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**Work-Related Muscular-Skeletal Disorder among UK Sonographers: Understanding the  
Challenges**

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### ***Contextualising the Problem***

Work-Related Muscular-Skeletal Disorders (henceforth WRMSDs) are a set of conditions characterised by persistent pain in the muscles, joints, bones, nerves, and/or tendons.<sup>1,2</sup> Typically caused and exacerbated by repetitive action and/or overexertion, they have been a noted problem in the general UK workforce for a significant period. In 2019/2020, the UK's Health and Safety Executive (henceforth HSE) estimated that around 480 000 workers were suffering from a new or long-standing WRMSD, at a prevalence of 1420 cases per 100 000 workers. Although there has been a slight downward trend in incidence over the last two decades, the latest HSE statistics indicate that around 9 million working days are still being lost per annum due to this problem, which amounts to 27% of all health-related absence.<sup>3</sup>

Across healthcare-related professions in the UK, the rates of incidence of WRMSD currently track at above the national average, with 1680 cases per 100 000 workers.<sup>3</sup> While there are no fully contemporary figures available relating specifically to WRMSD in the ultrasound workforce, there is strong evidence to suspect that the problem is at least as prevalent as that in wider healthcare, and very probably more so. Robust studies published in the last decade have, for example, reported that as many as up to 90% of UK sonographers are experiencing some symptoms of WRMSD at any given time.<sup>4-7</sup> Moreover, it is seldom more than five years post-qualification when some order of WRMSD manifests, and in the region of 20% of sonographers are believed to end their careers prematurely as a consequence of a WRMSD.<sup>8,9</sup> Similar concerns regarding the practical wellbeing of sonographers are also strongly reflected in a range of international studies.<sup>10,11</sup> This prospectively indicates that a prevalence of WRMSD is not an inherent artefact of UK-based working practices, but something more inherently rooted in the culture of ultrasound itself. Given such local and global evidence it is, therefore, perhaps surprising that relatively little solution-focused research has addressed the issue to date in the UK.

### ***Contextualising WRMSDs***

WRMSD is an umbrella term which denotes a wide and varied range of conditions, including (but not limited to) carpal tunnel syndrome, thoracic outlet syndrome, bursitis, tendinitis, and epicondylitis.<sup>1,12</sup>

These invariably cause chronic pain, but can also result in reduced range of movement and even alter body shape.<sup>13</sup> While a relatively clear medical nosology of WRSMDs is now established,<sup>1,2</sup> however, it is valuable to note that recent research has indicated how some confusion over the issue often exists at the level of public interpretation.<sup>14</sup> Primary here is a common conflation of ‘discomfort’ and actual disorder, respectively the gap between everyday response to a robust stimulus and a formal pathology. This is a phenomenon more commonly associated with psychological disorders than somatic conditions, with stress/anxiety being a definitive example of the former.<sup>15</sup> Short-term aches and pains are an entirely natural response to physical exertion in the same way that one *should* find at least some stress in challenging social contexts. It is only when the pertinent sensation enduringly transcends its original stressors that a pathology/disorder becomes relevant. Given this, it is possible that wider statistics around WRSMD based on self-report, such as the Labour Force Survey<sup>16</sup> which underpins HSE enumeration, might over-represent prevalence in the general population. It is less likely, however, that trained healthcare professionals would conflate sensation with syndrome in this way, which in turn implies a potentially greater gap in WRSMD between this group and others in the broader workforce.

### ***WRSMD and Risk Factors in Sonography***

Different WRSMD symptoms and syndromes are, of course, particularly prevalent in different occupations, depending on the dominant activities involved. Among sonographers, the anatomical regions reported to be the most frequently affected are the shoulder, the neck, the wrist and the back.<sup>3</sup> This unusually high diversity of impacted physiological sites reflects the complex set of activities endemic to a sonographer’s occupational role. It also renders formal assessment of risk factors an equally complex enterprise. To these ends, instructive research from Gibbs and Young highlights ten key causes of WRMSD among UK sonographers.<sup>5</sup> These are schematised in Table 1<sup>5</sup>.

*Table 1: Key causes of WRSMD among sonographers, as highlighted by Gibbs and Young<sup>5</sup>*

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1	Lack of rest breaks during the working day
2	Number of scans to staff ratio too high

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3	Management targets increasing pressure on workforce
4	Inadequate time allocations for individual examination types
5	Increasing numbers of patients with high Body Mass Index (BMI)
6	Increasing number of transvaginal (TV) scans, without adequate equipment/arm support
7	Increasing number of nuchal translucency (NT) scans, requiring long periods of time, with micro-movement of the transducer
8	Staff sickness (due to WRMSD) increasing pressure on remaining staff
9	Rotational use of different scan rooms, meaning equipment needs to be re-adjusted for each sonographer (which frequently is not done due to time constraints)
10	Lack of variety in scan types, meaning no variation in use of different muscle groups for sonographer

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There is evidence that awareness of WRSMD among sonographers is on the rise, and that some changes are being made at departmental level.<sup>17</sup> Despite the continued and high prevalence of the phenomenon in professional ultrasound, and causal knowledge having been established through research, however, very little practical action has been taken at a national level.<sup>12</sup> If left unchecked, this situation has clear implications for the future of the workforce itself.

