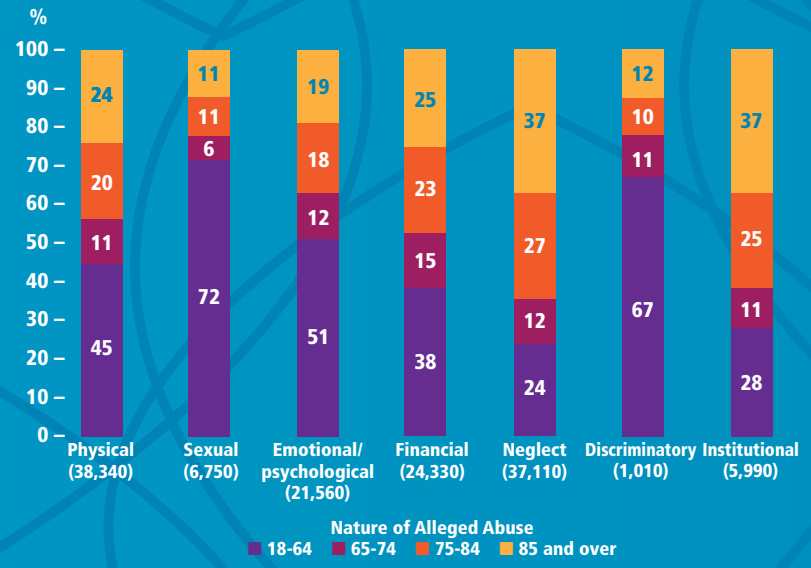


Figure 2: Nature of abuse by age group. Source: The Health and Social Care Information Centre (2014).

The imaging of elder abuse

Radiology plays a key part in the recognition of elder abuse and yet the evidence base remains under-represented. In the winter of 2012, Murphy et al, of Toronto's University Health Network, conducted a meta-analysis of 1100 cases of elder abuse, and estimated that only around 2% of elder abuse cases are ever reported.[14]

The findings included patterns of injuries that were demonstrated where abuse was known to have occurred. These included in particular, injuries of the maxillofacial, dental and neck region, such as laryngeal trauma and fractures to the mandible and face. The 'triangle of safety', an anatomical area around the lateral aspect of the face, behind the ears and down the neck to the clavicles, which is identified in inflicted injury of children, may also be indicative of non accidental injury in vulnerable adults. Less common sites for injury include the skull and brain, lower extremities and the chest (ie fractures to the ribs) and abdominal region. These are outlined in *figure 4*. Radiological indicators of abuse include bilateral injuries, especially if in a particular pattern, where no appropriate explanation can be provided on presentation, or where there is a delay in presentation or evidence of previously untreated injury or fractures.

A particularly indicative radiological finding is the 'night-stick' fracture, characterised by isolated fracture involving the mid-diaphysis of the ulna, arising from a direct blow to the forearm while raised in defense. It is important to differentiate this finding from the Monteggia fracture, which although rarely seen in adults, involves the proximal third of the ulna with dislocation of the head of the radius; this fracture typically arises from a fall on an outstretched hand, indicating a different etiology.

So, domestic violence, abuse and neglect experienced by the elderly can be likened to a chronic disease with periods of sporadic exacerbation[15] materialising as emergency admissions and subsequent diagnostic imaging, which has the potential to reveal subtle patterns of physical abuse. These may include previously untreated fractures at various stages of healing, or bilateral injuries which are rarely accidental, and call for increased awareness in imaging teams.

Elder abuse may also be demonstrated using cross-sectional imaging. Computed tomography (CT) in particular, has a burgeoning role in the provision of further information about the cause and circumstances of a death that may otherwise have gone undiscovered at autopsy. For example, Roberts and Traill describe a resident of a

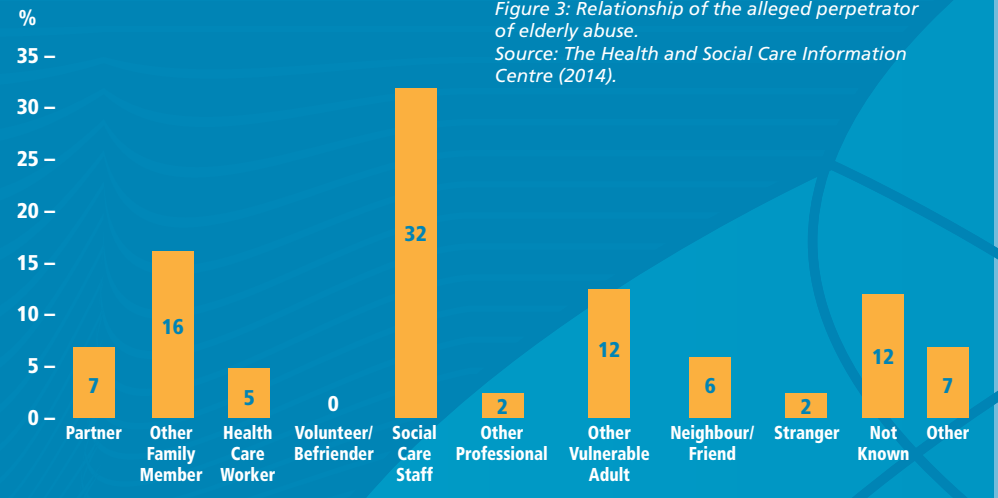


Figure 3: Relationship of the alleged perpetrator of elderly abuse.
Source: The Health and Social Care Information Centre (2014).

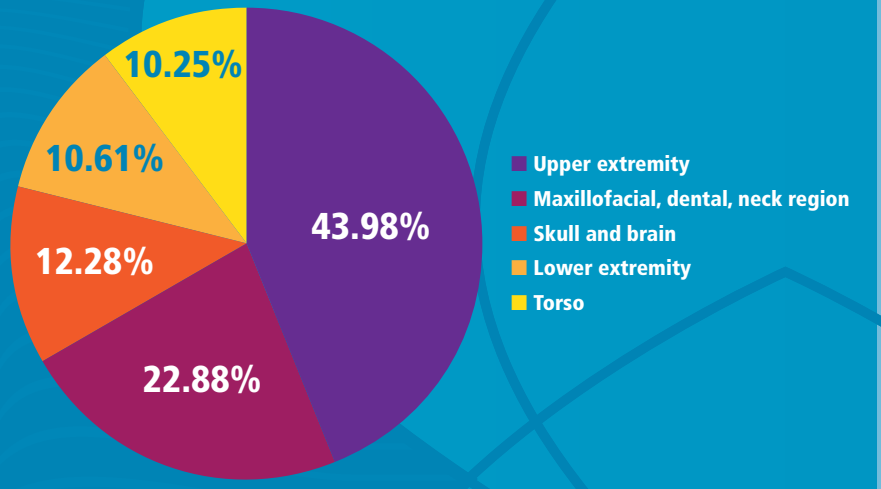


Figure 4: The radiological distribution of injuries in elder abuse. Source: Murphy K et al. A literature review of findings in physical elder abuse. The Canadian Association of Radiologists Journal 2013;64(1): 10-14.

POSSIBLE INDICATORS OF ELDER ABUSE:	
1. Physical abuse	• Unexplained changes in behaviour such as social withdrawal, isolation, anxiety and depression. • Unexplained bruising in well protected areas of the body, for example on the upper arms or the inside of the thighs. • A history of unexplained fractures or repeated injuries especially at different stages of healing. • Burn marks of particular or unusual type, eg caused by cigarettes or scalds caused by deliberate submersion, evidence of restraint. • Repeated attendance at Emergency department, frequent changes of GP or lack of engagement with GP practice. • Inappropriate administration of medication or deliberate poisoning.
2. Psychological and emotional abuse	• Unexplained changes in behaviour such as social withdrawal, isolation, anxiety and depression. • Anxiety when in the presence of alleged perpetrator.
3. Neglect and abandonment	• Unexplained changes in behaviour such as social withdrawal, isolation, anxiety and depression. • Unexplained hypothermia, dehydration, malnutrition; emaciation, malaise, unusual lethargy. • Evidence that prescription medication has been withdrawn or over administered, eg oversedation. • Unkempt, unwashed or inappropriate clothing worn for the weather condition. • Presence of one or more bedsore or recurrent, poorly managed bedsores. • Evidence of being left in soiled or wet clothing.
4. Sexual abuse	• Unexplained changes in behaviour such as social withdrawal, isolation, anxiety and depression. • Changes to sleep pattern. • Any injury, bruising, bleeding from genital or rectal regions including internal injury/unusual discharge. • Damaged or stained under garments or bedding, especially with evidence of blood or semen. • Unexplained diagnosis of sexually transmitted disease. • Unexplained incontinence (bladder or bowel). • Bruises in particular to the inner thigh area, bite marks, burn marks. • Anxiety when in the presence of alleged perpetrator.
5. Financial abuse	• Unexplained changes in behaviour such as social withdrawal, isolation, anxiety and depression. • Complaints of missing belongings or loss of personal money. • Reported changes to banking habits or unusual activity.
6. Discriminatory abuse	• Unexplained changes in behaviour such as social withdrawal, loss of self esteem, anxiety and depression. • Evidence or disclosure of hate crime or harassment, resistance or refusal to access services required.
7. Institutional abuse	• Any of the signs outlined above when the elderly individual is in the health and care setting (domiciliary or residential).

Figure 5: Possible indicators of elder abuse.

A particularly indicative radiological finding is the 'night-stick' fracture

care home who was found to have extensive bronchopneumonia at autopsy and a previously undiagnosed femoral fracture demonstrated with CT, that would otherwise have remained undetected[16].

Another example from the same authors, involves an 80 year old woman who was found to have alcoholic ketoacidosis as a primary cause of death following autopsy. The Coroner's objective of eliminating unnatural death appeared to have been fulfilled. However, following post-mortem CT, multiple injuries were also cited as the secondary cause of death. These included fractures of the right humerus and right femoral neck that would have remained unknown with autopsy alone, and raises the index of suspicion for non-accidental injury inflicted prior to death[16]. The presence of untreated fractures warrants consideration of neglect and further investigation for signs of abuse.

Where CT is an excellent imaging tool for the demonstration of bony injury, the use of magnetic resonance imaging (MRI) might also be advantageous in the assessment of the brain and spinal cord, blunt force trauma and soft tissue injury such as strangulation. MRI has limited routine use in forensic imaging for logistic reasons, but might be advantageous in future clinical forensic investigations, particularly as an adjunct to CT as part of a 'virtual autopsy' approach[17].

Where cross-sectional imaging has the potential to reveal inflicted injuries that would otherwise have gone undetected, it is currently not routine practice to carry out post-mortem imaging as part of death investigation, primarily due to resource, capacity and training constraints. Furthermore, physical abuse may also be missed where autopsy is not carried out due to a cause of death being identified, negating the need for post-mortem examination. The differentiation between inflicted and accidental injury or underlying disease therefore, presents a challenge and contributes to the under-reporting of elder abuse incidence.

While there are no injuries found to be singularly conclusive of elder abuse, it remains imperative that images and scans are interpreted within a biopsychosocial context, which includes factors such as underlying disease, mental health of the patient and other social factors. As well as imaging, there is also a personal and professional responsibility held by members of the clinical imaging team for the safeguarding of vulnerable adults and older people undergoing radiological examination, where indicators of inflicted physical abuse are revealed or disclosed *(figure 5)*. For example, accompanied by their

alleged abuser, an individual's change in demeanour may give rise for enquiry through their behaviour during radiological examination; they may appear anxious or agitated. The carer may appear over concerned or, conversely, apathetic to the needs of the elderly individual or even be aggressive towards them at the time of the examination.

Preventing elder abuse

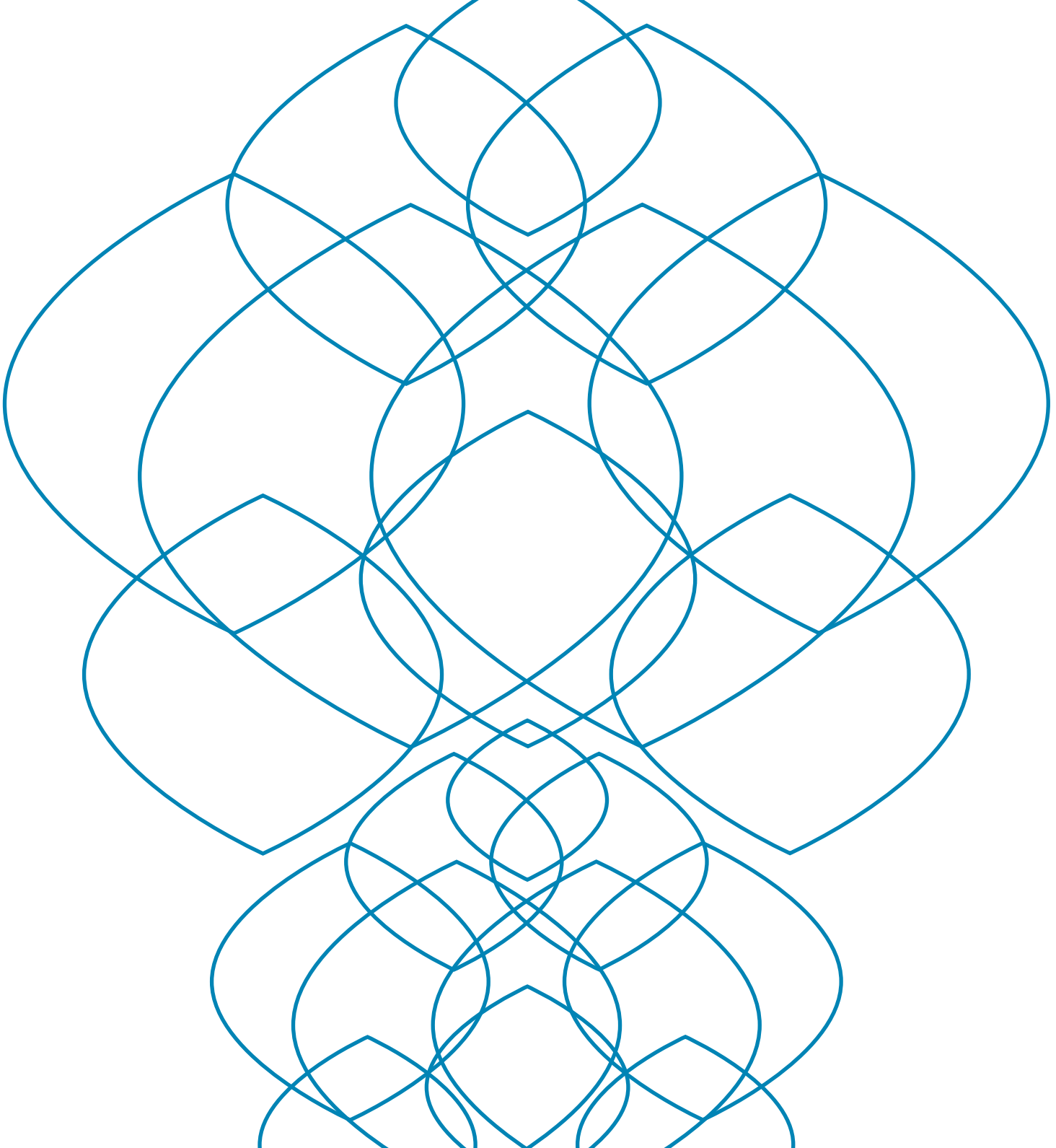
There are clear lessons to be learned from the recent past when it comes to the prevention of elder abuse. The most comprehensive and perhaps most well-known public enquiry, is the report of the Mid Staffordshire NHS Foundation Trust Public Inquiry chaired by Sir Robert Francis QC, published in February 2013, which identified serious safeguarding issues and failings in basic care of inpatients of the Trust[18]. Both the Royal College of Radiologists (RCR)[19] and the Society and College of Radiographers (SCoR)[20] acknowledged this report, although no clinical imaging staff came under scrutiny during the inquiry. The SCoR asserted: 'Radiographers are core frontline staff who come into contact on a daily basis with patients who are ill, vulnerable and elderly… turning a blind eye is not an option.'

Conclusion

It is more than 40 years since the term 'granny battering' first appeared and elder abuse remains a significant social issue, the extent of which is not fully known and is set on an increasing trajectory without radical, co-ordinated action that reaches beyond national policy and legislation.

Radiology has a role in the demonstration of injuries to support a diagnosis of inflicted physical abuse. Despite examples provided, imaging of elder abuse remains a challenge due to the potential for underlying disease and contributory features relating to frailty and degenerative changes (eg an increased likelihood of falls or spontaneous fracture due to an age related decrease in bone density).

Longevity has been one of the greatest triumphs of humanity, yet the prolific abuse of the elderly is at odds with humanity and with what it means to be humane. Lessons can be learned from the findings of the Francis Inquiry and, in its response, the Department of Health declares nothing short of a 'real transformation in the culture of the entire health and care system: a refocusing and recommitment on putting the patient first and foremost, every time' is required[21].



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The presence of untreated fractures warrants consideration of neglect and further investigation for signs of abuse

Further information:
Action on Elder Abuse (AEA)

Established in 1993 by practitioners from health and social care, academics and representatives of the voluntary sector, addressing abuse within people's own homes (whether by family, friends or paid staff), within sheltered housing, and within care homes and hospitals.
AEA offers a UK-wide free phone helpline, open every weekday from 9am to 5pm: 080 8808 8141.
Action on Elder Abuse, PO Box 60001, Streatham, SW16 9BY.
Email: enquiries@elderabuse.org.uk.
Website: www.elderabuse.org.uk.

Emily Faircloth is a founder member and past Chair of the International Association of Forensic Radiographers, with specialist interests in post-mortem dental identification and safeguarding children and adults. With a career ranging across clinical radiography, teaching and project management, she currently works as a Commissioning Manager of healthcare services in Devon.

Imaging in the pre-operative management of endometriosis

Lutfi Shamsuddin, Nazar N Amso

Endometriosis is a condition with varying effects. Ectopic endometrial glands and stroma can be present in places other than the endometrium causing symptoms of pelvic pain, dyspareunia and dyschezia, and may result in long-term impact on the quality of life.

Imaging options are used to investigate and plan treatments, although it is widely accepted that the gold standard for investigation of endometriosis is laparoscopy, with histological confirmation of the ectopic endometrial tissue. It is an invasive investigation with the option of performing direct surgical management to treat the disease, if found. This usually involves a general anaesthesia with the patient commonly in the Trendelenburg position. However, with patients who have symptoms suggestive of endometriosis, ultrasound assessment of the pelvis should be undertaken to exclude endometriomas and other suspicious features, prior to such an invasive operative procedure.

