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HEALTHCARE IN ALLIED MILITARY OPERATIONS: A QUALITY APPROACH

Abstract:

Recent conflicts in the Middle East allowed for strengthening the cooperation within NATO and enhanced the shared experience in the conduct of Allied operations. The medical support system represents a core element for the success of the mission but needs to be constantly adapted to evolving conditions and emerging threats. Readiness and performance must be prepared, sustained and monitored to optimise resources according to the requirements and medical capabilities required to accomplish the best patient outcomes. During the Covid-19 crisis, Allied nations were forced to rethink their homeland healthcare models to withstand the surges of patients on a wide scale by applying the military approach. However, it took time for the civilian medical infrastructure to prepare an ad hoc response in the first and most affected areas. In our paper, we describe the status of the Allied doctrine for healthcare quality delivery in operations and propose our solution to enhance the systemic resilience of national medical infrastructures for facing future medical challenges with increased adaptability.

Keywords:

military healthcare, quality improvement, NATO medical support, medical challenges, adaptable systems

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Background

According to the World Health Organization (WHO), health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. The same principle is applied in the NATO militaries under normal circumstances. However, during the conduct of allied operations health is categorized as the ability to carry out duties unimpeded by physical and psychological problems³, while recognizing the additional risk that a fighting force must sustain for mission success when always-evolving conditions are set by enemy threats and combat requirements. This paper aims to describe the allied military medical support system using modern healthcare quality management tools. Common understanding and exchange of knowledge with the civilian sector may lead to future synergies for the benefit of patients in both settings, especially in crises.

Quality of healthcare in allied operations

The Military Committee of the North Atlantic Treaty Organization (NATO) states that the role of medical support in operations is ‘preserving and restoring health and fighting strength’ as a core enabling function of allied readiness and effectiveness⁴. Military Healthcare is a patient-centric health service provision by military healthcare professionals for the defined populations at risk; it encompasses preventive health protection, prehospital emergency care, primary healthcare, hospital care and rehabilitative care⁵. The multinational domain is the special ingredient in NATO initiatives. When multinational forces are deployed to accomplish military objectives, a wide range of medical solutions must be coordinated in a constantly changing scenario. Typical examples are represented by the integration of individual national contributions in collective trauma systems to reach patients at the right place, at the right time and with the right resources⁶. The coexistence of different players significantly increases the need for shared quality improvement strategies so that interoperability gaps among nations are counterbalanced by an adaptable collective experience.

To optimize medical decision-making in a specific context and with available resources, NATO medical policy requires the application of a quality

³ NATO, *MC 326/4 - NATO Principles and Policies of Medical Support*, 2018.

⁴ *Ibidem*.

⁵ NATO, *AJMedP-8 (Ed.A v. 1) - Allied Joint Medical Doctrine for Military Health Care*, 2018, <<https://www.coemed.org/resources/stanag-search>> (30.11.2021).

⁶ D. M. Berwick, A. S. Downey, E. Cornett, *A National Trauma Care System: Integrating Military and Civilian Trauma Systems to Achieve Zero Preventable Deaths after Injury*, Washington 2016.

assurance system to achieve Continuous Improvement in Healthcare Support on Operations (CIHSO)⁷. Continuous Improvement in Healthcare Support on Operations assures that the international standards agreed upon among the allied nations are met and that experience is utilized to optimize medical support by dealing with⁸:

- risk management,
- learning processes,
- sharing best practices and
- building required capabilities.

For its inviolable ethical principles, military medicine is an independent profession from warfighting, but still, practice is constrained in a combat environment. A physician-led organization within the command structure is required to deliver clinical solutions in non-purely clinical systems and achieve the highest standards of care despite unfolding military campaigns. Hence, differently, from the civilian context, healthcare must be more focused on the essential values that achieve the best patient outcomes in a specific battlespace, leveraging the surrounding military organisational capabilities to deliver quality improvement and provide risk management⁹. The strength of the traditional military methodology to translate plans into actions consists in a steady decision-making structure able to take advantage of opportunities, concentrate efforts and react quickly. The military medical community is tied to the same dynamics and uses the same combination of leadership, management and governance to convey medical solutions within the operational layout. Leadership aligns healthcare decision-making to the medical vision at all levels of command, management ensures a coordinated use of resources and governance identifies roles, rules and responsibilities¹⁰. When such processes are wisely executed following improvement models like Continuous Improvement in Healthcare Support on Operations, practice can be adapted to current scenarios and the best conditions for quality to be sustained can be achieved.

Quality is directly related to patient outcomes and underperforming structures can have irreversible effects on long-term disability and survival

⁷ NATO, *AJP-4.10 (Ed.C v.1) - Allied Joint Doctrine for Medical Support*, 2019, <<https://www.coemed.org/resources/stanag-search>> (30.11.2021).

