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DEVELOPMENT OF COMPONENTS AND STANDARDS FRAMEWORK OF HEALTH INFORMATION MANAGEMENT FOR EMERGENCY MEDICAL TEAMS DURING DISASTER RESPONSE IN ASEAN: A SYSTEMATIC REVIEW OF POLICY AND EMPIRICAL EVIDENCE

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List of Abbreviations

AACDHM	: ASEAN Academic Conference on Disaster Health Management
AADMER	: ASEAN Agreement on Disaster Management and Emergency Response
AHA Centre	: ASEAN Coordinating Centre for Humanitarian Assistance on disaster management
ALDDHM	: ASEAN Leaders' Declaration on Disaster Health Management
AMS	: ASEAN Member States
APHDA	: ASEAN Post 2015 Health Development Agenda
ARCH Project	: ASEAN Regional Capacity on Disaster Health Management Project
ARDEX	: ASEAN Regional Disaster Emergency Response Simulation Exercise
ASEAN	: Association of Southeast Asian Nations
COVID-19	: Coronavirus Disease 2019
DHM	: Disaster Health Management
Embase	: Excerpta Medica Database

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EMT	: Emergency Medical Team
EMT-MR	: Emergency Medical Team minimum requirements
EMTCC	: Emergency Medical Team Coordination Cell
ERU	: Emergency Response Unit
HEOC	: Health Emergency Operation Center
GIS	: Geographic Information System
HIS	: Health Information System
HMN	: Health Metrics Network
I-EMT	: International Emergency Medical Team
INPLASY	: International Platform of Registered Systematic Review and Meta-Analysis Protocols
JBI	: Joanna Briggs Institute
JICA	: Japan International Cooperation Agency
MDS	: Minimum Data Set
MeSH	: Medical Subject Headings
MMAT	: Mixed Methods Appraisal Tool
NT	: National level Target
OAOR	: One ASEAN One Response
PCC	: Population, Concept, and Context
POA	: Plan of Action
PRISMA	: Preferred Reporting Items for Systematic Reviews and Meta-Analyses
RAP	: Review of Peer-Reviewed Academic Publications
RGL	: Review of Grey Literature
SANRA	: Scale for the Assessment of Narrative Review Articles
SASOP	: Standard Operating Procedure for Regional Standby Arrangements and Coordination of Joint Disaster Relief and Emergency Response Operations
SOP	: Standard Operating Procedure
WHO	: World Health Organization

ABSTRACT

Introduction: The World Health Organization (WHO) developed the Emergency Medical Team Minimum Data Set (EMT MDS) to facilitate data-driven decision-making

during emergencies. Although ASEAN has advanced disaster health management (DHM), EMT MDS implementation remains inconsistent among Member States. A structured framework is needed to strengthen national implementation capacity. **Objective:** This study aimed to identify components and standards from published literatures and develop a structured framework for evaluating EMT MDS implementation in ASEAN. **Methods:** A Systematic review was conducted with two complementary components: a Review of Grey Literature (RGL) examining operational guidelines and regulatory documents from international organizations, and a Review of Peer-Reviewed Academic Publications (RAP) from PubMed, Embase, and Scopus. Extracted items were synthesized and categorized into six domains: Resources, Indicators, Data Sources, Data Management, Data Quality, Information Dissemination and Use. **Result:** The RGL of five grey literature sources yielded 40 items across six domains. The RAP screened 785 articles, with 11 eligible studies producing 13 items, 12 overlapping with the RGL. A unique quote from RAP on "Interoperability with existing HIS systems" expanded the framework to 41 items. **Conclusion:** The suggested framework provides a preliminary, evidence-informed basis for guiding assessment and benchmarking of national EMT MDS implementation in ASEAN.

Keywords: Emergency Medical Teams; Minimum Data Set; Health Information Management; Disaster Health Management; ASEAN

INTRODUCTION

Health information systems (HIS) are fundamental to effective disaster response, as timely and accurate data are required for situational awareness, coordination, and evidence-based decision-making. However, during large-scale disasters, local health facilities are often damaged or overwhelmed, and routine HIS rapidly become dysfunctional. As a result, patient records, surveillance, and reporting systems are frequently disrupted at the very time they are most needed. In such settings, Emergency Medical Teams (EMTs) play a crucial role in restoring health service delivery and health information functions. However, EMTs often deploy using their own recording and reporting forms, which complicates data compilation and hampers timely and coherent overall reporting during disaster responses. Recognizing the central importance of standardized reporting, the World Health Organization (WHO) formally endorsed the Emergency Medical Team Minimum Data Set (EMT MDS) in 2017 as a global reporting standard during disaster and emergency. The EMT MDS is designed to support

coordinated patient reporting, real-time analysis, and evidence-based resource allocation. Since its first operational deployment during the 2019 Cyclone Idai response in Mozambique, the EMT MDS has been applied in multiple disaster settings worldwide, demonstrating its value for decision-making (1–8).

This reporting standard is particularly critical in Southeast Asia, which is among the most disaster-prone regions in the world. The Association of Southeast Asian Nations (ASEAN) has emphasized collective disaster response through regional frameworks, such as the Agreement on Disaster Management and Emergency Response (AADMER) and the "One ASEAN, One Response" Declaration. These commitments have been operationalized through the ASEAN Coordinating Centre for Humanitarian Assistance on disaster management (AHA Centre) and the Standard Operating Procedure for Regional Standby Arrangements and Coordination of Joint Disaster Relief and Emergency Response Operations (SASOP) (9–12).

Under SASOP and related regional frameworks, standardized EMT reporting tools such as EMT MDS are to be developed, regularly reviewed, tested, and updated at the regional level. At the national level, ASEAN Member States are expected to ensure that each country has at least one International EMT (I-EMT) compliant with ASEAN or WHO minimum standards, and that on-site EMT coordination and reporting mechanisms are functional. Disaster Health Management (DHM) is further prioritized under the ASEAN Post-2015 Health Development Agenda and the ASEAN Leaders' Declaration on Disaster Health Management (ALDDHM), which explicitly promote the development and use of EMT reporting tools and medical records as part of disaster-resilient health systems (13–15). Despite such strong policy endorsement of the EMT MDS at ASEAN level, there remains no concrete and standardized understanding of what national-level components and standards must be in place to effectively implement the EMT MDS in ASEAN countries. While SASOP and WHO guidance define what should be used, they provide limited operational clarity on how national systems should be structured, resourced, and governed to enable consistent use of the EMT MDS (7, 16–20). In addition, no dedicated framework has been systematically developed or synthesized specifically for evaluating EMT MDS implementation capacity at the national level, particularly within ASEAN contexts. As a result, EMT MDS implementation across ASEAN remains uneven, shaped by varying operational, structural, and functional constraints (21–24).

Therefore, this study aimed to identify the components and standards for EMT MDS implementation in ASEAN countries and to develop a structured framework to support both practical implementation and regional policy alignment in ASEAN.

METHODS

Study Design and Methodological Approach

The design of the literature review framework is based on the Joanna Briggs Institute (JBI) Framework of evidence synthesis (25). It followed the guideline of "Systematic reviews of textual evidence" particularly evidence from policy/consensus guidelines, which consists of the following main stages:

1. Determining the review question
2. Identifying eligibility criteria
3. Identifying the search strategy
4. Selecting evidence sources
5. Critical appraisal of included evidence
6. Presenting evidence
7. Collating results

Determining the Review Question

Based on the JBI Framework of evidence synthesis, the review question consisted of information on the "participants", the main focus or "concept", and the "context" of the review as abbreviated as PCC. In this current review, "participants" are EMTs, the "concept" is the components and standards for implementation of the EMT MDS, and the "context" is disaster response and EMT operations in ASEAN Member States (AMS). The following research question was developed based on the defined PCC framework: What components and standards must be in place to implement the WHO EMT MDS within the ASEAN disaster response context?