The role of ultrasound

It has been accepted that ultrasound is not diagnostic in excluding endometriosis, but what is its role in the diagnosis of the various manifestations of endometriosis? As far back as 2002, Moore et al published a systematic review on the use of ultrasound in diagnosing endometriosis and concluded that ultrasound was a reliable method in detecting adnexal masses and differentiating endometriomas from other adnexal masses[1]. It was also acknowledged that the papers reviewed covered endometriomas but did not address other forms, such as peritoneal endometrial deposits. Ultrasound appearance of an endometrioma is often described as being typically a unilocular cyst with a regular wall and homogeneously low-level echogenicity (so-called 'ground glass' appearance) of the cyst's content[2] *(figure 1a)*. Atypical endometriomas include cases with retracted clots that appear solid but without blood flow, endometriomas in pregnant women, and endometriomas in post-menopausal women with

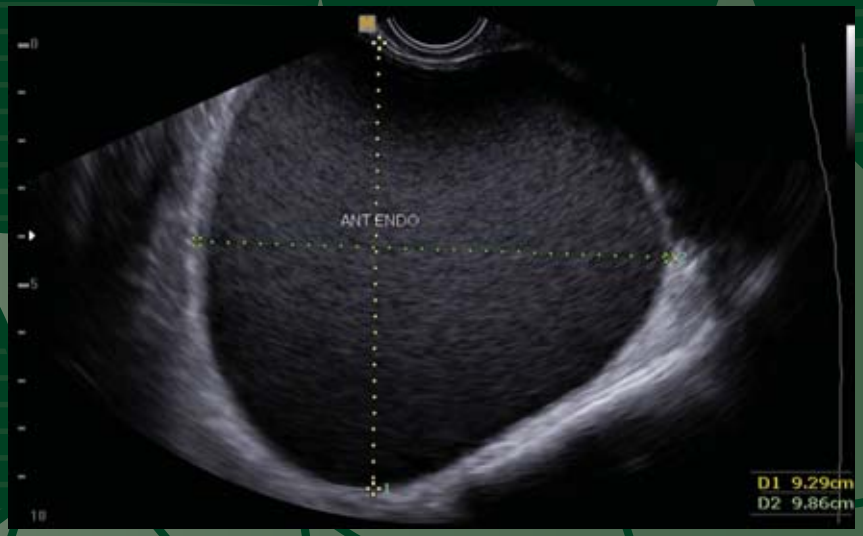


Figure 1a: Endometrioma demonstrating the typical 'ground glass' appearance.

Figure 1b: Solid areas with highly vascularised papillary projections.

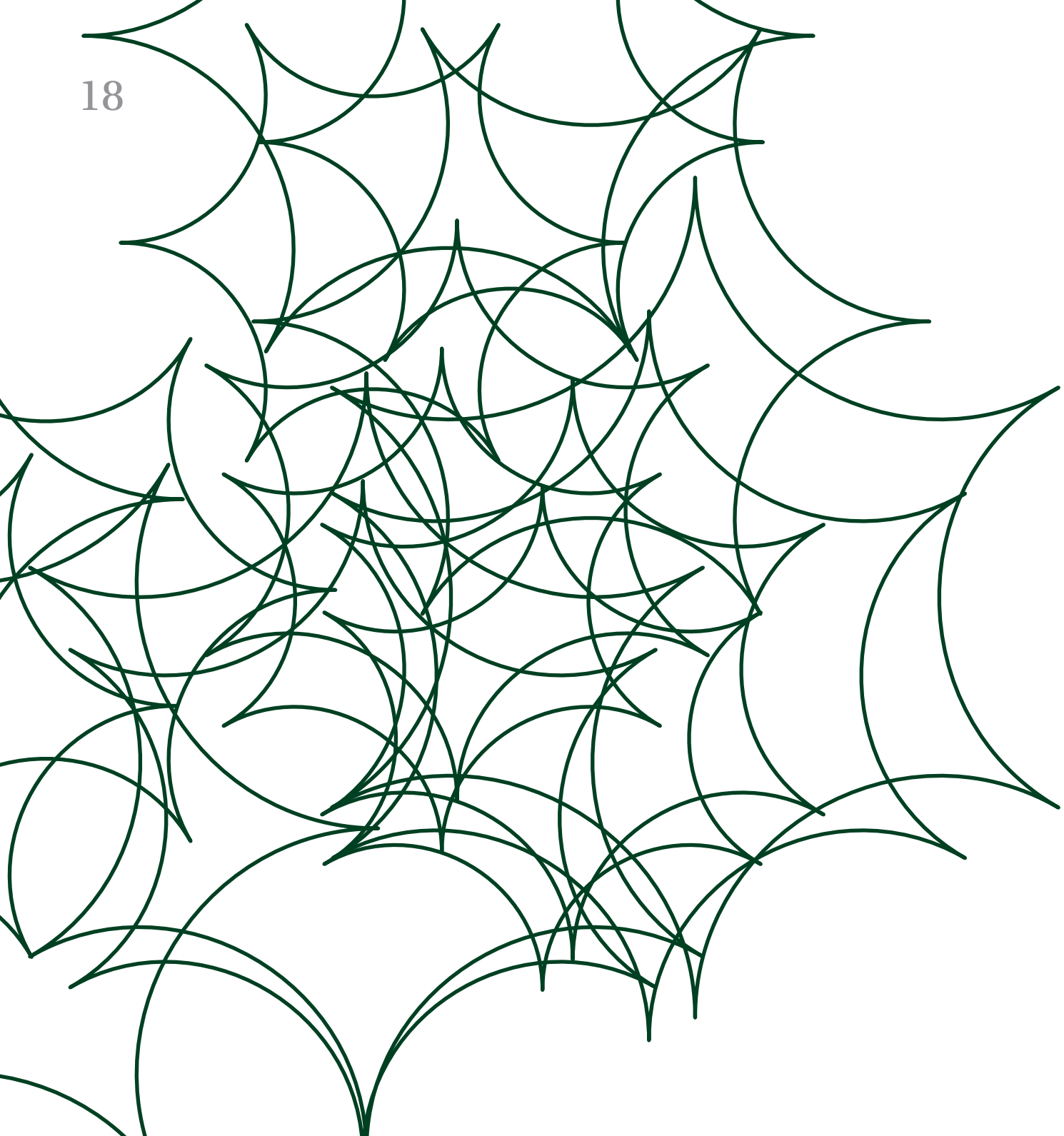
CT colonography provided better and finer evaluation of the impact of deep infiltrating endometriosis of the bowel

heterogeneous internal echoes and central calcification[3]. Hence, pattern recognition of the endometriotic cyst's content, wall and solid areas, including the use of Doppler, should be undertaken to exclude potential malignancy. Solid masses, especially if highly vascularised and with papillary projections *(figure 1b)* are the most common forms mimicking ovarian malignancy[4].

Ultrasound can also help in detecting other causes of pelvic and menstrual pain other than endometriosis. Meredith et al[5] performed a systematic review on the use of transvaginal scanning (TVS) to determine the diagnostic accuracy of detecting ectopic endometrial tissue within the myometrium, commonly called adenomyosis. A total of 14 trials with 1895 aggregate participants were reviewed and the authors concluded that TVS was an accurate method of detecting adenomyosis.

Guerriero et al undertook a systematic review of articles evaluating TVS for the diagnosis of endometriosis in specific sites, eg uterosacral, recto-vaginal (RV) septum, vaginal and bladder endometriosis prior to surgery[6]. The overall pooled sensitivity and specificity in all above locations increased when suspicion of endometriosis was present after TVS examination. The authors concluded that the overall diagnostic performance of TVS for detecting deep infiltrating endometriosis (DIE) in the above areas was fair with high specificity. However, it is widely agreed that TVS does not have a high pick up rate for endometriotic seedlings on the peritoneum covering the pelvis.

The University Hospital of Wales, Cardiff currently uses transrectal ultrasound scanning as a preoperative tool to determine whether there is RV endometriosis. Griffiths et al followed up patients



who had transrectal scans and subsequent laparoscopy for RV endometriosis and confirmed high diagnostic accuracy[7]. Although not used as a first-line test, it does allow resources to be directed appropriately prior to undertaking major gynaecological surgery for patients with suspected bowel involvement.

However, TVS has also been used to assess the RV septum and uterosacral nodules. A study in 2011, compared diagnostic performance of clinical vaginal examination with that of TVS in the pre-surgical diagnosis of DIE[8]. Around 40% of this cohort of women with symptoms suggestive of endometriosis had DIE. The positive and negative predictive values, and positive and negative likelihood ratios for TVS were similar with regard to vaginal and RV space, but were superior to vaginal examination in cases of ovarian, uterosacral ligament and recto-sigmoid endometriosis. The authors concluded that TVS was more useful than vaginal examination in detecting endometriosis.

In a recent prospective observational study, Exacoustos et al assessed the accuracy of TVS in defining size and location of DIE with laparoscopic findings, supported by histological confirmation[9]. The accuracy of TVS mapping ranged from 76-97% depending on the location of the lesions, with least sensitivity in vaginal disease and highest in the bladder and pouch of Douglas obliteration.

Alternative imaging

What other imaging modalities are available and how can they help with preoperative diagnosis and management of endometriosis?
It is widely accepted that plain radiography, as well as computed tomography (CT) are not sensitive for the appearance of implants of endometriosis or diagnosis of endometriomas. However, there are alternative uses of CT which are employed to diagnose bowel endometriosis.

In the last ten years, a new imaging step in planning endometriosis surgery has been described using virtual CT colonoscopy. Van der Wat and Kaplan described the use of CT to provide a virtual colonoscopy technique to diagnose DIE[10]. More recently, Vassilief et al used similar techniques to predict pre-operatively, the degree of endometriosis-related stenosis in the gastrointestinal tract[11]. This allows forward planning of the exact operative procedure, such as shaving of the lesion or full thickness

resection. A further study compared the use of CT colonoscopy with magnetic resonance imaging (MRI) for evaluating deep seated endometriosis[12]. CT images were analysed for the luminal alteration of the recto-sigmoid colon, mural thickening, and mass formation, whereas MR images were analysed for the mass formation in the recto-sigmoid colon, fat plane obliteration between rectum and uterus or vagina, retroversion of uterus, retraction of uterus toward the colon, and the detection of endometrial spots in the recto-vaginal space. Both imaging methods showed high levels of sensitivity for recto-sigmoid endometriosis, but lacked specificity.

More recently, Roman et al compared CT colonography (CTC) with MRI and rectal endoscopic ultrasound against intraoperative findings[13]. An added advantage of CTC was the accurate detection of height and length of colorectal involvement, as well as detection of associated lesions above the level of the sigmoid colon when compared to other pre-operative investigations. Once again, this could be used to direct resources and techniques prior to carrying out extensive surgery. Although accurate at detecting stenosis, it did not determine the technique used to excise the endometriosis. Roman and co-authors stated that the technique was dependent on a range of factors including the patient's age, intention to conceive, and agreement to postoperative medical treatment. Their opinion was that CTC provided better and finer evaluation of the impact of DIE of the bowel, and should be complementary to MRI.

MRI is not sensitive in diagnosing superficial peritoneal deposits of endometriosis[14]. MRI findings compared with endometriosis detected at laparoscopy with histological confirmation, showed low sensitivity and specificity for endometriosis. Although it is not surprising that small lesions were not seen on MRI, large superficial lesions were also identified less commonly. Addition of gadolinium contrast did not yield better detection rates for peritoneal lesions. MRI is good at detecting endometriotic lesions that are large in three dimensions, such as endometriomas and large peritoneal defects.

MRI has been used to detect endometriomas, which are usually multiple and bilateral. Characteristically, they are homogeneously hyperintense on T1-weighted sequences with relatively low signal intensity on T2-weighted sequences. High concentrations of cystic methaemoglobin and other protein or iron concentration causes loss of signal intensity on the T2-weighted sequences. Heterogeneous signals can also be explained by blood products in various stages of degradation from multiple episodes of bleeding. Free water from the cyst is re-absorbed, thus increasing the iron concentration in the endometriomas. The viscosity of cystic fluid changes, and it has been shown that, as the fluid is more dense, there is a decrease in the T2 relaxation time as iron concentration increases. Additionally, MRI can detect DIE in order to plan surgery[15]. Chamie et al showed a high detection rate at diagnosis in the retro-cervical and retro-sigmoid regions, ureters, bladder and vagina for the presence of endometriosis[16]. As well as a low T2 signal intensity, which correlated with the presence of fibrosis and stromal endometrial tissue, lesions had an appearance of irregular margins that correlated with surgical findings.

What does the future hold for endometriosis?

Undoubtedly, new innovative imaging techniques or improvements in the current ones will improve the diagnostic accuracy, especially for unusual manifestations of the disease. However, a newly published Cochrane systematic review reported that studies evaluating recent advances in imaging modalities, such as TVS with bowel preparation, rectal water contrast TVS, 3.0T MRI or multi-detector CT with enema were observed to have high diagnostic accuracies, but were too few to allow prudent evaluation of their diagnostic role[17]. But perhaps a better understanding of the pathogenesis of the disease would have a significant impact on its diagnosis. Proposed pathogenesis mechanisms include polygenic inheritance, and linkage to chromosomes 7 and 10. Molecular and gene expression profiling in endometriotic tissues might help to identify women at greater risk of developing the disease before it becomes symptomatic[18].

Conclusion

Imaging is a useful adjunct in the detection of endometriosis. Ultrasound is a reliable and economical method for detecting endometriomas, but should not be used to exclude the diagnosis. It is a reliable method for detecting rectal wall endometriosis and whether there is full thickness infiltration into the bowel wall. CTC is a reliable method for detecting DIE affecting the bowel and

Perhaps a better understanding of the pathogenesis of the disease would have a significant impact on its diagnosis

especially lesions above the sigmoid. MRI is already an established method for detecting RV endometriosis and is extensively used in the pre-operative planning, prior to embarking on major surgical excision of endometriotic nodules. No one method is completely accurate, but applying different approaches depending on the clinical situation, may help in tailoring the most appropriate surgical technique, team and place of surgery. A multi-disciplinary approach should be the gold standard to manage this debilitating condition that affects a large number of women throughout the world.

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Government plans for our NHS: Realistic and sustainable or smoke and mirrors?

Matt Dykes

The *Five Year Forward View*[1] launched in October 2014, sets out an ambitious blueprint for how the NHS in England should change in order to meet the demands of a growing and ageing population, while providing huge efficiency savings in order to plug a growing funding gap. In the November 2015 *Spending Review*, the Government claimed to have provided the funding to make this happen. Over a year into the plan, what does the current state of play look like and how successful have ministers and NHS leaders been in bringing the workforce with them on this journey?

Last year started off with the Government negotiating its way out of a bout of unprecedented industrial action by NHS workers in England, including nurses, midwives, paramedics and radiographers. It started this year with the Government facing historic strike action by junior doctors.

At the time of writing, junior doctors' talks have stalled and new strike dates announced. It is hard to know what compromise might be reached, but a number of key issues emerged from this latest industrial unrest.

A discontented workforce

Foremost is a worrying breakdown of trust between healthcare professionals and the Secretary of State for Health, Jeremy Hunt. With the rejection of the NHS Pay Review Body recommendations that triggered previous strike action, and now the threat to impose the junior doctors' contract, Hunt's approach has been seen as high-handed and intensely political in a healthcare system where relationships between employers and unions have traditionally been positive and partnership arrangements resilient[2].

While the Secretary of State's strategy of framing himself as the champion of patient interest fighting the medical establishment might work with elements of the press, it is less conducive to building constructive long-term and sustainable industrial relations, which the NHS desperately needs if it is to meet the challenges of reform and redesign set out in the *Five Year Forward View*. It may also play less well with a public that has shown significant sympathy for striking NHS staff, who continue to retain high levels of public trust.

Radiography staff would have had a keen interest in the junior doctors' dispute. The issue of work-life balance and appropriate reward within a seven-day NHS is as acute for non-medical staff as it is for junior doctors and they will feel equally aggrieved by ill-conceived comments from ministers about staff resistance to seven-day services, when so many are already working those hours.

With a review of Agenda for Change (the NHS pay and grading system) taking place this year, health workers may well be concerned that the junior doctors' dispute encourages Jeremy Hunt to promote changes to the unsocial hours payments of other staff, giving rise to the potential for further unrest. If this proves to be the case, he would do well to note that in its own report on the issue the NHS Pay Review Body[3] reached the conclusion that there was no case for wholesale change, stating that: 'There is a case for some adjustments to Agenda for Change unsocial hours definitions and premia. However, if done in isolation, this could risk the morale and motivation of staff, damage employee relations, exacerbate existing shortages, and in particular, risk the goodwill of staff already working across seven days.'

Perhaps a more fundamental point that the Pay Review Body makes in the report is that 'staff engagement, and by this we mean staff being involved in the design and delivery of services as equal partners with management, is a key success factor'.

This entails a crucial role for NHS trade unions and must be a key principle underpinning all levels of engagement, not just on big-picture projects like the Staff Council refresh of Agenda for Change or the work of the national and regional Partnership Forums[4], but meaningful involvement of trade union representatives in changes being considered and made to the services they deliver.

The Government is undermining partnership through excessive use of diktats forced on employers

Collaboration or fragmentation?

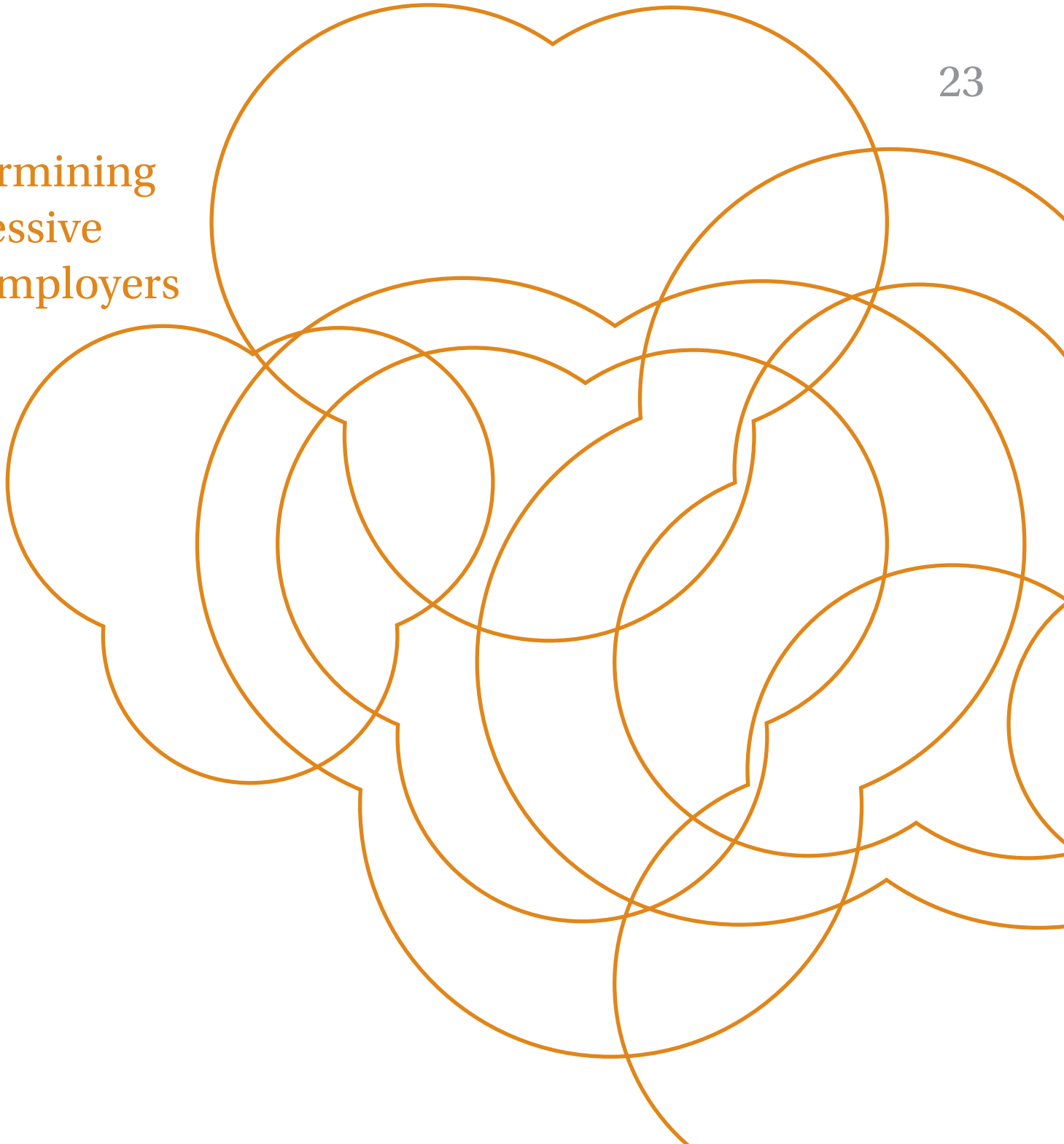
For the NHS to meet the strategic objectives set out in the *Five Year Forward View*, partnership working must be embedded and supported. But all too often the Government is undermining partnership through excessive use of diktats forced on employers, from caps on redundancy payments, to restrictive pay policies that threaten collective agreements and inhibit the employers' right to manage.

