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# Transferable military medical lessons from the Russo-Ukraine war

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## ABSTRACT

The first year of the war in Ukraine has presented critical lessons for the UK's Defence Medical Services (DMS) regarding its preparedness to support the nation for warfighting at scale. There are tactical, clinical, and strategic challenges that must be addressed. The war has exposed the limitations of international humanitarian law and the laws of armed conflict in protecting forward field hospitals from deliberate targeting. The DMS may need to employ measures such as disguise, deception, and dispersal to provide care in a contested environment. The historical trend of disinvestment in military medical capability between major conflicts, known as the "Walker Dip," represents a clinical risk that must be mitigated. Even if this is achieved, clinical outcomes during large-scale warfighting are likely to be worse than those the nation has come to expect during more low-intensity conflicts. Effective civilian-military collaboration will be paramount to manage casualties at scale. Both novel and reversionary modes of transportation may be required, such as the mass movement of casualties by train. The need for a sufficient and capable medical workforce, amid global shortages and post-COVID burnout, calls for further investment. The DMS requires innovation and adaptability to harness the ability to adopt external ideas, translate successful innovations and address complex challenges. By addressing tactical vulnerabilities, enhancing clinical preparedness, fostering civilian-military collaboration, and embracing innovation, the DMS will be better equipped to support the UK and allied armed forces in future warfighting at scale.

## INTRODUCTION

Napoleon Bonaparte recognised that when commanders move field hospitals to the front line of troops, they declare an intent to take casualties and thus an intent to fight. In January 2022, the international community observed, largely in open source materials, field hospitals appearing along the northern, eastern and southeastern borders of Ukraine. There were blood drives of university students, Russian military medical exercises that used large anaesthetised animal models, and medical evacuation chains in place back to St Petersburg. These declarations of intent warned of impending war.<sup>1</sup> In summer 2022, Olena Chernenko, founder and CEO of the Ukrainian Medical Alliance stated that although 'war' had been everywhere in media and public communication, Ukraine's hospitals were unprepared for the invasion on a systemic level.<sup>2</sup>

Would the UK's Defence Medical Services (DMS) and National Health Service have been ready for an equivalent response to support the nation? In July 2022, the Royal United Services Institute Journal published an article entitled, "*You are the weakest link: the limits of UK Defence Medical Capability*".<sup>3</sup> This article articulates an 'uncomfortable truth': the war in Ukraine has highlighted the military medical capability gaps for warfighting that have accrued during the 30-year peace dividend following the Cold War. It concluded that recapitalising the DMS was essential if Op MOBILISE<sup>4</sup> (the mission to 'deter Russian aggression' and 'prevent war') was to be realised. Now is the time to address the deficiencies in collective medical capability, taking the lessons from the war in Ukraine, which have been shared directly with the alliance Surgeon General community. Others from the USA have summarised some of the lessons learnt from the first year of war in Ukraine.<sup>5</sup> The current article discusses the most important tactical, clinical and strategic lessons that apply to the UK's DMS according to its Surgeon General, and some of the mitigations to the identified medical challenges. Learning and adapting to these lessons through refinement in concepts and doctrine will ensure preparedness for future warfighting at scale.

## TACTICAL

### Abuses of international humanitarian law and the laws of armed conflict

It had previously been assumed that a principle (the Geneva Conventions), and an emblem (the Red Cross) would provide 'protection' in state-on-state conflict within forward field hospitals. However, Russian actions have shown this not to be the case. Long before the invasion of Ukraine, in 2016 Amnesty International reported that Russian and Syrian government forces were deliberately and systematically targeting hospitals and other medical facilities to pave the way for ground forces to advance on northern Aleppo.<sup>6</sup> In that protracted conflict, health workers were forced underground or into unmarked buildings of opportunity to deliver care to wounded patients.<sup>7</sup> Equally in Ukraine, it is now clear the international consensus is inadequate protection against a belligerent party who does not respect either the laws of armed conflict or humanitarian principles. In January 2023, Ambassador Neil Bush, the Head of the UK's Delegation to the Organization for Security and Co-operation in Europe highlighted mounting evidence of war crimes committed by Russian forces in Ukraine while areas were under their control.<sup>8</sup> In addition,



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## Analysis

ongoing strikes on Ukraine's cities, civilians and critical infrastructure is creating an enduring humanitarian impact on the Ukrainian population. Within weeks of the start of the invasion, multiple healthcare treatment facilities had been targeted by the regime, often with devastating consequences.<sup>9</sup> In such circumstances the DMS may need to make better use of disguise, deception and dispersal, such as the use of underground car parks and basement contingency hospital wards to provide care to patients. Enhanced air defence protection for medical treatment facilities such as those at a military headquarters may be required.<sup>10</sup>