Identifying Eligibility Criteria

Documents were considered eligible if they comprised grey literature or peer-reviewed academic publications relevant to the implementation of the EMT MDS in the ASEAN context. Accordingly, this study employed two complementary approaches: a Review of Grey Literature (RGL) and a Review of Peer-Reviewed Academic Publications (RAP).

The RGL focused on operational and policy-relevant materials, capturing official documents issued by authoritative organizations that reflect current best practices and technical standards directly applicable to EMT MDS implementation. Eligible documents met at least one of the following criteria: (A) potential model references defining components and standards

for national implementation capacity; (B) global technical references for EMT MDS implementation; or (C) ASEAN-specific references for EMT implementation.

Category (A) included globally applicable frameworks and assessment tools for evaluating national health information system capacity. Category (B) and (C) comprised documents providing global and ASEAN-level guidance for EMT MDS preparation and implementation, respectively. To ensure credibility, only materials with formal institutional authorship or official endorsement were included. Documents were required to be available in English and demonstrate ongoing global or regional relevance. Drafts and outdated versions were excluded, with outdated versions referring to earlier versions of documents that had been superseded by more recent versions.

For the RAP, eligible studies were peer-reviewed articles published in English addressing data collection, medical recordkeeping and reporting, or health information management system during disaster or emergency response. Studies were included if they explicitly referred to EMT MDS, Emergency Medical Team Coordination Cell (EMTCC), or related health, medical, or emergency response information frameworks in ASEAN countries. Exclusion criteria comprised studies primarily focused on clinical outcomes, patient-level data or medical procedures without system-level or data-related operational aspects, as well as those lacking sufficient information on ASEAN countries. We also excluded editorial, commentaries, and conference abstracts without sufficient detail for assessment. Additional documents were identified through snowballing from retrieved studies to ensure completeness (Table 1).

Identifying the Search Strategy

The RGL aimed to identify documents relevant to implementation of the EMT MDS, with particular attention to its application within the ASEAN region. The search strategy focused on sources published by international organizations, regional coordination bodies, and technical networks. Search was conducted through direct navigation of organizational websites and document repositories. Key sources included WHO, the ASEAN Secretariat, and selected international and regional humanitarian agencies. A structured search protocol was developed using predefined keywords and Boolean operators, applied across PubMed, Embase, Scopus. To account for differences in controlled vocabularies and indexing, we constructed search queries for each database in a paralleled fashion.

In PubMed, Medical Subject Headings (MeSH) and free-text keywords were combined to capture literature related to EMTs, data systems, disaster response, and the ASEAN region.

For Embase, the search strategy was adapted using Emtree terms alongside free-text keywords to ensure conceptual equivalence. In Scopus, the search was conducted with the title, abstract, and keywords fields, and was further broadened by incorporating country- affiliation filters to increase sensitivity. We registered and updated the review protocol in the International Platform of Registered Systematic Review and Meta-analysis Protocols (INPLASY; INPLASY202550069) (26). Table 1 elaborated search strategies in more details.

Table 1. Study Framework

	Review of Grey Literature (RGL)	Review of Peer-Reviewed Academic Publications (RAP)
Purpose	Operational/ policy relevance	Academic rigor/ evidence
Scope	Official documents from authoritative organizations/ technical networks	Peer-reviewed academic publication
Eligibility Criteria	Inclusion: Only English materials with formal institutional authorship or official endorsement from at least one of followings: (A) Model reference defining components and standards for national implementation capacity for EMT MDS (B) Global technical references for EMT MDS implementation (C) ASEAN-specific references for EMT implementation. Exclusion: Draft documents, outdated versions	Inclusion: English language, Implementation of disaster response activities involving data collection, medical recordkeeping and reporting, or the management of health and medical data Exclusion: Clinical outcomes, Patient-level data, or Medical Procedures, Lacking information on ASEAN countries
Search Strategy	Sources: Organizational Websites and repositories of WHO, ASEAN Secretariat and AHA Centre	Databases: PubMed, Embase, SCOPUS Search concepts (overview): (1) EMTs, (2) Health information management, (3) Disaster response, (4) ASEAN Countries Boolean structure: (1) AND (2) AND (3) AND (4) Filters: English only *Note: Full search strings are provided in Appendix A.*

Selecting evidence sources: Screening/ Extraction	Single Reviewer: Screening, data extraction and consolidation were conducted by a single reviewer.	Three Reviewers: Lead and second reviewers analyze independently; discrepancies discussed; unresolved issues decided by third reviewer.
Quality Assessment	Joanna Briggs Institute (JBI) Critical Appraisal Checklist for Policy / Consensus Guidelines Evidence	Critical appraisal conducted using Mixed Methods Appraisal Tool (MMAT), the JBI guidance and the SANRA scale.

Source: Kita et al., 2026

Selecting Evidence Sources

For RGL, screening, data extraction and consolidation were conducted by a single reviewer. A standardized data extraction form was used to record publication year, source, geographic scope, and key content related to items of components and standards relevant to national implementation capacity of EMT MDS.

For RAP, three reviewers were involved. The title and abstract screening were conducted independently by two reviewers, with discussion and consensus to resolve discrepancies. An adjudication by a third reviewer was carried out in case of unresolved discussion between the two reviewers. A standardized data extraction form was used to record publication year, source, geographic scope, and key content related to items of components and standards relevant to national implementation capacity of EMT MDS. All records were imported into Covidence (Veritas Health Innovation, Melbourne, Australia) for duplicate removal and screening, with an initial review of titles and abstracts followed by full-text review of potentially eligible studies.

The selection of documents from both grey literature and academic publication was visualized using a PRISMA flow diagram.

Critical Appraisal of Included Evidence

Two independent reviewers conducted the critical appraisal process. In case of discrepancies, the two reviewers discussed on potential consensus. Where consensus could not be reached by the initial discussion, a third reviewer made the final decision on the discrepant issue.

For RGL, JBI Critical Appraisal Checklist for Policy / Consensus Guidelines Evidence was used for assessing the quality. For RAP, established tools, including the Mixed Methods Appraisal Tool (MMAT), the JBI guidance and the SANRA scale were used depending on study design. Quality assessment informed the interpretation and confidence in the findings but was not used as a basis for exclusion.

Synthesising the Data

For all included documents comprising both grey literature and academic publications, a summary of basic bibliometric information was presented. Qualitative synthesis was undertaken in accordance with the thematic domains derived from WHO Health Metrics Network (HMN) framework: Resources (Domain A), Indicators (Domain B), Data Sources (Domain C), Data Management (Domain D), Data Quality (Domain E), and Information Dissemination and Use (Domain F) (22–24). Duplicate or overlapping items were identified and merged, and terminology was harmonized to ensure consistency across sources. Two independent reviewer conducted data synthesis for RAP with subsequent discussion to resolve discrepancy. A third reviewer subsequently validated the final synthesis to ensure accuracy and rigor. To ensure consistency in data extraction for the RAP, "Components and Standards / Keywords" used for the RAP were defined based on the RGL results (Table 2). Any deviations from the predefined definitions were documented and analysed as Emerging Items (Domain X). Overall, we conducted and reported this systematic review in accordance with the PRISMA 2020 guidelines.