The Trade Union Bill working its way through Parliament is a good example of legislation that will have huge repercussions for partnership and staff engagement. Public sector unions will be tied in bureaucratic knots and locally-agreed arrangements for union subscriptions and time-off for representatives that do so much to facilitate good work on the ground, will be prohibited by a government that claims to want more, not less, local flexibility. No wonder then that so many NHS employers have openly criticised the Government's proposals[5].

Another potential faultline in industrial relations across the NHS is the growing disparity in pay policies between the devolved nations. The recent announcement in Northern Ireland that seeks to re-impose the government's preferred pay offer of non-consolidated 1% rises for only those at the top of their scale this year, is a case in point and may well trigger further strike action. Health unions hope that the Agenda for Change talks will offer some scope to bring pay rates more in line across the UK.

Financial promises

It is worth reflecting on the scale of the challenge facing the NHS in the next five years, particularly in light of the NHS funding settlement announced in the *Spending Review* in November 2015[6]. With



hospital finances in crisis and performance metrics deteriorating from waiting lists to cancer treatment times, nursing numbers and accident and emergency department attendances, there was huge pressure on the Chancellor, George Osborne, to deliver some much needed investment.

Much has been made of Osborne's announcement of the 'biggest ever commitment to the NHS since its creation'[7] and the astute job that NHS England boss, Simon Stevens, did in securing the up-front funding that was so desperately needed[8].

It would be churlish to disregard the fact that the Chancellor apparently heeded calls from health unions, campaigners and the medical profession, by front-loading a significant slice of the promised extra £8bn in order to address the immediate financial crisis brought on by the unprecedented financial squeeze imposed by his Government over the last five years. However, the NHS is a long way from being out of the woods.

The sums agreed in the NHS five year plan were about plugging the gap caused by flatlining funding at a time of a growing and ageing population. As health commentator Roy Lilley put it, the funding will just about 'allow the NHS to keep the lights on, pay the bills and if we are lucky, invest in turning the vanguards (new models of care pilots) into operational, replicable, scaleable reality'[9]. But even this will happen only if the NHS is able to find £22bn efficiency savings by 2020, that nearly all informed opinion believes is highly unlikely[10]. Around three-quarters of savings found in the last five years in the NHS have come through cuts to tariffs (the price paid to hospitals for treatments) and capping NHS workers' pay. But neither are sustainable going forward, with hospitals in open revolt over tariff reductions and NHS staff increasingly voting with their feet.

That old cliché: New ways of working

Many agree the long-term solution lies in productivity gains largely delivered through new ways of working, with a greater focus on prevention and integration. But we should caution against glib assumptions that greater integration and prevention, with increased care in primary and community settings, will inevitably lead to significant savings, even though it might be the right thing to do for patients.

A recent report by a commission put together by the *Health Service Journal* labelled NHS England's prediction of £22bn productivity gains as 'a heroic assumption' and found 'no evidence' to support assumptions that integration between health and social care would lead to significant cashable savings[11].

They cite key research looking at integration across different countries, and found no evidence of reductions in hospital admissions or increased cost-effectiveness resulting from integration, although there were better outcomes for patients[12]. So while integration remains an essential, albeit often elusive, aspiration for improved health services, it may prove to be far from the silver bullet that many in NHS England and the Treasury are hoping it is.

With NHS providers hitting over £2bn in deficits at end of the last financial year and facing a £1bn bill for increased National Insurance contributions from April, that £4bn advance is already looking under serious pressure. With further contributions by the NHS to fund social care projects with local authorities through the Better Care Fund[13], a considerable dip in spending from 2018 and a commitment to move to seven day services, it is obvious that the NHS funding squeeze is not over yet – even if short-term pressure has been alleviated.

After all, contrary to George Osborne's claims of largesse, average yearly increases in NHS spending amount to around 0.9% across this spending review period, compared to an historical average of 3.7%[6]. Furthermore, the Kings Fund states that spending as a proportion of GDP will likely fall by 1% by 2020.

Changes to workforce education

Another key point is that, while NHS England spending may have been protected, the wider Department of Health budget certainly has not, with further cuts to public health and clinical training bursaries. While training commissions have been reduced at points in recent years as a result of Treasury-imposed constraints[14], opening up training places to the Higher Education 'market' does not seem a particularly effective way to plan the health workforce of the future, particularly when placements in Trusts will remain subject to financial pressures. And saddling NHS staff with further debts in the middle of a ten year period of pay restraint does not seem the most effective way to attract, recruit and retain the skilled full time people the health service desperately needs to fill vacancies and cut spending on agency staff. Richard Evans, Chief Executive Officer of the Society of Radiographers, described the measures as revealing 'a lack of understanding of the depth of the workforce crisis in the NHS' calling for 'coherent programme' to increase the numbers of professionals being trained and arguing that the removal of bursaries will 'disrupt workforce supply'[15].

Further cuts to public health will also weaken exactly the kind of local preventative interventions in areas such as obesity, sexual health and well-being that we need in order to manage demand on health services over the long run. Reducing funding to public health initiatives that keep people away from stretched general practice surgeries and hospitals is a false economy.

The NHS Confederation says that 'the cut to public health in particular is hard to swallow considering the importance of investing now to keep people healthy and avoid building trouble for the future'[16].

Funding issues in social care

Finally, it is important to return to issues regarding social care. Local authority funding is set to decline still further, with very different outcomes for local authorities with low council tax and business rate incomes, which may be more dependent on central government grants that will be halved by 2020. The 2% precept to council tax will, at best, raise £2bn by 2020 – against a predicted funding gap twice that size[17]. Local authorities with high levels of council tax income could increase their social care spending by up to four times as much as more grant-reliant authorities through the precept. The postcode lottery for older people reliant on paid-for care is going to get a whole lot worse, with huge repercussions on local NHS services – think tank ResPublica predicts additional costs of up to £3bn as a result[18].

Amanda Doyle, co-chair of NHS Clinical Commissioners reiterates this point when she says: "To not seriously address the funding issues in social care will have a direct knock-on effect to wider NHS services and inevitably have a detrimental impact on what Clinical Commissioning Groups are able to achieve for their local patients and populations. It will also have implications on the role they can play in making the £22bn efficiency savings that the NHS needs"[19].

While the scale of the financial challenges has preoccupied many, debate continues to rage about the threat of privatisation in the health service. And the Government remains surprisingly

The sums agreed in the NHS five year plan were about plugging the gap caused by flatlining funding at a time of a growing and ageing population

committed to the health service market, despite all the evidence pointing to mounting failure. The collapse of UnitingCare's £1.2bn contract for older people's and adult community healthcare in Cambridgeshire after just eight months[20] has had knock-on effects with the outsourcing of the Staffordshire cancer and end-of-life services now suspended over fears of financial unsustainability[21]. The prime provider model proposed for cancer care in Staffordshire would have handed over the commissioning of services to the main healthcare provider leading the bid, potentially outsourcing the whole cancer care pathway in that area, with potentially significant implications for those providing imaging and oncology services. It is unclear at this time if the contract will eventually proceed, but health unions are calling on the local Clinical Commissioning Groups to drop the plans completely.

Increasingly, the market competition introduced by the Government's health reforms of 2012 have become to be seen as an obstacle to the kind of integration, collaboration and partnership that the new care models promoted in the *Five Year Forward View* rely on. Several NHS commissioners and providers have called for the suspension of competition regulations in those areas piloting the new care model vanguards[22], highlighting how the market is acting as a barrier to the innovative new approaches that they are trying to develop.

While private takeover of services has largely been confined to community and mental health services, the perception remains that privatisation across the service remains high on the agenda, particularly as the Transatlantic Trade and Investment Partnership agreement looms large, and with many seeing the city region devolution deals as providing the economies of scale that may well attract greater private sector interest.

Conclusion

Undoubtedly, 2016 is as challenging as any other in recent years. The industrial relations environment looks far from positive, with some pinch points yet to emerge. The financial challenge appears as daunting as ever and, while the new care models proposed in the *Five Year Forward View* may have merit in terms of improving patient care, the jury remains out on the scale of cashable savings that they might deliver. As we draw closer to the end of the parliament, NHS funding is set to become an even more intense political battleground.

Many agree the long-term solution lies in productivity gains largely delivered through new ways of working

Ultimately, however, no amount of funding will deliver change in the health service without empowered, engaged and rewarded staff. This is not simply a desirable outcome, but an absolute necessity if we are to achieve the transformation required in productivity and services to deliver a sustainable, integrated and collaborative health and social care service that meets the growing needs of our communities.

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The increasing use of dental cone beam CT – is there cause for concern?

Stephen Green, Chris Cobb

Dental cone beam computed tomography (CBCT) is a relatively new application in dental imaging that is being rapidly employed by specialist dental surgeons in the field of craniofacial imaging. With the procurement of such costly equipment may come the pressure to use it more intensely than might be prudent, to gain returns on the investment. This may include the temptation to undertake a CBCT examination solely to reconstruct a panoramic or cephalometric projection.

Dental cone beam CT unit images are, understandably, becoming indispensable in areas of dental practice such as implantology, and certain areas of endodontics. In consequence the Faculty for General Dental Practice (FGDP) has included specific reference to the modality in the third edition of *Selection Criteria for Dental Radiography*[1] – although they also caution against its use in inappropriate areas such as caries assessment. Indeed, undertaking CBCT imaging is not recommended routinely in orthodontic practice, but the decision-making with CBCT, as in all diagnostic testing, is a balance between risk and benefit gained from the diagnostic examination[2].

In addition, there has been a noticeable increase in research submissions to certain journals such as *Dentomaxillofacial Radiology*, reflecting the fact that oral and maxillofacial radiology attracts more and more attention from all dental sub-specialities as well as from neighbouring disciplines. The major reason for this is the boom in CBCT in nearly every dental subject[3].

Studies have shown that the radiation doses to patients undergoing these examinations, and potential scattered radiation doses to employees and other persons arising from the use of such equipment can, without appropriate integral and room shielding, be significantly higher than from the radiography undertaken using conventional x-ray equipment. A large field of view CBCT examination for example, may give effective doses to the patient ranging from 68 to 1073 microsieverts – that is from 3 to 45 times that delivered from a typical panoramic x-ray examination[4] – with corresponding prospective increases in scattered doses.

With large field of view images being acquired, non-dentoalveolar structures are also being included on the image, and a written report must be produced for the structures visible. 'Reporting' has been identified as an issue for orthodontists planning treatments, as often they have insufficient training to interpret radiographs beyond the confines of their speciality[5]. In consequence, it is recommended (in European, SEDENTEXCT and Health Protection Agency (HPA) guidelines) that areas such as base of skull, temporal bones, neck and skull are reported by a radiologist unless the reporting operator has the appropriate experience[2,4].

In addition, other costs include a robust regular quality assurance (QA) testing regime by the practice, which may require access to a suitable phantom and, certainly in the UK, the time and expertise from a radiation protection adviser to undertake this. There is also the issue that images produced may suffer from the presence of significant artefacts principally from metallic restorations in the path of the x-ray beam[1].

Radiation protection

Occupational exposure from CBCT should not be an issue when such equipment is correctly installed[6], but it comes with the additional cost of shielding. With conventional intra-oral equipment, an operator can usually use the concept of the inverse square law (and hence consider distance rather than shielding) to protect themselves from scattered radiation. However, impractical distances of around eight metres might need to be employed when applied to CBCT units[6] . It should also be remembered that one of the '*matters in respect of which a Radiation Protection Adviser (RPA)* ***must*** *be consulted by a Radiation Employer*' under the Ionising Radiations Regulations 1999 (IRR99)[7] is '*the prior examination of plans for installations and the acceptance into service of new or modified sources of ionising radiation ….*'

Occupational exposure from CBCT should not be an issue when such equipment is correctly installed

So why is staff radiation safety so important for CBCT units? Sutton et al in '*Radiation Shielding for Diagnostic Radiology*' state that 'these units operate at higher tube potentials and deliver significantly higher radiation levels than other dental x-ray equipment'[8]. To give a comparative example, the IRR99 Regulation 8 approved code of practice (ACOP) states that '*shielding, including beam collimation will normally be adequate if designed to reduce dose rates below 7.5 microsieverts per hour (μSv/hr) in specific locations where persons will be working*' (Reg8(2), Para 79)[7], yet monitoring by one of the authors has measured unshielded dose rates of up to one millisievert per hour (mSv/hr), that is 1000 μSv/hr, at up to one metre from these units, and of course with the majority of these types of units being installed in small purpose-built rooms or enclosures, the distance between the unit and some of the walls of the room are not uncommonly at distances of less than one metre, particularly as these units are likely to be attached to one of the walls of the room.

The essential requirement then, if it is the intention to reduce dose rates to below 7.5 μSv/hr through the walls and doors of these rooms, is for some form of shielding. If the proposed unit is replacing a panoramic unit, there may be enough already in-situ. However, if it is a newly constructed room, or a room where the assessment by an RPA indicates that further shielding is needed, then lead is perhaps still the obvious choice. But there are other options; solid high density concrete block (ie with a density greater than 2.0 g/cm^3) and various thicknesses of (perhaps more environmentally conscious) products such as Knauf Safeboard (Knauf Insulation Ltd, St Helens, Merseyside), which is essentially a barium plasterboard, can certainly be considered. The required thickness of the shielding material will be important to ascertain, and taking lead shielding as the example Sutton comments that 'for a unit operating at 90kVp, protection greater than Code 3 is likely to be required, only where both the secondary radiation level and the workload are high, whereas for a 120kV unit the wall on which the cone beam CT unit is mounted may require protection with Code 4 or 5 lead'[8]. Code 3 thickness is 1.32mm, Code 4: 1.8mm and Code 5: 2.24mm.

For the operator position, a viewing window is essential to be able to observe the patient during the examination, and for small rooms this will need to be of a lead equivalence comparable to

'Reporting' has been identified as an issue for orthodontists

the shielding in the door or wall into which it is set.

Radiation protection of the patient is multi-faceted and a medical physics expert (MPE) should be consulted to advise on this (although the RPA and MPE may well be the same person), with a prime consideration being 'justification'. But with CBCT imaging this is not only a case of 'do I need to take this sort of image for my diagnostic purpose?'. Other factors such as the required resolution of the image and the region of interest or field size are important considerations as well. Quite simply, increasing the resolution of an image requires either the kVp, the tube current (mA) or the scanning time to be increased, and this increases the effective dose to the patient (and in consequence also the potential scattered dose to the operator). Increasing the size of the area scanned, ie increasing the scan volume, has exactly the same result.

The International Commission on Radiological Protection principle of 'dose optimisation' requires doses to be kept 'as low as reasonably achievable' or 'practicable' (the so-called ALARP principle). The Ionising Radiation (Medical Exposure) Regulations 2000 IR(ME)R[9], enforced by the Care Quality Commission and dealing specifically with the radiation protection of the patient, require any operator of the equipment to manipulate the above factors accordingly to ensure that 'doses arising from the exposure are kept as low as reasonably practicable consistent with the intended purpose'. Appropriate and adequate training of all involved, in line with the requirements of IRR99 Regulation 14 and IR(ME)R Regulation 11 and Schedule 2, is in consequence essential.

Quality assurance

Quality assurance (QA) measures are also important as an ongoing commitment, but again QA starts from the installation of the unit, as there is an IRR99 requirement to perform a 'critical examination' – to ensure that the safety features and warning devices of the unit operate correctly, and there is sufficient protection for persons from exposure to ionising radiation[7]. The Health and Safety Executive Guidance Notes PM7710 also recommend that the QA programme includes tests on equipment prior to its first clinical use (separate from those of the critical examination) and include acceptance tests to confirm that the equipment is functioning as intended, and commissioning tests to determine baseline results, against which to compare future measurements and to determine appropriate clinical exposure settings.

The legislation also requires the employer to ensure that the equipment is capable of restricting exposures, to the extent that is compatible with the intended clinical purpose, and subsequently instituting a QA programme of adequate testing for the equipment: i) at appropriate intervals, ii) after major maintenance procedures, and iii) by also assessing representative doses through the concept of 'diagnostic reference levels' (DRL) to those persons undergoing medical exposures[7]. DRLs established by the employer for radiodiagnostic examinations are not expected to be exceeded for standard procedures when good and normal practice regarding diagnostic and technical performance is applied.

Confused by the legislative requirements? Fortunately in 2010, in the UK the Health Protection Agency Radiation Protection Division (HPARPD – now Public Health England Centre for Radiation, Chemical and Environmental Hazards) published recommendations relating to the selection of equipment, reference doses and QA, and includes guidance on areas such as the design of facilities, training, risk assessment and local rules. European guidance, with the similar aim of providing evidence-based guidelines to relevant professional groups involved with CBCT imaging, has also been produced[2]. While local circumstances may warrant some flexibility in the implementation of what is a 'guidance' document, the authors would strongly recommend this as required reading for any employer intending to purchase a CBCT unit.

Education and training

There has been a considerable increase in the application of CBCT in dental and maxillofacial radiology in recent years. Some authors point to a lack of strict guidelines and a limited understanding of the role of CBCT, which has led to it becoming a substitute for conventional radiography[11].

In reality, the majority of current dental practitioners may well have received insufficient or no training in interpreting CBCT images, and they will not have been trained to justify or perform scans[12]. Yet Regulation 11 of IR(ME)R clearly indicates that no practitioner or operator shall carry out a medical x-ray exposure or any practical aspect without having been adequately trained – and while IR(ME)R makes

no explicit requirements regarding referrer training, anyone acting in this capacity has to be capable of providing the relevant clinical information to enable the practitioner to justify the examination.

There appears to be some recognition now that there are additional educational demands that the use of CBCT scanners pose. Making reference to their published work from 2009[13], the European Academy of DentoMaxilloFacial Radiology (EADMFR) states that dentists who are responsible for CBCT facilities, who have not previously received 'adequate theoretical and practical training' should undergo a period of training that has been validated by an academic institution. In order to address these issues, this working party of the EADMFR has produced a position paper setting out guidance on the training of all dentists, to enable the safe use of CBCT in the dentoalveolar region[12]. The authors emphasise that the training recommended is not intended to be regarded as adequate to create 'specialists' in dental and maxillofacial radiology, but is applicable to all dentists who are not specialised in radiology, but who may have a role in the utilisation of CBCT.

They stress that it is not intended to cover training for operators, technicians or radiographers, so perhaps this discrepancy could be addressed by groups such as the Society and College of Radiographers, working in conjunction with the dental profession and the Royal College of Radiologists to develop an educational framework in this area.

The EADMFR guidelines recommend that at least two levels of continuous education are necessary for general dentists – a basic 'level 1' directed at prescribers (the 'referrer' under IR(ME)R with a limited knowledge of CBCT as an imaging modality and radiology in general), and a 'level 2', an advanced level directed at practitioners and all those who report on CBCT imaging. The guidelines include formulated learning outcomes for both the basic and advanced levels, together with suggested hours of delivery. The UK guidance document HPA-CRCE-10 also provides details of a core curriculum developed in association with the British Society of Dental and Maxillofacial Radiology. This details 'adequate' training requirements for each IR(ME)R duty holder – ie referrers, practitioner and operators[4]. Whilst these guidelines, which provide a recommended minimum training requirement, are welcome, they are recognised as being just guidelines and cannot replace national regulations.