⁸ *Ibidem*

⁹ NATO, *MC 326/4... op. cit.*; NATO, *AJP-4.10 (Ed.C v.1)..., op.cit.*; NATO, *AJMedP-8 (Ed.A v. 1)..., op. cit.*

¹⁰ *Leadership Management, and Governance Evidence Compendium*, United States Agency for International Development, 2017.

rates¹¹. The WHO identifies seven measurable elements of quality in healthcare: effectiveness, safety, people-centred care, timeliness, equity, integration of services and efficiency¹². However, not all elements may have the same implications in military settings as in civilian systems. Safety, for example, is needed to avoid negative occurrences, while the remainder 6 elements are connected to the positive efforts to achieve the best services. To better explain how medical quality is accomplished in warfare, we propose to keep ‘safety’ as a separate feature and combine the remainder 6 elements of the WHO definition under the category ‘performance’. Consequently, quality will be the result of:

- the greatest level of medical safety possible for the operational conditions, plus
- the performance of the system to deliver optimal health services to the force.

Safety is a condition intended to prevent injury and damage, or at least a state in which the risks of harm are reduced and controlled to an acceptable level¹³. Safety is the desired result of successful risk management where the relative weight of human factors in adverse occurrences increases with the growing workload, operational stressors and complexity of the situations¹⁴. In civilian settings, it has been recognized that ineffective healthcare and patient harm may become relevant problems in all systems, also in nations with high standards of care¹⁵. Organizational and communication gaps are among the most cited preventable causes¹⁶. Military medical frameworks are shaped according to operational plans and generally are assembled by multiple different capabilities provided by different nations. Patient safety is accomplished when preventable causes of potential harm are identified and removed at the lowest level of care, ideally by every single caregiver. Consequently, allied headquarters can focus on networking trust in reliable systems that are constantly monitored.

¹¹ Organisation for Economic Co-operation and Development, World Health Organization, World Bank Group, *Delivering Quality Health Services: A Global Imperative for Universal Health Coverage*, 2018.

¹² World Health Organization, *Handbook for National Quality Policy and Strategy*, 2018, <<https://apps.who.int/iris/bitstream/handle/10665/272357/9789241565561-eng.pdf?ua=1>> (30.11.2021).

¹³ *NATO Term Online Database*, <<https://nso.nato.int/natoterm/Web.mvc>> (30.11.2021).

¹⁴ J. Reason, *Human error: models and management*, “BMJ”, vol. 320/2000, pp. 768-770.

¹⁵ L. Slawomirski, A. Auraen, N. Klazinga, *The Economics of Patient Safety: Strengthening a Value-Based Approach to Reducing Patient Harm at National Level. Vol 96*, OECD 2017.

¹⁶ E. N. de Vries, M. A. Ramrattan, S. M. Smorenburg, D. J. Gouma, M. A. Boormeester, *The incidence and nature of in-hospital adverse events: a systematic review*, “Quality and Safety in Health Care” 2008/17(3), pp. 216-223.

Performance is the action of accomplishing a task. Specifically, the implementation of effectiveness, efficiency, timeliness, equity, integrated and people-centric care represents the performance of a system capable of achieving the expected healthcare services. The relative importance of these elements in operations may vary across the whole spectrum of conflict, from permissive environments to the most hostile territories, and should be continuously assessed by a medical director to comply with mission objectives and be respectful of the medical code of ethics. However, performance must be measured in order to rate the standards delivered. Indicators are quantitative figures that provide information about a variable (i.e. mortality rates, use/availability of specific medications, execution of particular medical/surgical interventions, the average number of sick days, waiting time), and are very useful to monitor outcomes and processes¹⁷. Many clinical indicators in military operations originate from interdisciplinary teamwork: raw metrics are frequently owned by other stakeholders in the headquarters (i.e. pilots for patient air transfer times, logisticians for consumption rates of supplies, finance for productivity, human resources for administrative data...) and information is used to generate situational awareness for a common benefit before the commander approves the next course of action. Consequently, the performance of the healthcare support needs a dynamic approach based on the relevant medical requirements for a continuous improvement in quality in the specific context.

The Elements of CIHSO

Continuous Improvement in Healthcare Support on Operations (CIHSO) represents an evolution of clinical governance in NATO policy as a framework through which healthcare organizations continuously improve the quality of their services and safeguard high standards of care¹⁸. Each operation has individual features: large-scale campaigns to collectively defend our territories differ significantly from global projections of small military components to responses to localised crises. Consequently, CIHSO is specific for each allied initiative to translate the principle of clinical governance into locally appropriate structures, processes, roles and responsibilities. Clinical governance

¹⁷ R. Busse, N. Klazinga, D. Panteli, W. Quentin, *Improving Healthcare Quality in Europe: Characteristics, Effectiveness and Implementation of Different Strategies*, OECD 2019.

