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# Medical Cadets as Force Multipliers: Operational Readiness from the Sumatra Disaster Relief Task Force

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## Abstract

**Background:** As an archipelagic territory highly vulnerable to severe weather anomalies, Indonesia requires prompt multi-sectoral deployment and flexible civil-military medical protocols to mitigate post-disaster health crises; hence, this study evaluates the operational integration, health service support, and health risks of military medical cadets serving in the Sumatra Disaster Relief Task Force.
**Methods:** This study utilizing a descriptive field report with a narrative review component of disaster healthcare guidelines from 2016–2026, this research evaluated operational logbooks spanning November 30 to December 17, 2025.
**Results:** The mission successfully achieved five strategic milestones, including logistical readiness, shipboard surgical assistance, management of an internal Typhoid Fever case, evacuation recovery, and multi-sectoral water purification installations. Frontline operations in Aceh Tamiang managed a high-throughput volume of 586 acute civilian cases over two days (n=305 on December 16; n=281 on December 17), where waterborne gastroenteritis, post-flood infectious dermopathy, and neglected chronic pathologies represented the primary clinical burden.
**Conclusion:** Ultimately, deploying supervised senior military medical student volunteers functions as a vital mechanism to reinforce overloaded health infrastructures, though sustaining operational durability strictly depends on mandatory pre-deployment vaccinations, clear boundaries of practice, and rigid compliance with Incident Command Systems.

**Keywords:** *disaster medicine, military medicine, medical volunteerism, hydrometeorological disaster, WASH engineering.*

## Background

Indonesia is highly vulnerable to hydrometeorological disasters due to its archipelagic geography, monsoon climate, and exposure to extreme rainfall events, which are closely linked to climate-related variations in monsoon intensity, sea-surface temperature anomalies, and fragile river basin catchments.[1,2] The Sumatra deployment period (November-December 2025) coincided with extreme precipitation profiles that precipitated catastrophic flash floods, extensive riverbank breaches, and massive landslides across multiple provinces.[2-5] Such disasters fundamentally obliterate regional healthcare supply chains, displace vulnerable civilian cohorts, and destroy water sanitation grids, establishing an ideal environment for secondary public health emergencies.[6-8]

The immediate aftermath of flood-related inundation may trigger a range of secondary health risks, including acute waterborne diarrheal epidemics, vector-borne resurgences, systemic soft-tissue infections, and severe acute respiratory infections (SARI).[8,9] Simultaneously, local healthcare facilities are often structurally compromised or understaffed, limiting their capability to respond to the surge.[10,11] Under the World Health Organization (WHO) Global Emergency Medical Teams guiding bluebook, establishing auxiliary disaster medical posts focusing on coordination, minimum standards, and integration with local command systems is a cornerstone of effective disaster response.[11,12]

Senior medical students—particularly military medical cadets trained under the Faculty of Medicine and Health Sciences, Indonesia Defense University (IDU)—may represent a disciplined and potentially valuable auxiliary workforce when appropriately supervised and integrated into formal command structures.[13,14] In contrast to ad hoc volunteer mobilization, military medical cadets may benefit from pre-existing command structures, logistical discipline, and clearer operational accountability.[13,15,16] This operational integration allows them to serve as immediate force multipliers for licensed military and civilian healthcare teams.[13,15] This study

presents a rigorous analysis of the Sumatra Disaster Relief deployment, focusing on the tactical realities, clinical data, and the health vulnerabilities of the medical responders themselves. However, evidence on the supervised deployment of military medical cadets remains limited, and few reports describe their operational contribution, clinical workload, and responder health risks in Indonesian disaster settings.

## Methods

This study employs a descriptive field report with a narrative review component.[13,14,18] The data corresponds to the deployment of the Sumatra Disaster Relief Task Force spanning November 30 to December 17, 2025. The deployment route began in Jakarta, continued by naval transport to Sibolga, and proceeded through Padang and Medan before reaching Aceh Tamiang.[19,20]

Primary field parameters—including the number of patients, clinical diagnoses, disease categories, treatments provided, referrals, logistics records, WASH data, and health events among responders—were recorded by triage officers and the field administration team, and subsequently extracted from daily operational logbooks, clinical registries from field triage points, and institutional records. To fulfill international ethical standards for clinical reporting, all patient data was fully aggregated and anonymized; no individual names, national identity parameters, or private medical registration numbers were collected or utilized. Statistical variables are presented as aggregate absolute frequencies (n) and relative disease distribution percentiles. No inferential statistical analysis was performed due to the descriptive nature of the study. A comprehensive search across PubMed, ScienceDirect, and Google Scholar was performed to capture relevant literature from the last decade (2016–2026). Guidelines from the Sphere Handbook (2018), WHO EMT Minimum Standards, and the Indonesian National Disaster Management Authority Strategic Blueprints were incorporated, and field findings were narratively compared with international and national disaster response standards.[2,11,21]

## Results

The deployment followed a five-phase timeline from November 30 to December 17, 2025, tracking the team's progression from initial logistical mobilization and shipboard surgical assistance to managing medical emergencies, integrating tactical water purification units, and delivering frontline disaster relief in flooded sectors (Figure 1).