Conclusion

Cone beam CT units are becoming seemingly indispensable in certain areas of dental practice. However, it must be remembered that, because higher radiation doses are typically used when CBCT examinations are performed compared to conventional radiographs, it is essential that anyone using this technique understands the issues of radiation protection in relation to shielding, along with the justification of patient exposure and optimisation of patient dose. In addition, dental professionals must consult and obtain relevant advice and guidance at all stages of procurement and installation. Furthermore, they must set up relevant QA programmes throughout the use of the unit, to ensure that radiation doses are being kept to the minimum, consistent with the intended diagnostic purpose and produce consistently adequate diagnostic information[9]. In consequence, the user must also be particularly proactive in obtaining appropriate training that underpins and develops their understanding of the issues that must be addressed when commissioning and using this valuable imaging modality.

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Verbal abuse in the workplace: Are we exacerbating the situation?

Richard Hamilton

"Stop being a F****** P****!" This was not the sentence I was expecting to hear when I welcomed my next patient into the ultrasound room. In fact it was not the pregnant woman I was about to scan who said this, but her partner.

This torrent of verbal abuse occurred recently in the workplace and culminated in the partner walking out of the scan room, before I had even started the examination. The scenario is an increasingly common one seen by sonographers across the country, particularly during a 20 week fetal anomaly scan. The problem arose when I said that only one person was allowed into the scan room with the prospective mother, as is our departmental policy. This policy is in place primarily to reduce the number of distractions to the sonographer during the examination, which requires high levels of concentration, and in the event of having to break bad news to parents. A recent survey by the Society and College of Radiographers found that only one accompanying adult is allowed in over 50% of departments[1]. In this respect my department is similar to most other departments in the UK.

This is not the first time I have encountered verbal abuse in my career – as a radiographer it was fairly common during a night shift in the emergency department. Following my recent incident I wondered if, as a 'public service', we are providing an adequate service for our patients and, whether I as a professional should expect to be verbally abused.

The fourth principle in The NHS Constitution states: 'The NHS aspires to put patients at the heart of everything it does'[2] and its services tailored to the needs of the patients, their families, and their carers. If this is the case, then perhaps the patient should choose how many friends and family members should be allowed into the scan room for 'their baby scan'. However, an inferior scan may be the consequence. There can sometimes be a fine line between providing a high standard of care, alongside what the patient wants and, on occasions, these two factors directly oppose each other.

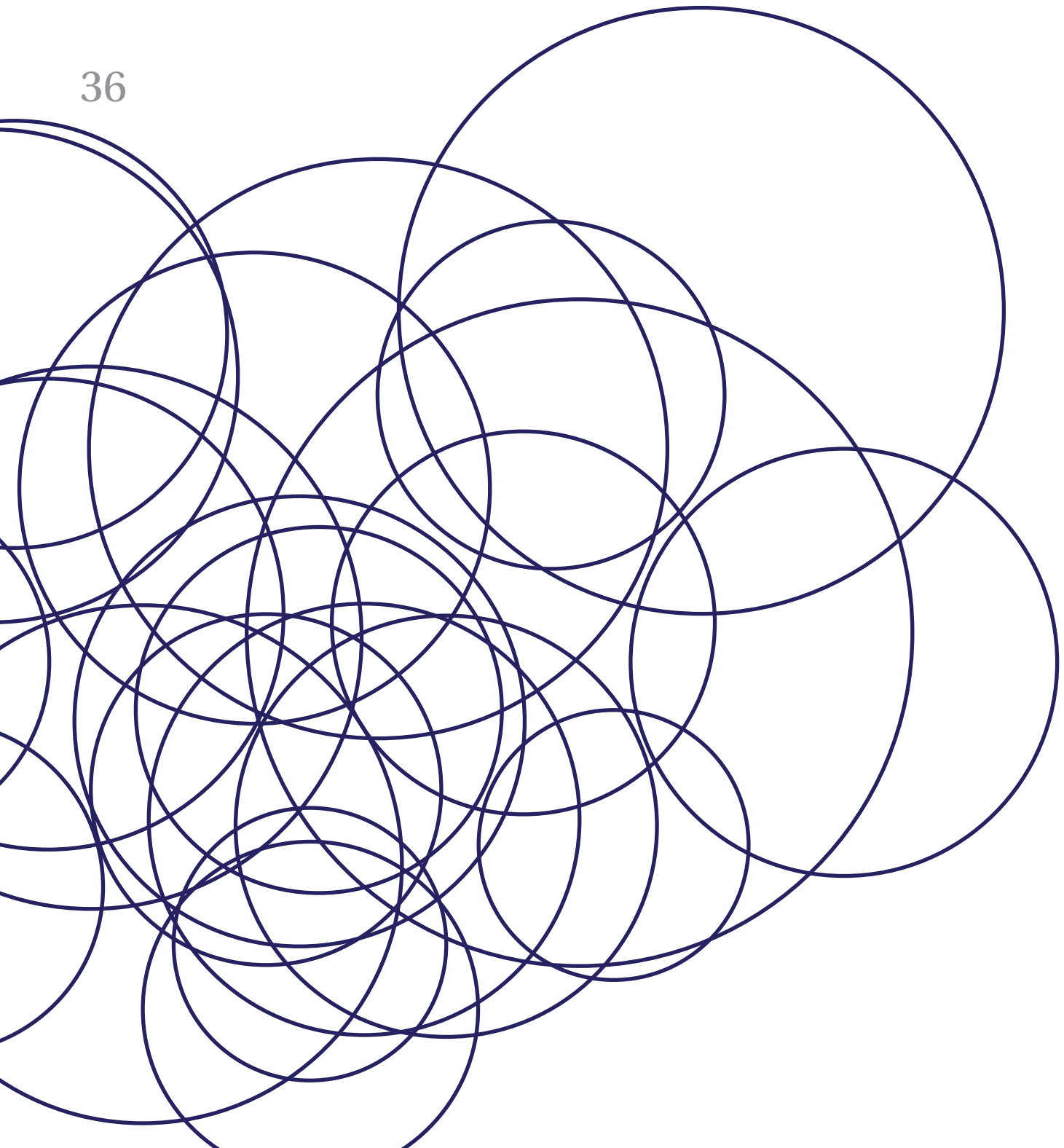
The abuse

Physical abuse on NHS staff is increasing. In 2013-14 there were almost 70,000 reported physical assaults on staff within the NHS. This is an increase of more than 12% compared with figures from ten years ago[3]. However, abuse does not have to be physical to be taken seriously. Non-physical assault is defined as 'the use of inappropriate words or behaviour causing distress and/or constituting harassment'[4]. According to the NHS Security Management Service, one out of every three frontline NHS staff has been verbally abused or threatened by a patient within a 12 month period[5].

Nurses have limited effective strategies to deal with verbal abuse[6]. Some studies have suggested that our education and healthcare providers should prepare students for negative verbal exchanges[7], but does that imply that, as a cohort, healthcare trainees should expect and accept abuse? Most, if not all, Trusts now offer conflict resolution training (CRT) as part of the mandatory training package. However, in my personal CRT, no coping mechanisms are provided following an event of verbal abuse; so perhaps again verbal abuse is deemed so commonplace as to be acceptable.

Psychological effects following an abusive event can persist for months or even years[8]. I am not suggesting that we will all suffer for years after being verbally abused at work, but we may well think about it throughout the following days or even weeks, and these thoughts can be distracting and upsetting. Perhaps, as abusive events continue to increase, there will need to be more emotional and psychological support in the workplace. Post-incident support still appears to be inconsistent and even curtailed in many areas[9], while swearing within the healthcare setting has been found to be widespread and under-reported[6]. Support for any of us will be limited

Perhaps the patient should choose how many friends and family members should be allowed into the scan room



Patients need to have respect for healthcare professionals and other patients in the hospital

if our employers remain unaware of the extent of abuse that occurs in the workplace.

The stresses

Arguably, the radiology department is the epicentre of the hospital, with access to imaging and reporting underpinning around 80% of all clinical decisions[10]. Radiologists, radiographers, sonographers, assistant practitioners and all other radiology staff, interact with vast numbers of people on a daily basis. Our interactions with patients and their families are often complex, necessitating a quick rapport to be found. Fisher from the Antenatal Results and Choices charity recognises this, noting that sonographers are 'at the apex of what can be a very positive but also a hugely challenging interaction'[11].

Any kind of imaging examination can be a stressful time for patients but perhaps in the maternity setting, the already stressful situation is exacerbated. Many prospective parents may feel anxious as they understand that the sonographer could tell them that their baby has an abnormality. Anxiety may lead to aggression but that does not mean the staff may be abused. There is little published research concerning abuse, be it physical or verbal, towards sonographers, radiographers or radiologists. The literature focuses primarily on nurses and other 'frontline' staff dealing with 'difficult' patients[12]. The radiology department and its workers are not mentioned per se but certainly we are 'frontline'. Furthermore, almost every patient has the potential to

become 'difficult' if environments and situations are alien to them and not as they expected.

Sexing

The common policy in obstetric ultrasound departments of allowing only one accompanying adult into the scan room is not the only issue that often upsets parents-to-be. Our attempts to sex the fetus may also generate aggression. The National Childbirth Trust (NCT), which is the leading charity in support and advice during pregnancy, childbirth and early childhood has a very informative website; however they do state that 'at 20 weeks, your baby's sex is now visible on the scan so you will know – if you choose to – if you are having a boy or a girl'[13]. The website does not warn that some Trusts do not offer this service. So, in these Trusts, prospective parents could already be annoyed and frustrated before the scan begins. The website also fails to explain that sexing is not 100% accurate and that sometimes it is simply not possible. Studies have shown sexing a fetus with ultrasound in the second and third trimester is possible in 91% of cases with approximately 98% sensitivity. The estimated specificity for identification of the male sex, at 100%, is statistically significantly higher than for the female sex, where it is 78.3%[14]. In other words, we can still get it wrong – ultrasound is not an exact science.

Digital recording

Nearly all Trusts (99%) have a 'no recording' policy during obstetric ultrasound examinations[1], although most provide 'souvenir' prints if requested. However, parents often ask if they can take pictures of the scan or record the scan themselves and are then disappointed or annoyed when told 'no'. Again, arguably, we are responsible for potentially making our patients feel frustrated with their 'tailored' NHS service, but the downside of allowing filming is that sonographers may find it distracting and an invasion of their privacy.

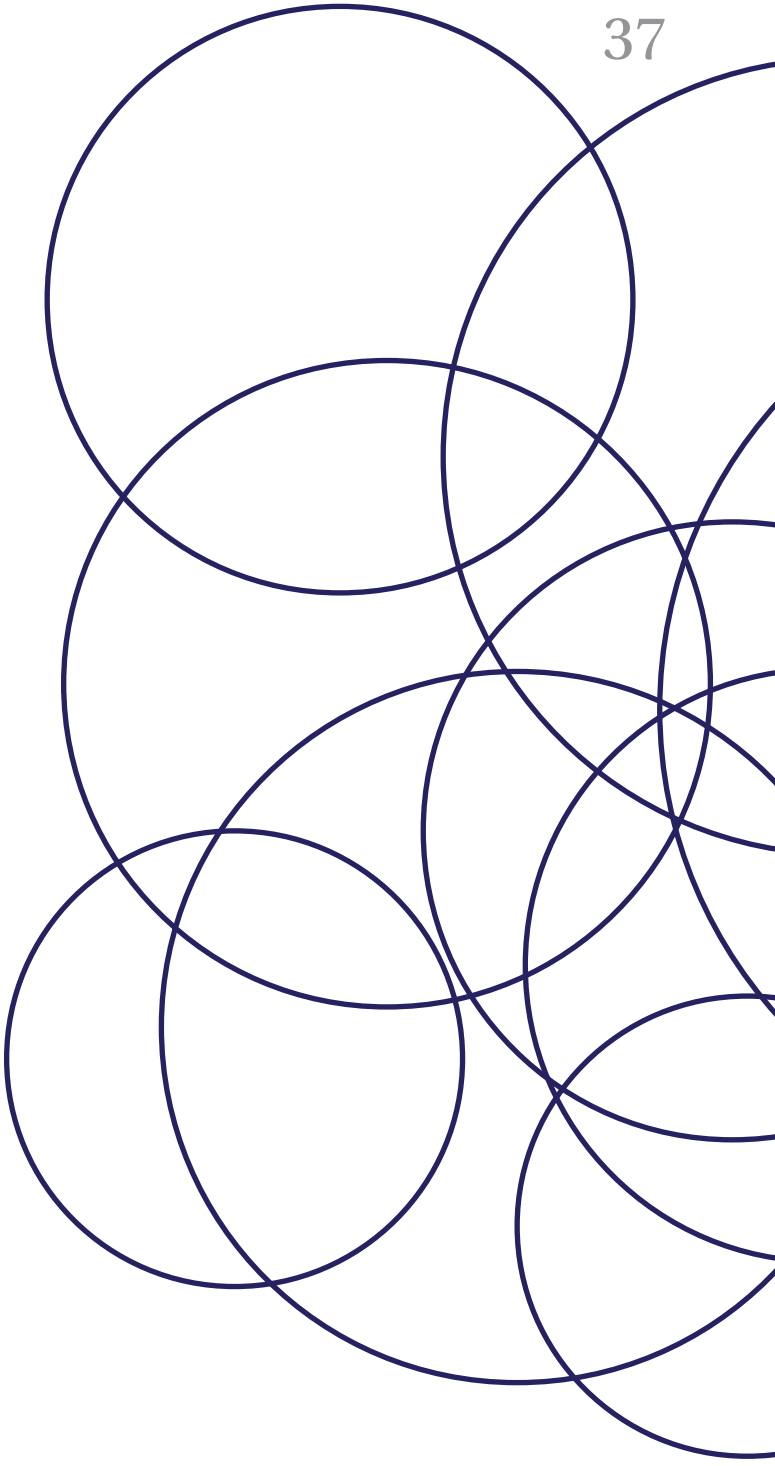
Parents may purchase a private 'souvenir scan' if they wish. Also known as a 'boutique' scan; this type of ultrasound scan is used purely to obtain souvenir 'photos' and DVDs. These scans have been a cause for concern for the Health Protection Agency[15], now part of Public Health England, despite some evidence to suggest that providing pictures or recordings to patients can reduce anxiety[16], and stimulate a parental bond with the fetus[17]. Bonding 3D and 4D ultrasound scans are offered commonly in private practice, but this service is unlikely to be provided by the already overstretched NHS.

Expectations

One key problem currently within healthcare is that of managing expectation. Patients often have 'very high expectations of our power to help them, and we may be unable to meet these expectations'[18]. This may lead to aggression or violence in the workplace. Sadly, it is my experience that sometimes patients who cause the most aggravation in our imaging departments are the ones who get what they want. Some want to be seen sooner and staff allow them to queue-jump rather than leave them to continue to upset others in the waiting areas with their disruptive behaviour. I know of a couple attending another Trust who complained loudly at the reception desk after their obstetric scan, because they felt the sonographer did not try hard enough to see the sex of their baby. Sexing a fetus is not part of the NHS screening programme checklist and the sonographer had done their best, but this couple had another scan with a different sonographer straight-away. It is easy to criticise the decision to acquiesce so readily, but difficult to predict the full extent of events had the situation been allowed to escalate.

Perhaps we should take a firmer stance, otherwise such patients may be more likely to use disruptive and abusive behaviour again at their next radiology examination in order to achieve what they want. Currently in some circumstances we are, in essence, rewarding bad behaviour. Nuisance or disturbance behaviour on NHS property can result in the offending persons being removed, under Sections 119 and 120 of the Criminal Justice and Immigration Act 2008. Guidance states that a nuisance or disturbance against an NHS staff member can be described as 'any form of non-physical anti-social behaviour on NHS premises'[19]. This includes the use of foul language and verbal abuse. Unfortunately there is a stipulation that anyone who has a 'reasonable excuse' cannot commit an offence under Sections 119 or 120. The list of reasonable excuses is not exhaustive and includes such circumstances as the person having received bad news earlier in the day.

In my own Trust, a senior member of the Safety and Security team told me it is very difficult to have an offender removed under



One key problem currently within healthcare is that of managing expectation

Sections 119 and 120 due to the stipulations already described. As such, it is more likely the person would be removed under the Public Order Act[20], which requires police involvement, and would be undoubtedly a last resort. Thus, even though there is government legislation in place to help combat verbal abuse, it appears difficult to enforce. This reinforces the fact that perhaps, as healthcare workers, we are expected to just tolerate verbal abuse. As part of the healthcare workforce, I understand that we must treat our patients with care and respect and keep them at the centre of all we do; but our patients need to have respect for their healthcare professionals and other patients in the hospital too.

Solutions

There are no easy solutions to managing abuse in the healthcare setting, but from an obstetric point of view perhaps we need to work more closely with our midwifery colleagues, since they are the ones who usually see the parents before us. Although written information around obstetric scans, digital recording, and admitting friends and relatives is usually given to patients in advance, perhaps community midwives, or staff in booking clinics should help reinforce these points. In this way patients will be advised exactly what to expect at their examinations. We are thereby attempting to manage their expectations from an early stage.

Another strategy that may go some way to helping our difficult situations could be for well known, valuable and well respected charities like the NCT to amend the information they provide (especially on their websites) so it more accurately reflects what happens in practice at an ultrasound scan.

As for those causing disruption in waiting and reception areas, short of calling security, it is likely that they will continue to be whisked away as fast as possible by very obliging staff to give them what they want.

Conclusion

In summary, abuse, be it physical or verbal, is prevalent in our workplace, and perhaps some areas of our service design exacerbates this problem. Abuse can have significant negative psychological effects on us and we should be reporting all types of abuse to our employers, rather than just deeming it part and parcel of today's society.

For now, will I be allowing obstetric patients and their 'entourage' into the scan room? No, because as a professional, I need to take every step to ensure I can perform a high quality and detailed ultrasound examination of their baby. Am I ready for more abuse then? I guess so.

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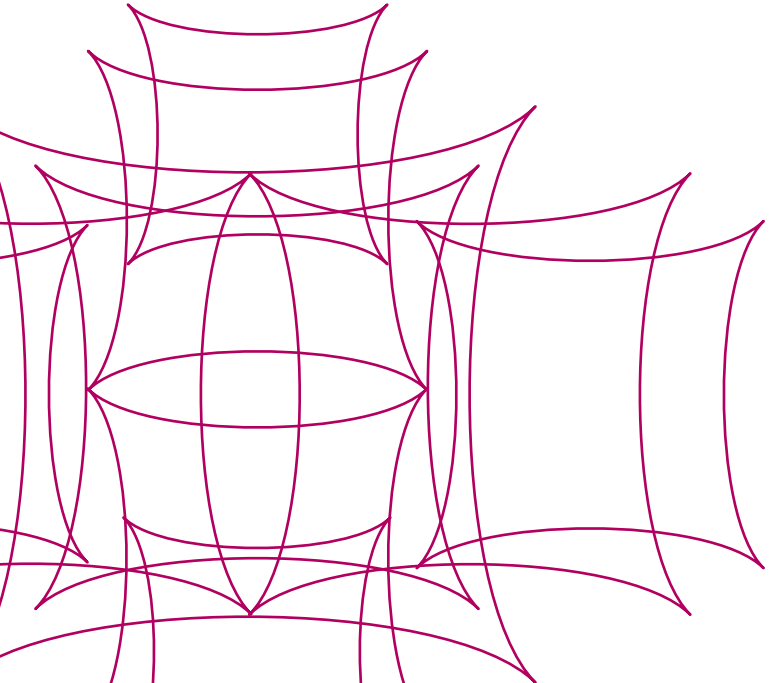
Abuse does not have to be physical to be taken seriously

Why don't hospital Trust boards take more interest in their imaging services?

Paula Higson

Managing a large NHS hospital Trust is one of the most complex of leadership challenges[1]. Hospital Trust annual reports and papers for board meetings show this complexity in action.