### Protected ground Medical Evacuation

Protected ground Medical Evacuation allows combat casualties to reach timely surgery (including 'damage control surgery') that can preserve life and maintain future function. This was one of the earliest priority-asks of Ukraine and has been met with wide international assistance. Furthermore, there has been a re-evaluation of reversionary methods of moving mass casualties over large distances while offering meaningful treatment. These have included hospital trains. With a degree of irony, it is acknowledged that the hospital train was a method first used after the battle of Balaklava in Crimea in 1854, and later refined to include a surgical capability as a Russian innovation during their war with Japan in 1904 by the surgeon Vera Gedroits.<sup>11</sup> Up to 60% of Ukrainian military casualties have been moved east to west by train. As well as the parallel effort to explore how surgical teams can be mounted on an aircraft, it is necessary to also re-explore how such a capability might be used on a train when moving casualties for hundreds of miles.

### Transnational casualty movement

The war in Ukraine has highlighted the need to address the requirement for transnational casualty regulation across and between continents. To manage *civilian* casualty distribution across Europe from Ukraine, the EU's Emergency Response Coordination Centre has been used, supported by military STRATEVAC air assets, particularly from Germany and Norway. To manage *military* casualty redistribution, the new Multinational Military Coordination Centre in Koblenz has been used. Lessons from this experience are enhancing understanding for redistribution of the North Atlantic Treaty Organization (NATO) allied casualties in the event of the UK being involved in warfighting at scale.

### Medical supplies (project KOROVAI) and stockpiles

Project KOROVAI is the initiative designed for the international community to come to Ukraine's aid and to commit to gifting lethal and non-lethal aid. The project has subsequently been expanded to include coordination of medical materiel gifting. This aims to avoid key gaps in provision and avoid duplication of effort. In essence, it is the same function as a 'wedding list' and Korovai (коровай) is a symbolic bread baked for Ukrainian weddings, where it is cut and distributed to guests who offer gifts in exchange.

The COVID-19 pandemic demonstrated that 'just in time' logistics do not work, particularly when consumables (eg, personal protective equipment) are procured and supplied from a common source. If there is excessive demand by multiple nations on the supply chain, or if the supply chain is contested or disrupted by war, there is a risk of key shortages. In order to address this challenge, there are several key priorities; first to consider what critical equipment or consumables must be manufactured from within the UK ('sovereign capability'); second to

hold more stock and third, how to rotate this greater stock out and use it for healthcare provision, so it is not wasted.

## CLINICAL

### Expectations for clinical outcomes when fighting at scale

It is acknowledged there is an historical and cyclical disinvestment in military medical capability between major campaigns, known as the 'Walker Dip'.<sup>12</sup> Such a dip has been entered at the end of the contemporary Afghanistan campaign. It is not just a UK phenomenon, but has been mirrored across the NATO alliance. It explains why clinical outcomes improve through the course of a war, in part through restoration of capabilities and in part through innovation to match new signature injury or illness patterns. To offer reassurance, the current European war has been a catalyst for international military medical reinvestment: mitigating actions will drive medical capability collectively back up the curve.

Irrespectively, clinical outcomes will still be poorer during warfighting at scale than in low-intensity conflict. The crude outcomes of military casualties in Ukraine have been expressed as the ratio of Killed in Action to Wounded in Action, and these are less favourable than survival in the 21st century conflicts in Iraq and Afghanistan. Yet this is no surprise, given the volume of casualties, the contested evacuation and the proportion of wounding from heavy weaponry. It is a reminder for commanders, politicians and the public—including the families of Service personnel—to understand and accept that outcomes may be poorer in future conflicts of this kind. History confirms that more risk is accepted in wars of national survival than wars of choice. But today, the unattainable public expectation may be the sustainment of exquisite care previously afforded by the DMS for individual casualties in low-intensity conflict.

### Antimicrobial resistance

Before the invasion, drug-resistant organisms were prevalent in Ukrainian hospitals. In a study of >9000 surgical patients, rates of surgical site infection were high (21%) with methicillin resistance reported in 35.7% of *Staphylococcus aureus* isolates.<sup>13</sup> With antibiotics previously available over the counter, in August 2022 the Ukrainian Ministry of Health implemented a new process where all patients are required to obtain a prescription from a doctor before buying antibiotics. However, a combination of a sustained influx of patients with complex wounds, delays to treatment, long turnaround time of laboratory tests and transport of patients over large geographical distances has created a 'perfect storm' for a major problem with antimicrobial resistance in Ukraine.<sup>14</sup> The DMS will need to prepare for, and mitigate this risk if undertaking operations in similar scenarios.