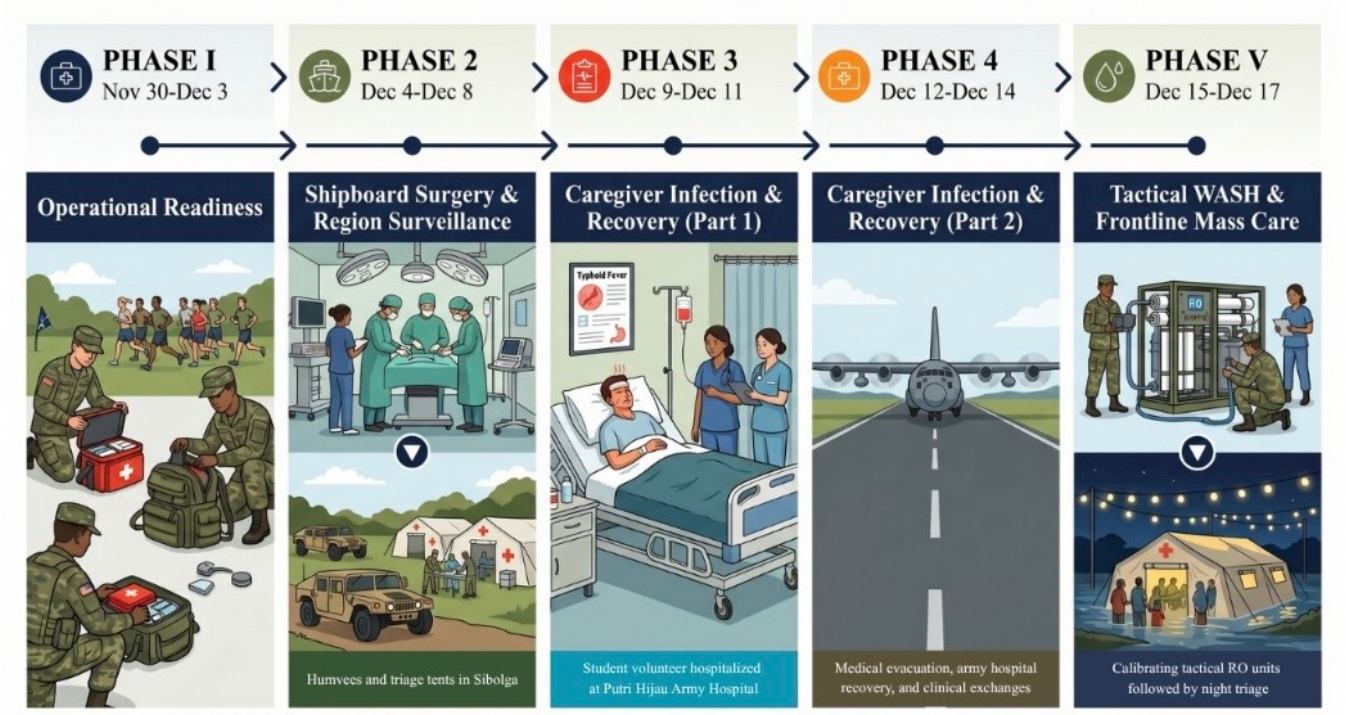


**Figure 1.** Phased Timeline of Military Medical Disaster Response Operations

**Phase I: Operational Readiness and Logistical Mobilization (Nov 30 – Dec 3)**

Operations commenced on November 30, 2025, with an aggressive vetting of tactical equipment, including personal protective equipment, medical diagnostic kits, and specialized field gear consolidated within standardized tactical transport bags.[11,17,22] Strict command structures were established by the Command Group.[11,16] On December 1, 2025, the team mobilized to the Military Sealift Command via institutional transport assets, leveraging a familiar operational environment due to prior training in Naval Medicine.[14] Daily operations integrated structured morning physical conditioning and collective environmental sanitation details, reinforcing group cohesion, physical readiness, and operational discipline.

