



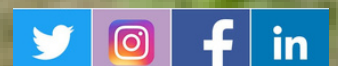
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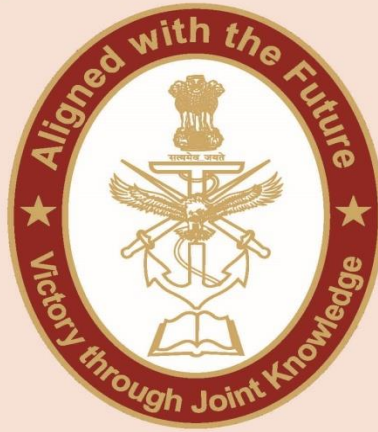
CIVIL-MILITARY FUSION IN HEALTHCARE: THE WAY FORWARD

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**CIVIL-MILITARY FUSION IN
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Introduction

Civil Military fusion is the establishment of an infrastructure which promotes a symbiotic relationship between state resources and commercial sectors with military and defence assets so as to enhance the military advancement.¹ The concept of Civil-Military Fusion (CMF) denotes the convergence of military and civilian resources and systems for maximising a nation's ability to express its comprehensive national power both during war and peacetime.

The ability of the armed forces to wage war has increased along with the rapid growth of technologies in all domains. A nation's ability to fight a war is not solely determined by the characteristics of its weaponry; it also includes a wide range of related capacities of the nation as a whole, such as healthcare services. The art of medicine and war have a long and entwined history. Military medicine has come a long way since the days when injured soldiers were left on the battlefield, waiting for help that came only once the fighting had stopped.²

After security to life and property the most important basic human needs for the citizens of any civilized society are Food & nutrition, Water & sanitation Housing, Health Care Facilities and Education. North-eastern region is not a very homogeneous

¹ Joshi, 'China's Military-Civil Fusion Strategy, the US Response, and Implications for India'.

² Lacey, 'The Arts of War and Medicine'.

place for conveniently offering standard health care services round-the-clock in the region due to its geographic location, rough terrain, high rainfall, vast hilly region, large forest areas, and large number of ethnic groups. Moreover, due to inadequate communication facilities throughout the region, health care services have not yet become available to everyone as can normally be expected.³

In the remote locations of the operational areas, it might not always be feasible by Armed Forces to construct or relocate medical infrastructure outfitted with specialised equipment. The medical facilities and infrastructure being developed for border region villagers must be carefully crafted with a dual purpose in mind, serving both the local civilian population in times of peace and the armed forces in times of eventuality. It is imperative that methodological mapping of these existing and planned med infrastructure must be carried out along with formulation of roadmap to identify requisite up-gradation.

It is undeniable that any war would invite casualties and delay in providing appropriate and timely treatment would result in more fatalities. It is imperative that the preparedness of armed forces to provide medical cover should not be assessed in isolation but must be evaluated in conjunction with the overall capability of existing resources. In order to carry out the operational tasks lucidly, it is also important to frame the necessary coordination between civil and military authorities. Requisite synchronization between civil and military agencies is vital to undertake any adversities.

The Russia-Ukraine conflict has made it apparent to all countries across the globe that the pace, intensity and reach of our military operations will necessitate cooperation amongst armed forces and many organisations in the areas of industrial assistance, R&D, material support, industry, and personnel.

To quote Defence Minister Rajnath Singh “India has become the fifth-largest economy in the world today. It is fast moving towards becoming a \$5 trillion economy. In future, whether in the battlefield or civilian sector, the criticality of logistics sustenance is going to increase. Reforming the system of logistics according to the needs of 21st century is the need of the hour” he said at the Army Logistics Conference. General Manoj Pande said that “Wars aren’t fought between militaries alone; they remain a whole nation endeavour. Wars test national resilience and stretch the nation’s resources and capacities. The Russia-Ukraine conflict, which has already passed the half-year mark, is an apt example,” he said.⁴

In this article we will explore the present status and future possibilities for CMF in the healthcare sector and their relevance for North-eastern India.

³ Goswami et al., ‘Multiscale Interaction with Topography and Extreme Rainfall Events in the North-East Indian Region’.

