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# From Campus to Crisis Shelter: A Reflective Case Analysis of Shelter-Based Healthcare and Enacted Disaster Preparedness during the 2025 Hat Yai Flood

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## Abstract:

Disaster preparedness is commonly framed around advance planning and formal protocols, yet major emergencies often require institutions to adapt under rapidly changing conditions. This reflective case analysis examines the transformation of Prince of Songkla University Hat Yai Campus into an evacuation shelter during the 2025 Hat Yai flood, when widespread disruption left Songklanagarind Hospital as the principal functioning major hospital in the city. Established through situational necessity rather than prior designation, the shelter expanded rapidly from approximately 2,000 evacuees to a peak occupancy of approximately 7,000 and operated through flexible multidisciplinary staffing, public donations, volunteer mobilization, and cross-sector collaboration. Shelter-based healthcare functioned as an extension of the disrupted health system, integrating triage, medication continuity, referral, transport, and differentiated care for acute, chronic, high-dependency, and psychosocial needs. Social cohesion and adaptive governance enabled resources and personnel to be mobilized despite the absence of predefined shelter governance, while frontline experience generated practical knowledge subsequently translated through an After-Action Review. Viewed through the World Health Organization (WHO) Health

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Emergency and Disaster Risk Management framework, the experience illustrates preparedness as an enacted capacity spanning preparedness, response, and recovery. The case highlights the potential role of hospitals, universities, and community institutions as complementary operational nodes during health-system disruption and underscores the value of combining formal preparedness with flexible governance, cross-sector coordination, and institutional learning.

**Keywords:** adaptive governance, disaster preparedness, shelter-based healthcare, social cohesion, Thailand

## Introduction

Disaster preparedness is commonly conceptualized as a technical and administrative process, defined by advance planning, formal command structures, and standardized operational protocols[1]. However, disaster research has consistently shown that real-world emergencies rarely unfold according to predefined plans, often revealing a gap between preparedness as policy and preparedness as practice. This gap becomes evident when rapidly evolving conditions require adaptive action beyond what formal plans can anticipate or operationalize. Preparedness therefore extends beyond procedural compliance to encompass the capacity of institutions and communities to respond effectively under uncertainty, disruption, and resource constraints[2]. Against this background, this reflective case analysis examines the PSU shelter response as an example of enacted preparedness, focusing on how adaptive governance, informal coordination, and ethical decision-making emerged under disruptive conditions.

### Disaster and health-system context

The 2025 Hat Yai flood developed through successive episodes of heavy rainfall and runoff. Heavy rainfall over Khao Kho Hong on November 21 caused rapid runoff into Hat Yai Municipality, followed by further flooding from November 21–22. After the water levels temporarily receded, a major second surge on November 24, driven by upstream flow through the U-Taphao Canal, rapidly overwhelmed urban drainage and response capacity. Approximately 630 mm of rainfall was recorded over three days, exceeding the 2010 record, while an estimated 500 million $m^3$ of water entered Hat Yai during the same period[3,4]. In severely affected areas, floodwater reached approximately 2–3 m and exceeded 3 m at Hatyai Hospital. Roads, transportation, electricity, water supply, communication systems, and essential services were extensively disrupted.

The flood also severely affected the city's healthcare system. Hat Yai normally relies on five major hospitals with a combined capacity of more than 2,000 beds and over 200 private clinics serving the city and surrounding districts. During the flood, four of the five major hospitals became non-operational or severely disrupted, leaving Songklanagarind Hospital as the principal functioning major hospital[5]. Hat Yai Hospital, the main Ministry of Public Health referral hospital, experienced flooding and disruption of power, water, and essential services. By November 26, more than 500 inpatients remained in the hospital, including approximately 50 critically ill patients requiring evacuation by helicopter, boat, or other available transport[6]. Songklanagarind Hospital consequently maintained its routine functions while receiving transferred patients and responding to disaster-related healthcare demand.

**From campus to crisis shelter: social cohesion and adaptive governance**

Against this background of population displacement and health-system disruption, facilities at Prince of Songkla University Hat Yai Campus (PSU) were rapidly converted into an evacuation shelter through situational necessity rather than prior designation. Without dedicated funding or predefined governance arrangements, operations relied on public donations, flexible resource allocation, and collaboration among university personnel, volunteers, private-sector actors, and informal networks. The shelter evolved beyond temporary refuge into an operational node for logistics, communication, healthcare, and real-time decision-making. Occupancy increased from approximately 2,000 evacuees initially to a peak of approximately 7,000. Because evacuees continuously entered and left, complete individual-level registration and reliable estimates of length of stay were not feasible. The shelter remained operational until 30 November, with dedicated triage discontinued as healthcare demand declined and evacuees began returning home.