**Phase II: Shipboard Surgical Assistance and Region Surveillance (Dec 4 – Dec 8)**

Upon naval transit to North Sumatra, the medical cohort was integrated into an active hospital ship.[19,20] Under the direct supervision of licensed military surgeons, medical cadets functioned as surgical assistants performing tasks strictly tailored to their level of competence, without making independent clinical decisions; all invasive procedures remained the sole responsibility of the licensed physicians.[3,13,23] Volunteers actively participated in two major procedures under maritime conditions:

- **Surgical Debridement for Cellulitis Pedis Sinistra:** Students managed localized chemical antisepsis, automated fluid suctioning, surgical field isolation, and post-anesthesia vital signs monitoring.
- **Open Reduction Internal Fixation (ORIF) for a Spiral Femur Dextra Fracture:** Cadets assisted in tissue retraction, layer-by-layer anatomical alignment tracking, dermal subcuticular suturing, and sterile compressive wound dressings.

Following maritime transit, land surveillance was initiated in Sibolga using tactical military transport. The team executed structural public health evaluations at the regional field kitchen managed by the Ministry of Social Affairs, the local military medical post (Denkesyah 01.04.02 Sibolga), and an emergency clinic situated inside the Pandan Multi-Purpose Building. Triage protocols successfully identified a complex case of an untreated chronic malunion humerus dextra fracture within the local civilian population.

**Phase III & IV: Caregiver Infection Vulnerability and Inpatient Recovery Logistics (Dec 9 – Dec 14)**

On December 9, 2025, upon arrival in the Padang sector, cumulative physical exhaustion, sleep deprivation, and environmental pathogen exposure resulted in acute physiological collapse within the student cohort.[24,25] A student volunteer presented with hyperpyrexia (39.5°C), severe retro-orbital cephalea, productive cough, intense pharyngitis, acute abdominal pain, and intractable emesis. Emergency evaluation and positive serological Widal tests confirmed a clinical diagnosis of severe Typhoid Fever.[26,27]

In accordance with direct orders from the Faculty Leadership and attending Emergency Medicine consultants, the volunteer was placed on absolute bed rest and admitted for aggressive inpatient management, which precluded immediate transport via military Hercules aircraft to the subsequent sector. Following clinical stabilization, the patient was evacuated to the Putri Hijau Army Hospital in Medan. The inpatient recovery period was strategically leveraged to engage in peer-to-peer academic and clinical protocol exchanges with local military nursing staff. The volunteer achieved full clinical and microbiological resolution and was officially discharged on December 14, 2025.

**Phase V: Tactical WASH Integration and Frontline Mass Primary Care (Dec 15 – Dec 17)**

On December 15, 2025, the team reintegrated into active duty at the Military Region 1 Command Headquarters engineering division. Volunteers collaborated with military engineering cadets to construct and calibrate tactical Reverse Osmosis (RO) water purification units.[28] This multi-sectoral exercise focused on establishing automated water purification capabilities for immediate deployment to flooded sectors lacking potable water pipelines.

From December 16 to December 17, 2025, the task force advanced directly into the flood disaster zone of Aceh Tamiang. Operating under the tactical oversight of the Army Health Center, the team established continuous night-shift triage and emergency medical posts. Clinical workloads were exceptionally high, requiring rapid, high-throughput triage and evidence-based interventions.[29]

During the two-day peak frontline deployment in Aceh Tamiang, the task force managed a total of 586 acute civilian cases. (Table 1) details the specific epidemiological breakdown of these clinical presentations, categorized by system and diagnostic frequency.

**Table 1.** Epidemiological Breakdown of Acute Civilian Cases in Aceh Tamiang by System and Diagnostic Frequency

| Diagnostic Category | Vol (n) | Prevalence (%) | Primary Clinical Presentations Managed |
|---|---|---|---|
| **December 16, 2025 (Total n = 305)** | | | |
| Acute Respiratory Infections (ARI) | 124 | 40.66% | Acute rhinopharyngitis, acute bronchitis, febrile cough secondary to humidity. |
| Musculoskeletal & Soft-Tissue Trauma | 101 | 33.11% | Myalgia, contusions, minor lacerations from flood debris, acute back strain. |
| General Constitutional Symptoms | 80 | 26.23% | Physical exhaustion, tension-type headaches, uncontrolled chronic primary hypertension. |
| **December 17, 2025 (Total n = 281)** | | | |
| Acute Waterborne Gastroenteritis | 112 | 39.86% | Profuse watery diarrhea, acute gastritis, mild-to-moderate dehydration. |
| Post-Flood Infectious Dermopathy | 98 | 34.87% | Tinea pedis, severe cutaneous candidiasis, infected scabies, localized cellulitis. |
| Advanced Chronic Pathology (Neglected) | 56 | 19.93% | Advanced gangrene pedis secondary to Type 2 Diabetes Mellitus, chronic ulcers. |
| Ocular Infections | 15 | 5.34% | Acute bacterial conjunctivitis due to exposure to contaminated floodwaters. |
| **Grand Total** | **586** | | |