⁴ ‘Rajnath Singh: Civil-Military Fusion Will Strengthen Logistics: Rajnath Singh - The Economic Times’.

Contributions of Military-Civil Synergy in Healthcare Globally

The role of military assistance in responding to natural and environmental disasters, including incidents related to chemical, radioactive and nuclear accidents or deliberate events, has been long established.

When the United States began to project power outside its borders, tropical diseases quickly began to degrade the strength of the force. A surge of deaths from malaria and yellow fever during the Spanish–American War prompted the US Army to start investing in infectious disease research. This led to important discoveries about vector-borne illness, antibiotics, insect repellents, and vaccines — all of which paid huge dividends when applied to the civilian sector.⁵ More recent examples of military-driven innovations that have civilian applications are vaccines against malaria (collaboration between Walter Reed Army Institute of Research in the USA and GSK Biologicals, then SmithKline Beecham)⁶, HIV (ALVAC HIV vaccine)⁷ and enteric diseases and portable chlorine makers for safe and sustainable drinking water in low-resource communities.

While the military has historically not been regarded as a primary partner in responding to disease outbreaks, the engagement of the military in the response to the Ebola virus disease outbreak in West Africa in 2014 – 2016 and the Zika virus disease outbreak in 2016 illustrated some of the benefits of civil – military health collaboration in the context of an epidemic.⁸

Military-Civil Synergy in Healthcare During COVID in India

The requirement of Armed Forces in disaster relief and assistance is generally limited to instances when civil agencies become overwhelmed. Most recently, during the COVID-19 pandemic, the scale and complexity of the pandemic has reinforced that partnership and demonstrated that collaboration with other sectors beyond the health sector is essential while preparing for and responding to public health threats and risks.

The Armed forces supported the state authorities in whatever ways they could — for instance. Most notable contributions that could be highlighted are⁹:

- (a) *Force Preservation Measures*. The Indian Army has been proactive towards Force Preservation measures and issued exhaustive instructions pertaining to hygiene, sanitisation, social distancing, wearing of protective gear, contact

⁵ Brueggemeyer, Riddle, and Kellermann, 'Health Protection'.

⁶ Hutter et al., 'First-in-Human Assessment of Safety and Immunogenicity of Low and High Doses of Plasmodium Falciparum Malaria Protein 013 (FMP013) Administered Intramuscularly with ALFQ Adjuvant in Healthy Malaria-Naïve Adults'.

⁷ 'USAMRDC: U.S. Army Sponsors First HIV Vaccine Trial to Show Some Effectiveness in Preventing HIV'.

⁸ Janse et al., 'Civil–Military Cooperation in the Management of Infectious Disease Outbreaks'.

⁹ Barman, 'Fighting the "Invisible Enemy"'.

tracing, isolation and quarantine. They also took the initiative to encourage a 'Work from Home' culture, wherever feasible.

- (b) *COVID Beds.* As part of a medical management plan to combat the pandemic, several military hospitals were transformed into Covid treatment facilities. Additionally, their medical services were made available to citizens. Indian army provided highly skilled medical teams of medical officers and specialists, nursing officers, nursing assistants, and paramedics to five civil DRDO-established COVID-19 hospitals.
- (c) *Operation Vande Mataram.* About 2,500 Indian citizens stranded outside the country due to the pandemic were successfully evacuated and quarantined at Indian Army Wellness Centers set up across India.
- (d) *Aid to Friendly Foreign Countries* -The Indian Armed Forces have been committed to providing assistance to Friendly Foreign Countries, including sending a 15-person Rapid Response Team to Kuwait to build its COVID response capacity. Similar teams to Nepal and the Maldives were sent for CoViD capacity building, along with many such endeavours. It was this readiness to provide support and commitment to foster international cooperation that encouraged friendly foreign countries to supply medical equipment as India battled the second wave of the deadly pandemic.
- (e) *Vaccination of Serving Personnel, ESM and Dependents* as part of the vaccination drive in coordination with MoHFW

The Indian Armed Forces also played a pivotal role in enhancing communication and transportation with respect to medical supplies:

- (f) *Oxygen Tankers and Cylinders.* As the demand for medical oxygen increased exponentially, the Indian Army helped escort about 150 oxygen tankers pan India. They helped repair Oxygen plants, and made the transportation of oxygen cylinders much easier with the help of special military trains, and assisted in refilling empty oxygen containers.
- (g) *Critical Medical Stores.* The Army used its air prowess and ensured that medical essentials like testing kits, ventilators, etc. reached the places needing them in minimum time.