Table 2. Thematic Domain and Operational Definition, Keywords.

Thematic Domain	Operational Definition	Components and Standards/ Keywords for RAP
A Resources	Components/ Standards necessary for the host country, especially health sector, to establish/ maintain a functional EMTCC system to ensure quality EMT MDS reporting	- Coordination, planning and policies - Financial resources - Human resources - Infrastructure - WHO EMT Initiative/ Strategy - EMT coordination mechanism - ASEAN disaster management (DM) framework
B Indicators	Components/ Standards necessary for the "MDS items", including their selection, to maintain a quality EMT MDS reporting	- Reporting items - WHO EMT MDS items

C	Data Sources	Components/ Standards necessary for EMTCC to ensure the capability of "EMT", as Data Sources, to produce a quality EMT MDS report	- Capacity as data sources for HIS - WHO EMT minimum requirement - EMT MDS reporting forms
D	Data Management	Components/ Standards required for a set of procedures, established by EMT Coordination Cell (EMTCC), involving collection, storage, processing and compilation of data	- Data management procedures - Data collection - Data storage - Data processing - Data compilation - DS data analytical platform
E	Data Quality	Components/ Standards involving data quality of EMT MDS reporting	- Timeliness - Periodicity - Consistency - Representativeness - Disaggregation - Confidentiality, data security and data accessibility - Mechanisms to ensure data quality
F	Information Dissemination/ Use	Components/ Standards involving the process of the "Information Dissemination and Use"	- Information Dissemination and Use - Demand and analysis - Policy and advocacy - Planning and priority-setting - Resource allocation - Implementation and action
X	Emerging Items	Newly identified items that emerged during the literature review, were not predefined in the initial six domains, yet were recognized as relevant and sufficiently important to be incorporated into the final results.	*Used only for RAP

Note: The thematic domains were derived from Assessing the National Health Information System: An Assessment Tool, Version 4.0 (2008) developed by the WHO Health Metrics Network. Operational definitions were developed by the authors by aligning each item with these predefined thematic domains.
Source: Kita et al., 2026 (Adapted from WHO Health Metrics Network, 2008)

RESULTS

General Description of Reviewed Documents

A total of five operational and regulatory documents produced by authoritative organizations and technical networks were identified and included in the RGL. The database search for the RAP retrieved 852 records; after removing duplicates, 785 records remained for screening. Following title, abstract, and full-text screening, 9 studies met the inclusion criteria. After incorporating 2 additional studies identified through citation searching, a total of 11 studies were included in the RAP (Figure 1).

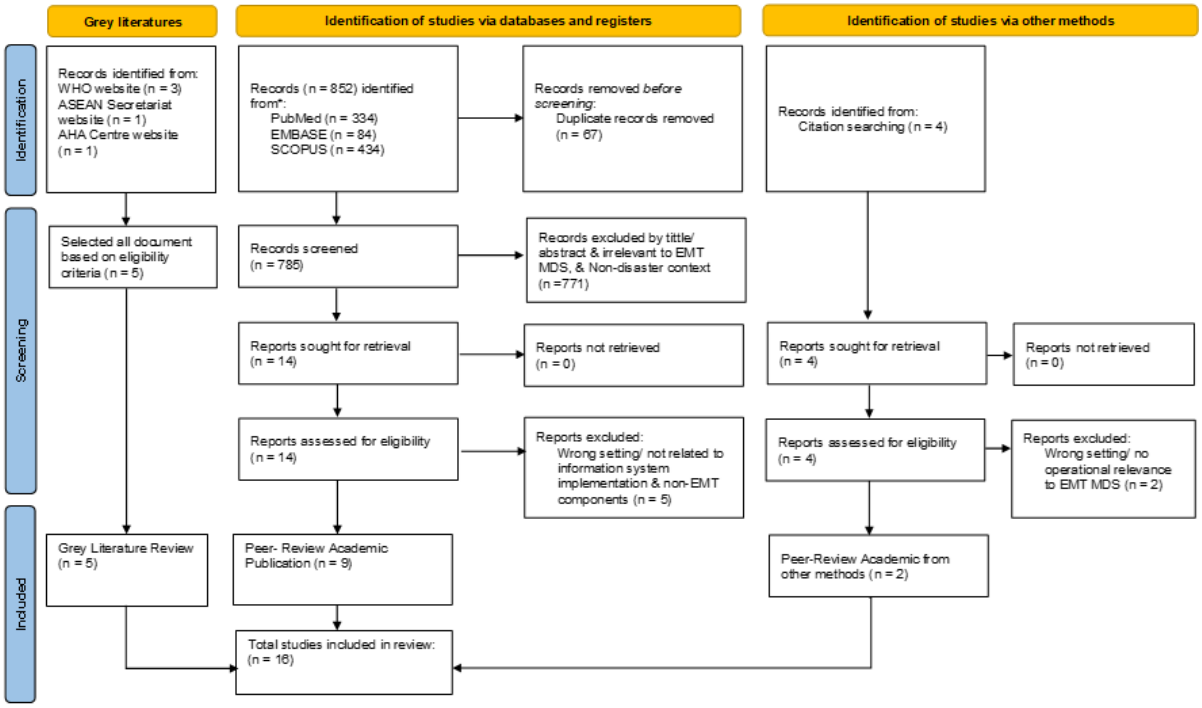


Figure 1. PRISMA Flow Diagram of the Study Selection for the Literature Review.
Source: PRISMA 2020 Guidelines

For RGL, selected five sources were categorised into three groups based on the type of document: (A) model reference for the expected study output, (B) global technical reference for EMT MDS implementation, and (C) ASEAN-specific reference for EMT implementation (Table 3).

Table 3. Grey Literature Sources Reviewed.

No.	Organization / Author	Year	Document Title	Main content	Category of Document
GL1	WHO Health Metrics Network	2008	Assessing the National Health Information System – An Assessment Tool, Version 4.00	Model for the expected output of this study	A
GL2	WHO	2021	Classification and Minimum Standards for Emergency Medical Teams	Global technical references to guide the preparation and implementation of EMT MDS	B
GL3	WHO	2016	Emergency Medical Team Coordination Cell (EMTCC) Coordination Handbook		B
GL4	ASEAN Secretariat	2019	Plan of Action to Implement the ASEAN Leaders' Declaration on Disaster Health Management	Regional reference to confirm the expected roles and actions of AMS in EMT MDS implementation	C
GL5	AHA Centre	2022	ASEAN Standard Operating Procedure for Regional Standby Arrangements and Coordination of Joint Disaster Relief and Emergency Response Operations (SASOP)		C

Source: Kita et al., 2026

For the RAP, all included articles comprised concept papers, framework papers, or descriptive accounts, although some were published as "original articles." None reported primary empirical data. Accordingly, all were treated as textual evidence, fulfilling the requirements for synthesis under the JBI framework. All publications addressed either the global context or the ASEAN regional context (Table 4).

Table 4. Peer-Reviewed Academic Publication used in Current Literature Review.