Staffing followed a flexible multidisciplinary model rather than a fixed roster. During the hours 08:00–24:00, medical coverage was organized into two shifts, typically with four to five interns and one supervising physician per shift. Additional physicians assisted according to availability, while volunteer nurses, pharmacists, and medical students supported clinical care and operational coordination. Overnight (00:00–08:00), a nursing team provided continuous coverage. Because staffing fluctuated throughout the response, a reliable total workforce count could not be determined.

Public communication and ad hoc coordination mechanisms became critical infrastructure, enabling the shelter to attract, channel, and redistribute donations in response to rapidly changing needs[7]. In disaster settings, social capital—networks of trust, reciprocity, and shared norms—helps explain how collective action and resource sharing emerge when formal systems are disrupted[8,9]. Social cohesion further supports sustained participation and cooperative behavior during emergency response[10]. At the PSU shelter, these dynamics were evident in the mobilization of volunteers, university personnel, private-sector actors, and informal networks. Pre-existing institutional and community relationships therefore functioned as a form of latent preparedness, enabling collective action despite limited formal coordination. However, the donation-driven response also created mismatches between donated items and actual needs, logistical burdens related to sorting and storage, and ethical decisions about prioritization under scarcity[11]. These challenges required continuous adjustment and illustrate adaptive governance, in which coordination and authority emerge pragmatically as conditions change, rather than solely through predefined institutional structures[12]. At the PSU shelter, social capital and social cohesion enabled collective mobilization, while adaptive governance translated these relational resources into coordinated action as needs evolved.

**Shelter-based healthcare and health system reconfiguration**

As flood conditions escalated, shelter operations became increasingly intertwined with the disrupted regional health system. Emergency referrals required differentiated transport according to clinical urgency and dependency: lower-acuity patients without life-sustaining support needs were transferred through organized water-based rescue operations, whereas critically ill patients requiring mechanical ventilation or advanced life support were prioritized for helicopter transport. This reconfiguration illustrates how disaster conditions can shift referral systems from routine hierarchical pathways toward negotiated, real-

time coordination based on urgency, available capacity, and risk[13].

Within the shelter, healthcare delivery required coordination of clinical care, logistics, and referral pathways as an extension of the disrupted health system. Family medicine and community medicine teams assumed primary operational responsibility, drawing on broad-based clinical care, triage, and continuity-of-care functions. Multidisciplinary personnel supported these teams through flexible task-sharing as needs evolved.

Patient flow was structured around on-site triage and the level of care required. Common acute conditions included minor wounds, immersion-related skin conditions, rashes, mild respiratory infections, and diarrheal illness, most of which were managed within the shelter. Another major group comprised patients with pre-existing chronic diseases, for whom care focused on medication continuity and coordination of ongoing treatment. Patients requiring dialysis posed a particular logistical challenge, as available slots had to be identified across functioning facilities. Those requiring further assessment, but not emergency care, were referred to a dedicated outpatient service established during the disaster, whereas clinically unstable or high-acuity patients were transferred directly to the emergency department.

Effective shelter-based healthcare depended not only on clinical care but also on coordinated logistics, referral pathways, and health financing. Logistics support included patient transport, referral documentation, medical supplies, and real-time communication between shelter and hospital teams, allowing referrals to continue despite disruption. Administrative coordination also maintained health insurance and reimbursement mechanisms, enabling displaced patients to access the necessary care without additional out-of-pocket payment[14,15].

**Beyond acute treatment: integrating well-being into shelter-based care pathways**

Beyond acute clinical care and emergency referral, shelter-based healthcare extended to the broader dimensions of well-being and vulnerability. Particular attention was required for individuals with functional limitations, disrupted caregiving arrangements, and complex medical or psychosocial needs[16]. Psychological distress related to displacement, uncertainty, and prolonged crisis conditions was also an important concern. Volunteer-facilitated activities, including music, storytelling, and art-based play, provided opportunities for emotional expression, social connection, and a sense of normality, particularly among children and caregivers[17]. Mental health professionals, including psychiatrists, psychologists, and trained counselors, provided targeted support for individuals experiencing acute distress, sleep disturbance, or trauma-related symptoms, and advised shelter teams on psychological first aid and supportive communication. Together, these activities positioned psychosocial well-being as an integral component of shelter-based healthcare, rather than just a secondary consideration[18].

While many vulnerable individuals could be supported within the shelter, others had needs exceeding its functional capacity, particularly those with severe mobility limitations, high dependency, or requirements for continuous caregiving[2]. These individuals were supported through alternative arrangements coordinated with hospital-based services, including transfer to the Yensira Center, where rehabilitation teams and trained caregivers provided continuous care, pressure injury prevention, and functional support. This differentiated approach aligned patient needs with appropriate levels of care rather than assuming that all displaced individuals could be safely managed within a single shelter setting[14].