***On the Ultrasound Workforce***

Since 2005, the UK government’s Migration Advisory Committee has listed sonography as an official ‘shortage specialty’.<sup>18,19</sup> Most recent literature seems to concur<sup>19,21,22</sup> and consequently Sonographers continue to be placed under increased workload pressures in order to keep up with caseload demand. The data outlined in Table 2 (below) demonstrate the significant increase in workload for sonographers over a period of a decade and therefore suggest an increase in overall relative workload pressure on sonographers, particularly in comparison to sonographer staffing resource currently available within the UK.

*Table 2: Shows a summary of data from NHS England outlining the number of imaging examinations performed in a given period, by each imaging modality<sup>23</sup>*

<b>Modality</b>	<b>2012-13</b>	<b>2013-14</b>	<b>% Growth in last year</b>	<b>Average Growth per year since 2003-2004</b>
<b>Radiographs (‘X-Rays’)</b>	22,636, 000	23,054,000	1.8%	1.4%
<b>Ultrasound</b>	9,302.000	9,972,000	7.2%	5.3%

CT	4,723,000	5,193,000	10%	10.1%
MRI	2,447,000	2,741,000	12.1%	12.3%
Fluoroscopy	1,314,000	1,335,000	1.6%	0.9%
Radio-isotopes/Nuclear Medicine	598,000	625,000	4.5%	0.7%
<b>Total</b>	<b>41,019,000</b>	<b>42,921,000</b>	<b>4.6%</b>	<b>3.4%</b>

Furthermore Figure 1 illustrates the overall increase in number of examinations being performed in imaging departments in England, in particular noting the significant increases in ultrasound examinations, thus further highlighting the increased pressure on the existing ultrasound workforce, thought to be adding to the increased incidence of WRMSD.

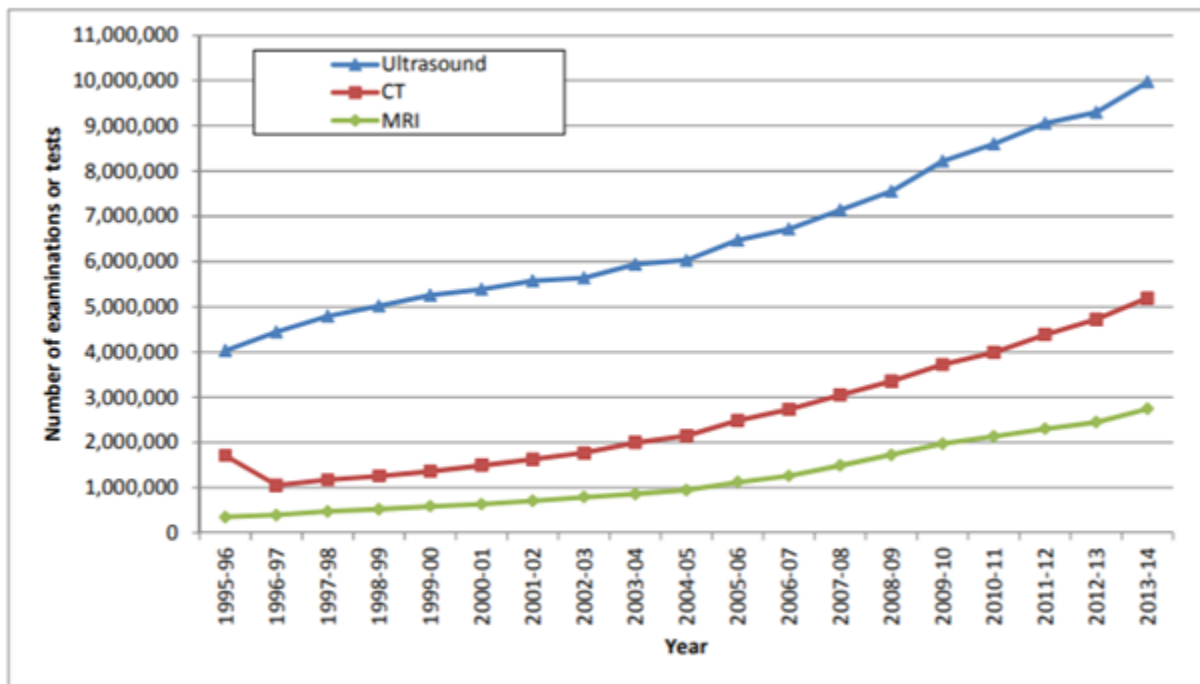


Figure 1: Shows growth in number of Ultrasound, CT and MRI imaging and diagnostic examinations, performed in England, 1995-96 to 2013-14, as cited by NHS England in 2014<sup>23</sup>