¹⁸ M. C. Bricknell, R. Cordell, *Continuous Improvement in Healthcare Support to Operations*, "Journal of the Royal Army Medical Corps", 2011, vol. 157 (Suppl_4), pp. 460-462.

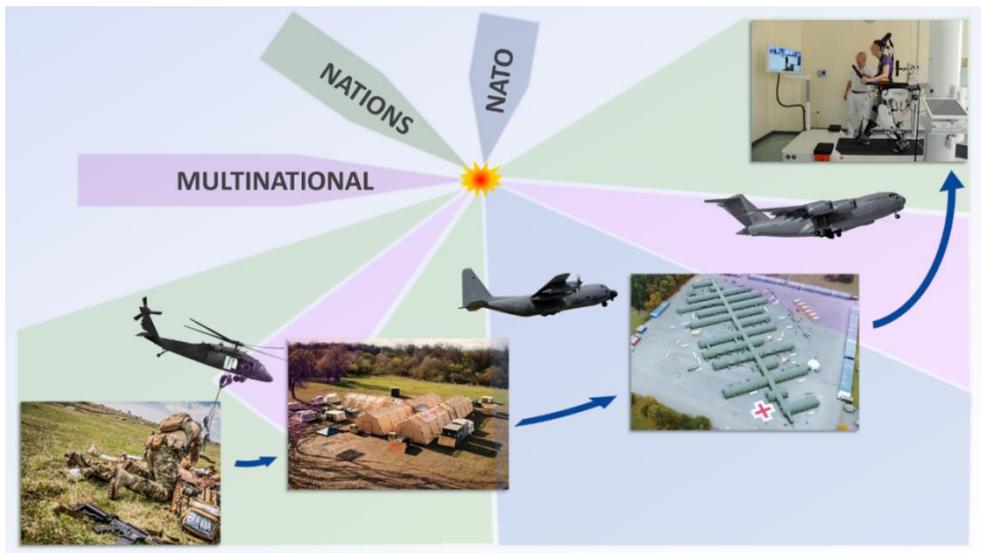
can be considered as the result of three main elements of modern allied healthcare organizations¹⁹:

- accountability;
- standardization;
- improvement.

Accountability: in NATO operations, three levels of medical responsibility are immediately clear when shaping integrated medical services and ensuring regulated cycle of patients through a continuum of care (see Figure 1):

- Nations are the risk owners for their troops and develop support capabilities following their level of ambition;
- When resources are limited multinational agreements provide a cost-effective solution to share and contribute to common medical services;
- NATO commanders and their medical staff represent the only authorities to be aware of the current care options across the whole battlespace and to coordinate theatre medical assets.

Figure 1. The Allied continuum of care and areas of responsibility for care delivery.



Source: own study.

¹⁹ J. Frassini, *Continuous improvement in healthcare support on NATO operations*, “BMJ Military Health”, Vol. 167, Issue 6, <<https://militaryhealth.bmj.com/content/167/6/446>> (30.11.2021).

Nations are the final risk owners for their forces. However, nations may not always be individually able to deliver the best healthcare resources to their personnel across the whole theatre of operations. When coalitions are formed, the number of disconnected, customized solutions may lead to the risk of fragmentation in accountability, duplication of assets, uncovered services and lack of transparency. Only NATO leaders in command and control of the deployed medical infrastructure may be in the position to acknowledge the whole medical picture and integrate the services in a continuum of care. Consequently, despite NATO decision-makers not being considered accountable for each patient outcome, they still share the responsibility when providing the best operational conditions for the medical network to generate best practices.

Standardization: NATO standards are documents, established by consensus and approved by a recognized body within the NATO standardization process, that provide, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context²⁰. Medical standards issued as Allied Publications are directions for a wide military community to plan, train and conduct operations (i.e. time thresholds for accessing increasing levels of care like the NATO 10-1-2(+2) timeline²¹), and should not be interpreted as clinical rules for the practice of medical providers who are granted medical flexibility in the individual decision-making process (Figure 2). To tell a target medical community what should be done for patients and provide the conditions for the best healthcare outcomes, the right format is with clinical practice guidelines which are non-mandatory evidence-based graded recommendations issued by scientific bodies²² (i.e. the U.S. Joint Trauma System Clinical Practice Guidelines²³).