In addition, notable assistance as also been provided by Civil agencies in healthcare to Armed Forces which can be enumerated as:

- (a) Provision of vaccines to Armed forces through District health authorities
- (b) Providing healthcare to the ex-serviceman through ECHS empanelled hospitals

(c) Training of doctors in super speciality courses through renowned institutes like AIIMS and PGI

(d) Training of paramedics through affiliated courses

(e) Providing emergency treatment to the army personnels in hour of need

Sino-Indian Military Balance in CMF in Healthcare

Military-Civil Fusion has gained salience since Xi Jinping came to power in 2012 and made it the state's key goal to transform the PLA into a "world-class military" By the use of MCF, China plans to leverage its flourishing commercial technology sector and rising capabilities in innovation, to drive military modernisation and healthcare development.¹⁰

Healthcare system in China has undergone basic transformation over twentieth and twenty first century, using both public and private medical institutions and insurance programs to practice two parallel medical systems, one for modern or Western medicine and one for traditional Chinese medicines. Hospitals in China work on the principle of CMF with every healthcare setup available for providing round the clock services to both Civilians and Armed forces personnel. China spends a considerable percentage of GDP (6.6%) on healthcare¹¹ as compared to India's just over 2% of expenditure. China is a large country that mostly relies on public provision of health care services with multifaceted approach involving private sector as well, the three-tier, bottom-up delivery system is regarded as highly efficient for decentralizing health care provision. With this approach the PLA has an added advantage of utilizing all its healthcare resources for treatment of its personnel in state funded hospitals. The burden of developing separate infrastructure and decentralizing its medical resources separately for PLA and civil population is largely reduced. Development of healthcare infrastructure at border areas will not only serve the PLA but also civilian population residing in the rural border areas. This does lead to elimination of barriers between China's civilian research and commercial sectors, and its military and defence industrial sectors.

We need to explore the potential implications the success of this strategy can have on the healthcare reforms in the country. In essence, there will be a growing asymmetry between the combat medical care of China and India—one that cannot be easily addressed given the size of the economies of the two countries and their level of industrialisation.

¹⁰ Joshi, 'China's Military-Civil Fusion Strategy, the US Response, and Implications for India'.

¹¹ 'China'.

Need for CMF in Healthcare in North-eastern States in India

Any war witnesses an appalling number of casualties and modern day warfare is in notable contrast with erstwhile wars in terms of military concepts and use of technology. The availability of weapons of mass destruction inevitably results in large number of casualties. With the rapid transformation of adversary on Northern borders, it is imperative for Eastern Army to continually adapt to the changing nature of conflict.

Number of casualties in a war is a prerequisite for identifying the required medical resources and engaging them to provide adequate combat medical support. Present day casualty calculation is based on primitive standards not taking into account the modernisation that has occurred in the interim. Thus, the accuracy of this is fallacious with the facelift of military tactics and thus planning requisite resources in terms of man and material is arduous.

With the present-day practice being followed, civil resources in India per se are not utilized by the armed forces for providing essential healthcare to the troops. Non utilization of the existing civilian resources results in evacuation of a casualty to a military medical echelon which leads to hindered medical care provision. Creation or relocation of medical infrastructure by Armed Forces which consists of high end specialised equipment is not always feasible during active Ops. This results in delayed diagnostics and thus delayed intervention to provide adequate healthcare. One of the greatest challenges to implementing any sort of trauma intervention in a resource-poor setting is the inadequacies in the health system in which it is set. The same can be improved manifold on augmentation with CMF.

