AXREM | ASSOCIATION OF HEALTHCARE TECHNOLOGY PROVIDERS FOR IMAGING, RADIOLOGY & CARE

Manifesto for Medical Ultrasound

The modern-day stethoscope

> Right first time....
> Helping to improve Ultrasound pathways cost and resource management.

To cite this article:
AXREM (2022). Manifesto for Medical Ultrasound - "The modern-day stethoscope"
Available at: https://www.axrem.org.uk/

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01 An existing infrastructure under pressure that needs to prepare for the future

Diagnostic Medical Ultrasound is a non-invasive imaging modality that uses high frequency sound waves (non-ionising radiation) to create images of the inside of the body.

Diagnostic ultrasound is used to assess anatomical structures and physiological functions, such as the velocity of blood or the characterisation of tissue.

The advantages of ultrasound compared with other medical imaging modalities, such as Magnetic Resonance Imaging (MRI) and Computed Tomography (CT) are numerous:

- Images are produced in real-time.
- The capital cost is significantly lower compared with the other imaging modalities.
- It does not use harmful ionising radiation, like X-Rays.
- It is mobile and can be used at the patient's bedside.
- It can be used in out-patient environments for example ambulances, primary care, sports environments.

As a result, ultrasound systems are becoming increasingly ubiquitous in a contemporary health-care environment and are often regarded as being a modern-day stethoscope. Medical ultrasound constitutes one of the most commonly performed diagnostic imaging examinations undertaken nationally and internationally.

Persons that can undertake diagnostic medical ultrasound are currently not regulated, similarly to other imaging professionals, for example, diagnostic radiographers. Although the deleterious effects of ultrasound are minimal as there is no ionising radiation, there is the potential to cause harm through misdiagnoses in the hands of inexperienced operators.

Ultrasound Practitioners have evolved from a multiplicity of professional and technical backgrounds, such as radiographers, medical practitioners, and clinical scientists. As a result, there are several different descriptors for their role, for example, sonologists, radiologists, and sonographers. Depending on their start point they may or may not have specialist training and education in ultrasound and may or may not possess a medical degree.

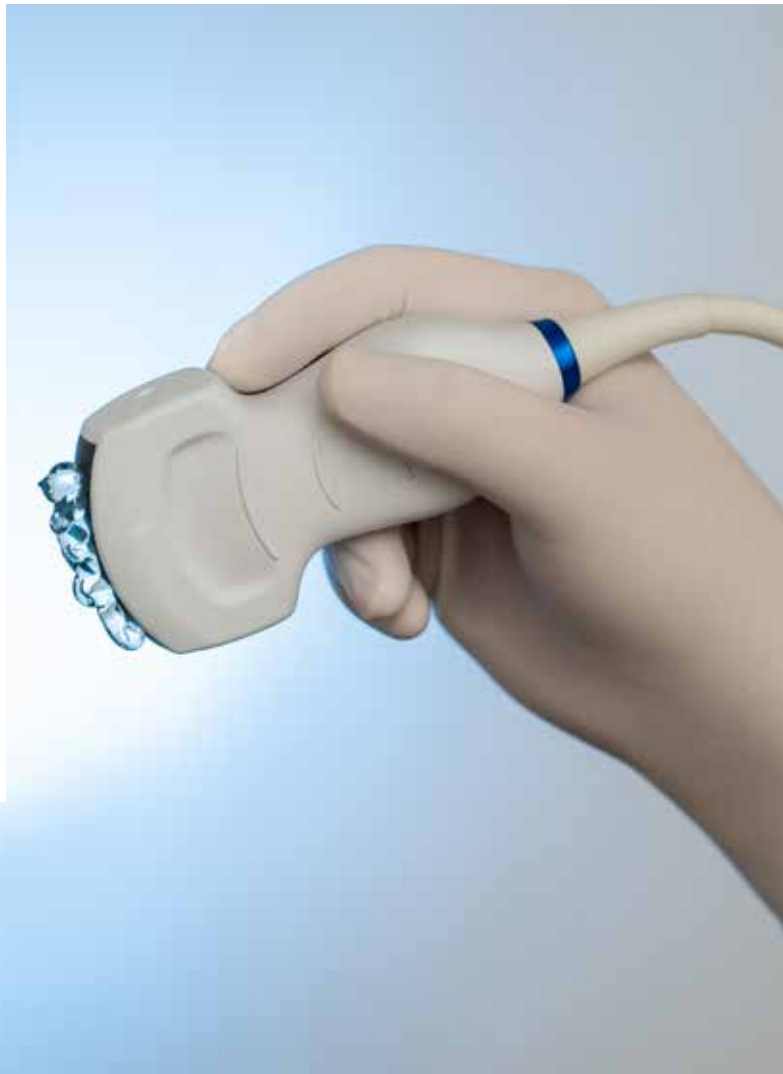
02 An existing infrastructure under pressure that needs to prepare for the future

1. The rising demand for medical ultrasound

The COVID-19 pandemic has amplified existing issues in the provision of imaging services. Currently, waiting lists for ultrasound are growing due to reduced staff capacity, an increase in referrals, and increased infection control measures. Out of all of the imaging modalities, the waiting list for non-obstetric ultrasound was reported to be the largest, accounting for 33% of the 1.34 million outstanding diagnostic tests, which is an increase of +65% since June 2020 (1). In 2018/19, according to NHS England, the demand for non-obstetric ultrasound has grown over the past five years by 3.8%, to 7.6 million exams, with annual growth rate predicted to continue at 4% (2).