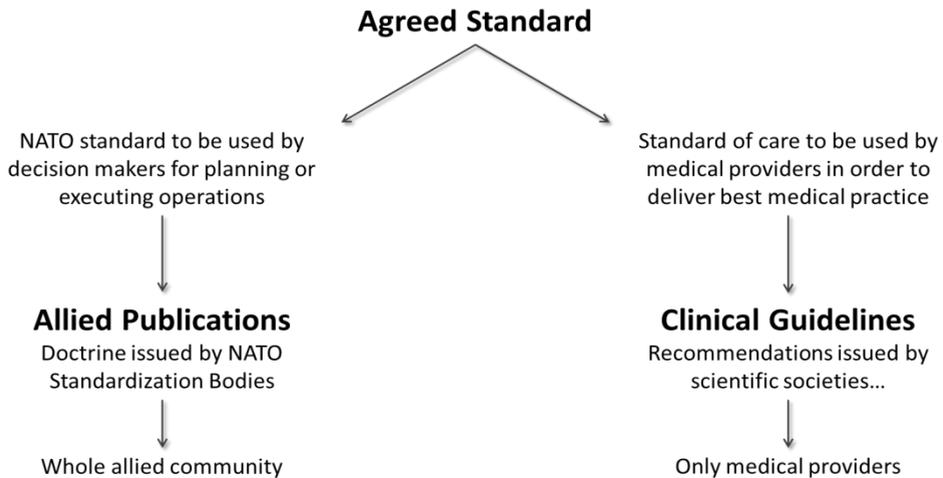
²⁰ NATO Standardization Office, *AAP-3 Ed.K v.1 - Directive for the Production, Maintenance and Management of NATO Standardization Documents*, 2018.

²¹ NATO, *AJP-4.10...*, *op. cit.*

²² World Health Organization, *WHO Handbook for Guideline Development*, <http://apps.who.int/iris/bitstream/10665/145714/1/9789241548960_eng.pdf> (30.11.2021).

²³ *U.S. Joint Trauma System. Clinical Practice Guidelines (CPGs) Online Database*, <https://jts.amedd.army.mil/index.cfm/PI_CPGs/cpgs> (30.11.2021).

Figure 2. Simplified separation of military standards from standards of care.



Source: own study.

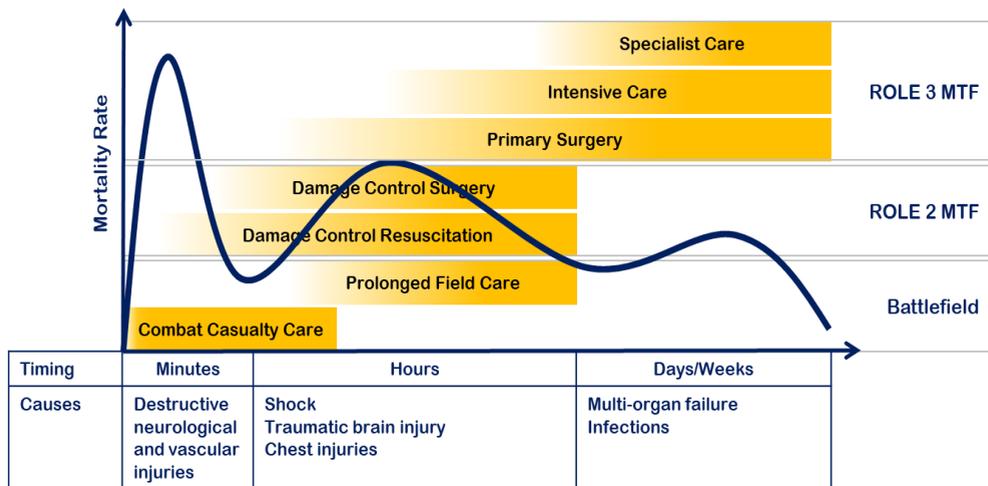
The process that leads to the implementation of allied medical standards starts with strategic meetings of national delegates that are scheduled regularly in the NATO agenda, independently from operations. Progress in medical knowledge is collected from multiple sources internally and externally to the Alliance, discussed among experts, ratified by nations and incorporated into the body of Allied Publications²⁴. Agreed standards are now ready to reach the frontlines through the national chain of command in the form of plans and orders that are created, executed and adapted for the specific context. Military medical leaders at each stage of the process review and relay applicable directions to their clinical environment to achieve a uniform distribution of multi-nationally validated methods.

Improvement: In a learning organization, improvement refers to the optimization of already existing solutions and considers the future as a result of the integration of experience with evidence so that remedial actions lead to predictable patient outcomes. Quality improvement requires a dynamic approach to achieve an advantage in the events and maintain responsiveness. On one side, improvement represents a direct consequence of an effective risk management process. On the other side, it requires proactive decision-making on innovative opportunities that are constantly generated by science and technology.