No.	Author(s)	Year	Title of Article/Document	Journal	Country
AP1	Brolin et al.	2015	Foreign medical teams in the Philippines after typhoon Haiyan 2013 - Who were they, when did they arrive and what did they do?	PLoS Currents	Philippines
AP2	Budiman et al.	2025	GIS-Based 'Banua Siaga' Platform for Enhancing Disaster Preparedness Through Health Post Mapping in Palu	Journal of Public Health and Pharmacy	Indonesia

AP3	Burkle et al.	2012	Emergency surgery data and documentation reporting forms for sudden-onset humanitarian crises, natural disasters and the existing burden of surgical disease.	Prehospital and Disaster Medicine	Global
AP4	Estuar et al.	2022	Management of Health- and Disaster-Related Data	Sustainable Development Goals Series	Philippines
AP5	Faisal et al.	2024	Implementation of the World Health Organization Minimum Dataset for Emergency Medical Teams to Create Disaster Profiles for the Indonesian SATUSEHAT Platform Using Fast Healthcare Interoperability Resources: Development and Validation Study	JMIR Medical Informatics	Indonesia
AP6	Hamilton et al.	2022	The role of emergency medical teams in disaster response: a summary of the literature	Natural Hazards	Global
AP7	Kubo et al.	2019	Health data collection before, during and after emergencies and disasters—The result of the kobe expert meeting	International Journal of Environmental Research and Public Health	Global
AP8	Salazar et al.	2018	Health Consequences of an Armed Conflict in Zamboanga, Philippines Using a Syndromic Surveillance Database	International Journal of Environmental Research and Public Health	Philippines
AP9	Savage et al.	2015	The Canadian Armed Forces medical response to Typhoon Haiyan	Canadian Journal of Surgery	Philippines
AP10	Sutiono et al.	2010	Designing an emergency medical information system for the early stages of disasters in developing countries: The human interface advantage, simplicity and efficiency	Journal of Medical Systems	Global

AP11	Yanasan et al.	2022	ARCH Project and the Global Initiatives of Disaster Health Management	Prehospital and Disaster Medicine	ASEAN Member States

Source: Kita et al., 2026

Key Findings from the review of Grey Literature and Peer-Reviewed Academic Publications

From the RGL, a total of 40 items related to the EMT MDS implementation capacity were extracted. The distribution of these items across six domains showed that Resources (Domain A) accounted for the largest share (37.5 %), followed by Data Management (Domain D) and Information Dissemination and Use (Domain F) (17.5 % each), and Data Sources (Domain C) (17.5 %). Relatively fewer items were mapped to Indicators (Domain B) (7.5 %) and Data Quality (Domain E) (2.5 %).

From the RAP of 11 studies, 13 items were identified. The distribution of these items across domains showed that Resources (Domain A) accounted for the largest share (30.8 %), followed by Information Dissemination and Use (Domain F) (23.1 %), and Data Sources (Domain C) and Data Management (Domain D) (15.4 % each). Only one item (7.7 %) was categorized under Indicators (Domain B), and no item was mapped to Data Quality (Domain E).

The lists of items extracted from the grey literature and academic publications across six domains are presented in Appendix B.

One additional item identified from the RAP was “Interoperability with existing Health Information Systems (HIS).” This item was derived from three independent quotes, highlighting the importance of linking EMT reporting to routine national and international HIS platforms. Although it was initially coded as an Emerging Item (Domain X), it was subsequently incorporated into Data Management (Domain D). Of the 13 items identified though the RAP, 12 overlapped with items identified through the RGL (Appendix B, Table A5).

Synthesis of Findings across Grey Literature and Peer-Reviewed Academic Publications

Finally, the synthesis of findings from the RGL and RAP yielded a final framework comprising 41 mutually exclusive items distributed across the six domains. Within the final framework, Resources (Domain A) (36.6 %) remained the most prominent domain, followed by Data Management (Domain D) (19.5 %) and Data Sources (Domain C) (17.1 %). Information Dissemination and Use (Domain F) also accounted for 17.1 % of the items. Fewer

items were allocated to Indicators (Domain B) (7.3 %) and Data Quality (Domain E) (2.4 %) (Table 5).

Table 5. Identified Items of Components and Standards.

Thematic Domain	Items of Components and Standards	Source Document
A. Resources: 15 items (36.6 %)	1. A legal and regulatory framework, together with a national strategic plan, is established to support EMT coordination including the implementation of EMT MDS	GL1, GL2
	2. WHO EMT minimum standards, including EMT MDS-related technical standards, are adopted and integrated at the national level	GL2
	3. A national SOP for EMT coordination, including a mechanism for regular testing and validation, is established	GL2, GL4
	4. An EMT coordination mechanism is integrated within the Health Emergency Operation Center (HEOC) / Ministry of Health structure	GL1, GL2, GL3, GL5, AP7
	5. National Focal Units for EMT coordination are designated	GL2, GL5
	6. A system is established to monitor the performance and service quality of health facilities and EMTs	GL1, GL2
	7. External and international support mechanisms are utilized to support EMT coordination	GL2
	8. Dedicated national budget allocations are in place to support Health Information Systems (HIS) / the implementation of EMT MDS	GL1
	9. Trained, experienced, and deployment-ready human resources are available for EMT coordination/ the implementation of HIS/EMT MDS	GL1, GL3, AP2
	10. Human resources for HIS/EMT MDS implementation are being retained	GL1
	11. The Ministry of Health has adequate capacity in core Health Information Sciences to support HIS/ EMT MDS implementation	GL1
	12. Capacity building and training programs are in place to support EMT coordination and HIS/EMT MDS implementation	GL1, GL2, GL3, AP7
	13. A human resources database exists, covering all major health professional categories relevant to EMT operation/ coordination	GL1
	14. Basic data recording and reporting supplies (e.g., stationery) are available and accessible for HIS/ EMT MDS implementation	GL1
	15. ICT infrastructure, including computers and reliable internet access, is available to support HIS and EMT MDS implementation	GL1, AP4
B. Indicators: 3 items (7.3 %)	1. Core indicators and essential data items, including standardized definitions, are identified and established for HIS/EMT MDS implementation	GL1, GL2
	2. Case definitions and surveillance strategies are established for key epidemic-prone diseases and other health conditions of public health importance	GL1
	3. Additional reporting items beyond core indicators are identified for EMT MDS reporting systems as needed	GL2, GL3, AP1, AP8, AP9

C. Data Sources: 7 items (17.1 %)	1.	Health activities conducted by EMTs are systematically recorded	GL2
	2.	EMTs submit reports regularly and in a timely manner	GL1, GL2, AP2, AP3
	3.	EMTs utilize standardized reporting forms, including the EMT MDS Daily Report, for consistent data collection and reporting	GL2, GL5
	4.	Capacity building mechanism is in place to support compliance with EMT minimum standards, including EMT MDS implementation	GL1, GL2, GL5
	5.	Appropriate EMT equipment, including communication setups, is available and maintained to support effective EMT operations	GL1, GL2, AP10
	6.	Health facilities/ EMTs have the capability to accurately diagnose, record, report, and transmit cases of nationally notifiable diseases as appropriate	GL1
	7.	Health facilities/ EMTs have the capability to identify, isolate, treat, safely refer, and report cases of communicable diseases as appropriate	GL2
D. Data Management: 8 items (19.5 %)	1.	Data management procedures and platforms are established for EMT MDS implementation, in line with the WHO EMT Initiative	GL1, GL2, GL4, GL5, AP1, AP6
	2.	Data management procedures and platforms for EMT MDS implementation are designed with flexibility to accommodate both paper-based and electronic data collection systems	GL3, AP5
	3.	Health facilities/ EMTs are accurately identified using standardized identifier codes and advanced technological tools	GL1
	4.	A system is established to ensure and maintain the integrity of data	GL2
	5.	A system is established to protect patient privacy and confidentiality in all health and EMT data management processes	GL2
	6.	Data visualization techniques, such as graphs and maps, are applied to analyze and present data effectively	GL1
	7.	A reporting utility is established to allow EMTs and EMT Coordination Cell (EMTCC) to upload, access, and manage relevant data	GL1
	8.	National Health Information Systems are interoperable with EMT MDS reporting systems to ensure seamless data integration and use	AP4, AP5, AP7
E. Data Quality: 1 item (2.4 %)	1.	A mechanism is established to supervise data quality, ensuring completeness and consistency of EMT reporting	GL1
F. Information Dissemination and Use: 7 items (17.1 %)	1.	EMT reporting is utilized to identify and monitor demand and supply during EMT operations and coordination	GL1, GL3, AP3, AP11
	2.	EMT reports are shared with the national surveillance and disease early warning systems in a systematic manner	GL1, GL2, GL3, AP8
	3.	EMT reporting is utilized to inform policy decisions and support advocacy efforts	GL1, GL2