Few problem statements identified for troops survivability and health care which can be resolved with CMF are enumerated as:

- a) **Network of ambulance vehicles:** There is a need for roping in of 24x7 ambulance network services 101 toll free calling system for facilitating transfer of beneficiaries in case of emergency. Building up on a robust system of ambulance network will not only benefit the civilians but also add on to the capacity of Armed Forces during hot war scenario. The civil ambulances can be utilised for casualty evacuation from established mobile medical echelons rearwards to secondary or tertiary care centres for advance management and rehabilitation if not as first line responders.
- b) **Casualty evacuation:** In Eastern sector the terrain is mostly mountainous with majority of area being high altitude. Casualty evacuation in this terrain becomes more challenging due to harsh weather conditions with flawed road network. Availability of air ambulance (fix wing and rotary) with patient transfer units will enhance the capability of civil administration in evacuating civil patients residing near the border rural areas in the hour of need and also cater for critical requirement of military during ops for casualty evacuation. Availability of advance landing ground and helipad with night

landing capability will result in swift transfer of medical emergency to speciality centre at all times thus saving critical lives.

c) **Dug in medical infrastructure:** Building underground and fortified hospitals in vulnerable areas now is a way to provide immediate protection while building critical health care infrastructure that can survive the fighting and deliver post-war benefits. The conflict in Syria witnessed more than 454 attacks on medical facilities in the conflict killing over 814 Syrian health workers between 2007 and 2011. The strategic logic of inflicting widespread injuries on local populations and then routinely destroying the healthcare that would treat them, breaks the backbone of any war.

There is a need to setup dug-in district hosp/ PHC/ CHC near the border areas so they can be utilised routinely as healthcare infrastructures and would also serve as a protection head during any surprise attacks by the enemy. These can be utilized by the Armed Forces as readily available infrastructure to setup their surgical centres to carry out immediate resuscitation and urgent surgeries.

d) **Multispeciality hospitals with public private partnership:** There is a requirement in far flung areas to have tertiary care to be provided to citizens in timely and effective manner. The same can be utilized by Armed Forces personnel during BMP as well as conflict. Public Private Partnership will also help address the shortage of skilled healthcare staff by establishing programmes to upskill the health workforce of Armed Forces as well with ability to adapt to technological advancements and their utilization for armed forces in that theatre. For the same there is need to place state of the art multispeciality hospital with public private partnership of 100 beds each. The same model can be replicated in other locations as well.

e) **Diagnostics:** Diagnostics form the backbone of early and precise diagnosis, thus enabling early intervention and proves worthy in delivering definitive healthcare. Lack of advance diagnostics and imaging facilities leads to loss of many precious lives due to untimely correct diagnosis. District hospitals/ CHCs/ PHCs should be upgraded to the scale that renders utmost diagnostic capabilities along with imaging to the civilians and Armed forces personnel during peace and conflict situations. Setting up of advance labs, CT scan and MRI centres in far flung areas will augment diagnosis and treatment modalities and will be of immense benefit in saving lives.

f) **Blood bank:** The safe and timely provision of blood is of crucial importance in the prevention and mitigation of morbidity and mortality during war. Transportation of blood from far flung hospitals or supply depots is often difficult due to non-maintenance of proper cold chain and also the terrain is not conducive to transport blood with frequent jerks enroute resulting in haemolysis of blood. This renders the blood unsuitable for use and leads lot of wastage. Blood banks in District hospitals should be well built to cater for needs of civil population during peace and also serve as a source to provide supply to Armed Forces during its need. Availability of mobile blood van with PPP will act as a force multiplier for transportation of blood to forward remote areas, PHCs/CHCs.