²⁴ NATO Standardization Office, *AAP-3 Ed.K v.1 ...*, *op. cit.*

A typical example of medical improvement derives from the sum of achievements in combat trauma care over the past 20 years. Compared to civilian trauma, combat trauma is typically 10- to 100-fold more frequent and differs in the type of injuries, demographic features, protective gear, special environments and rescue practices²⁵. While civilian trauma is mainly due to traffic accidents or impacts with objects, trauma in combat is generally related to high-energy blast and ballistic injuries²⁶. Available data from World War II and wars in Korea, Vietnam, Afghanistan and Iraq show that more than 80% of combat deaths occur on the battlefield (Figure 3)²⁷ and that casualties who manage to access surgical care have a very high chance of survival²⁸.

Figure 3. Combat mortality and medical support capabilities



Source: own study.

Simplified distribution of mortality according to the time of injury, with main causes of death and required medical capabilities to mitigate complications until definite care. MTF: medical treatment facility; ROLE 2:

²⁵ R. F. Bellamy, *Combat Trauma Overview*, [in:] *Anesthesia and Perioperative Care of the Combat Casualty*, Office of the U.S. Surgeon General, Falls Church 1995, p. 42.

²⁶ M. Martin, J. Oh, H. Currier, *An analysis of in-hospital deaths at a modern combat support hospital*, "The Journal of Trauma", 2009/66 (4 Suppl), pp. 51-61.

²⁷ *Ibidem*.

²⁸ B. J. Eastridge, R. L. Mabry, P. Seguin, *Death on the battlefield (2001-2011): Implications for the future of combat casualty care*, "Journal of Trauma and Acute Care Surgery", 2012/73, pp. 431-437.

equals to resuscitative care and surgery; ROLE 3: equals to hospital care in core medical support specialities.

Studies on the first decade of combat operations in Afghanistan and Iraq reported that 20-25% of deaths could be preventable²⁹. The measures adopted to mitigate the vulnerabilities in the healthcare system such as the combination of new evidence-based best practices in combat casualty care on the battlefield³⁰ together with a reduction in prehospital times of less than 60 minutes³¹ contributed to lowering the overall mortality compared to previous conflicts (9,4% Afghanistan/Iraq vs 15,8% Vietnam³²). However, a deployed healthcare system is not exclusive to trauma patients. Multiple clinical conditions may affect the readiness of the force either as minor complaints or occasional outbreaks of a specific disease or other rare acute emergency presentations. Regularly, the emergency medical care and patient transportation systems need to be effective in the provision of all general measures for the health of the force and must comply with the agreed standards. For this reason, medical capabilities are distributed in the areas of operations according to officially recognized NATO medical timelines³³ so that all patients can reach all available treatment options according to their priority. Yet, time is only part of the treatment and the delivery of proper interventions requires specific medical resources at the destination. To maximize the accessibility to specialized medical resources, meet the demand and achieve sustainable standards of care over vast territories, deployed medical support services are organized in clinical pathways.

Clinical Pathways

A clinical pathway is a multidisciplinary plan of care used to translate medical evidence into local structures for a specific group of patients with a predictable clinical course. A clinical pathway has the following characteristics: (1) it is used to translate guidelines or evidence into local structures; (2) it details the steps in a course of treatment or care in a plan, pathway, algorithm, guideline, protocol or other ‘inventory of actions’; and (3) it aims to standardize care for a specific clinical problem, procedure or episode of healthcare in a

²⁹ *Ibidem*.

³⁰ T. E. Rasmussen, T. M. Rauch, D. C. Hack, *Military trauma research: answering the call. Preface*, “Journal of Trauma and Acute Care Surgery”, 2014, 77(3 Suppl 2), pp. 55-56.

³¹ R. S. Kotwal, J. T. Howard, J. A. Orman, *The Effect of a Golden Hour Policy on the Morbidity and Mortality of Combat Casualties*, “JAMA Surgery”, 2016, 151(1), pp. 15-24.

³² J. B. Holcomb, L. G. Stansbury, H. R. Champion, C. Wade, R. F. Bellamy, *Understanding combat casualty care statistics*, “The Journal of Trauma”, 2006, 60(2), pp. 397-401.