	4. EMT reporting is utilized to guide planning and priority-setting for EMT operations and coordination	GL1, AP2, AP3
	5. EMT reporting is utilized to inform and guide resource allocation during EMT operations and coordination	GL1
	6. EMT reporting is utilized to guide implementation and operational actions during EMT operations and coordination	GL1
	7. Procedures for information sharing by the EMT Coordination Cell (EMTCC) are established to facilitate effective EMT operations and coordination	GL1, GL3, GL5
	Total: 41 items	

Source: Kita et al., 2026

A comparison of item distributions across the six domains identified through RGL and RAP, and the final synthesized framework is presented in Appendix C.

The quality appraisal conducted using established assessment tools for both grey literature and peer-reviewed academic publications, indicated that all evaluated documents were of acceptable quality (Appendix D).

DISCUSSION

Interpretation of Synthesized Findings from RGL and RAP

This study provides the first structured, ASEAN specific framework for assessing national implementation capacity of the EMT MDS, synthesizing evidence from both policy-oriented grey literature and peer-reviewed academic sources. By consolidating 41 mutually exclusive items across six HMN domains, the framework translates high-level regional and global commitments into actionable national system requirements.

The dominance of Resources (Domain A) in the final framework underscores that EMT MDS implementation is fundamentally a systems and governance challenge, rather than a purely technical or reporting exercise. Legal frameworks, institutional coordination mechanisms, dedicated financing, and trained human resources emerged as the most frequently emphasized components across both evidence streams.

This finding aligns with observed implementation gaps in ASEAN, where EMT MDS adoption is often constrained not by lack of guidance, but by insufficient institutionalization within national disaster and health governance structures. It is also supported by the fact that integrating new health information systems remains a major challenge in the region such as ASEAN, especially in the diversity of health system, resource capacity in digital infrastructure, and disaster health preparedness and response capacity across countries (27, 28).

The substantial representation of Data Management (Domain D) and Data Sources (Domain C) highlights the operational core of EMT MDS functionality. Effective reporting depends on standardized procedures, interoperable platforms, and EMT capacity as reliable data producers. Importantly, interoperability with existing national HIS emerged uniquely from the RAP and was subsequently integrated into the final framework. This reflects growing recognition, particularly from recent experiences that EMT MDS cannot function as a parallel or stand-alone system, but must be embedded within routine national and regional HIS architectures to ensure sustainability, data reuse, and policy relevance.

Experiences from COVID-19, major typhoons, and earthquake responses demonstrate that fragmented information systems significantly slow situational analysis and resources allocation (29, 30).

In contrast, the relatively limited emphasis on Indicators (Domain B) and especially Data Quality (Domain E) suggests an implicit assumption in existing guidance that these elements are either predefined or self-regulating. However, the scarcity of explicit data quality mechanisms identified across both literature streams raises concerns. Without dedicated supervision, feedback loops, and accountability structures, even well-resourced EMT MDS systems risk producing incomplete or inconsistent data, undermining their value for coordination and decision-making during disasters.

The strong overlap between RAP and RGL findings (12 of 13 items) indicates a high degree of conceptual convergence between policy guidance and academic discourse, reinforcing the robustness of the synthesized framework. At the same time, the limited empirical nature of RAP evidence highlights a persistent gap in implementation research, with few studies systematically evaluating national EMT MDS readiness or performance in real-world disaster settings.

Overall, this framework addresses a critical gap between “what should be used” and “what must be in place” for EMT MDS implementation in ASEAN. It offers a practical tool for countries to assess preparedness, prioritize investments, and align national systems with ASEAN and WHO commitments.

However, its operationalization will depend on how these components and standards are applied within national systems. Given variations in legal frameworks, institutional coordination mechanisms, human resource capacity, digital infrastructure, and disaster health management capacity across AMS, the functionality of the framework cannot be assumed to be uniform. Therefore, understanding the country-specific conditions under which these

components and standards are implemented will be critical for translating the framework into effective practice.

Practical and Policy Implications

The identification of 41 items across six domains provides AMS with both a components-and-standards framework and a practical roadmap to strengthen preparedness for EMT MDS implementation. Although SASOP specifies the use of EMT MDS forms and the POA to implement the ALDDHM calls for standard reporting mechanisms for EMT operations, no operational benchmarks or indicators currently exist to define or measure progress toward these commitments. Accordingly, the 41 items can be used as national readiness benchmarks to guide planning, prioritization, and monitoring of EMT MDS implementation across AMS (10, 14).

For the AMS national health authorities, the framework clarifies the system prerequisites required before standardized reporting can function under disaster conditions, such as integration into national strategies, EMT coordination/ Health Emergency Operation Center (HEOC) structures, and routine training and simulation, and highlights the need to extend these requirements to sub-national levels, where EMT operations and reporting are executed. For deploying EMTs, the framework clarifies the minimum enabling conditions needed to produce standardized data in austere environments, including clear reporting expectations, accessible tools, defined reporting channels, and predictable support throughout the deployment cycle.

At the regional level, the framework provides a shared reference point to support harmonization across diverse health systems and to strengthen ASEAN coordination for disaster response. For the AHA Centre and other ASEAN mechanisms, the 41 items can inform the design of capacity-building packages, interoperability planning for regional digital platforms, and the content of regional simulation exercises, such as ASEAN Regional Disaster Emergency Response Simulation Exercise (ARDEX) (31), thereby improving the consistency and utility of EMT reporting for situational awareness and coordinated resource mobilization.

However, the implementation of the proposed framework may be influenced by a range of context-specific barriers and facilitators. Potential barriers include limited human resource capacity for data management, fragmentation of existing health information systems, and regulatory constraints related to data sharing and governance. In contrast, facilitators may include the ongoing DHM initiatives, established professional networks within ASEAN, and prior experience in disaster response. Consideration of these factors is essential to ensure that

the framework is not only conceptually sound but also operationally feasible across diverse national contexts.

Implications for Future Research

Future research should focus on validating and refining this framework through multiple approaches. Country case studies are needed to assess its applicability in diverse national contexts and to examine how EMT MDS integration with national HIS influences disaster response effectiveness and health system resilience.

In parallel, expert review and Delphi consultations should be conducted to refine the items, validate their relevance, and explore their applicability across AMS. Such expert review is essential to evaluate the clarity, completeness, and technical issues of the 41 items. Additionally, Delphi consultation should be undertaken to refine the items through consensus processes. Engaging national EMT focal points, HEOC officers, surveillance data managers, and other regional stakeholders will help validate the relevance of each items and identify the potential gaps.