- g) **Communication network in Telemedicine:** Telemedicine refers to the provision of remote clinical consultation services of Medical Officer with specialists and super specialists, via real-time two-way communication using electronic audio and visual means. Its utilization in providing early diagnosis and thus better treatment is undeniable. Under Digital India, provision of high speed internet networks in rural and remote areas would facilitate in establishing communication networks for telemedicine. Involvement of software companies to establish a robust mode of communication with tertiary care centres for prompt consultation.
- h) **Provision of medical stores and equipment:** Unlike in the civil arena, logistics and supply chain management is more complex in the armed forces owing to the inhospitable terrain and far-flung border areas. Replenishment of medical stores (medicines, iv fluids, essential life saving drugs etc) in active ops is a herculean task and would consume a major chunk of man and machine which otherwise could have been utilised in the war front. Utilisation of civil medical resources as replenishment bricks for the aid posts and surgical centres would lighten the burden of stocking of medical stores. Availability of cargo drone services for lifting vital medical stores like blood and emergency drugs will go a long way in enhancing the quality of emergency medical care in border areas by circumventing the challenging terrain.
- j) **Involving Civilian Medical staff during Wartime:** In addition to physicians actively serving in the military, civilian physicians can be pooled in to provide assistance at the rear medical facilities. Their involvement will have a substantial impact on human morbidity and mortality through warfare. A society akin to “Doctors without Borders” should be formed to register all doctors across the nation at a common platform willing to contribute during hot war scenario. Identification and making a database of qualified medical volunteers & ESM willing to extend help during any adverse situations will augment the capability of medical resources thereby enhancing the quality emergency care provided in such situations.
- k) **Augmenting medical logistics through private partners:** During war logistics and supply chain also take a hit. Supply Chain Management plays an important role to provide a resource to our users in real-time. Identification & mapping of private partners who are willing to transport vital equipment and medicines at a short notice from different part of the country to North Eastern regions and extending repair and maintenance service to sophisticated medical equipment will aid in maintaining seamless combat medical care.
- l) **Disposal of Biomedical waste:** Disposal of BMW in mountains and High Altitude Areas is a challenging factor. Innovative methods of waste disposal sites/ collection agencies at various locations will ensure minimal pollution and relative health hazards. Creating such infrastructure for proper BMW disposal will prove worthy during BMP and conflict scenarios for both civil and Armed Forces medical setups.

The Way Forward

Identifying existing resources available within government and military domains which can be exploited for providing real time apt solutions. It is also prudent to recognise resources which can be employed for devising resolution for problems which cannot be deciphered readily. In India, the defence Research, development and production has been dominated by State-Owned Enterprises (SOEs). Heavily funded and supported by the state, these monoliths are slow to react to rapid changes in technology and have poor efficiency. In view of the rapidly changing scene of present-day warfare, this deficiency can be adequately combated with Civil military fusion.

Numerous development schemes are being undertaken at national and state levels with an aim to structure comprehensive infrastructure development. There is a need to keep a holistic approach while formulating and implementing these projects and integrating them with Armed Forces requirement at the abstract. There is a need by the central and state government to customize schemes and projects befitting the defence requirements also.

There are various schemes undertaken by central and state governments already in vogue for development of rural areas. Niti Aayog conceptualised in 2015 serves as a think tank for the Government of India and serves as a nodal agency tasked with catalysing economic development and fostering cooperative federalism through the involvement of State Governments of India in the economic policy making process using a bottom-up approach.

Prime Minister Gati Shakti Yojna aims to provide competitive advantage for manufacturing in India by bringing all relevant ministries and departments of Government of India together and create a digital platform for more holistic and integrated planning of projects. The yojna would interconnect ministries of roadways, railways, airways and waterways. Improved connectivity would enhance the casualty evacuation capabilities of Armed Forces.

Schemes like **Atmanirbhar Bharat and Make in India** are an umbrella concept for India to become more efficient, competitive and resilient. Battlefield of today and subsequent years are going to be severely dominated by eternally emerging technology that the responsibility on keeping the pace with rapid technological advancements lies with respective armed forces only. These initiatives encourage small scale companies to invest and foster innovation resulting in influx of latest technologies available which proves useful in providing combat health care. Their utility is of paramount importance in innovating medical stores like haemostatic patches, light weight inflatable stretchers, tourniquets, splints etc.