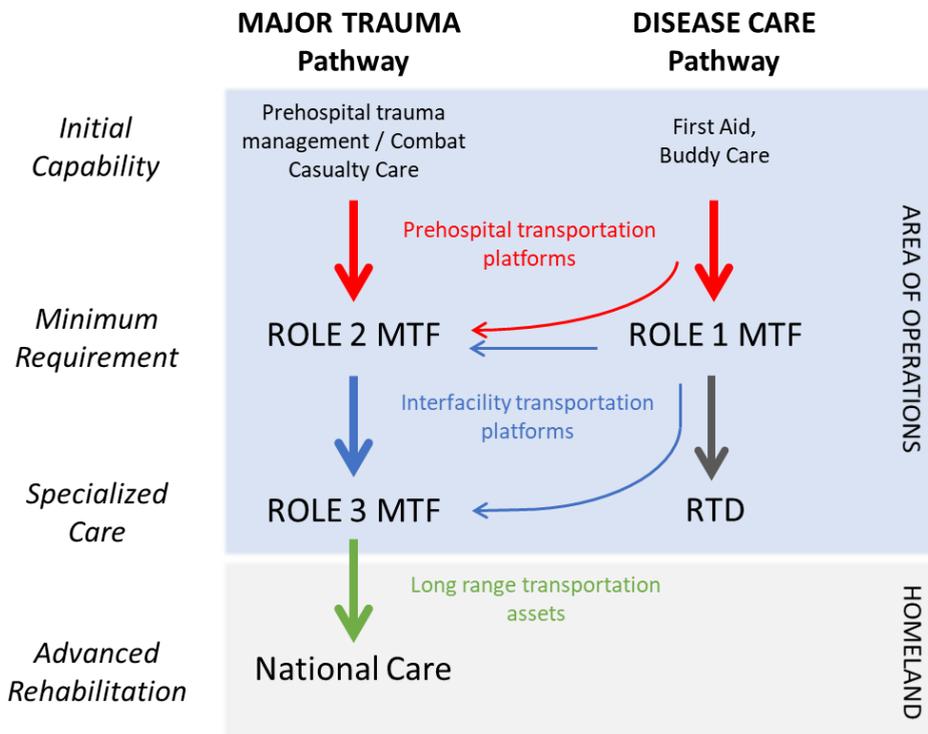
³³ NATO, *AJP-4.10 (Ed.C v.1)...*, *op. cit.*

specific population³⁴. In military operations, medical officers are guided by defined, optimized and sequenced interventions to sustain best medical practices in a context where conditions evolve unexpectedly, and resources must be carefully organized. A typical deployed healthcare system has two main pathways, but their number can be increased according to the planning requirements (CBRN threats, humanitarian assistance, disaster response...):

- major trauma pathway
- disease care pathway.

The two or more pathways used in operations are networked by evacuation assets like in a hub-and-spoke organization so that all medical capabilities can be timely accessed by all patients even if dispersed in remote outposts³⁵. The main features of the two pathways are summarized in Figure 4 and Table 1.

Figure 4. Standard healthcare pathways for operations.



Source: own study.

³⁴ R. Busse, *op. cit.*

³⁵ NATO, MC 326/4..., *op. cit.*; NATO, AJP-4.10 (Ed.C v.1)..., *op. cit.*

The two core intratheatre clinical pathways for a deployed healthcare system and their main simplified features. MTF: medical treatment facility; ROLE 1: equals to primary care on-base clinic; ROLE 2: equals to resuscitative care and surgery; ROLE 3: equals to hospital care in core medical support specialities. RTD: return to duty.

Major Trauma Pathway (MTP) is designed for surges of patients with serious injuries requiring resuscitative surgical capabilities. Disease Care Pathway (DCP) responds to the constant flow of common medical problems. MTP starts at the point of injury with evidence-based prehospital and/or combat-related clinical practice guidelines by first-line providers. Normally, critical patients are provided with staged interventions, timely integrated at different locations in a continuum of care so that patients receive an increasing level of medical capability and specialist care during their rearward movement towards safer support areas. Coordination in the treatment and evacuation chain can result in strategic transportation of patients for definite homeland care in less than 72 hours of wounding and with minimal mortality (0-0,02%) during the interfacility transfers³⁶.

DCP involves primary care for common diseases or minor injuries and the first response to urgent medical conditions. Most patients self-refer to the base clinic or need evacuation from remote outposts to receive medical treatment locally not available. Primary care supports the readiness of the force by promptly returning personnel to duty. Some individuals may suffer from acute disorders (i.e. cardiovascular, neurologic, allergic, psychiatric...) and require emergency care and evacuation. These critical conditions rarely occur in highly selected populations but are unpredictable and possibly life-threatening.

Table 1. Main features of the two core clinical pathways used in operations.