In addition, implementation science approaches should be incorporated to assess how the framework functions in real-world settings. Pilot testing in selected countries, followed by process evaluations, would allow for systematic examination of feasibility, acceptability, and operational challenges. Such approaches would also support the identification of context-specific barriers and facilitators and enable iterative refinement of the framework.

LIMITATION

This study has several limitations. First, the targeted literature review was limited to selected grey literature from international and regional organizations and technical networks, and therefore did not capture relevant national-level documents of individual AMS. Second, only a small number of peer-reviewed literatures met the eligibility criteria, reflecting the relatively recent history of EMT MDS implementation, the limited number of operational cases in real disasters, especially in ASEAN, and scarcity of studies specifically addressing national EMT MDS implementation capacity. Finally, the RGL was conducted by a single reviewer, as it focused on a predefined set of authoritative sources, including documents issued by international and regional organizations such as WHO, the ASEAN Secretariat, and the AHA Centre. As a result, the risk of selection bias was considered limited. To enhance methodological transparency and rigor, several measures were implemented, including the use

of predefined eligibility criteria and a standardized data extraction form. Nevertheless, the single-reviewer approach may have introduced bias in the selection, extraction and interpretation of sources.

CONCLUSION

This study suggested a 41-item of component and standard framework across six domains to define national implementation capacity for EMT MDS in disaster response in ASEAN. By integrating evidence from technical and policy guidance from authoritative organizations and peer-reviewed literature, the framework provides a preliminary, evidence-informed basis for guiding the assessment and benchmarking of national EMT MDS implementation.

Further refinement through experts reviews and Delphi consultations will be essential to validate its relevance and applicability in the ASEAN region.

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All authors meet the journal's authorship criteria and have approved the final manuscript. We gratefully acknowledge the researchers who, upon request, kindly provided access to restricted articles used in the literature review.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

ETHICAL APPROVAL

As this component of the study was based exclusively on a review of published literature, it did not involve human participants or the use of identifiable personal data.

APPENDIX A

Detailed Search Strategies for PubMed, Embase, and Scopus.

We performed literature search through PubMed, Embase, and Scopus. Although a common conceptual search framework was applied across all databases, the detailed search strings differed due to variations in indexing terms and database-specific search operators. The full search strategies for each database are presented separately in Tables A1 to A3.

Table A1. Full Search Strategy for PubMed.

Item	Description
Database	PubMed
Search Date	26 May 2025
Filters Applied	English only
Total Records Retrieved	334
Search String	**Concept (1) EMTs** ("emergency medical team" OR "disaster medical team" OR "emergency response team" OR "emergency health services" OR emergency care OR emergency responders OR earthquake OR tsunami OR typhoon OR cyclone OR flood OR landslide OR "mass casualty" OR "natural disaster" OR "sudden onset disaster" OR emergency medical services [MeSH]) **Hits: 608,665**
	Concept (2) Health information management ("minimum data set" OR "core data" OR "core data elements" OR "data standard"

	OR "information standard" OR "health information system" OR "health information systems" OR "data collection" OR health information OR information systems [MeSH]) **Hits: 1,443,803**
	Concept (3) Disaster response (implementation OR deploy* OR readiness OR "operational capacity" OR "system readiness" OR "surge capacity" OR "health system strengthening" OR preparedness OR capacity building [MeSH] OR disaster planning [MeSH]) **Hits: 649,406**
	Concept (4) ASEAN Countries (ASEAN OR "Southeast Asia" OR "Asia, Southeastern"[MeSH] OR Brunei OR "Brunei Darussalam" OR Cambodia OR "Kingdom of Cambodia" OR Indonesia OR "Republic of Indonesia" OR Laos OR "Lao People's Democratic Republic" OR Malaysia OR Myanmar OR Burma OR "Republic of the Union of Myanmar" OR Philippines OR "Republic of the Philippines" OR Singapore OR "Republic of Singapore" OR Thailand OR "Kingdom of Thailand" OR Vietnam OR "Viet Nam" OR "Socialist Republic of Vietnam") **Hits: 543,742**
	Combined Search (1) AND (2) AND (3) AND (4) **Hits: 336**
	Final Search with Filters (1) AND (2) AND (3) AND (4) Filters applied: English language Final hits: 334

Source: Kita et al., 2026

Table A2. Full Search Strategy for Embase.

Item	Description
Database	Embase
Search Date	26 May 2025
Filters Applied	English only
Total Records Retrieved	84
Search String	**Concept (1) EMTs** ('emergency medical team':ti,ab,kw OR 'disaster medical team':ti,ab,kw OR 'emergency response team':ti,ab,kw OR 'emergency health service'/exp OR 'emergency medical service':ti,ab,kw OR 'emergency care':ti,ab,kw

OR 'emergency responder':ti,ab,kw OR earthquake/exp OR tsunami/exp OR typhoon:ti,ab,kw OR cyclone/exp OR flood/exp OR landslide:ti,ab,kw OR 'mass casualty':ti,ab,kw OR 'natural disaster'/exp OR 'sudden onset disaster':ti,ab,kw) **Hits: 435,332**
Concept (2) Health information management ('minimum data set':ti,ab,kw OR 'core data':ti,ab,kw OR 'core data element':ti,ab,kw OR 'data standard':ti,ab,kw OR 'information standard':ti,ab,kw OR 'health information system':ti,ab,kw OR 'health information systems':ti,ab,kw OR 'data collection'/exp OR 'health information':ti,ab,kw OR 'information system'/exp) **Hits: 3,395,719**
Concept (3) Disaster response (implementation:ti,ab,kw OR deploy*:ti,ab,kw OR readiness:ti,ab,kw OR 'operational capacity':ti,ab,kw OR 'system readiness':ti,ab,kw OR 'surge capacity':ti,ab,kw OR 'health system strengthening':ti,ab,kw OR preparedness:ti,ab,kw OR 'capacity building'/exp OR 'disaster planning'/exp) **Hits: 735,421**
Concept (4) ASEAN Countries (ASEAN:ti,ab,kw OR 'Southeast Asia':ti,ab,kw OR 'asia, southeastern'/exp OR Brunei:ti,ab,kw OR 'Brunei Darussalam':ti,ab,kw OR Cambodia:ti,ab,kw OR 'Kingdom of Cambodia':ti,ab,kw OR Indonesia:ti,ab,kw OR 'Republic of Indonesia':ti,ab,kw OR Laos:ti,ab,kw OR 'Lao Peoples Democratic Republic':ti,ab,kw OR Malaysia:ti,ab,kw OR Myanmar:ti,ab,kw OR Burma:ti,ab,kw OR 'Republic of the Union of Myanmar':ti,ab,kw OR Philippines:ti,ab,kw OR 'Republic of the Philippines':ti,ab,kw OR Singapore:ti,ab,kw OR 'Republic of Singapore':ti,ab,kw OR Thailand:ti,ab,kw OR 'Kingdom of Thailand':ti,ab,kw OR Vietnam:ti,ab,kw OR 'Viet Nam':ti,ab,kw OR 'Socialist Republic of Vietnam':ti,ab,kw) **Hits: 245,467**
Combined Search (1) AND (2) AND (3) AND (4) **Hits: 85**
Final Search with Filters (1) AND (2) AND (3) AND (4) Filters applied: English language **Final hits: 84**

Source: Kita et al., 2026

Table A3. Full Search Strategy for SCOPUS.