It is essential that a medical representative of Armed Forces be incorporated in State health council bodies since inception of any healthcare project in order to tailor made the infrastructure and health related policies suitable for both civ and Armed Forces. This will facilitate better integration of health matters which will be a boon in future

endeavours of development goals. It is imperative that methodological mapping of these existing and planned medical infrastructure must be carried out along with formulation of roadmap to identify requisite upgradation.

Conclusion

The circulation of resources between civilian and military departments as well as private industry and academia has been inadequate in India. CMF is a complex concept that consists of numerous layers and nuances. Qualitative aggregation of resources and capacities from both the civil and military domains is the cornerstone of CMF. CMF is the right metric and instrument to establish a robust healthcare system which would not only serve the civilian population during peace but also will prove to be useful during conflict. The granite walls that exist between the silos of civil and military institutions must be collapsed in order to allow the seamless creation of necessary medical infrastructure for providing quality healthcare.

DISCLAIMER

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References:

1. Barman, Shreya Das. 'Fighting the "Invisible Enemy": Military-Civil Fusion in Focus – Center For Land Warfare Studies (CLAWS)'. Accessed 16 January 2023. <https://www.claws.in/fighting-the-invisible-enemy-military-civil-fusion-in-focus/>.
2. Brueggemeyer, Mary T., Mark Riddle, and Arthur L. Kellermann. 'Health Protection: Military Concepts Applied to the Civilian World'. *American Journal of Public Health* 108, no. 9 (September 2018): 1155–57. <https://doi.org/10.2105/AJPH.2018.304577>.
3. Statista. 'China: Health Expenditure GDP Share'. Accessed 16 January 2023. <https://www.statista.com/statistics/279402/health-expenditure-in-china-as-a-proportion-of-gdp/>.
4. Goswami, Bidyut, Parthasarathi Mukhopadhyay, Rahul Mahanta, and B. N. Goswami. 'Multiscale Interaction with Topography and Extreme Rainfall Events in the

North-East Indian Region'. *J. Geophys. Res* 115 (June 2010).
<https://doi.org/10.1029/2009JD012275>.

5. Hutter, Jack N., Paul M. Robben, Christine Lee, Melinda Hamer, James E. Moon, Kristen Merino, Lei Zhu, et al. 'First-in-Human Assessment of Safety and Immunogenicity of Low and High Doses of Plasmodium Falciparum Malaria Protein 013 (FMP013) Administered Intramuscularly with ALFQ Adjuvant in Healthy Malaria-Naïve Adults'. *Vaccine* 40, no. 40 (22 September 2022): 5781–90.
<https://doi.org/10.1016/j.vaccine.2022.08.048>.

6. Janse, Jacobine, Jori Pascal Kalkman, George Louis Burchell, Adriaan Pieter Cornelis Christiaan Hopperus Buma, Teun Zuiderent-Jerak, Myriame Thérèse Isabella Beatrice Bollen, and Aura Timen. 'Civil–Military Cooperation in the Management of Infectious Disease Outbreaks: A Scoping Review'. *BMJ Global Health* 7, no. 6 (15 June 2022): e009228. <https://doi.org/10.1136/bmjgh-2022-009228>.

7. Joshi, Manoj. 'China's Military-Civil Fusion Strategy, the US Response, and Implications for India'. ORF. Accessed 16 January 2023.
<https://www.orfonline.org/research/chinas-military-civil-fusion-strategy/>.

8. Lacey, S. W. 'The Arts of War and Medicine: A Study in Symbiosis'. *The American Journal of the Medical Sciences* 305, no. 6 (June 1993): 407–20.
<https://doi.org/10.1097/00000441-199306000-00010>.

9. 'Rajnath Singh: Civil-Military Fusion Will Strengthen Logistics: Rajnath Singh - The Economic Times'. Accessed 16 January 2023.
<https://economictimes.indiatimes.com/news/defence/rapidly-moving-towards-jointness-of-three-services-says-rajnath-singh/articleshow/94146968.cms>.

10. 'USAMRDC: U.S. Army Sponsors First HIV Vaccine Trial to Show Some Effectiveness in Preventing HIV'. Accessed 16 January 2023.
https://mrhc.health.mil/index.cfm/media/articles/2009/HIV_vaccine.

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