	MAJOR TRAUMA PATHWAY	DISEASE CARE PATHWAY
Type of clinical conditions in the patient group	High energy impact injuries, and their complications	Musculoskeletal injuries, common medical problems, mental health, rare acute conditions
Predictable clinical course	Prehospital lifesaving interventions at the point of injury, timely evacuation and	First aid, primary care and treatment with increasing capabilities in the continuum of

³⁶ N. Ingalls, D. Zonies, J. A. Bailey, *A review of the first 10 years of critical care aeromedical transport during operation Iraqi freedom and operation enduring freedom: the importance of evacuation timing*, "JAMA Surgery" 2014, 149(8), pp. 807-813.

	surgical resuscitation until specialized care and rehabilitation	care
Context	Presence of enemy threats - Remote off-base locations	Generally, inside the perimeter of outposts or of operational bases.
Core Enabling Professionals	Prehospital Caregivers skilled in trauma management, Critical Care Specialists and Surgeons	All personnel in the prehospital phase, Emergency Medical First Responders, General Medicine Providers
Targeted Outcome	Save life and reduce disability	Prompt Return to Duty
Timeliness of care	Standard allied interventional timeline for critical patients must be accomplished or according to assigned priority for evacuation of non-critical conditions.	
Incidence of patients	Surges related to the intensity of conflict 75.7/1000 soldier year (AFG) ³⁷ >90% of injured evacuated	Constant flow 0,1-0,3% of the force per day 257/1000 soldier year (AFG) ³⁸ ~16% of patients evacuated
Mortality rates	Casualty Fatality Rate \approx 25-30%	Casualty Fatality Rate < 0,5%
Dependency level during transfers	High Dependency	90% Low - 10% High Dependency
Focus of Indicators	Outcomes (mortality, disability...)	Process (efficiency, effectiveness...)
Context	Presence of enemy and/or environmental threats - Remote off-base locations	Generally, inside the perimeter of outposts or operational bases.

Source: own study.

³⁷ P. J. Belmont, G. P. Goodman, B. Waterman, K. DeZee, R. Burks, B. D. Owens, *Disease and nonbattle injuries sustained by a U.S. Army Brigade Combat Team during Operation Iraqi Freedom*, "Military Medicine", 2010, 175(7), pp. 469-476.

³⁸ P. J. Belmont, G. P. Goodman, M. Zacchilli, M. Posner, C. Evans, B. D. Owens, *Incidence and epidemiology of combat injuries sustained during "the surge" portion of Operation Iraqi Freedom by a U.S. Army brigade combat team*, "The Journal of Trauma", 2010, 68(1), pp. 204-210.

Even if there still is an ongoing discussion about the specific benefits on health outcomes³⁹, clinical pathways show a clear advantage in shaping organizational solutions so that improvement can be focused on the priority needs of the different patient groups. The separation in pathways assists managers to choose performance indicators and safety strategies to keep the focus on the quality objective for each service provided, especially regarding:

- the distribution (relative allotment) of medical resources,
- the identification of opportunities for improvement,
- the risk assessment for patients and caregivers, and
- the harmonization between operational and medical requirements.

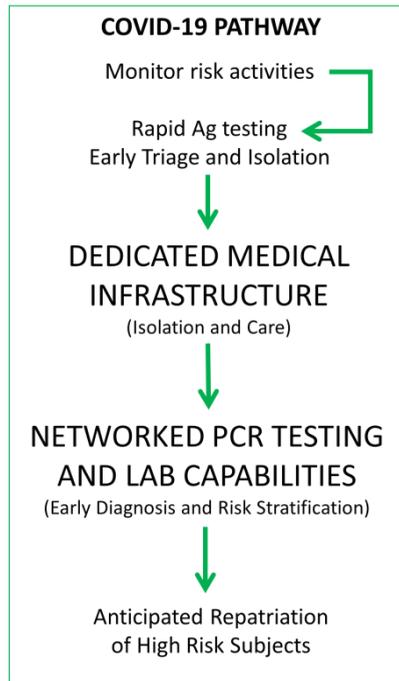
The two pathways differ deeply in the kind of clinical objectives that are intended to support: for MTP the maximized chance of survival and the reduced risk of long-term disability; for DCP the optimized fitness and readiness of the force. Consequently, the main focus of the performance indicators used to monitor quality is also different: in MTP the outcomes are privileged (disability, case fatality rates...), while in DCP the processes are valued (efficiency and effectiveness to yield healthcare services relative to supplies, budget, workload...).

Additional clinical pathways can be added according to special circumstances, such as in the event of an outbreak of a certain disease (i.e. infectious or CBRN-related) where a dedicated approach to a new type of patient helps achieve organizational responsiveness and optimize decision-making. For example, during the Covid-19 pandemic, the activation of a new pathway (Figure 5) led to:

- rapid screening of personnel in activities at risk as a collective protective measure,
- immediate isolation of suspected cases,
- networked testing capacities for early diagnosis and investigation,
- anticipated evacuation of patients at risk of complications to protect susceptible individuals and avoid complex aeromedical transfers.