The sharp rise in sonographer workload against the potential difficulty in growing the workforce is clearly a significant problem in terms of growth of the clinical specialism and increasing pressure on existing sonographers, and it is this sense of pressure which is inherent in sonographer culture.<sup>20</sup>

### *Contextualising impacts of WRSMD in the Ultrasound Workforce*

Two recent qualitative studies the UK's ultrasound workforce identified, above all, a state of flux brought on by understaffing and high workload pressures in all but a few key areas and specialisations.<sup>21,22</sup> These indicated that a persistent 'decapitation' of the most senior staff was often a consequence of the physical and/or psychological demands of them being forced to fill more than one sonographer's role. Psychological stresses alone typically gave rise to a movement elsewhere, given that more desirable senior posts are often available in other towns or cities in a short-staffed professional economy. There was significant evidence, however, that those who instead took early retirement often did so due to physical pressures, with WRSMD cited as a persistent causal factor. This circumstance has consequences beyond the immediate loss of staffing numbers. Firstly, it denudes the existing body of sonographers of experienced mentorship. This stymies the transfer of practical knowledge within the broader profession.<sup>22</sup> Secondly, it places exceptional pressure on mid-career sonographers, who are then charged with covering senior roles and their own.<sup>21</sup> Finally, and transparently, it risks discouraging new sonographers from persisting in the profession, if they witness first-hand the potential physical consequences they may face later in their own careers.

In the most recent available HSE report, at the time of writing, sonographers in the UK were reported to be conducting between 12 and 20 scans per day, with most departments scheduling this work in 15-20 minute slots.<sup>3</sup> Evidence would indicate that these figures are now much higher,<sup>24</sup> particularly since the outbreak of Covid-19 pandemic. Furthermore, the significant national shortage of sonographers would suggest that those remaining in ultrasound practice must manage the ever-increasing workload demands, and cope with the resulting personal and professional pressure being placed upon them,<sup>22</sup> consequently affecting sonographers' ability to consider WRMSD prevention strategies, potentially leading to further cases of injury.

### *Current WRMSD Prevention Strategies*

The complexity of WRMSD in sonographers is a significant issue, particularly the multifactorial nature,<sup>5</sup> and one which directly links with the challenges of creating a suitable prevention strategy and provides some explanation as to why no single workable solution has been found. The Society and

College of Radiographers (SCoR) has issued a series of guidance documents for sonographers regarding WRMSD prevention, and the most recent was published in 2019.<sup>25</sup> Furthermore, there is also evidence that WRMSD prevention strategies, for sonographers, have been emerging over the last 10 years and in places improvements seem to be developing.<sup>12, 26</sup> The recommended improvements include better ultrasound equipment design (with improved ergonomics), the distribution of muscle-strengthening exercise instruction posters throughout ultrasound departments, ultrasound departments varying their examination types throughout the day for each sonographer, to allow different muscle groups to rest, and improvements in education for sonographers, managers and appointments staff relating to the risks and of WRMSD.<sup>12, 27</sup> Despite these positive efforts, current WRMSD prevention methods continue to remain inadequate in reducing the incidence of WRMSD, supporting the need for further research in this area.

Most contemporary studies related to WRMSD prevention tend to be quantitative in nature and have often adopted an approach utilising a simulated environment.<sup>28, 29</sup> Consequently, the findings of such studies are not always directly transferable into current clinical practice (i.e., there are issues of ecological validity at stake). Furthermore, there are a number systematic reviews and review articles available which, although powerful tools for consolidating existing knowledge, do not necessarily add anything novel to the current debate. Strong and practical interventions for WRMSD in the ultrasound working environment require, as a precursor, an equally strong and practical range of contemporary evidence. This cannot be achieved through limiting ourselves to a small number of research methodologies. Simulations and reviews need to be augmented by robust workplace-based research and studies of lived experience if we are to properly comprehend the true shape of the problem itself. Our own ongoing qualitative investigations, exploring how the sonographer role and its associated professional culture in the UK interrelates with WRMSD incidence and experience, is only one example of this. Some creative thinking is going to be required from researchers in forthcoming years if their data are to inform clear and meaningful policy development.



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