## Discussion

### Multi-Sectoral Synthesis: WASH, Engineering, and Disaster Medicine

Frontline results reinforce a core tenet of modern disaster medicine: effective public health interventions in flood zones require direct integration with logistical and engineering frameworks. The deployment of Reverse Osmosis (RO) water purification units highlights this synergy.[30] In flood disasters, water sources are heavily contaminated with fecal coliforms, causing immediate spikes in acute gastroenteritis, which accounted for 39.86% of all cases on December 17. The deployment of RO units addressed a key environmental risk factor for waterborne disease transmission, aligning with the Sphere Handbook's minimum standards for water supply and sanitation.[21]

Furthermore, the students' involvement in shipboard major surgeries (debridement and ORIF) shows how the clinical scope of a disaster deployment transitions dynamically from primary public health to tertiary trauma care. Senior medical students, trained in sterile techniques and basic surgical assisting, effectively reduce the workload of primary surgeons, optimizing operative throughput in resource-constrained maritime surgical settings.[14,15]

### Responder Health Risk: A Suspected Typhoid Fever Case

The clinical case of a volunteer contracting severe Typhoid Fever serves as an operational warning regarding caregiver vulnerability. Literature shows that disaster responders face significant health risks due to high pathogen loads, physical exhaustion, irregular sleep, and compromised personal hygiene. Typhoid fever, caused by *Salmonella enterica* serovar Typhi, spreads via the fecal-oral route and has an incubation period that aligns with the timeline of this deployment.[24,30]

The patient's high pyrexia and systemic symptoms required immediate hospitalization, disrupting planned air transit via military Hercules aircraft. This scenario highlights the operational impact of volunteer illness: it reduces frontline team capacity and diverts logistical resources for medical evacuation. This case underscores the necessity of strict pre-deployment protocols, including mandatory viral capsular polysaccharide vaccinations, structured work-rest cycles, and mandatory chemical water treatment tabs for all deployment personnel.[31,32]

### Force Multiplication and Educational Paradigms in Military Medicine

When evaluated against recent literature regarding medical student volunteerism during crises, this deployment demonstrates that structured military medical cadets provide a highly effective asset.[15,23,33] Civilian student deployments often face challenges related to role confusion, inadequate supervision, and fragmented communication with command elements. In contrast, the Military medicine cohort operated under a strict military chain of command, which facilitated rapid, disciplined deployment across diverse transit modalities (naval vessels, military aircraft, and land transport).[13,19]

This operational experience addresses key competencies in military medicine: adaptability, clear communication within an Incident Command System, resource management, and esprit de corps. These field realities reinforce the value of formal disaster medicine integration within the medical school curriculum, transforming theoretical knowledge into structured, high-impact field capability.[14,18]

## Conclusion

This field report suggests that supervised senior military medical cadets may provide meaningful operational support during hydrometeorological disaster response when integrated into a clear military command structure. Under direct supervision and within defined scopes of practice, cadets can assist licensed healthcare teams through logistical preparation, field triage support, clinical documentation, supervised surgical assistance, and WASH-related operational activities.[13,15,33]

The deployment also highlights that disaster responders are exposed to substantial infectious, environmental, and physiological risks. Maintaining mission sustainability therefore requires clear Incident Command System implementation, standardized scopes of practice, structured supervision, risk-based pre-deployment immunization, safe food and water protocols, early illness reporting, and regulated work-rest cycles.[28,33]

Overall, this deployment provides practical field evidence supporting the integration of disaster medicine, responder safety, WASH preparedness, and civil-military coordination into military medical education. Further studies using standardized operational indicators, patient outcome assessment, and responder health surveillance are needed to evaluate the broader effectiveness and scalability of this model.[27,31]

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## Author Contributions

AP conceived the ideas, collected the data, analysed the data, and drafted the manuscript.

## Conflict of Interest

No conflict of interest.

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