³⁹ R. Busse, *op cit.*

Figure 5. Newly generated Covid-19 pathway to separate patients in primary care facilities.



Source: own study.

Learning from the Covid-19 Crisis

The Covid-19 crisis represents an opportunity for most Allied militaries to successfully interact with the civilian healthcare systems, offering a wide variety of services to mitigate vulnerabilities at a local, national and multinational level. Many examples are available across NATO, especially as a prompt response to the initial shock, when the healthcare infrastructure suffered from a combination of surges in care demand and a limited reserve of capabilities. According to published reviews⁴⁰, information available online and our observations at the NATO Centre of Excellence for Military Medicine, the incidence waves of Covid-19 cases mobilized military capabilities in support of the civilian needs as summarized in Table 2.

⁴⁰ M. Gad, J. Kazibwe, E. Quirk, A. Gheorghe, Z. Homan, M. Bricknell, *Civil-military cooperation in the early response to the COVID-19 pandemic in six European countries*, “BMJ Military Health”, 2021/167, pp. 234-243.

Table 2. Military capabilities that contributed to the response to the Covid-19 crisis.

<p>MEDICAL AND NON-MEDICAL MANPOWER</p>	<p>Augmentation of civilian manpower in the national health system Allocation of crisis response experts in operational centres Administrative personnel for track-and-tracing activities Assistance to police/civil protection and other public services Mobilization of reservists</p>
<p>MILITARY ASSETS</p>	<p>Deployment of expeditionary capabilities to augment hospital capacity Execution of repatriation flights Transportation of patients within the country and transnationally Military logistics for stockpiling and distribution of supplies/vaccines Use of military treatment facilities for civilian patients</p>
<p>MILITARY ACTIVITIES</p>	<p>Reorganization of current operations to protect core military functions Reconfiguration of the medical support to deployed forces Participation in national crisis response management Sharing of medical information and intelligence with partner nations Provision of cross-national situational awareness for homeland security</p>
<p>NATIONAL RESILIENCE</p>	<p>Medical information sharing and processing into intelligence products Networking activities with multinational partners Identification of requirements for national and collective preparedness Contribution to the crisis response planning and lessons-learned process</p>

Source: own study.

Independently from the Nation, initiatives aimed at relieving the most affected hospitals, reorganizing care pathways for the continuation of critical medical services, and assuring a reliable supply of essential medical products in a context at high risk for speculations. Initially, military assets granted a readily available buffer capacity to fill evolving gaps in care delivery, virus testing and contact tracing. Individual healthcare facilities were easily overwhelmed and tended to solve contingencies by focusing on the optimization of internal processes. In the long period, the coordination with the military turned out to be beneficial to align crisis response requirements more like in a network of

hospitals with a common assessment of the ongoing situation. On this basis, the interaction between the civilians and the military continued further into the pandemic as more structured cooperation during the vaccination campaigns when the armed forces across the Alliance contributed to the sustainment of the distribution chain, provided personnel for the immunization centres, and participated with own medical facilities in the vaccination of the population.

Unfortunately, it is difficult to draw a collective solution to increase the resilience of the national healthcare systems which are still very specific for each country. Allies should implement the synergies between the civilian and the military systems observed in their area of responsibility and try to harmonize their approach with other partners to accomplish a cross-border effect. Future medical crises will likely hit again, affecting a wide territory with unusual surges of patients and shocks to the healthcare network. Preparedness and responsiveness can be difficult challenges for the endurance of individual healthcare institutions, especially if placed in fragmented governance frameworks. A continuous civil-military interaction, starting from peacetime and directed at achieving a continuous exchange of experience with common learning processes, can contribute significantly to optimising interoperability in applied solutions and reduce the latency in reaction times to emerging threats.

Conclusion

In highly dynamic military operations exposed to mutable threats, the healthcare support must be able to adapt quickly and improve quality exploiting experience through leadership, management and governance. Gaps in interoperability are mostly expected in multinational environments. However, in all organizations, only clear policies and situational awareness can translate into best practices and flexible processes, where clear roles and responsibilities support the agreed evidence-based standards. Transparent cooperation between medical and non-medical stakeholders is necessary to achieve synergies in healthcare performance and safety for best patient outcomes, and sustainability in crisis or combat situations. The use of individual pathways for managing different healthcare requirements within the same support system can assist medical providers to organize the resources, monitor performance and outcomes, and highlighting gaps and opportunities, resulting in a leveraged effect on the comprehensive quality delivered to the entire population at risk. In particular, the Covid-19 crisis showed that the interaction of civilian and military systems in support of healthcare represented a successful element in the management of the crisis across the Alliance. A more structured approach to civil-military cooperation starting from peacetime should lead to increased preparedness and effectiveness of the national and collective response.

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