



## REVISITING MEDICAL CARE FOR PEER-ON-PEER MAJOR COMBAT OPERATIONS

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### JCSP 50

#### Service Paper

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**REVISITING MEDICAL CARE FOR  
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# REVISITING MEDICAL CARE FOR PEER-ON-PEER MAJOR COMBAT OPERATIONS

## AIM

1. The aim of this paper is to improve the short-term sustainment of combat effectiveness and increase medical survivability in Major Combat Effectiveness by significantly changing the system of combat medical care.

## INTRODUCTION

2. The Canadian Armed Forces Medical Services are optimized to the lessons of counterinsurgency. The resulting system relies on friendly forces having overmatch in terms of fires, fighting vehicles and reserves. These allowed the care and extraction of casualties to be a high priority in contact without the engaged force facing significant risk of being over-run. The CAF were able to evacuate, often by air, to a well-established surgical centre in proximity to the battlespace. Here surgeons delivered exceptional care with minimal risk of attack. The above factors have yielded medical doctrine where the first principle in medical planning is “*primacy of clinical lead*” while “*sustaining the fight*” is not listed.<sup>1</sup> This paper shift to consider a Canadian battlegroup or brigade fighting against attack by a peer enemy. Based on the Ukraine conflict the CAF can expect the close battle to see heavy use of artillery and drones to support mechanised forces. The enemy is expected to use rocketry, air and drones to target the brigade rear. Opposing Force reach will routinely extend deep into the rear including covering major population centres. It is also likely that the enemy will have the will, and capacity, to attack critical national infrastructure such as power generation, communications and host nation medical assets.<sup>2</sup> It is expected that large facilities such as Role 2 and 3 hospitals will be identified and struck by long range fires or raiding and sabotage by irregular forces.<sup>3</sup> The intensity of combat is likely to be dramatically higher than that seen by NATO forces in the last two decades. Evidence from Ukraine suggests that surgical facilities and evacuation assets are targets not sanctuaries.<sup>4</sup> In preparation for peer conflict the CAF, and allies, must revisit how they prepare for casualties, evacuate them, where they treat them and how the force keeps fighting to win the close battle. At core this should be championed by all arms not the support community as in executing the ‘Shield’ function we will safeguard the ‘Act’ function to strike and defeat the enemy. While giving primacy to ‘Act’, leaders must demonstrate that the

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<sup>1</sup> Department of National Defence, *CFJP 4-10 Health Services* (Ottawa: Canadian Forces Health Services Group 2022), p1-4 Accessed 2 February 24.

<sup>2</sup> Keilar, Brianna, Alex Marquardt, Jim Sciutto, and Bianna Golodryga. *Horror Intensifies as Russians Bomb Children's Hospital in Ukraine; Russia Escalates Attacks on Civilians, Including a Maternity Ward; Russia-Ukraine Talks End without Progress on Ceasefire. Aired 7- 7:30a ET.* New York: CQ Roll Call, 2022.

<sup>3</sup> Craig, Melvin, Hoda Kotb, and Molly Hunter. *Russia Steps Up its Attacks Hitting A Military Base in Ukraine just Miles from the Border with Poland.* New York: CQ Roll Call, 2022.

<sup>4</sup> United News of India, “*Around 64 Hospitals Attacked in Russian Invasion of Ukraine: WHO.*” [Link](#), Mar 24, 2022. Accessed 16 February 24.

institution has achieved the most beneficial balance between collective victory and individual survival to protect the moral component of fighting power ('Shield').

3. This paper expects casualties in the first hours of a major assault to run in the region of 15-30% of the combat BG force elements engaged. This is based on British Army wargame evidence.<sup>5</sup> While this close fight is conducted it is expected that the line of communication will be interdicted with fires and significant air defence assets will challenge use of aviation. This paper proposes four areas where the current medical scheme of manoeuvre in the close battle should be changed to preserve combat power while protecting medical assets. The areas for review are: preparation for contact, immediate first aid, evacuation and re-location of surgical care (which is enabled by improved evacuation mechanisms). The paper builds on the recognition in doctrine of emerging technology; however, it is restricted to that which is in development and likely to be realised within the next five to ten years.<sup>6</sup>