Item	Description
Database	SCOPUS
Search Date	26 May 2025
Filters Applied	English only
Total Records Retrieved	434
Search String	**Concept (1) EMTs** TITLE-ABS-KEY ("emergency medical team" OR "disaster medical team" OR "emergency response team" OR "emergency health services" OR "emergency medical services" OR "emergency care" OR "emergency responders" OR earthquake OR tsunami OR typhoon OR cyclone OR flood OR landslide OR "mass casualty" OR "natural disaster" OR "sudden onset disaster") **Hits: 826,969**
	Concept (2) Health information management TITLE-ABS-KEY ("minimum data set" OR "core data" OR "core data elements" OR "data standard" OR "information standard" OR "health information system" OR "health information systems" OR "data collection" OR "health information" OR "information system" OR "information systems") **Hits: 931,270**
	Concept (3) Disaster response TITLE-ABS-KEY (implementation OR deploy* OR readiness OR "operational capacity" OR "system readiness" OR "surge capacity" OR "health system strengthening" OR preparedness OR "capacity building" OR "disaster planning") **Hits: 2,763,324**
	Concept (4) ASEAN Countries (TITLE-ABS-KEY (ASEAN OR "Southeast Asia" OR Brunei OR "Brunei Darussalam" OR Cambodia OR "Kingdom of Cambodia" OR Indonesia OR "Republic of Indonesia" OR Laos OR "Lao People's Democratic Republic" OR Malaysia OR Myanmar OR Burma OR "Republic of the Union of Myanmar" OR Philippines OR "Republic of the Philippines" OR Singapore OR "Republic of Singapore" OR Thailand OR "Kingdom of Thailand" OR Vietnam OR "Viet Nam" OR "Socialist Republic of Vietnam") OR AFFILCOUNTRY(Brunei) OR AFFILCOUNTRY(Cambodia) OR AFFILCOUNTRY(Indonesia) OR AFFILCOUNTRY(Laos) OR AFFILCOUNTRY(Malaysia) OR AFFILCOUNTRY(Myanmar) OR AFFILCOUNTRY(Philippines) OR AFFILCOUNTRY(Singapore) OR AFFILCOUNTRY(Thailand) OR AFFILCOUNTRY(Vietnam)) **Hits: 2,270,937**

	Combined Search (1) AND (2) AND (3) AND (4) **Hits: 435**
	Final Search with Filters (1) AND (2) AND (3) AND (4) Filters applied: English language **Final hits: 434**

Source: Kita et al., 2026

APPENDIX B

Items Extracted from Grey Literature and Academic Publications.

Table A4. Items Extracted from Grey Literature.

Thematic Domain		Items of Components and Standards	Source Document
A. Resources: 15 items (37.5 %)	A-1	A legal and regulatory framework, together with a national strategic plan, is established to support EMT coordination including the implementation of EMT MDS	GL1, GL2
	A-2	WHO EMT minimum standards, including EMT MDS-related technical standards, are adopted and integrated at the national level	GL2
	A-3	A national SOP for EMT coordination, including a mechanism for regular testing and validation, is established	GL2, GL4
	A-4	An EMT coordination mechanism is integrated within the Health Emergency Operation Center (HEOC) / Ministry of Health structure	GL1, GL2, GL3, GL5
	A-5	National Focal Units for EMT coordination are designated	GL2, GL5
	A-6	A system is established to monitor the performance and service quality of health facilities and EMTs	GL1, GL2
	A-7	External and international support mechanisms are utilized to support EMT coordination	GL2
	A-8	Dedicated national budget allocations are in place to support Health Information Systems (HIS) / the implementation of EMT MDS	GL1
	A-9	Trained, experienced, and deployment-ready human resources are available for EMT coordination/ the implementation of HIS/EMT MDS	GL1, GL3
	A-10	Human resources for HIS/EMT MDS implementation are being retained	GL1

	A-11	The Ministry of Health has adequate capacity in core Health Information Sciences to support HIS/ EMT MDS implementation	GL1
	A-12	Capacity building and training programs are in place to support EMT coordination and HIS/EMT MDS implementation	GL1, GL2, GL3
	A-13	A human resources database exists, covering all major health professional categories relevant to EMT operation/ coordination	GL1
	A-14	Basic data recording and reporting supplies (e.g., stationery) are available and accessible for HIS/ EMT MDS implementation	GL1
	A-15	ICT infrastructure, including computers and reliable internet access, is available to support HIS and EMT MDS implementation	GL1
B. Indicators: 3 items (7.5 %)	B-1	Core indicators and essential data items, including standardized definitions, are identified and established for HIS/EMT MDS implementation	GL1, GL2
	B-2	Case definitions and surveillance strategies are established for key epidemic-prone diseases and other health conditions of public health importance	GL1
	B-3	Additional reporting items beyond core indicators are identified for EMT MDS reporting systems as needed	GL2, GL3
C. Data Sources: 7 items (17.5 %)	C-1	Health service activities conducted by EMTs are systematically recorded	GL2
	C-2	EMTs submit reports regularly and in a timely manner	GL1, GL2
	C-3	EMTs utilize standardized reporting forms, including the EMT MDS Daily Report, for consistent data collection and reporting	GL2, GL5
	C-4	Capacity building mechanism is in place to support compliance with EMT minimum standards, including EMT MDS implementation	GL1, GL2, GL5
	C-5	Appropriate EMT equipment, including communication setups, is available and maintained to support effective EMT operations	GL1, GL2
	C-6	Health facilities/ EMTs have the capability to accurately diagnose, record, report, and transmit cases of nationally notifiable diseases as appropriate	GL1
	C-7	Health facilities/ EMTs have the capability to identify, isolate, treat, safely refer, and report cases of communicable diseases as appropriate	GL2
D. Data Management:	D-1	Data management procedures and platforms are established for EMT MDS implementation, in line with the WHO EMT Initiative	GL1, GL2, GL4, GL5

7 items (17.5 %)	D-2	Data management procedures and platforms for EMT MDS implementation are designed with flexibility to accommodate both paper-based and electronic data collection systems	GL3
	D-3	Health facilities/ EMTs are accurately identified using standardized identifier codes and advanced technological tools	GL1
	D-4	A system is established to ensure and maintain the integrity of data	GL2
	D-5	A system is established to protect patient privacy and confidentiality in all health and EMT data management processes	GL2
	D-6	Data visualization techniques, such as graphs and maps, are applied to analyze and present data effectively	GL1
	D-7	A reporting utility is established to allow EMTs and EMT Coordination Cell (EMTCC) to upload, access, and manage relevant data	GL1
E. Data Quality: 1 item (2.5 %)	E-1	A mechanism is established to supervise data quality, ensuring completeness and consistency of EMT reporting	GL1
F. Information Dissemination and Use: 7 items (17.5 %)	F-1	EMT reporting is utilized to identify and monitor demand and supply during EMT operations and coordination	GL1, GL3
	F-2	EMT reports are shared with the national surveillance and disease early warning systems in a systematic manner	GL1, GL2, GL3
	F-3	EMT reporting is utilized to inform policy decisions and support advocacy efforts	GL1, GL2
	F-4	EMT reporting is utilized to guide planning and priority-setting for EMT operations and coordination	GL1
	F-5	EMT reporting is utilized to inform and guide resource allocation during EMT operations and coordination	GL1
	F-6	EMT reporting is utilized to guide implementation and operational actions during EMT operations and coordination	GL1
	F-7	Procedures for information sharing by the EMT Coordination Cell (EMTCC) are established to facilitate effective EMT operations and coordination	GL1, GL3, GL5
Total: 40 items			

Source: Kita et al., 2026

Table A5. Items Extracted from Academic Publication.