### Chemical, Biological, Radiological & Nuclear (CBRN) considerations

The Russian government supported Syria with military aid and direct military involvement since the beginning of the Syrian conflict in 2011. There have been multiple allegations of the use of chemical weapons in Syria (eg, the Khan Shay Sarin gas attack on 4 April 2017 that allegedly killed 90 civilians; and a chlorine gas attack on Douma on 7 April 2018, which allegedly killed between 40 and 50 people). The spectre of nuclear weapons has also been overtly threatened by Russia. In September 2022, Vladimir Putin stated: *"If the territorial integrity of our country is threatened, we will without doubt use all available means to protect Russia and our people. This is not a bluff"*.<sup>15</sup> NATO is committed to developing and maintaining necessary Chemical,

Biological, Radiological and Nuclear (CBRN) defence capabilities including intelligence, personnel, equipment, policies, plans, exercises and training. These are effectively integrated into NATO's deterrence and defence posture; and there is a commitment that societies will have the necessary resilience against CBRN threats. Additionally, there are trusted medical countermeasures, diagnostics and treatments, and NATO has re-energised its policy on CBRN, signed off at the last Heads of State summit in Madrid.<sup>16</sup>

## STRATEGIC

### Civilian-military collaboration

Collaboration between civilian and military organisations will be central to success in the management of casualties at scale. In peace, when the DMS is involved in expeditionary deployments, these can rely on a high-income country's Role 2 and Role 3 facilities for emergency care. In war, this may be more complex when the host nation's civilian population has parallel increased demands on emergency 'war surgery' care. For strategic evacuation, civilian air, rail and ferry assets will provide the necessary capacity. On arrival in the home nation, injured Service personnel would likely overwhelm any dedicated military hospital capacity and would need to be treated in civilian hospitals. This is absolute for those nations, including the UK, who no longer have independent military hospitals. Civil-military collaboration is understandably therefore at the heart of the new NATO Medical Support Capstone Concept, approved in 2022 by NATO's Military Committee. In the 21st century, UK combat casualties have almost exclusively been received at the Role 4 hospital in Birmingham (currently the Queen Elizabeth Hospital). With a higher number of casualties than recent conflicts, there may need to be many more receiving hospitals within the UK, requiring a level of civilian-military collaboration far beyond what has been required in the more recent conflicts.

### Medical work force capability

One of the greatest risks for warfare at scale is a sufficient and sufficiently capable work force, which is well understood through internal review.<sup>17</sup> The fragility is compounded by external factors beyond control, including the global shortage of healthcare workers, an NHS under extreme pressure and post-COVID-19 burnout.<sup>18</sup> The mitigation may be to re-invest in some areas where posts have been civilianised, de-enriched or deleted, particularly where this impacts on support to deployability in the firm base. There is also the requirement to ensure 'the offer' to serve is at least as attractive as the NHS, when barriers to exit are extremely low.

### Innovating in crisis

To innovate in crisis, it is necessary to harness the ability to be good 'innovation adopters'. This is the ability to take an external idea and rapidly bring it in to one's own organisation. The conditions required to be a good ADOPTER are Agility, Decisiveness, being Outcome-focused, politically aware, Tolerant of risk, Empowered and Rewarded.<sup>19</sup> 'Innovation translation' is where innovation is spread to a different part of an organisation, to another organisation or internationally to an ally. An example of this might be the UK expertise in building military rehabilitation capacity in Ukraine. However, it is not always straightforward to effect change, especially if complex. For innovations to be successful, transformational leadership is required in the receiving organisations as well as responsive networks to effect and distribute change. This would also require innovations to be

relevant and adapted to the specific needs so that innovations are accepted, with life-enhancing impacts for patients. The DMS may wish to consider the eight-step model of complex change described by John Kotter when planning for large-scale change.<sup>20</sup>

## CONCLUSION

Vladimir Putin has consistently stated that: '*Russians and Ukrainians are one people—a single whole*' and descendants of an '*Ancient Rus*'.<sup>21</sup> This denial of Ukrainian statehood led to the illegal annexation of Crimea and the subsequent illegal and unprovoked invasion of Ukraine. The devastating impact of modern munitions on a civilian population and national critical infrastructure has revealed the true implications of 'fighting at scale'. There are tactical, clinical and strategic lessons to learn for the UK's DMS. The challenge of retrieval of casualties from the point of wounding and their treatment in facilities that are no longer protected while within range of drone munitions and missiles is the catalyst to review and revise modern combat medical support. The Korovai principle of gifting what can be afforded to Ukrainian peers must be matched by the effort to ensure the DMS medical capabilities are ready to step up to provide the effective support to the UK and allied Armed Forces.

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