## PREPARING THE FORCE

4. Firstly, the CAF must address the preparation of the force so this it maximises combat power at the point of contact in order to defeat the enemy lead echelon. Under current NATO joint doctrine this fixing of the enemy lead element allows for further prosecution by joint assets. The challenge for BG commanders is to ensure that there is balance between battle preparation, patrolling & positioning, camouflage & deception with rest. Soldiers will have little rest prior to contact. Once contact begins it is likely that this burden will increase even if the CAF is successful in the initial contact battle. Soldiers will need to re-position, re-dig, resupply or counterattack. It is probable that for at least 72-hours minimal rest will be achieved while the enemy assault element is defeated and both sides seek to consolidate.<sup>7</sup> In this period soldiers will experience high stress and many will be wounded below the threshold for immediate evacuation. To deal with this the CAF should continue to improve inoculation training; but, being more proactive the forces should also review protocols for the use of stimulants.<sup>8</sup> For the purposes of this scenario the CAF should authorize leaders to issue amphetamines in preparation for intense combat.<sup>9</sup> Similarly, the use of nootropics in command and control roles could be beneficial.<sup>10</sup> These stimulants will come at a longer term psychological cost; however, they are likely to increase performance for the time required to defeat the lead enemy echelon.<sup>11</sup>

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<sup>5</sup> British Army. LWC S&T Wargame - Op CABRIT 10 EFP BG Plan 1-9 Jul 22. Official Sensitive. 5 August 2022. Available on request. Accessed 6 Feb 24.

<sup>6</sup> Department of National Defence, *CFJP 4-10 Health Services* (Ottawa: Canadian Forces Health Services Group 2022), p1-3 Accessed 2 February 24.

<sup>7</sup> Watling, J. & Reynolds, N. 'Meatgrinder: Russian Tactics in the Second Year of its Invasion of Ukraine', Royal United Services Institute for Defence and Security Studies (2023). p. 5. <https://static.rusi.org/403-SR-Russian-Tactics-web-final.pdf> Accessed 2 February 23.

<sup>8</sup> Wiederhold, Mark D., Brenda K. Wiederhold, and Virtual Reality Medical Centre San Diego CA. 'Using Advanced Prosthetics for Stress Inoculation Training and to Teach Life Saving Skills', no. Generic (2010), p1. Accessed 7 February 23.

<sup>9</sup> Davidson, Colin. *A brief history of drug-fuelled combatants*. The Conversation. 2024 p3. Accessed 7 February 23.

<sup>10</sup> Davidson, Colin. *A brief history of drug-fuelled combatants*. The Conversation. 2024 p3. Accessed 7 February 23.

<sup>11</sup> Historically precedent such as the use of Pervitin by the Wehrmacht suggests that short term use of stimulants does yield opportunities for sustained manoeuvre.

5. There is clearly risk to be addressed in this recommendation such as altered short and long-term behavior. These have been explored in some areas, such as in support to pilots to use nootropics; however, the proposal here would increase usage and delegate to a lower level of authority-to-issue and would increase risks.<sup>12</sup> In the short term reduced inhibitions and increased aggression may require us to introduce checks to ensure that soldiers are monitored and removed from the contact zone once initial contact has been resolved. It would seem logical to provide for military police, with supporting medical personnel, to be in the BG reserve ready to be tasked forward to oversee and support the chain of command in controlling combat troops post-contact. These support troops may need sedatives to support troops whose judgement has failed until they are in a condition to receive psychological support.

## **KEEPING MORE SOLDIERS IN THE FIGHT FOR LONGER**

6. The second area identified is to keep more soldiers effective for longer in order to defeat the enemy lead echelon and buy time for friendly forces to act. To do this the CAF must address cases of shock, minor wounds and those whose wounds are serious but not life threatening. For example, history gives multiple example of soldiers who through exceptional heroism have continued to fight with broken limbs or blood loss. The goal here is not to keep wounded soldiers fighting indefinitely but for a period of some hours. This will allow the force to win the current fight and reduce the surge burden on medical and evacuation assets. This paper proposes that CAF exploits advances in medical technology, pharmaceuticals and AI to replace the requirement for exceptional heroism with managed stimulation and enhanced first aid. This topic could clearly be expanded upon by experienced medical personnel; however, for the purposes of this document two cases are considered. Soldier A is wounded by shrapnel resulting in traumatic amputation of the left hand above the wrist. They clearly require medical attention, will be losing blood and are likely to be in a condition of shock. However, mechanically, they are capable of fighting, albeit at reduced efficiency. Combat aides that are already issued can address the bleeding such as tourniquets and CELOX gauze. With changes to protocols and training there are aides to counter the psychological impacts of the injury; for example, experiments with '*pain vaccines*' could allow a soldier to fight on if mechanically fit.<sup>13</sup> The CAF clearly needs to guide soldiers in when such drugs are administered; here, the CAF can introduce the third enhancement to the medical process: artificial intelligence and virtual medical assistants. It will be impractical, and unsafe, to have a medical professional in every section position to provide expert advice; however, it is possible to provide '*smart aide memoires*' which support the troops while reducing exposure of medical personnel.<sup>14</sup> The forces should develop an app with voice recognition that can be programmed with the tools troops carry and can

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<sup>12</sup> Caldwell, John A. "Go Pills in Combat: Prejudice, Propriety, and Practicality." *Air & Space Power Journal* 22, no. 3 (Fall, 2008): 97-104. p102.