Communicable disease prevention in emergency shelters requires adequate hygiene and sanitation, safe food and water, environmental cleaning, and measures to identify and separate individuals with potentially infectious conditions[19]. At the PSU shelter, implementation was constrained by rapidly increasing occupancy. Efforts focused on environmental cleanliness, freshly prepared meals from centralized food services, and hand hygiene. Spatial separation of symptomatic individuals was initially feasible but became difficult as occupancy increased, while face masks could not be supplied consistently. Influenza vaccination and doxycycline prophylaxis were introduced later in the response. These experiences highlight the gap between recommended infection prevention standards and operational feasibility, underscoring the need for scalable space, hygiene supplies, and infection-control resources in shelter preparedness.

**Institutional learning and implications for disaster preparedness**

As shelter operations stabilized, attention shifted from the immediate response toward anticipatory health management. Teams assessed emerging risks related to medication interruption, deterioration of chronic conditions, infectious disease transmission, environmental exposure, and caregiver fatigue[13]. These assessments informed adjustments in staffing, space use, referral planning, and coordination with hospital and rehabilitation services. Decisions regarding resource allocation and referral were guided not only by clinical acuity, but also by vulnerability, dependency, and potential harm[20]. Shelter-based healthcare therefore required ethical, as well as clinical and logistical, judgments, particularly concerning fairness and the protection of vulnerable populations under resource constraints. Frontline teams developed practical knowledge during the response, including how to organize patient flow, prioritize vulnerable groups, coordinate referrals under disrupted conditions, and adapt staffing and space as needs changed. These experience-based practices represented tacit knowledge that was subsequently discussed through an informal After-Action Review and translated into explicit lessons for future shelter planning, care pathways, and inter-institutional coordination. The Hat Yai experience illustrates that preparedness encompasses more than just the implementation of predefined plans. The PSU shelter relied on social cohesion, institutional flexibility, cross-sector coordination, volunteer mobilization, and rapid resource reallocation as needs changed. Informal and semi-formal arrangements helped bridge gaps when formal mechanisms were delayed or unavailable, while referral, transport, and continuity of care maintained connections between the shelter and the wider health system. Viewed through the WHO Health Emergency and Disaster Risk Management (Health EDRM) Framework, these experiences illustrate capacities spanning prevention and mitigation, preparedness and readiness, response, and recovery[21]. The response also revealed preparedness gaps, including the absence of predefined shelter governance, dedicated resources, scalable infection-control arrangements, and established care pathways for high-dependency populations.

Although shaped by the Thai healthcare and institutional context, these lessons suggest broader relevance to other disaster settings, particularly the need to combine formal planning with relational and adaptive capacities when actual conditions diverge from predefined plans. Hospitals, universities, and other community institutions serving as emergency shelter nodes should be supported by predefined governance arrangements, flexible resource allocation, established healthcare and referral pathways, and mechanisms for institutional learning. Table 1 synthesizes these experiences across the Health EDRM continuum, linking the enacted practices at the PSU shelter with their implications for future disaster preparedness.

**Table 1** Conceptual mapping of the PSU shelter experience across the WHO Health EDRM continuum

| Health EDRM phase | Enacted practices at the PSU shelter | Implications for preparedness |
|---|---|---|
| Prevention & mitigation | Anticipatory assessment of medication interruption, chronic disease deterioration, infection, environmental exposure, and caregiver fatigue | Incorporate vulnerability, dependency, and preventable harm into risk assessment and resource prioritization |
| Preparedness & readiness | University facilities, personnel, and community networks provided latent capacity, despite limited predefined shelter governance and dedicated resources | Pre-identify potential shelter nodes and establish flexible governance, essential resources, and care pathways for vulnerable populations |
| Response | Rapid shelter activation, volunteer and donation mobilization, on-site healthcare, medication continuity, and coordinated referral and transport | Combine clinical capacity with flexible logistics, cross-sector coordination, and mechanisms for rapid resource mobilization |
| Recovery | Progressive transition from shelter operations toward community return, accompanied by reflection through an After-Action Review | Capture experiential knowledge and translate operational lessons into future planning and institutional preparedness |
| Across the continuum | Social cohesion, informal networks, and adaptive governance supported coordination as needs and available resources changed | Complement formal preparedness with relational and adaptive capacities that can function under disruption |

PSU=Prince of Songkla University, WHO=world health organization, EDRM=health emergency and disaster risk management

## Conclusion

The PSU shelter experience demonstrates that disaster preparedness extends beyond formal plans to include the capacity to adapt healthcare delivery, mobilize multidisciplinary resources, and coordinate care under disruption. Shelter-based healthcare served as a flexible extension of the health system, supporting triage, continuity of care, referral, and differentiated responses to diverse health needs. Viewed through the Health EDRM framework, the experience highlights the importance of combining predefined preparedness with adaptive governance, cross-sector coordination, and institutional learning. Universities and other community institutions may therefore serve as complementary operational nodes when conventional health systems are disrupted.

## Conflict of interest

There are no conflicts of interest to declare.

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