Chief Executives and their boards have to focus on many different targets set by Monitor, the regulator for health services in England. These targets cover referral to treatment; accident and emergency (A&E) department attendance time to discharge; cancer referral times; diagnostic tests waiting times; infection control and, of course, financial performance[2]. Boards then, have to manage all the issues of clinical safety, patient care, staffing and recruitment, financial challenges, Care Quality Commission (CQC) inspections and so on. For one Trust, for example, there is a 19 page report among the board papers, containing graphs, tables and literally hundreds of key performance indicators (KPIs) shaded in red, amber or green, depending how well things are going[3].

In all of this complexity, one key issue for a board is how to recognise what they don't know. It was Donald Rumsfeld who articulated so clearly the challenges and risks of these 'unknown unknowns'[4]. After the event it can often seem obvious that a piece of information should have been questioned, that a process didn't get a second glance, but turned out to be the key to realising something is not right. In an article in the *Health Service Journal*[5], I listed the six questions every non-executive should ask:

How do I know:

1. We are delivering our services safely?
2. We have sufficient motivated and skilled staff?
3. We are delivering, ie in a health setting improving outcomes for our patients?
4. We are financially viable?
5. We have the right strategy?
6. Our stakeholders support what we do?

They are easy questions to ask, but not so easy to answer. Quality assurance systems can help.

Diagnostic imaging; important but missing the board's attention

Looking at hospital Trust board meeting papers and annual reports, despite diagnostic imaging services playing a key role in any large hospital, they do not appear to merit much of the board's attention. On page seven of the 19 pages of KPIs mentioned previously, for example, there is one line about diagnostic waiting times.

In the financial year 2014-15, 40 million imaging tests were reported in England[6]. That's more than three million people per month. In many NHS Trusts, the numbers of radiographs, scans and procedures carried out by clinical imaging do not even merit mention in the annual report. Yet these numbers far outweigh those of other departments who do get included. In one large Trust, for example, its annual report mentions a number of important statistics. It looked after 170,000 inpatients and had 131,000 A&E attendances in a year[7]. It does not mention the quarter of a million diagnostic imaging tests[8] that it also undertook in that same year.

It's not only the number of tests that make this department significant. The World Health Organisation says[9]:

- Medical imaging, especially x-ray based examinations and ultrasonography, is crucial in a variety of medical settings and at all major levels of healthcare.

- In public health and preventive medicine, as well as in curative and palliative care, effective decisions depend on correct diagnosis. Though medical/clinical judgment maybe sufficient prior to the treatment of many conditions, the use of diagnostic imaging services is paramount in confirming, correctly assessing and documenting the courses of many diseases, as well as in assessing response to treatment.
- With improved healthcare policy and increasing availability of medical equipment, the number of global imaging-based procedures is increasing considerably.
- Effective, safe and high quality imaging is important for much medical decision-making and can reduce unnecessary procedures.

Something like 98% of patient journeys in a hospital include diagnostic imaging. This makes this service surely critical in many of those Monitor performance targets discussed earlier. Imaging services used appropriately can also reduce the length of a hospital stay[10].

Another reason why imaging departments should feature higher on Trust board agendas is because of the financial outlay. There are 395 MRI units and 519 CT Scanners in the UK[11], worth maybe £650m (in terms of the purchase cost) and costing an average Trust maybe £300,000 a year in depreciation[12]. An annual figure of 250,000 clinical imaging events possibly generates around £13m of the Trust's income[13].

All these factors should surely mean that the diagnostic imaging services department has the attention of its Trust board, but regularly it does not. It may be that their department does not appear to be causing any problems, but surely having your imaging services department working optimally must have a far reaching impact on both patients and staff in a Trust. A successful imaging department needs to be able to handle flows of patients effectively, allow fast access to diagnostics to assess treatment options, and ensure the issue of high quality clinical reports to support early and accurate diagnoses in life-changing illnesses such as cancer. In addition, there are the health and safety challenges of using radiation and strong magnetic fields.

How does the board – how can the board – have greater insight into this critical service when there are so many issues and challenges on its agenda?

Quality costs less as its focus is on getting things right first time

Quality improvement: The approach to delivering better value care?

There is a move towards realising that an effective way for hospital Trust boards to meet their complex leadership challenges, could be a greater focus on quality improvement.

According to Monitor, maintaining and improving quality is an important indicator of the effectiveness of governance at a Trust[14]. Monitor uses Lord Darzi's definition of quality. It comprises three dimensions of quality, all of which are required for a high-quality service:

- Clinical effectiveness.
- Patient safety.
- Patient experience.

The need to focus on quality in health systems was argued by the World Health Organisation ten years ago[15] and they suggested six dimensions of quality:

- Effective: Improved health outcomes for individuals and communities, based on need.
- Efficient: Maximises resource use and avoids waste.
- Accessible: Timely, geographically reasonable, where skills and resources are appropriate to medical need.
- Patient-centred: Takes into account the preferences and aspirations of individual service users and the cultures of their communities.
- Equitable: Does not vary in quality because of personal characteristics such as gender, race, ethnicity, geographical location, or socioeconomic status.
- Safe: Minimises risks and harm to service users.

However, in a busy Trust struggling with growing demand, staff shortages and pressures on budgets, a quality improvement programme can seem a step too far. Its role in bringing about the balancing act of better outcomes and productivity gains can seem counter-intuitive; surely quality costs more?

The Health Foundation, an independent healthcare charity, looked at how five UK Trusts built their quality improvement capability and reported evidence that quality improvement can improve patient experience and outcomes, and bring financial and productivity benefits for an organisation[16]. More recently, another healthcare charity, The King's Fund, has argued that a focus on quality improvement is the way to deliver the huge challenges of improving patient care, while facing growing financial and workload pressures and implementing new commitments, such as seven-day working[17]. This second report goes on to say that the healthcare sector has come late to recognising the important contribution that quality improvement has to make to delivering better value care.

Quality costs less as its focus is on getting things right first time. Managing quality requires good governance, quality assurance and a culture of improvement[18]. For good governance, systems and processes need to be clearly set out and fit-for-purpose with respect to stakeholders' requirements. The purpose of quality assurance is to make sure that the processes and systems are implemented as intended and deliver what was expected. Finally, a culture of evaluation and improvement addresses risks, failures, non-conformances and inefficiency/waste.

In answer to the questions posed earlier then, a good quality system helps us to ask the right questions and find the assurance. A good quality system helps you to know how you will know. It puts in place the systems to spot when something is not as expected or planned.

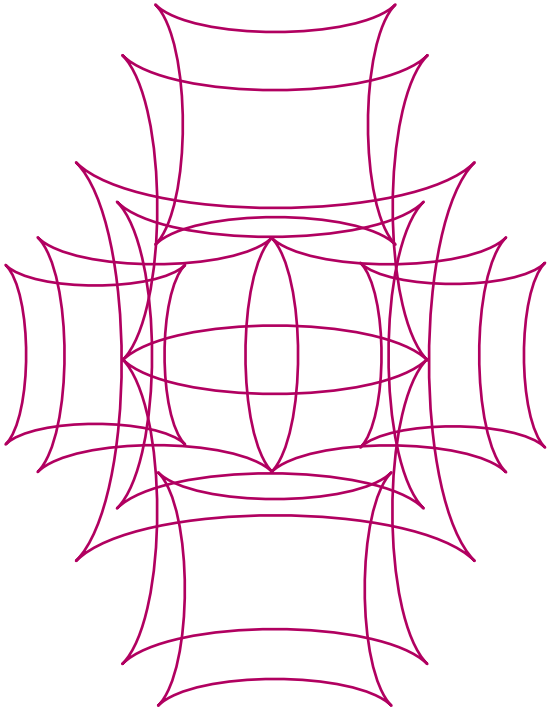
Quality systems versus inspection

The implementation of a quality assurance system is also a step in the right direction for the long-term. Focusing on quality now has the potential to help NHS Trusts to achieve the balancing act of improving patient care while reducing costs. Looking further into the future, having in place quality assurance systems potentially reduces the need for inspection.

Quality assurance can be described as a strategy of prevention. With its focus on planning, documenting and agreeing on a set of guidelines that are necessary to assure quality, it prevents problems occurring in the first place. An internal focus on quality assurance is about an organisation providing confidence for themselves that quality requirements will be fulfilled.

Quality control on the other hand, can be described as a strategy of detection. It checks and inspects the service to verify that it conforms to the expected quality levels. A focus on quality control can mean conducting inspections without any clear vision

Focusing on quality now has the potential to help NHS Trusts to achieve the balancing act of improving patient care while reducing costs



for understanding and eliminating problems, and for driving improvement into the delivery of services. Reliance on inspection means that the management is only focused on fulfilling quality requirements.

Imaging services quality system

Hospital Trust boards could benefit from getting closer to their diagnostic imaging service and at the same time start to implement a quality system in their Trust. The Imaging Services Accreditation Scheme (ISAS) is a patient-focused assessment and accreditation programme, designed to help diagnostic imaging services ensure that their patients consistently receive high quality services, delivered by competent staff working in safe environments[19].

ISAS works to a quality standard set jointly by the Royal College of Radiologists and the Society and College of Radiographers. An independent accrediting body, the UK Accreditation Service (UKAS), currently assesses imaging services against the standard and then regularly monitors them to observe if standards are being maintained. The Trust is then accredited as delivering services to the standard. Essentially the standard says:

'Have you got systems in place to be assured that you are delivering safe and effective services that are patient-centred and safe for both patients and staff?'
'Are you checking and monitoring these systems regularly?'

The standard has four domains: clinical; facilities, resources and workforce; patient experience; safety. So it is asking...

1. How do you know you are delivering a clinically effective service – that you are providing rapid and accurate diagnosis and treatment?
2. How do you know you are providing a safe, efficient, comfortable and accessible service – that you have sufficient resources in place and they are being used effectively?
3. How do you know your services are respectful of individual patient needs and requirements; that you provide appropriate information and support for patients and carers that is mindful of their culture, religion, and age?
4. How do you know that your services are safe? How do you assess and manage risks related to technology, infection, hazardous substances, moving and handling, violence and aggression?

ISAS is recognised by the CQC and has been approved for use within the CQC hospital inspection methodology. The key lines of enquiry that the CQC inspectors undertake, map closely to the standards in the ISAS scheme[20]. Therefore, when the inspector(s) calls, if you have implemented the ISAS quality system, you are armed with plenty of evidence of how you have assurance in place about your systems and processes.

But let's not pretend this is easy. Investing in quality does take time and effort up front. It requires leadership from the board and investment in building and developing capability[16]. If it can improve patient experience and outcomes and bring financial and productivity benefits for an organisation, surely it has got to be worth it?

Conclusion

I started by asking why NHS Trust boards don't show more interest in their diagnostic imaging services. I recognised that, in the complex world of a major hospital, it is not easy to engage with everything, especially if all appears to be going well. However, the 'hidden' department of imaging has a big impact on most patients and on many other services and targets and so is worthy of attention. By implementing quality systems within imaging there is the opportunity to both improve services and make significant progress on the journey towards quality systems that give assurance. In the longer term, a good quality assurance system means that inspections are not the way quality delivery is managed. This has surely got to be worth the time and effort it takes.

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Challenges and opportunities in educating the medical imaging practitioner workforce

Charles Sloane

This paper will argue for a fundamental rethink in the education of professionals involved in medical imaging.

The last two decades have seen unprecedented change in the technologies used within medical imaging. This includes the volume of procedures undertaken, as well as the range and complexity of imaging examinations carried out within radiology and medical physics departments. Against this background, radiography curricula have remained largely static, with a divergence of provision and the creation of silos within the regulatory frameworks which govern the education provision of the medical physics practitioner and the radiography practitioner. Both of these factors have contributed to inefficiency, a lack of undergraduate education provision for the medical physics practitioner and generalised workforce shortages which are currently being experienced within the sector[1, 2].

The expansion of cross-sectional imaging and technological changes in projection radiography

The last decade of the 20th century and the beginning of the 21st century have seen an explosion of the number of imaging procedures carried out using cross-sectional imaging modalities. The number of MRI examinations undertaken is currently growing at 12.1% per year and has increased by a staggering 220% over the last ten years[3]. Computed tomography (CT) has seen similar increases with a reported 10% yearly increase. Ultrasound has shown a 5.3% expansion in activity since 2003-4[3]. There has been a 14% growth in PET-CT services between 2008 and 2012[4] and this is set to continue with an increase in the prevalence of cancer and the drive for early detection. The numbers of projection radiography examinations is also increasing albeit at a lower rate of 1.4%[3]. Even though the total percentage of ultrasound (21%), CT (10%) and MRI (7%) examinations undertaken is far less than the number of projection x-ray procedures (56%), they take longer to perform and are consuming a disproportionate amount of the imaging workforce resource.

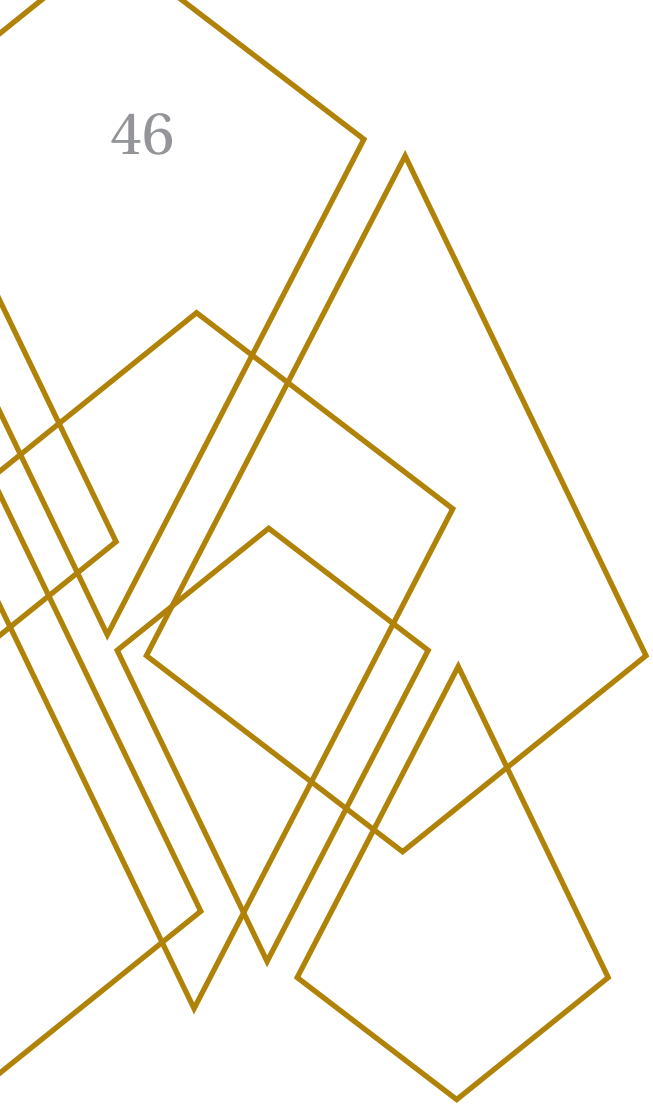
The introduction of direct digital radiography (DR) has seen an increase in the throughput of patients per unit when compared to traditional film or the newer computed radiography technologies. The limiting factor which determines the workload capacity of the room is the physical fitness of the patient and the time it takes to get them in and out of the room safely, whilst maintaining appropriate levels of care. Consequently, there has been a reduction in the number of DR rooms found within a typical department which are required to meet the demand for projection x-ray imaging, although these rooms are working with a higher throughput of patients[5]. This presents those charged with the clinical education of students with a problem; there is less physical resource available for educating students and the resource that is accessible is under much greater time pressure due to the increased workload. These factors are a challenge in creating an effective and supportive learning environment in which the students can operate. There is less space and time available for the students to develop their skills in a non-pressured environment with the appropriate levels of support and supervision. The current focus of education within diagnostic radiography is directed toward producing practitioners who are competent in undertaking projection radiography with a limited competence in CT head scanning, usually of a relatively fit and healthy patient[6]. The appropriateness of this model within the current context clearly needs to be questioned. The expansion of cross-sectional imaging and reduction in resource available for projection radiography must be seen as key drivers for change within education, but there are other developments which must be considered.

It is a huge disincentive for universities to engage with two bureaucratic processes

Nuclear medicine, the advent of PET-CT and regulation

Historically, the development and location of nuclear medicine departments within hospitals has led to the creation of two workforces, educated by different mechanisms, both of which undertake a very similar or identical role. If the nuclear medicine department resides within a radiology department, then it will usually be staffed by qualified radiographers registered with the Health and Care Professions Council (HCPC). Should the nuclear medicine department be located within the medical physics department, then the practitioners caring for patients and undertaking the imaging procedures are called technologists. The technologists may be graduates who have undertaken an in-house training programme, perhaps supplemented by a more formal training by an external provider. A portfolio of evidence is produced to demonstrate that the technologist has achieved the levels of knowledge and practical competence in a process overseen by the Institute of Physics in Engineering and Medicine (IPEM) which then maintains a voluntary register for technologists since they are ineligible for registration with the HCPC.

More recently, a second method of education has evolved via the Modernising Scientific Careers Healthcare Science initiative[7]. The National School for Healthcare Science has produced a medical physics technology curriculum designed for universities to use in the creation of a three year Bachelor of Science programme for nuclear medicine technologists, but also for technologists working within radiation physics and the emerging role of the dosimetrist within radiotherapy[8]. Graduates register with the accredited register operated by the Academy of Healthcare Science. These programmes have struggled to be viable due to small numbers of students and the unattractiveness of the programme, which requires students to pay fees compared to radiography, which is fully funded. The funding arrangements are set to change in 2017 but the issue of low numbers will remain, as there is little public awareness of healthcare science as a profession. This will continue to threaten the viability of medical physics technology programmes. The current regulatory frameworks governing medical imaging and therapy have become a complex minefield for educators and managers to negotiate. Some professionals are registered with the HCPC, some with IPEM and others with the Academy of Healthcare Science. It would surely be in everyone's interest if a more standardised system of regulation was introduced, especially when we see a convergence of roles brought about by new technologies



The limiting factor in training imaging professionals will be the clinical placement capacity

such as PET-CT, PET-MRI or MRI-guided linear accelerators.

A recent issue has emerged concerning technologists who use PET-CT. This is connected to radiation governance or competence issues relating to their use of CT, as this may not have been included within their education and hence is beyond their scope of practice[9]. The issue does not apply to radiographers as CT forms part of their curriculum, although it should be emphasised that the clinical experience of the radiographer may be limited, as their first post competence may not extend beyond the performance of a head CT scan. The development of the two education pathways and roles for nuclear medicine practitioners would now seem inappropriate, as there is clear convergence within the roles, the use of PET-CT being a good example. Arguably, there is scope for the delivery of a common programme to meet the needs of both pathways. It is merely the physical separation of nuclear medicine facilities between radiology and medical physics departments that has resulted in the unnecessary development of two professions, ie radiographer and nuclear medicine technologist, whose roles are essentially the same within this field of imaging. An examination of the core competences and curriculum requirements from the HCPC for radiographers and the National School of Healthcare Science for medical physics practitioners, shows a large degree of commonality. The arguments for economies of scale in marketing and running relatively small programmes together are compelling and would again point towards curriculum and regulatory reform. It is a huge disincentive for universities to engage with two bureaucratic processes for course approval and quality assurance, in addition to the extensive internal quality assurance processes that the university will already have in place.

It is interesting to observe that the Professional Standards Authority, whose role is to independently oversee nine statutory bodies that regulate health professionals (including the HCPC), note that current regulatory frameworks are becoming unfit for purpose. These frameworks inhibit the innovation required to support the changes needed to counter the challenges faced by 'a healthcare system creaking under the strain of an ageing population, long-term conditions, co-morbidities, the rising costs of health technologies and a global shortage of healthcare workers'[10].