<sup>13</sup> Wang, Brian "\$3 Billion Super Soldier Program." *Next Big Future*. 2008. Accessed 8 February 2024.

Taraska, Philip Andrew. "How can the use of Human Enhancement (HE) Technologies in the Military be Ethically Assessed?" Order No. 10265411, Duquesne University, 2017. p142.

<sup>14</sup> John Quinnet al. *Prehospital Lessons From the War in Ukraine: Damage Control Resuscitation and Surgery Experiences From Point of Injury to Role 2*, Military Medicine, Volume 189, Issue 1-2, January/February 2024, p21.

provide direction on appropriate first aid and the drugs which should be administered.<sup>15</sup> This 'doctor in a box' should also ideally be linked to a soldier wearable technology that can monitor heart rate and other vital signs to assist in diagnosis.<sup>16</sup> These would need to be based off short range Bluetooth or similar to reduce the impact in terms of emissions. Soldier B is catatonic with shock due to exposure to artillery fire. In this case a 'doctor in a box' could direct the provision of calming drugs such as *propranolol* and *oxytocin* to control fear and assist the soldier in returning to temporary combat effectiveness.<sup>17</sup> This approach would require changes to how soldiers are trained in first aid and the approach taken to triage for evacuation. Soldiers will need to be practiced in how they deal with wounds and to expect that evacuation will only be immediate for those with the most severe wounds. Commanders from the fire team level upwards will need to train for how to employ soldiers who are wounded and what should be expected from those on stronger stimulants and analgesics while those at the company level and above will need to understand how to monitor the condition of troops. They will need to understand how long they have until they need to pull wounded soldiers out of combat even if the pharmaceutical assistance means they are no longer seeking evacuation for themselves. Again, wearable technology tied to AI medical assistants may be able to provide a hand-rail by tracking soldiers vital signs, automatically timing exposure to drugs and predicting rates of degradation. These tools will need a simulated training package so personnel such as Company Seconds-in-Command and Sergeants Major can understand implications and practice the managed of evacuation assets to ensure that each soldier provides the greatest combat output for the longest possible time without unacceptably impacting on their personal chance of survival.

## MODERNISING CASUALTY EVACUATION

7. The third area to overhaul is the casualty evacuation process. At present troops must extract wounded from the direct fire zone manually. Either the target platoon or a force element drawn from the reserve is coordinated by the sub-unit Sergeant Major to carry casualties out of contact. Over anything but the shortest distance this requires four personnel and a stretcher. The deployed force may expect twenty percent casualty rates and it may assume that in a platoon of thirty this means six casualties and that two are non-ambulatory, requiring immediate evacuation then a platoon has lost a section of eight in addition to the two casualties. The four further casualties may require some support the platoon may have close to half its strength non-effective for a period. This is not acceptable if the friendly position is to survive and repulse an assault. Some of this problem may be addressed by seeking to keep walking wounded as temporary combat effectives; but, of greater importance is freeing up the bearer parties to fight either with the original target platoon or as part of the reserve. Unmanned Systems are the logical solution to this problem.<sup>18</sup> The CAF should invest in a multi-domain system that embraces networked unmanned systems for casevac. This should include land and air but it may be appropriate to use

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<sup>15</sup> Gandhi, Meera, Vishal. K. Singh and Vivek. Kumar, "*IntelliDoctor - AI based Medical Assistant*," Fifth International Conference on Science Technology Engineering and Mathematics (ICONSTEM), Chennai, India, 2019. Accessed 7 February 2024. p 162.

<sup>16</sup> Ibid.

<sup>17</sup> Taraska, Philip Andrew. "How can the use of Human Enhancement (HE) Technologies in the Military be Ethically Assessed?" Order No. 10265411, Duquesne University, 2017. p159.