Thematic Domain	Item ID	Components and Standards/ Keywords (Specific contents)	Source Document	Overlap with RGL
A. Resources:	RAP 1	Coordination, planning and policies	AP7	A4

4 items (30.8 %)	RAP 2	Infrastructure (ICT), Financial resources, Human resources	AP2	A9
	RAP 3	Human resources (Capacity-building and training)	AP7	A12
	RAP 4	Infrastructure (ICT)	AP4	A15
B. Indicators: 1 item (7.7 %)	RAP 5	Reporting items	AP1, AP8, AP9	B3
C. Data Sources: 2 items (15.4 %)	RAP 6	WHO EMT minimum requirement (EMT Reporting)	AP2, AP3	C2
	RAP 7	WHO EMT minimum requirement (Communication Set-up)	AP10	C5
D. Data Management: 2 items (15.4 %)	RAP 8	Data management procedures	AP1, AP6	D1
	RAP 9	Data management procedures (paper-based and electronic data collection systems)	AP5	D2
X. Emerging Items 1 item (7.7 %)	RAP 10	Interoperability with existing HIS systems	AP4, AP5, AP7	N/A(Unique) Subsequently incorporated into Domain D
F. Information Dissemination and Use: 3 items (23.1 %)	RAP 11	Demand and analysis	AP3, AP11	F1
	RAP 12	Demand and analysis (Integration with existing surveillance systems)	AP8	F2
	RAP 13	Planning and priority-setting	AP2, AP3	F4
	Total: 13 items			

Source: Kita et al., 2026

APPENDIX C

Comparison of Reviews and Final Framework Regarding Item Distribution Across Domains.

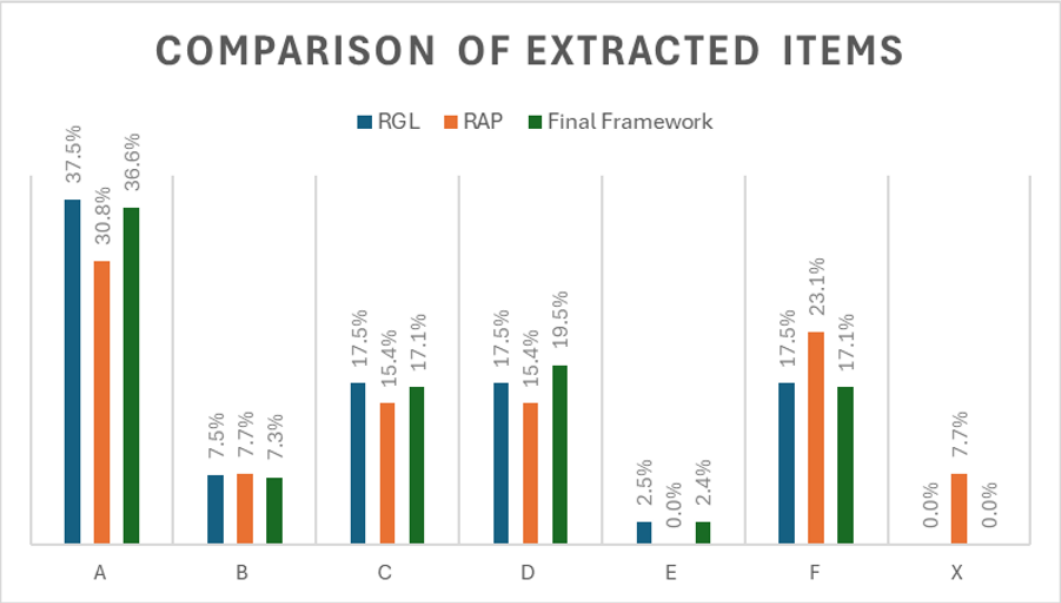


Figure A1. Comparison of Reviews and Final Framework Regarding Item Distribution Across Domains. Source: Kita et al., 2026

APPENDIX D

Quality Assessment of Included Literature.

Table A6. Grey Literature Sources.

No.	Author(s)	Year	Title of Article/Document	Journal	Tool	Quality Status
GL1	WHO Health Metrics Network	2008	Assessing the National Health Information System – An Assessment Tool, Version 4.00	Not Applicable	JBI - Policy / Consensus	High
GL2	WHO	2021	Classification and Minimum Standards for Emergency Medical Teams	Not Applicable	JBI - Policy / Consensus	High
GL3	WHO	2016	Emergency Medical Team Coordination Cell (EMTCC) Coordination Handbook	Not Applicable	JBI - Policy / Consensus	High
GL4	ASEAN Secretariat	2019	Plan of Action to Implement the ASEAN Leaders' Declaration on Disaster Health Management	Not Applicable	JBI - Policy / Consensus	Moderate
GL5	AHA Centre	2022	ASEAN Standard Operating Procedure for Regional Standby	Not Applicable	JBI - Policy / Consensus	Moderate

			Arrangements and Coordination of Joint Disaster Relief and Emergency Response Operations (SASOP)			

Source: Kita et al., 2026

Table A7. Peer-Reviewed Academic Publication.

No.	Author(s)	Year	Title of Article/Document	Journal	Tool	Quality Status
AP1	Brolin et al.	2015	Foreign medical teams in the Philippines after typhoon Haiyan 2013 - Who were they, when did they arrive and what did they do?	PLoS Currents	MMAT	High
AP2	Budiman et al.	2025	GIS-Based 'Banua Siaga' Platform for Enhancing Disaster Preparedness Through Health Post Mapping in Palu	Journal of Public Health and Pharmacy	N/A	N/A
AP3	Burkle et al.	2012	Emergency surgery data and documentation reporting forms for sudden-onset humanitarian crises, natural disasters and the existing burden of surgical disease.	Prehospital and Disaster Medicine	N/A	N/A
AP4	Estuar et al.	2022	Management of Health- and Disaster-Related Data	Sustainable Development Goals Series	JBI - text and opinion	High
AP5	Faisal et al.	2024	Implementation of the World Health Organization Minimum Dataset for Emergency Medical Teams to Create Disaster Profiles for the Indonesian SATUSEHAT Platform Using Fast Healthcare Interoperability Resources: Development and Validation Study	JMIR Medical Informatics	N/A	N/A
AP6	Hamilton et al.	2022	The role of emergency medical teams in disaster response: a summary of the literature	Natural Hazards	SANRA	High
AP7	Kubo et al.	2019	Health data collection before, during and after emergencies and	International Journal of Environmental	JBI - text and opinion	High

			disasters—The result of the kobe expert meeting	Research and Public Health		
AP8	Salazar et al.	2018	Health Consequences of an Armed Conflict in Zamboanga, Philippines Using a Syndromic Surveillance Database	International Journal of Environmental Research and Public Health	MMAT	High
AP9	Savage et al.	2015	The Canadian Armed Forces medical response to Typhoon Haiyan	Canadian Journal of Surgery	MMAT	High
AP10	Sutiono et al.	2010	Designing an emergency medical information system for the early stages of disasters in developing countries: The human interface advantage, simplicity and efficiency	Journal of Medical Systems	N/A	N/A
AP11	Yanasan et al.	2022	ARCH Project and the Global Initiatives of Disaster Health Management	Prehospital and Disaster Medicine	JBI - text and opinion	High

Source: Kita et al., 2026

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