The historical siting of nuclear medicine departments or PET scanners either within medical physics or radiology departments has led to, and explains, the development of the current system of education. However, this is a poor rationale for the maintenance of the current training arrangements, which are inherently inefficient and are a disincentive for higher education institutions to educate technologists. There will however, remain a requirement to work within the existing structures in the short- and medium-term as regulation cannot be reformed easily or quickly.

Education funding changes, commissioning and caps

For many years the education of allied health professionals (AHPs) has been organised entirely from within the NHS. Health Education England and the Local Education and Training Boards (which operate at a regional level) are currently responsible for workforce planning, commissioning and monitoring the quality of placement provision. Universities are commissioned to educate a certain number of radiography students who have their course fees paid and are entitled to apply for a means tested bursary, student loan and receive reimbursement for costs associated with attending clinical placement.

Mostly, this has been an effective system for managing the education of healthcare professionals but this finite publicly funded resource, coupled with the ever increasing demand for healthcare, has not kept pace with the need for new graduates resulting in the current skills shortages[11]. Poor workforce planning has also been cited as a factor contributing to the shortages[12]. The Government's response to this was announced in the comprehensive *Spending Review* published just before Christmas 2015. There were fanfares of the new system removing the caps that existed under commissioning and thus enabling universities to allow 10,000 more health professionals to enter the education system[13]. As a consequence, about a third of Health Education England's budget will be passed over to the student loan company. From September 2017, students wishing to study for a nursing or AHP degree, will be required to obtain a loan for their fees and further loans to support their living costs. It is unclear at the time of writing whether students' clinical placement expenses will be reimbursed, but if this is not supported it will be a major disincentive for students to embark on a course of study, particularly where significant distances will be covered in travelling to clinical placements. What is certain is that universities will be able to recruit many more students, which will enable the skills shortages in medical imaging to be addressed, providing the issue of reimbursement of clinical placement expenses is properly taken into consideration within the new funding arrangements. The limiting factor in training imaging professionals will be the clinical placement capacity. This is a challenge which now must be addressed through curriculum redesign.

Addressing clinical education placement capacity shortages

The dwindling number of clinical rooms for projection radiography means less capacity to support students following a curriculum largely focused on such imaging. Clearly there is an urgent need for curriculum reform, especially if we are to create the clinical education capacity required to educate the additional students allowed as a consequence of the removal of recruitment commissioning caps.

Recent years have also seen a large expansion of private healthcare companies offering imaging services. This has been fuelled by the recent reforms in the NHS and the 'any qualified provider' policy[14]. Expansion in services has seen a further drain on the already depleted imaging staff resource base to operate these services[15]. Private companies do not at present provide widespread and regular clinical placements for undergraduate students. This is not from a lack of willingness to do so, but is a consequence of the services they are mainly involved with providing, ie MRI and PET-CT imaging. As has been discussed, the majority of undergraduate radiography curricula are focused toward projection radiography with students gaining an awareness of other imaging modalities. Students would not spend sufficient time gaining the experience they currently need to meet the course learning outcomes focused on projection x-ray imaging, if they were to spend more time working in cross-sectional imaging. Clearly, there is a large educational resource both in the private and public sector that is currently underutilised. This is not a sustainable position given large expansions in cross-sectional imaging modalities and the chronic workforce shortages. If a new curriculum was developed, with routes which provided a greater emphasis on CT and MRI, then this clinical education resource could be fully utilised and provide the extra clinical training capacity which is so desperately required.

The future of medical imaging and medical physics technology education

It is well beyond the scope of this paper to discuss the role and education of the assistant practitioner (AP) workforce within radiology. It is worth noting however, that this role is likely to expand as the skill mix develops, staff shortages remain and services expand[16]. New undergraduate programmes could offer greater flexibility in allowing 'step on' and 'step off' points which may be important if the education funding reforms affect the ability of certain groups, such as mature students, to engage with professional training.

The evidence provided from the increase in the volume and mix of medical imaging procedures undertaken by the breadth of healthcare provider organisations, supports the need for reform of undergraduate curricula. If this does not occur, there will be insufficient training capacity to meet the workforce requirements and graduates will not possess the range of skills needed to support the diversity of services offered by providers, both now and in the future as technology continues to evolve. It would seem sensible that future courses are made up of a core curriculum, which meets the demands of professional bodies and which also contains the range of core skills common to all the relevant career pathways including APs. Students could then opt to study one or two specific areas in the latter part of the programme, eg projection radiography, nuclear medicine, MRI, CT or PET-CT. There is a danger here that projection radiography could be seen as a less attractive option, but this need not be the case if new curricula include development of skills such as reporting and patient discharge, which are complementary to projection radiography. This would need to be coupled with a clear career development pathway within projection radiography, which would be attractive to graduates.

Conclusion

The changes in the funding arrangements which will apply from September 2017, do present potential threats to the education of the future professional workforce, but they also offer an opportunity to increase the number of graduates and plug chronic workforce shortages. This can be achieved through innovative curriculum redesign which supports the proliferation of imaging technologies, and corresponding changes in diagnostic pathways which have occurred over the last two decades.

The existence of a range of commissioning bodies, quality monitoring organisations, regulators and accreditation bodies, coupled with their inability to adapt to the very rapid changes in healthcare delivery, is a barrier to innovation and development. This has partly contributed to the current workforce shortages. The need for regulatory reform is therefore urgent and vital to ensure the protection of patients, by enabling educators to develop programmes which support the dynamic and rapidly evolving practice within the medical imaging context, as well as the wider healthcare environment.

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Ultrasound must do a u-turn to survive

Peter Rodgers

Thought of as quick, cheap and readily available, ultrasound (US) is all too often the 'go to' diagnostic test for which GPs refer their patients – regardless of its suitability.

The ultrasound (US) request had been rejected. The general practitioner (GP) was unhappy. The request stated that the patient was concerned he had stomach cancer. US has no role in the diagnosis of gastric cancer, says I, he needs an endoscopy. But I don't think he has gastric cancer retorts the GP.

Deep breath… Calmly I try to explain my ethical concerns around reassuring a patient about a condition the GP thinks he hasn't got, with a diagnostic test which cannot reliably diagnose the condition about which the patient is concerned.

Many more pragmatic colleagues will have worked out already how many scans might have been performed and reported in the time this conversation and the associated documentation required. Is the effort justified?

Anecdotally, many imaging departments are choosing not to vet US requests at all and some are considering offering walk-in services. The logic is doubtless laudable. There is a risk the examination will be worthless, but it will have been satisfyingly rapid and delivered at the patient's convenience.

The counter argument is that better requesting leads to better examinations, correct modality, correct protocol, and better reports focused on addressing the concerns of both patient and referrer.

A stitch in time?

The effort and cost of doing vetting and justification well, has to be balanced by the saving in time and resources of performing unhelpful examinations, avoiding risk to the patient, and not wasting the patient's time. Much of the guidance on vetting and justification of requests was developed in the context of regulating medical exposures[1], and therefore, as proponents of a laissez-faire approach to US provision argue, are not relevant to radiation-free examinations. It seems concerns about the safety of US have been largely forgotten, even by practitioners, despite national guidance instructing us, quite rightly, to apply the ALARA (as low as reasonably achievable) principle to US examinations, as well as examinations using radiation[2].

But if, as I observe, the growing demand for US examinations from primary care is largely directed at the worried well, this eats at the resource available for the sick, not just at the first US examination, but in the inevitable subsequent computed tomography (CT) and magnetic resonance (MR) examinations for the investigation of incidental findings.

The Royal College of Radiologists (RCR) provides robust guidance on the obligation on referrers to provide appropriate requests[1,3]. These include a clear clinical question (suspected diagnosis/es) and sufficient supporting clinical details to justify the question and subsequent examination, such as relevant past medical history, clinical examination findings, and relevant laboratory results.

A frequent offender in requests is the phrase 'LIF pain ? cause', which does not fulfil these obligations. It is a request which might have been written by the patient with no evidence of any medical intermediary. If this is acceptable, then self-referral may be a preferable use of resources.

The recent comprehensive *Standards for the provision of an ultrasound service* document, issued jointly by the RCR and Society and College of Radiographers is equally clear about the duties of the practitioner:

'Any individual issuing an imaging report, whether they be medically qualified, must ensure that they are appropriately trained and practise within their competence'[4].

They must understand the explicit and implied information on the request form. But the practice of encoding the real concern about the patient behind bland nudges and winks (say no more) is outdated. The private language of doctors has no place in the

world of transparency, where the patient gets to make informed decisions about their own care. In this new world the referrer is expected to provide explicit information and minimise the implied element.

I observe a worrying recurrence of the habit of providing coded information (such as TATT = tired all the time) rather than using the term cancer. I suspect that this is both from a patriarchal desire to protect the patient, and from a pragmatic desire to avoid the extended appointment time dealing with the repercussions of a suggested potential cancer diagnosis. Sending a patient for investigations with the intention of identifying a possible occult cancer, without explicitly stating this is the concern and thereby obtaining consent is contrary to good medical practice.

US has a well-defined first-line role in the investigation of several common malignancies (gynaecological and renal for instance), but not for the majority. Performing US in the latter cases may significantly delay referral through a relevant two week wait pathway, or may delay doing more appropriate imaging (usually CT). One of the most difficult common cancers to diagnose is pancreatic cancer[5]. If this is the question asked, should US be offered at all?

How to move forward

In 2015 The British Medical Ultrasound Society (BMUS) issued a guidance document – *Justification of Ultrasound Requests*[6] for referrals from primary care and is available to BMUS members on the Society website. This offers a considered view on the clinical scenarios in which US examinations may or may not be appropriate. It is a work in progress and will doubtless grow and change as informed by feedback from the members and hopefully from referrers.

Used in conjunction with the web-based RCR guidance 'iRefer' (www.irefer.org.uk)[3], the BMUS document forms a basis for

In an increasingly obese society, blaming 'body habitus' for scanning failures is a losing strategy

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negotiating local pathways with primary care. The more difficult stage is changing the culture so that there is a clear clinical question, and this is supported with appropriate evidence from the clinical history, examination, and laboratory results as necessary.

Why does this matter? Well, here's a case from a learning from discrepancy meeting (LDM):

GP request for imaging: ? renal colic.

Clinical information: Late middle aged male with gnawing, epigastric pain waking patient at night.

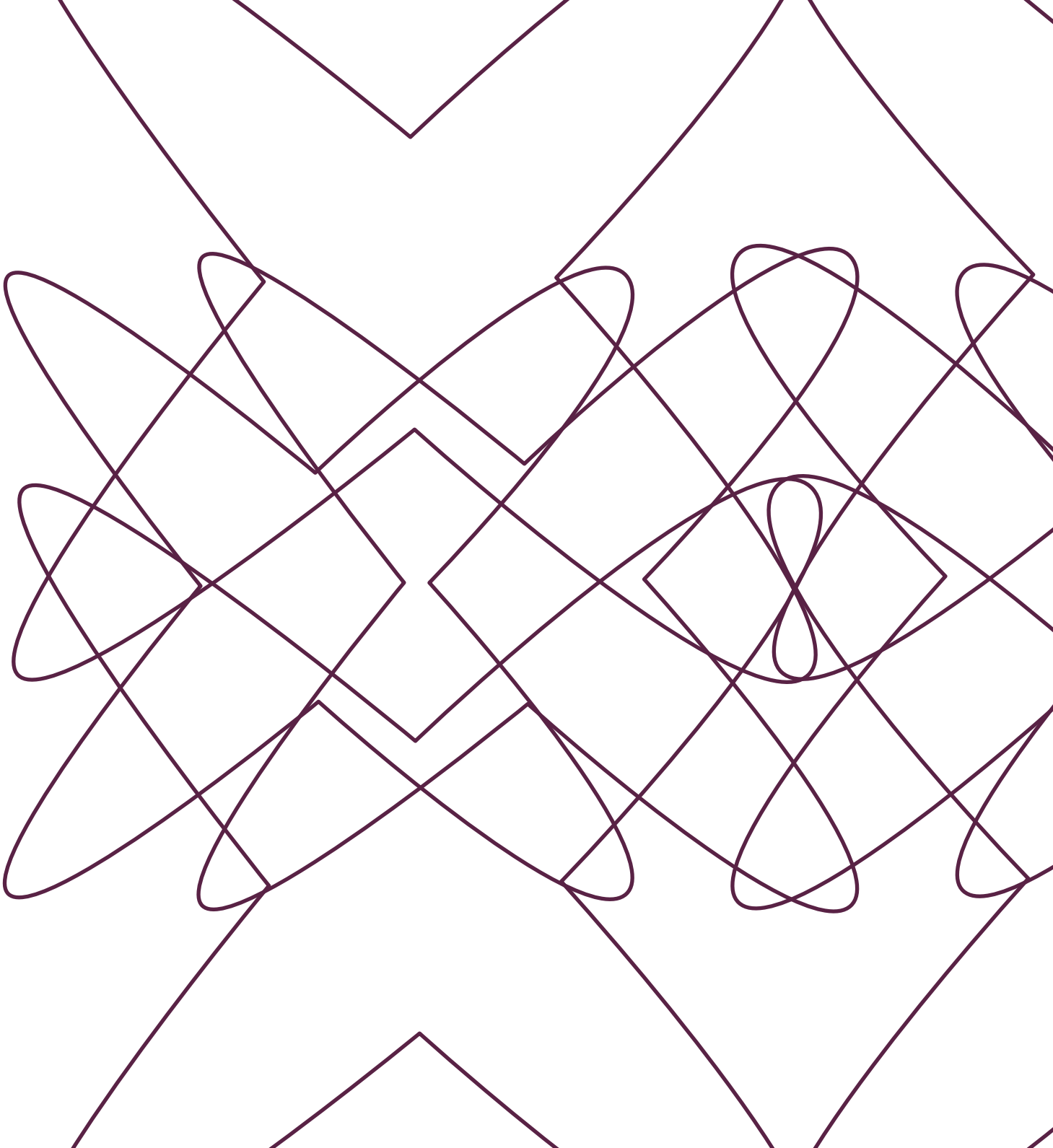
CT urinary tract scan (prone, low dose, non-contrast scan for stone) justified by radiologist.

Report: No stone. Nil else of note.

Three months later pancreatic cancer diagnosed on contrast enhanced CT. Retrospectively, the lesion would almost certainly have been seen on the earlier scan with intravenous contrast.

Red faces all around. The failure of effective communication resulted in a diagnostic delay with potential prognostic consequences. The clinical information strongly contradicted the proposed diagnosis and should have ensured a different scan was performed. The requester had provided enough information to have deserved the collaborative adjustment of the request.

Medicine is a complex discipline, best practised in a collaborative



environment. No-one is expert in all aspects, and general practitioners are equally aware and sensitive on this point. In my experience, a vocal minority can be deeply wounded by radiology staff questioning the adequacy of requests and the process terminology, ie 'rejection', has not been helpful here.

Requests could and should be returned for additional information when a minimum standard is not reached, but additionally, a campaign of winning hearts and minds is required to encourage a positive engagement. Part of this is the assurance that better requests will lead to better reports.

Anything to report?

Addressing deficiencies in reporting is also vital to the future of US. The primary sins being:

a) Descriptive rather than diagnostic reports, failing to answer the question.
b) Reports undermined by caveats.
c) Excessive recommendation for further imaging (US being reduced to something to do while a proper test is organised).

Tackling caveats

Standard professional guidance for sonographers[7] includes advice such as follows:

Any technical difficulties encountered must be noted, together with their impact on diagnostic accuracy.

For example:

Only limited intercostal views of the liver were obtained due to the presence of bowel gas obscuring access. However, where seen, the liver is normal in size and appearance.

Which begs the reader's question: Is the liver normal or not? The caveat evidently is both confusing and irritating to clinicians and undermines confidence in the individual report and, if widely practised, in the department or specialty[8].

One of the most depressing caveats in abdominal US reporting is the failure to examine the pancreas due to 'body habitus and bowel gas'. Check your own department; this may occur so frequently as to have become acceptable. If this is the case then remedial action is advised. With oral water loading (two cups = 300mls) to provide an acoustic window and varying the patient positioning/scan approaches, the entire gland should be examined in the vast majority of cases[3].

In an increasingly obese society, blaming 'body habitus' for scanning failures is a losing strategy. The important question of a test is whether or not it is 'robust'. Can it deliver the goods any time, any place, anywhere?

Getting to the point

The clinical question which has been asked (and justification should have weeded out all others) must be answered. Purely descriptive reports are not acceptable[4,9]. The clinical significance of the findings must be made clear in the context of the clinical information provided and additional information obtained at the time of the scan.

The old RCR document, *Standards for Reporting* (from 2006 and now archived) defined this as requiring medical training and this has traditionally been partly formal during training, but largely ad hoc and continuous as radiologists and sonographers worked alongside each other. Since the introduction of independent sonographer reporting in the early 1990s[10,11], numerous factors have conspired to interrupt this collaboration, and sonographers may seldom see a radiologist during normal working practice and struggle to get support when a second opinion on the clinical interpretation of findings is required.

Passing the buck

There are many circumstances where recommending further imaging or adding a report code, which refers the patient to a cancer multidisciplinary team (MDT) are appropriate. But clear guidance and audit is required. The risk is that increasingly isolated sonographers may find either of these options the easiest course to take. MDT workload cannot sustain additional inappropriate referrals. Sonographers must therefore, have continuous access to clinical support.

This invites the systematic reversal of the general abandonment of US by radiologists, which occurred with the sequential arrival of CT and MR in the '90s and early part of this century. To some extent radiologists have been tempted back by high tech niche advances in contrast enhanced and musculoskeletal US applications, but the US department lead consultants of the '70s and '80s are unlikely to

If quantity threatens quality then we are in danger of being 'too busy to be good'

return. However, Trusts should be looking at every new consultant radiologist job plan to see if the US skills learned and practised in training can be carried over in to regular clinical practice.

In addition, like their medical colleagues, practising sonographers have a duty to maintain and update their knowledge in these areas through online learning, attending local clinico-radiological meetings (including relevant cancer MDTs), and participating in professional study days and congresses such as the BMUS Annual Scientific Meeting. All of these require support in terms of time and finance from Trusts to make them possible.

This is an opinion. Others are available. Rapidly rising demand for US should be seen as great from a market perspective, where units of activity are reflective of consumer satisfaction and reflected in increased income (if only). But if quantity threatens quality then we are in danger of being 'too busy to be good'. That's how I see it; understaffed, overworked, too few radiologists in the US frontline to adequately support sonographers, US seen as a second class imaging modality, no time or funding for audit, governance or continuing education.

In a consumer driven medical model my solution is radical:

1. Do less but better. Focus on the areas where US is strongest. Focus on measuring and documenting quality; sonographers need protected time in their job plans and administrative support for audit, governance and standards.
2. Do the best in a timely fashion. For example, if US is the first-line imaging for children and younger adults with appendicitis, then it must be offered 24/7, 365. If not, the patient will get a CT scan at 3am and US will receive another blow.
3. Be picky (via robust vetting and justification). Focus on the sick. Let the worried well worry. Take the gamble that the current trend for referrers prioritising customer convenience and reassurance scans, through services provided at GP practices by non-NHS providers is only temporary. Local commissioning groups in Leicester are pressing for clear guidance, evidence-based pathways, and better reports to ensure contracted funding is well spent.
4. Where necessary, rebuild clinical teams of radiologists and sonographers. And, as most recently trained radiologists do not have the clinical experience of their predecessors, strengthen ties between imaging teams and clinical specialities. Sonographers should be attending relevant cancer MDTs.
5. Invest in training and continuing professional development (CPD). There is a national shortage of practising sonographers. Altering entry requirements and reviewing curricula is underway, but a commitment to identify and support trainees in every department is essential.