<sup>18</sup> Although enhanced load-carrying suits could also assist by allowing one soldier to carry a casualty

fast boats or boat-drones to bring soldiers across water at reduced threat of attack. All-terrain Unmanned Ground Vehicles should replace the requirement to carry soldiers out of the direct fire zone to the company aid post or, more preferably, to an exchange point to another faster exfiltration mechanism.<sup>19</sup> Utopia in this case would see low profile, fast moving UGVs dispatched from the Company Sergeant Major to the point of wounding with the UGV returning the casualty the CSM where a medic can check the casualty's packaging and then dispatch them by Unmanned Air Vehicle further to the rear.<sup>20</sup> A robotic pilot capable of navigation at speed and at very low altitude would reduce risk to the casualty from ground fire and interception. To realise the full benefits of such a system the CAF would wish to exploit this range to push surgical facilities to the rear to increase their safety, a fourth improvement. The CAF would; however, have to adapt battlespace management processes to coordinate the BG or Bde's fleets of UGV and UAV. These will need to be managed to ensure as close to continuous rotation of assets into and out of the contact area. There are further implications for multi-domain operations as there are clear impacts on air operations and the employment of fires in support of contacts. For this purpose, a new 'Evacuation Command' network is required. This cell will need to go beyond the remit of the current Medical Coordination Cell (MEDCC) which, in CAF doctrine, is "*normally formed at the Divisional level*" and conducts the medical elements of casualty control.<sup>21</sup> Instead, due to the increase in assets, impact on airspace management and implications for the duration in which units with degrading casualties may be held in contact must now be incorporated into J3 Battle Captain/Operations staff with its links to the Joint Fires and Air Cells at the Brigade level. J2 must complete synthesis of routes for the AI Pilots with the ability to dynamically re-route evacuations to enable aviation and fires. The Evac Comd will need to be more empowered than Medical Support Officers have traditionally been in order to ensure that the robustness of the system is maintained and yields the benefits in preserving combat power which are intended. This needs to be reflected in an update to doctrine where J3 is not currently given specific responsibility for enacting the control of evacuation.<sup>22</sup>

## CONCLUSION

8. **Benefits.** The recommendations above build a system that requires testing; however, it has the potential to enable forces to survive the shock of first contact, remain resilient for longer, inflict greater attrition on the enemy and generate the time required for friendly formations to respond. The risk faced at present is that medical assets are targeted and that those which remain are overwhelmed. On the line of contact the current mindset and responses to casualties increases the likelihood that positions will be over-run requiring us to accept greater risk with strike assets to stabilize the Forward Line of Own Troops. All of the technology listed in this

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<sup>19</sup> Beebe, Michael K., Gary R. Gilbert, and Army Medical Research and Material Command Fort Detrick MD. '*Robotics and Unmanned Systems - Game Changers for Combat Medical Missions*', Army Medical Research and Material Command Fort Detrick MD.no. Generic (2010).

<sup>20</sup> Handford, Charles, F. Reeves, and P. Parker. "*Prospective use of Unmanned Aerial Vehicles for Military Medical Evacuation in Future Conflicts.*" *Journal of the Royal Army Medical Corps* 164, no. 4 (08, 2018): 293. <https://doi.org/10.1136/jramc-2017-000890>. Accessed 9 February 2024. p294.

<sup>21</sup> Department of National Defence, *CFJP 4-10 Health Services* (Ottawa: Canadian Forces Health Services Group 2022), p3-9 Accessed 7 February 24.

<sup>22</sup> Department of National Defence, *CFJP 3-0 Operations* (Ottawa: Canadian Forces Warfare Centre 2011), p4-6 Accessed 7 February 24.

paper is extant, or at moderate to high level of technical readiness. However, an adjustment in mindset is needed to change risk acceptance, increase freedoms and take a balanced stance on a number of ethical areas such as the use of pharmaceutical options. Further, empowerment of junior leads is required to make them take decisions that provide temporarily increased combat power at the potential risk of increased psychological and physiological damage to serve people in the longer term. Planning for remediation of this damage once the combat is won will be required; however, the CAF will have increased its combat power and therefore ensure the collective survival of CAF units. In proceeding down this line of development the proposal should be considered not as an Army Medical Service project but as a combined arms necessity – it is combat units that will receive the greatest benefits, in terms of resilience and effectiveness, from enacting this revised system not the medical services.

## RECOMMENDATIONS

9. **Summary.** To conclude the CAF should:
  - a. **Pharmaceuticals.** Review, field and plan for increased use of stimulants and sedatives in preparing for combat to improve our robustness in initial contact.
  - b. **First Aid.** Review and change the approach to immediate first aid in terms of actions on injury and triage. This should be supported by wearable technology, AI aides and stimulants.
  - c. **Revolutionise Evacuation.** Conduct significant investment in unmanned evacuation assets and supporting control structures.
  - d. **Conduct Surgery rearwards.** Realise the benefits of the above by planning to place surgical teams at greater distance from the FLOT.



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