2. Creation of Community Diagnostic Centres to achieve additional capacity

To achieve additional capacity for diagnostic services and reduce pressures on acute hospitals, the creation of 40 Community Diagnostic Centres (CDCs) have been identified as an NHS initiative in England. These CDCs aim to improve population health outcomes through earlier, faster, and more accurate health diagnoses (3). This means a need for investment in new, multi-modality imaging facilities, training of personnel, potential additional resourcing challenges, and procurement of imaging equipment, including ultrasound.



02 An existing infrastructure under pressure that needs to prepare for the future

3. Continual shortage of qualified medical ultrasound practitioners

Expansion of the imaging workforce, combined with improvements in productivity, will be required to increase the capacity for diagnostics and to resource the CDCs (above).

A draft NHS health and care workforce strategy for England, to 2027, identified clinical radiology as a speciality requiring additional support. In the UK approximately 80% of ultrasound examinations are performed by, and reported on, by sonographers who are a significant part of the clinical radiology workforce. Recruitment for this occupational group was cited in the NHS health and care workforce strategy as a priority due anticipated future demand and the high numbers of job vacancies.

"This increase in scan requests has not been matched by resources. Radiology departments in particular are facing a national staffing crisis, and there is a well-documented shortage of both radiologists and sonographer practitioners, with a requirement for almost 25% more posts in order to adequately address current shortages. Vacancy levels as high as 30% have been reported in some departments (4)."

A 2014 survey undertaken by the Society and College of Radiographers (SCoR) reported that 18% of vacancies in ultrasound were unfilled (5). These data were supported more recently (2019) by a SCoR survey that reported 78% of respondents had a sonographer vacancy at their institution (6). The British Medical US Society (BMUS) has named 'sonography' as a shortage-occupation and suggested that vacancy rates in England varied between 5 and 25%. Furthermore, a significant number of practitioners were approaching retirement age, thereby creating a widening workforce gap that would continue to perpetuate the problems associated with long and protracted patient waiting times, if left unresolved (6).

In summary, the clinical pathways for ultrasound examinations have remained almost unchanged for decades. To cope with the increasing demand, new models of service delivery, and channels will be critical. There are significant challenges ahead to recruit, regulate, educate, and retain the workforce required for the future provision of an efficient ultrasound service.

03 The legacy of aged Ultrasound equipment

According to BMUS the increase in diagnostic scan requests, has not been matched with resources (4). This has been evidenced by a government report in 2018 that stated patients were being put at risk due to NHS trusts using decades old diagnostic equipment (7,8). Freedom of Information research revealed that in one case 295 ultrasound systems were over ten years of age, and of these 134 were past their replacement date (7).

A number of reports including a consensus statement from the College of Intensive Care Medicine, NHS England, and the BMUS recommended:

- As a minimum, that all inter alia ultrasound equipment older than 10 years of age should be replaced with the optimal lifespan being 5 years (9).
- A significant number of ultrasound systems are required in order to cope with demand and >1000 need to be replaced (2).
- Regular maintenance and service of systems plus timely replacement of obsolete/inadequate systems is critical (Op. Cit.).

With a significant number of ultrasound systems in the UK classified as being aged, there is an increasing trend to purchase second-hand (refurbished equipment), including transducers (probes), for economic reasons. As a result of this, AXREM in collaboration with BMUS and the Institute of Physics and Engineering in Medicine (IPEM), published guidelines in 2022 to inform the procurement of pre-owned ultrasound equipment (10). The objective of this publication is to educate buyers to make more informed purchasing decisions due to the lack of regulation in this area, and the potential to cause harm to patients, rather than to obviate this practice.

04 Technology advancements in Ultrasound

New and state of the art ultrasound equipment results in superior imaging quality and processing speed. These enhancements allow practitioners of ultrasound to make confident and accurate diagnoses.

There is considerable opportunity to further develop the technology within ultrasound systems. For example, new imaging features, reducing physical system sizes to encourage usage outside of the traditional hospital settings, increasing connectivity, and future applications including Artificial Intelligence (AI) which may allow for greater accuracy and diagnosis.

The use of ultrasound has gradually expanded beyond radiology, cardiology, and obstetrics/gynaecology and is routinely used in a wide range of clinical specialities, inter alia surgery, sports medicine, and gastroenterology. Five key trends in recent technologies have been introduced by various ultrasound vendors (11):

- Improving workflow: innovations to increase productivity & improve scanning ergonomics to enable higher patient throughput without sacrificing quality or accuracy.
- AI: the concept of creating smart, intelligent ultrasound systems which automate time-consuming task with minimal user interaction for example, data analysis of vast volumes, streamlining of workflows.
- Advancements in 3D: with faster computer processing 3-D & 4-D imaging can be used for diagnostic purposes and not just obstetrics.
- New visualisation methods: where manufacturers are using proprietary technologies to reconstruct images differently, allowing for speeding up of clinical evaluations.
- Point of Care development: the move away from larger cart-sized systems to the manufacture of smaller devices (pocket or hand sized) that can be brought to a patient's bedside.

The Ultrasound Manifesto

The Ultrasound UK Industry ask for recognition of a sustained level of investment in the ultrasound industry in order to:

- Drive a programme in accordance with UK professional bodies to recruit, train, invest in, and retain ultrasound practitioners. It is critical that the industry can be resourced for both the more ubiquitous use of ultrasound for diagnosis and for the extension of use out of secondary care for example through the Community Diagnostic Centers (CDC).
- Alignment across the industry that ultrasound education and qualification should be a fundamental skill within undergraduate medical degrees in the UK. This would include the introduction of a ultrasound module within the curriculum and an entry level qualification for all disciplines.
- Ensuring that the UK Health System has funding to secure the most up to date, technologically advanced, and fully maintained ultrasound systems. To deliver improved, faster diagnoses, and reduce significant patient backlogs. Many of these advanced tools and features are only available on the more modern equipment.

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