The narrative has to change. Open any published journal article or book chapter comparing imaging modalities in a clinical scenario and you will find a reference to US being quick, cheap and readily available. This often repeated claim was largely based on set-up costs, and promulgated when sonographers were not remunerated on reporting pay bands. With increasing specialisation, services have become more fragmented. Trainee radiologists are less experienced and less likely to choose US as a first-line test out of hours. US has become less available. It is not cheap. US has to earn its place by demonstrable quality, robustness, and availability.

Until recently, GPs had limited access to imaging, and for decades this was plain film, barium studies and US. For many, US has been the choice of least resistance. Even now, when access to CT and MR is available, many GPs prefer to refer patients with more vague symptoms to US. US is best championed by resisting this tendency. US can and should make a proper clinical impact on every encounter, and not be a way of deferring a difficult clinical conversation or a stepping stone to another imaging modality.

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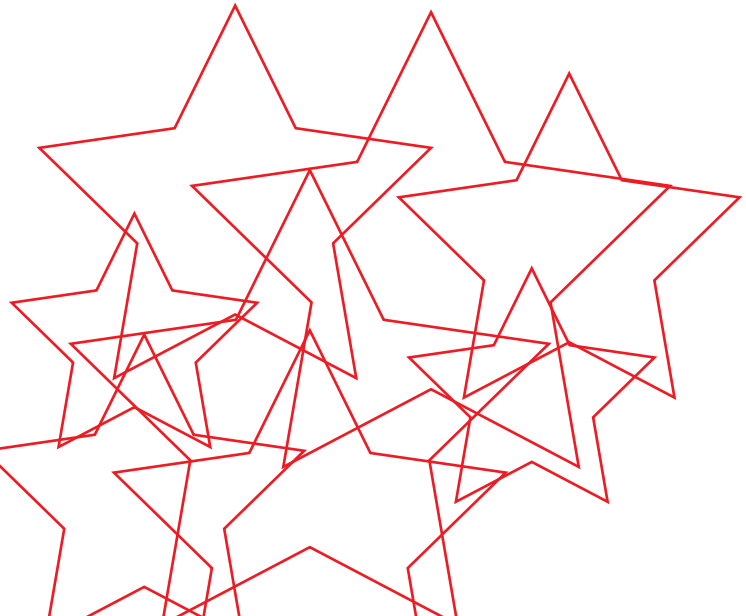
Independent sector provision of radiotherapy – eight years later

Sarah Hynd, John Pettingell, Karol Sikora

In response to their article featured in *Imaging & Oncology* 2008, the authors review independent sector provision as it now stands eight years on and discuss whether some of the challenges outlined back then have been met.



The global incidence of cancer is soaring due to rapidly ageing populations in most countries. By 2020, it is expected that there will be 20 million new cancer patients each year. Around 70% of them will live in countries that between them will have less than 5% of the resources for cancer treatment[1].

Ironically this is a great success story of public health. Cancer is predominantly a disease of older people – the average age of a British cancer patient is now 68 years. Better healthcare has led to a dramatic ageing of the world's population which in turn, has increased the incidence of cancer.

We have seen an explosion in our understanding of cancer at a molecular level and are now poised to see some very significant advances in prevention, screening and treatment[2].

The delivery of radiation to destroy cancers goes back over a hundred years, but the last two decades have seen amazing advances in radiotherapy hardware, software and imaging. These have enabled much more precise dose delivery to the real target – the cancer and its likely routes of spread – although the biggest problem of radiotherapy continues to be toxicity caused to critical surrounding tissues.

However, compared with the United States and mainland Europe, the majority of the NHS has been slow to implement these advances. This is partly due to lack of staff and resources, and where innovation has occurred it seems to be driven by local enthusiasm intensity rather than external incentive to change. So in the UK we have seen a slow and variable implementation of 3D CT planning, intensity modulated radiotherapy (IMRT), image-guided radiotherapy (IGRT), volumetric arc therapy (VMAT) and stereotactic ablative radiotherapy (SABR) and we still do not have any operational high energy proton facilities[3].

Chemotherapy, the treatment of cancer with drugs, is another important dynamic – as a systemic treatment, drugs can reach every part of the body thus ensuring there is no refuge for cancer cells. If the drug can selectively destroy the cancer cells then it can do this anywhere. In the past we have relied on a blunderbuss approach using drugs found serendipitously in plants, fungi and bacteria that cause profound damage to the machinery of a cell, but trial and error has led to great success in some cancers.

Promising advances on the horizon come from our rapidly increasing understanding of the 'cog' (clusters of orthologous groups) protein molecules that make cancer cells tick. Painstaking analysis of these and other data may eventually have considerable impact on prevention, screening, diagnosis and treatment and may herald a new golden age of drug discovery. The future is personalised medicine based on molecular diagnostics and genomics, defining hitherto biological signatures of drug response. In other words, the right drug combination will be given to the right patient. Radiotherapy will be given in the optimal time, dose and fractionation based on similar analyses.

More patients will benefit from better diagnosis and newer treatments, with greater emphasis on quality of life. Living long and dying fast will become the mantra of this century. Implementing innovative approaches into routine cancer care for all will be a profound challenge.

We could potentially prevent a quarter of all cancers, simply by applying existing knowledge[4]. A third are curable using today's

Living long and dying fast will become the mantra of this century

technology and this can be confidently predicted to rise to one half over the next 25 years. The appropriate expertise has to be in the right place at the right time and widely accessible. By taking effective action now we may reduce cancer incidence from 20 million in 2020 to 15 million and the death toll from 12 million to six million[5]. An effective strategy, ongoing political will, skilled persuasion, good media relations, as well as international professional and industrial collaboration will be vital to achieve this target.

The next 20 years will be a time of unprecedented change in the way in which cancer is controlled. The independent sector has a serious role to play in supporting the national profile with novel technology. It has good access to capital, can incentivise easily for defined results but it does need a significant return on its investment.

The current challenges in UK radiotherapy

- The increasing prevalence of cancer in the ageing populace.
- There is still major variation in radiotherapy and chemotherapy provision and significant inequalities in access to service and thus outcomes.
- There is still a diverse national pattern of waiting times for diagnostics, planning and treatment, despite national cancer targets.
- The NHS tariffs grossly underestimate both capital and staff costs.
- There continues to be (expensive) new and evolving radiotherapy tools and technology.
- There is still considerable variation in the quality of radiotherapy delivery across the UK, with radiotherapy departments varying in size and processes.
- Treatment machines are rarely used to full capacity and work patterns tend to continue to follow the historical '9-5' day, with no activity at weekends.
- There continue to be inefficiencies in process and pathways.
- There are still serious workforce deficiencies and very uneven workforce issues. For example, some London departments may have 50 or so radiographers chasing one entry grade job, yet recruitment may be very challenging elsewhere away from the larger cities. Are we recruiting enough staff to support the new challenging technology?

Current independent sector radiotherapy provision

The current profile of independent sector radiotherapy provision in the UK is markedly different to that of eight years ago, and includes providers operating private services on NHS sites, as well as standalone or on private hospital sites. Currently, there are no private centres for radiotherapy in Wales, Scotland or Northern Ireland although private chemotherapy services are offered.

More independent sector radiotherapy centres are in development, including the first independent centres to provide proton beam therapy being developed by Proton Partners International. The first of these centres, in Newport, is scheduled to go live with proton therapy by the end of 2017.

Achievements since 2008

The majority of radiotherapy treatment is still delivered within the NHS, but the growing independent sector has certainly helped to achieve some of the pledges within the 2007 Cancer Reform Strategy[6] by giving patients more choice and improved services in the following ways:

- **Increase in radiotherapy provision** for private and NHS patients. At a basic level, the independent sector has increased the number of treatment units. They currently contribute 32 treatment machines in addition to the NHS fleet. Treating private patients on privately funded machines frees up NHS machines for NHS patients. Additionally, some of the private centres opened since 2008 have also treated NHS patients through partnerships and contracts with their local NHS Trusts.
- **Centres open for longer hours** and offer back-up service at

Provider	London	NHS site	Linacs	Tomotherapy	Gamma Knife	CyberKnife	Other*	Details
Aspen Healthcare	✓		2				✓	Cancer Centre London (was 'Parkside')
BUPA	✓			2	1		✓	The Cromwell Hospital
Genesis Care was Cancer Partners UK			9					Nine sites including four standalone and five on Spire or BMI hospital sites
HCA	✓		2			1	✓	The Harley Street Clinic
HCA NHS Ventures		✓	1					The Christie, Manchester
	✓	✓	1					Queen's Hospital, Romford
	✓	✓			1			St Bartholomew's Hospital
	✓	✓	1					Guy's and St Thomas' Hospitals
	✓	✓	1					UCLH
The London Clinic	✓		2			1	✓	The London Clinic
The Mater Private		✓	1					Clatterbridge Cancer Centre
Medical Equipment Solutions					1			BMI Thornbury Hospital, Sheffield
	✓	✓			1			Queens Square Radiosurgery Centre (with UCLH)
Nova Healthcare		✓			1			Leeds Cancer Centre
Spire Healthcare			3				✓	Two sites in Bristol and Chelmsford
TOTAL (in London)			23 (10)	2 (2)	5 (3)	2 (2)		

Table 2: Independent sector centres currently treating patients:

**Other services include: superficial x-ray, brachytherapy, IORT (intraoperative radiotherapy) radioiodine, SIRT (selective internal radiotherapy treatment).*

weekends in times of compensation need. This has necessitated dedicated and hardworking staff who have 'gone the extra mile' and worked outside traditional hours.

- **A social function and pleasant environment.** In many centres this has been delivered with calm ambience, modern architecture and fresh décor. Centres have been built in very ambitious and slender timeframes and have required excellent project management and liaison.
- **A 'personal touch'** as the centres have either a single Linac or small numbers of Linacs and thus a more compact team leading to continuity of care for the patient. However, the lean model of staffing numbers has been questioned by professional bodies, and safe practice and quality has had to be demonstrated.
- **Across the country.** In 2008, there was very little independent sector radiotherapy provision outside London – including one Gamma Knife service but no Linacs. Since then the independent sector provision has grown beyond London, both on private sites and in partnership with the NHS, and has currently 13 Linacs and two Gamma Knife services treating patients outside London with more on the way.
- **A broader location.** Some centres are sited on business parks with ease of access and free parking, thus supporting patient convenience. The patient experience has been excellent but the teams have to ensure good infrastructure to support these standalone centres; examples being high levels of staff training for life support, adequate security measures and to have an increased awareness of risk factors.
- **Access to the latest technology.** On both private and NHS sites, the independent sector has tended to install high-end machines with the latest technology.
- **Holistic care support.** There has been the need for support from other parties and thus the need for very open consultation and service agreements.
- **Well-equipped centres** with a full and robust complement of equipment with good quality assurance processes. This has led to high capital costs and thus full justification and explanation to the financiers.
- **Excellent governance** structure with good audit measures. The teams have typically carried out their own 'provider visits' and had peer review mechanisms, as well as holding supportive governance committees and forums.
- **Content and happy workforce** who have risen to the challenge of working more autonomously and often with a leaner model of staff numbers. Feedback from staff shows that they have relished new ways of working, but would wish in some circumstances for more openness and better lines of communication.

Above all, there are many examples where the patient at the centre of the treatment delivery has fed back that they have received a quality service, with a team that has been extremely communicative and supported them through a life-changing experience.

The independent sector will continue to be a partner in the provision of radiotherapy and chemotherapy services into the future. The independent sector has set a benchmark with the outlined assets in their current centres and there have been pockets of examples of collaboration in working in partnership. Examples include some NHS contract work in certain geographical locations, sharing of good

The centre in Newport is scheduled to go live with proton therapy by the end of 2017

practice and accommodating visits from NHS sector centres. Teams continue to recognise that certain specialist treatments must still sit in large Trusts and some patients do need to visit different locations as such, eg a gynaecological patient who may receive their external beam radiotherapy with an independent provider, while having their brachytherapy in an NHS setting.

There has been buoyant liaison with the professional bodies and training institutions to support high quality, initial training and ongoing continuing professional development. Visits from the College of Radiographers and the Institute of Physics and Engineering in Medicine are commonplace and student placements are facilitated. The teams have also responded well with registration and regulatory visits from the Care Quality Commission, and facilitated good liaison with executive agencies such as Public Health England.

Further possibilities, partnerships and alliances should be:

- Working more closely with centres abroad – looking at good care models.
- Placements or exchange programmes overseas, along with recruitment from abroad.
- Working more closely with NHS sector (exchange programmes, closer working on specialist services, eg protons, embracing contract work).
- Utilisation of support services under service level agreements, eg dietetics, exercise programmes, clinical nurse specialist support.
- Immobilisation – working closely with the manufacturers to ensure continuing robust solutions, particularly for some of the specialist stereotactic work (including hypofractionation).
- Imaging – use of the CT/ MRI/ imaging facilities in standalone centres where use is low, to provide even more access for screening programmes and well-being clinics, for review and for follow-up mechanisms promoting survivorship.
- Workforce liaison between diagnostic and therapeutic radiographers. There are some great examples within some of the private sectors, eg a diagnostic radiographer carrying out an 'assist' role for planning scans or therapeutic radiographers carrying out simple staging CTs (all under competency frameworks).

The newer independent sector centres should work more closely with universities to support more fully the training of the radiotherapy workforce. Currently there are still high rates of attrition.

Conclusion

At the end of the prior article in 2008, we stated the following: 'Patients with cancer and undergoing radiotherapy wish for their care to be normalised into their work and family lives, bringing increased quality to their lives. They want speedier and more convenient access to treatment, as well as quality treatment from the associated fully-trained health professionals.'

Patients today in 2016 still wish for the same.

The independent sector continues to assist the NHS in meeting these expectations, delivering cancer care in state-of-the-art centres with environments that ensure a patient has access to excellent care with comfort, convenience and continuity. With Government spending becoming increasingly difficult, the independent sector will continue to make an important contribution and this role will likely become even more critical in future years. Given the challenges outlined in this article and the ever increasing patient needs described, there is clearly a need for continued transparency, openness and direct liaison at all levels both within and between the NHS and independent sector.

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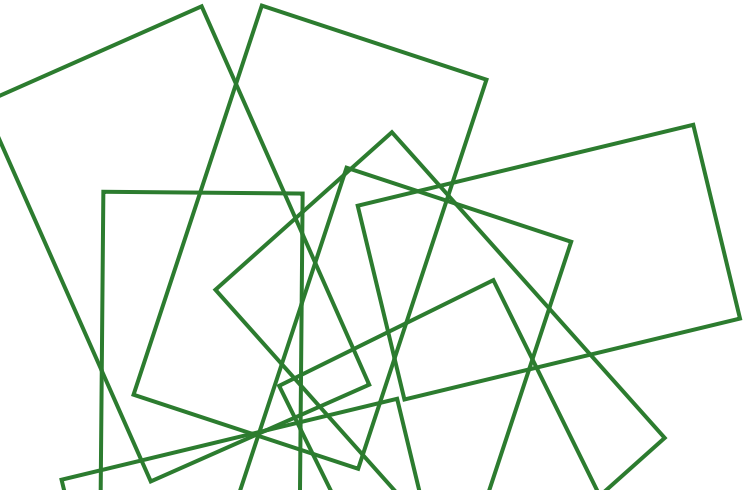
The growth of site-specialists in therapeutic radiography: Meeting patient needs or a response to the needs of the workforce?

Morven Masterton

A change is happening, and it's happening at a pace, yet it's not being given the attention it deserves. Over the past few years a trend has begun to appear – the growth of site-specialist therapeutic radiographers in radiotherapy centres across the UK.



Back in 2012 there were 40 site-specialists in post throughout the UK[1]. However, a recent study carried out in partnership by The Society and College of Radiographers (SCoR) and Prostate Cancer UK, revealed that in 2014, this figure had grown more than two and a half times to 105, and a further 81 specialist roles are in the pipeline over the next three years[2].

The research was undertaken to develop a better understanding of the role of the current prostate and urology specialist radiographer workforce; to identify the education, development and support needs of role-holders; and to create a tool for shared learning and build opportunities for support, networking and collaboration.

The changing context

In the UK, around 44,000 men are diagnosed with prostate cancer annually[3], and prostate cancer is set to be the most common cancer of all by 2030. Furthermore, prostate treatment, whether curative or palliative, is now one of the mainstays of radiotherapy centres, with radiotherapy being the most common treatment modality for prostate cancer. There is not only increasing demand for prostate radiotherapy, but also for more complex radiotherapy, as both technological developments and medical advances are introduced into practice. Just a decade ago, treatments such as image-guided radiation therapy (IGRT) and stereotactic ablative radiotherapy (SABR) were not widely available options. Now they form part of the mix of choices offered to patients. There is a growing need for streamlining and focusing care and support across the radiotherapy pathway.

Looking outside the hospital, at the wider policy context, there are calls for increasing radiotherapy treatment levels in line with the higher rates in other developed countries internationally[4] and to optimise the highly skilled radiotherapy workforce[5]. The 'vision' presented jointly by Cancer Research UK and NHS England states: 'Taking full advantage of advances and innovations in radiotherapy will require highly skilled staff, effective team working, training and sufficient capacity workforce. New models of working will be crucial to deliver advanced treatments and supportive care across radiotherapy pathways'[5]. The evidence is there to say this is needed, and there are signs of this happening, albeit in an unsystematic, inconsistent way.

The research

In the Prostate Cancer UK and SCoR joint report investigating site-specialists[2], the focus was primarily on the prostate and urology workforce, but it was necessary to make comparisons with specialists for other tumour sites to understand whether the project findings were site-specific or part of something more widespread. Data were collected on all of the main tumour sites (table 1). The research methodology incorporated both qualitative and quantitative elements including an online survey of UK service managers (N=46, 64%), three focus group workshops (N=40), a set of in-depth telephone interviews of multiprofessional members (N=10) and a full day conference/event (N=50).

In prostate and urology, the following findings were reported by service managers.

- Eighteen centres (41%) have either a prostate or urology therapeutic radiographer.
  - Thirteen centres (30%) have at least one urology therapeutic radiographer (two have two posts, and one has three posts).
  - Seven centres (16%) have at least one prostate therapeutic radiographer (one has two posts).
- Twenty (45%) centres reported no prostate/urology therapeutic radiographer.
- Six centres (14%) did not answer the question.

As part of the survey, service managers were asked about the rationale for creating these roles. The primary reason given was 'to improve quality of service for patients' (N=16), followed by 'to improve skills mix and introduce new roles'. It was rare that the main motivation was around cost-saving (N=4) but perhaps this is always a consideration, whether or not the primary rationale. It was reported that these advanced and consultant roles have come out of the existing radiographer establishment, providing a natural progression for those moving forward in their radiography careers. It can therefore be concluded that the driving force behind the development, has been a combination of both patient and staff needs and opportunities.

The roles and the role-holders

There is evident variation in the roles and responsibilities of prostate and urology site-specialists that appears to have developed out of the service need and skills mix in each local setting. For example, the research found that there is a wide range of tasks and responsibilities, including independent prescribing; insertion of fiducial markers; and liaising with and training professionals in primary and community care. Some role-holders do one of the above, others may carry out all of these elements of advanced practice. Patient group directives (PGDs) and, to a lesser extent, independent prescribing, were viewed as incredibly important for maximising the value of the role to ensure patients' needs are responded to quickly and comprehensively, but are currently not essential requirements for role-holders.

Despite the variation, there is a common problem. The role-holders are often unique in their workplaces and they tend to be the specialist for their entire department. Role-holders reported professional isolation as well as heavy caseloads that were rarely shared. In fact, for many, the organised focus groups for this research represented the first time that these specialists had been brought together formally. There is a real concern that centres are becoming reliant on these individuals and there has been insufficient succession planning, or even day-to-day cover built in. One workshop participant reported:

"There is generally no whole time equivalent built in for sickness or annual leave and no-one to cover these standard absences. This can mean that the patient is left unseen, clinics and appointments are delayed or postponed, or support comes in the form of a non-specialist. It also results in the post-holder experiencing a challenging increase in their workload before and after these periods."[2]

This view was echoed by others who felt their absence would lead to disruption in the pathway. This stage of the research included only prostate and urology specialists, but for future research it would be interesting to explore whether this is also true of other site-specialists or whether superior models could be replicated.

Support needs highlighted by role-holders in the focus groups included mentorship in developing practice; appropriate supervision in the four domains of advanced practice; and access to research frameworks – areas that are sorely lacking and should be addressed

Tumour site	Current number of centres with posts	Current number of posts	Number of centres planning to introduce posts	Total number of posts planned	Total number of posts, current & planned
Breast	16	28	11	11	39
Colorectal	6	6	4	4	10
Gynae-oncology	13	13	5	5	18
Head & Neck	10	11	13	14	25
Lung	6	6	4	4	10
Neuro-oncology	6	6	3	3	9
Paediatric	5	5	0	0	5
Palliative care	5	5	15	17	22
Prostate only	7	8	13	13	21
Urology inc Prostate	13	17	9	10	27
Total	X*	105	X*	81	186

Table 1: Summary of site-specialist posts.

** The number of centres cannot be totalled because they have multiple numbers of site-specialist radiographers.*

In the current climate, more than ever the spotlight is on value and return on investment

immediately to bring increased consistency and standards across the profession. Site specialists also need to be integrated into multidisciplinary teams (MDTs) if they are to improve and streamline care, and work effectively with clinical nurse specialists.

As well as nurses, consultant oncologists were described as being critical to the specialist therapeutic radiographer. Clinical oncologists have been instrumental in the creation and development of these roles and recognise that they themselves benefit from the expertise of these trained professionals. By taking on duties previously associated with oncologists and therefore saving them time, specialist therapeutic radiographers enable oncologists to focus more on clinical work and indeed often help support the development and training of oncology registrars.

The site-specialist as a key worker

In some centres across the UK, prostate and urology site-specialists are already functioning as key workers, even though this is not always formally recognised. There is certainly no shortage of desire amongst the specialists themselves to undertake this role. The barrier to this formalisation does not appear to be any specific challenge, but rather that it has never really been up for discussion. MDTs are under such pressure to deliver and focus so much on the clinical side of care, that they may not often have the time or space to look at *how* care is being delivered. As we move to a future of more stratified patient management, as well as patient-centred care, it seems sensible to, where appropriate, manage patients opting for radiotherapy with site experts. This could not or should not happen without a proper analysis of patient numbers and radiotherapy capacity, but if managed carefully, could help relieve the mounting workforce difficulties in specialist nursing.

Recommendations

The report makes a series of recommendations aimed at the various stakeholders key to embedding these roles, some of which are already in the early stages of implementation (figure 1). In terms of prioritisation however, there is a critical need to gather data on impact. In the current climate, more than ever, the spotlight is on value and return on investment. Those who design the cancer workforce of the future will benefit from learning what is already being done today.

An eye to the future

In the survey, 81 posts were highlighted as being planned, with the largest site-specific areas of growth in prostate and urology, and head and neck. While 81 posts were highlighted, in actual fact, only one had secured funding and the vast majority were ideas under consideration or proposals agreed in principle. Developing business plans with clearer cost benefits, or at least proof of impact, may assist in the securing of NHS funding.

What was clear throughout the face-to-face elements of this research was the passion of role-holders to drive forward their practice in order to enhance patient care. This needs to be harnessed, but the impact of this, critically, has to be measured. One of the participants in the qualitative research phase summed up their extensive and important role in the pathway:

"I identify my patients at MDT meetings; any patient who is going to be offered radiotherapy as a treatment option. I see them at first diagnosis, support them through the decision-making process and, if they do opt for radiotherapy, support them through the treatment and on into survivorship. Giving patients the knowledge and confidence to understand, be involved, take control and self-manage, is an amazing reward."[2]

But it is essential to know, amongst other things, how much knowledge, confidence and control these roles give patients. What is to gain by having a site-specialist as part of every radiotherapy service in the UK?

This research did not measure the impact of these roles and to date, this evidence does not exist. In this time of financial constraint, there is a critical and urgent need to demonstrate impact – whether it be on patient care, service improvement, workforce efficiencies, trust, or cost-savings. If service managers are clear on the rationale for introducing these roles in the first place, it would be useful to know how they are meeting the cases put forward initially.

Deciding what to measure and how to measure it is a challenge, but already the SCoR is attempting to bring members and partners together to develop collective guidance, and find and create outcome and experience tools that can be shared. The SCoR has created an online forum to support expertise in prostate treatment and care. Not only is this a space for current role-holders to share practice and gain peer support, it also provides a place for centre managers,

Workforce planning and service development

- Job descriptions that are clearly defined and include arrangements for cover for sickness and leave, and professional supervision together with job plans.
- Development of a model role descriptor to support service managers.
- Membership of prostate site-specific MDT for all practitioners.
- Advice and support for business case development, including sustainability and succession planning.

Establishment of core education and training

- Independent prescribing as the gold standard for prostate/urology specialist radiographers.
- Publication of flexible postgraduate education and training opportunities, widely available in order to support development of full professional autonomy.
- Professional accreditation of advanced and consultant practitioners.

Development of the research and evidence base

- Rigorous evaluation of the impact of the role.
- Promotion of relevant research opportunities.

Figure 1: Recommendations for development of site-specialist role.

non-specialist radiographers and educationalists to come together to learn and share to improve treatment and support for cancer patients across the board.

There is potentially a lot to learn from radiotherapy specialists working in other tumour sites too, for example breast, given it is similarly large in numbers. We can also learn from other professional groups, such as clinical nurse specialists. While some data should be collected directly via the patient through experience surveys and outcomes monitoring, the research suggests that these roles have a more systemic impact, both across the patient pathway and beyond. There is equal need, therefore, to investigate how these roles improve professional standards, support education and training, implement advances in technology and treatment and reduce service use in other domains including emergency departments and continence services. Is having a radiotherapy site specialist improving overall pathway coordination and therefore helping to meet national cancer targets? Anecdotal evidence suggests that these specialists are contributing to a reduction in hospital attendances for patients with post-radiotherapy complications, but hard evidence is needed to confirm this.

It is important to gain a better understanding of the bigger picture, but this means starting with the critical elements and building piece-by-piece. Improving patient outcomes, care and experience, has to be the central driver for these specialist roles, and it seems that the combined expertise, authority and passion of role-holders will ensure this happens, as well as improving efficiencies.

The growth of site-specialists in radiotherapy therefore, seems to have been driven by a mix of the demand for development opportunities amongst practitioners, alongside recognition that having advanced practitioners in a specialist tumour site will likely improve patient care. Moving forward, the combination of workforce challenges across the MDT, and evidence of impact, could lead to a strong case for more site-specialists in therapeutic radiography.

Conclusion

With prostate cancer set to become the most commonly occurring cancer in our society, it is essential that the right professionals with the right skill-sets are recruited and enabled to treat and support affected men. We are a long way off having at least one prostate-specialist therapeutic radiographer at every centre, but post numbers are increasing and it looks like this could eventually become a reality. However, before patting ourselves on the back, we need to get the data that confirm a difference really is being made to patients. Only then can we expect a more rapid acceptance of the role and for it to become commonplace and fully integrated within cancer centres.

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- To find out more about Prostate Cancer UK's work with health professionals visit: www.prostatecanceruk.org/profs.
- To get involved in the Society specialists' forum contact: SpencerG@sor.org.

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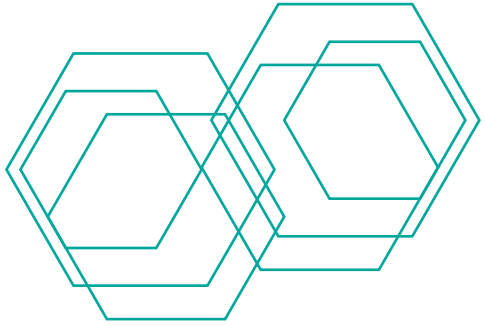
Improving cancer outcomes: Priorities for action

Sir Harpal Kumar

It's an exciting time in cancer research. Thanks to research and improvements in the way services are delivered in the National Health Service (NHS), survival rates have doubled in the UK over the last 40 years[1]. At Cancer Research UK our ambition is to accelerate this progress so that three in four patients survive cancer by 2034.



Let's not underestimate the challenge at hand: one in two people will be diagnosed with cancer at some point in their lifetime. An additional 80,000 cases of cancer are expected to be diagnosed in England each year by 2030[2], which clearly presents a huge challenge to the health system. And while progress has been good in some cancers it has not in others. There is significant variation in outcomes across the country and, while our cancer survival is improving, it still lags behind other similar countries[3]. Patient experience and long-term quality of life are also highly variable.

So it's vital that each UK nation sets clear cancer strategies to face this challenge head-on. There is absolutely no doubt in my mind that national cancer strategies provide the framework needed to galvanise the NHS around key areas for improvement.

Thankfully, each nation has a strategy in place in one form or another, but each at different stages. As such, it will be important for governments in Scotland, Wales and Northern Ireland to revisit their strategies this year as they come to the end of their lifespan, to ensure fresh ambitions are set to improve outcomes in those countries.

In England, we have a new cancer strategy, developed by the Independent Cancer Taskforce that I was honoured to lead. The reaction to the strategy has been extremely positive: the Government has committed additional funds and the NHS is developing plans for delivery. Some actions are already in hand. A Cancer Transformation Board and new national cancer lead, Cally Palmer, have also been brought in to lead the implementation across all NHS bodies, which is a positive step.

A new cancer strategy for England

Given the changes in the English NHS over the last few years, it was absolutely essential that we had a new strategy for cancer that worked within the new system configuration, building on the *Five Year Forward View*[4] for the NHS, and ensuring our patients receive the very best care.

The strategy represents the vision and ambitions of the community – not simply my views, or the views of the taskforce, but of the wide range of stakeholders including health professionals and patients we engaged with along the way. Why is that important? Because it represents a collective vision for change, and a consensus to see it implemented swiftly. And while there is a detailed list of recommendations that need to be taken forward, they can be grouped in to the following strategic priorities:

- Spearhead a radical upgrade in prevention and public health.
- Drive a national ambition to achieve earlier diagnosis.
- Establish patient experience on a par with clinical effectiveness and safety.
- Transform our approach to support people living with and beyond cancer.
- Make the necessary investments required to deliver a modern, high-quality service.
- Overhaul the processes for commissioning, accountability and provision.

The NHS and the Government now need to focus on implementation of the strategy in its entirety. The outcome of the spending review seems positive; we have commitments to invest more in early

Major barriers to better access to modern radiotherapy are workforce capacity and out-of-date equipment

diagnosis, molecular diagnostics, patient records and recovery packages. But there is much more to do, and I would like to highlight a few areas that must be prioritised to ensure we make progress by 2020.

Addressing workforce capacity

In all areas of the cancer pathway, we have significant workforce deficits that we urgently need to address. For me this is the area where we still have the most work to do, not just in England but across the UK. But in England, we need a coordinated strategic approach to truly address problems with the cancer workforce – to increase numbers to alleviate the capacity issues we are experiencing now, but also to have a workforce with the right skills mix that is fit for the future.

To date, the NHS has not developed workforce planning proposals across entire disease pathways and in different settings such as the community. A shared cancer workforce strategy would enable us to find sustainable ways to fill gaps and adopt an approach to cancer care which makes the best use of different skills. Some of the key things that should be considered include:

- Addressing immediate workforce gaps.
- Breaking down barriers in how care is provided to improve coordination of care.
- Ensuring the workforce has the right skills, training and behaviours, as well as the right support, to confidently deliver high quality and compassionate care.
- Valuing informal carers and volunteers as part of cancer care teams, and ensuring they have the skills, knowledge and support to provide care.
- Considering different models, for example the provision of some diagnostic services in community settings.

One key example is in radiology. We know that we have a deficit in the number of radiologists and this is undoubtedly impacting on our ability to deliver earlier diagnosis[5]. However, radiologists are one component of a complex diagnostic service – it is not just about increasing the number of radiologists; we also need to look at diagnostic radiographers, pathologists and non-medical endoscopists.

Of course radiologists also play a key role in the treatment of cancer, so we can't just view this from the diagnostic perspective. Within radiotherapy services there is a shortage of oncologists, therapeutic radiographers and physicists, which is impinging on our ability to provide the very best treatments to all our patients.

If we continue to take a short-term and siloed approach, we will never truly prepare our cancer workforce for the future.

Improving early diagnosis

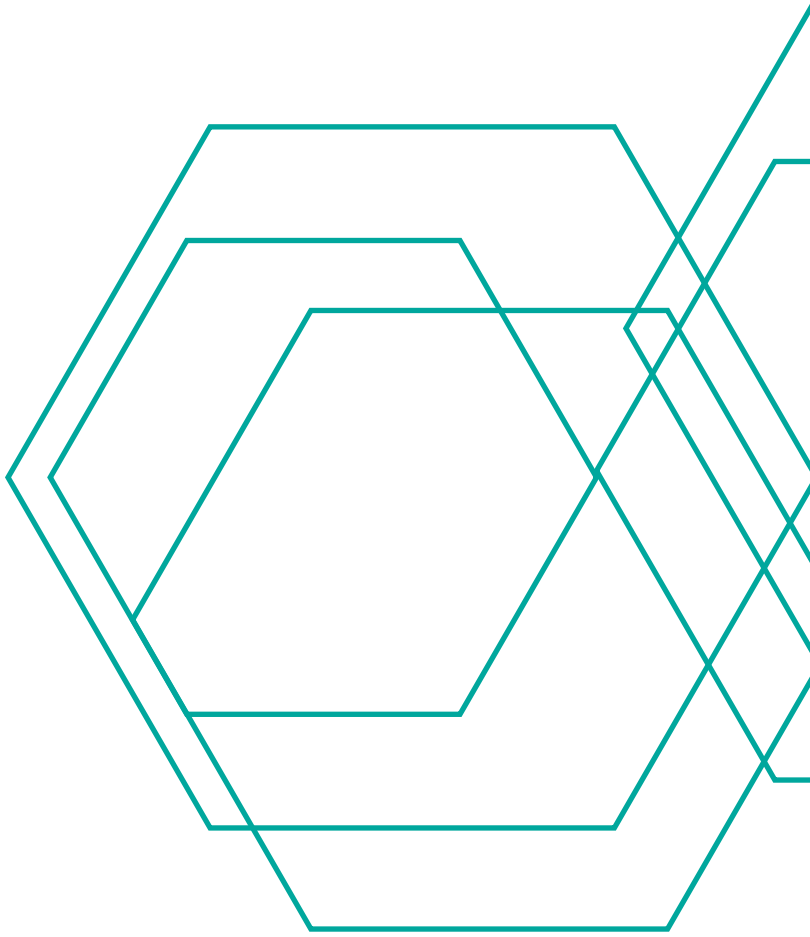
Improving early diagnosis is one of the six strategic priorities identified in the strategy for England[2]. It's vital we make progress in this area because we know that for many cancers, the earlier someone is diagnosed, the more treatment options they have, and the better chances of survival. It's also an area in which we are behind internationally – for example, we have particularly poor stage distribution for lung and bowel cancers compared to the best performing countries[6,7].

People are more than three times more likely to survive if they're diagnosed early[8]. Analysis of eight types of cancer (bladder, bowel, breast, cervical, uterine, malignant melanoma, testicular and ovarian) where there's high-quality, long-term survival data shows us that around 80% of patients survive for at least ten years when their disease is diagnosed at stage one or two. But this falls to around 25% in patients who are diagnosed at stage three or four.

There is also unacceptable variation in different parts of the country. Data have revealed that if all the regions of England were as good as the south west at diagnosing cancer early, nearly 20,000 more patients over two years could be diagnosed at stage one or two. Data are vital to highlight these disparities and help to focus efforts to make improvements.

A major reason behind late diagnosis is that there are real issues with diagnostic services capacity at the moment. For example, research that Cancer Research UK commissioned into diagnostic imaging found that services were struggling under increased workload. Imaging activity has been growing nearly 6% per year over the previous ten years, and this will continue to grow[9].

As noted previously, workforce capacity issues are part of the problem – workforce growth has not kept pace with increasing demand. But equipment is also an issue as very few hospitals have a planned, financially-supported approach to replacing or adding



Very few hospitals have a planned, financially-supported approach to replacing or adding equipment

There are real issues with diagnostic services capacity at the moment

equipment. Similar issues can also be seen in endoscopy services, where demand continues to outstrip capacity[10].

The strategy therefore, was strong in its recommendations to improve this situation. And I am pleased that the Government has responded – an extra £300 million will be provided by 2020 to fund new diagnostic equipment and additional staff capacity. This also includes training 200 additional staff to perform endoscopies by 2018. We now await more detail from the National Cancer Transformation Board, as to how this funding will be taken forward each year over the course of the strategy.

Modernising the radiotherapy service

Radiotherapy services is another area that is in need of attention. We know how effective radiotherapy is at treating cancer and in providing palliative support, being second only to surgery in its contribution to cure. It has become much more sophisticated over the last decade, providing ever more precise treatment to patients. And research will continue to refine techniques and develop new ones for patient benefit – for example, current trials funded by Cancer Research UK testing stereotactic radiotherapy and the opportunity for further research into proton beam therapy when the UK centres open. As the major funder of this type of research in the UK, it is a priority for us to ensure the benefits of research are passed on to patients as swiftly as possible.

But there is still significant variation in access to modern radiotherapy techniques across England. Patient access to intensity modulated radiotherapy (IMRT) ranges from around 20 to 70% depending on the centre[11]. It is now estimated that around 50% of patients needing curative radiotherapy should have IMRT, but this remains around 35% on average in England[12].

One reason may be that, despite the advances in treatment, awareness of radiotherapy among patients and the public is poor[13]. That is why Cancer Research UK is supporting the Radiotherapy Awareness Programme to try to improve public perceptions and awareness of the benefits of radiotherapy.

However, similar in many ways to the issues in diagnostics, the major barriers to better access to modern radiotherapy are workforce capacity and out-of-date equipment. The cancer strategy identified that 126 linear accelerators needed replacing within three years, and some that are over ten years old already need replacing more

urgently. Existing equipment also needs upgrading. Up to £275 million funding is needed to address this in the coming year and an additional £20m for dedicated MRI and PET facilities in radiotherapy departments. It's not clear whether this funding has been committed and how this will be taken forward. This is a vital and urgent issue, and we will continue to push for this funding so that patients can receive the best treatment.

So what now?

Achieving world-class cancer outcomes is a multi-faceted challenge. No one initiative will fix all the problems or address all the opportunities. What's needed now is action on all aspects set out in the strategy. We expect the Government and NHS to make true on the commitments and investments required to implement the new cancer strategy at speed.

I will be doing my best to keep them on course as Chair of the newly formed National Cancer Advisory Group. Through this group, we will be holding a mirror to the NHS and the other health bodies to keep a watchful eye on progress.

We have an opportunity to save many thousands of lives from cancer every year and significantly improve patient experience and care. We're better informed than ever about how best to prevent, diagnose and treat the disease, and how to deliver better patient experience and quality of life. We all have an equally important role to play in continuing to push for this to be taken forward, at pace, so that patients can benefit as soon as possible.

Sir Harpal Kumar is Chief Executive of Cancer Research UK, appointed in 2007. He was Chair of the Taskforce, author of *Achieving World-Class Cancer Outcomes: A Strategy for England 2015-2020*, published last year, and is a Trustee of The Francis Crick Institute in London. He also chairs the National Cancer Advisory Group and is a member of the MedCity Advisory Board. Harpal was knighted in the 2016 New Years Honours list.

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