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Curricular Design Strategies in Disaster Medicine Education- A Scoping Review Protocol.

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We use this protocol and it's working

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Abstract

Introduction:

Mass casualty incidents (MCIs), where casualty numbers exceed available emergency resources, are increasing worldwide due to natural disasters, terrorism, and pandemics. Effective response relies on well-trained healthcare professionals. Training programs, however, vary widely in design and delivery.

Purpose:

This scoping review systematically maps global evidence on disaster and MCI training curricula across clinical settings.

Methods:

Conduct the scoping review following the Arksey and O'Malley framework with Levac refinements and PRISMA-ScR guidelines. Include studies published in English within the past 10 years that involve healthcare learners in prehospital or in-hospital disaster education. Search multiple medical and educational databases comprehensively. Synthesize curriculum features, teaching approaches, competency frameworks, and simulation use. Incorporate stakeholder consultation throughout the review process.

Guidelines

1. PRISMA Extension for Scoping Reviews (PRISMA-ScR) Checklist.
2. Arksey and O'Malley Scoping Review Framework.
3. PRESS (Peer Review of Electronic Search Strategies) guidelines.

Materials

Computers, Internet Connection, MS Word, MS Excel, Reference Manager (Mendeley/EndNote/Zotero), Covidence.

Objectives

- 1 Examine global literature on disaster and mass casualty incident (MCI) training curricula across all levels of prehospital and in-hospital care.
 - 1.1 Identify the types of curricular design strategies used in MCI/disaster education for healthcare professionals, including paramedics, nurses, interns, residents, and physicians.
 - 1.2 Describe the educational approaches and pedagogical methods employed (e.g., simulation, tabletop exercises, PBL).
 - 1.3 Map the distribution of training programs across different educational settings (undergraduate, postgraduate, in-service).
 - 1.4 Highlight innovations such as virtual reality (VR), interprofessional learning models, and community-integrated frameworks.
 - 1.5 Identify common themes, competency frameworks, and specific skills addressed in curricula (e.g., triage, PPE, incident command).
 - 1.6 Expose existing gaps in training content, target audience inclusion, and interdisciplinary coordination.
 - 1.7 Inform future curriculum development and research to support comprehensive disaster preparedness across healthcare systems, not limited to medical first responders.

Methodology Overview

- 2 Follow the methodological framework established by Arksey and O'Malley, incorporating enhancements recommended by Levac et al.
 - 2.1 Adhere to the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews) guidelines.
- 3 Develop and register the protocol on protocols.io.

- 3.1 Submit the protocol to appropriate international registries for systematic review protocols.

Stage 1: Identify the research questions

- 4 Primary research question:
 - 4.1 How are disaster and mass casualty incident (MCI) training curricula designed and implemented across different healthcare professionals globally?
- 5 Secondary Research questions:
 - 5.1 What types of educational settings (e.g., undergraduate, in-service) are used to deliver MCI training across healthcare professions?
 - 5.2 Which healthcare roles (e.g., paramedics, nurses, residents, physicians) are targeted in disaster training programs, and how are curricula adapted for each group?
 - 5.3 What pedagogical strategies and teaching methods (e.g., simulation, PBL, tabletop exercises) are commonly employed in MCI/disaster training curricula?
 - 5.4 What types of curricular frameworks (e.g., competency-based, outcome-based) are used in disaster medicine education, and how are they applied?
 - 5.5 Which disaster competency frameworks (e.g., WHO EMT Standards, NDLS, Core Competencies for Disaster Medicine) are referenced in training programs?
 - 5.6 Which domains or themes (e.g., triage, logistics, leadership, communication) and specific competencies (e.g., PPE use, field triage, incident command) are emphasized in the curricula?
 - 5.7 What types of MCI scenarios (e.g., earthquake, flood, chemical spill, pandemic) are used in training simulations or case exercises?
 - 5.8 How are training modalities (e.g., in-person, online, hybrid) and pacing models (e.g., fixed schedule vs. self-paced) applied across different programs?

- 5.9 To what extent are simulation-based methods (e.g., tabletop, virtual) included in curricula, and what roles or tasks are assigned during these simulations?
- 5.10 How is pre-simulation preparation structured (e.g., videos, handouts), and are real-world scenarios integrated into the training design?
- 5.11 What assessment and evaluation methods (e.g., OSCE, pre/post tests, surveys) are used to measure learning outcomes, and what level of the Kirkpatrick framework do they reach
- 5.12 How is competency tracking implemented (e.g., checklists, e-Portfolios), if at all?
- 5.13 What outcomes, barriers, and success factors are reported in the implementation of these curricula?
- 5.14 What gaps remain in the current disaster/MCI curricula across healthcare training programs, and how might future programs be improved?
- 6 Scope: PCC (Population, Concept, Context) framework.
 - 6.1 Population: Involve healthcare providers, including but not limited to physicians, nurses, paramedics, EMTs, residents, interns, university or college students enrolled in health-related fields (e.g., medicine, nursing, EMS).
 - 6.2 Concept: Focus on curriculum structure, delivery methods, learning outcomes, or training modalities in disaster medicine or MCI training.
 - 6.3 Context: Focus on disaster medicine or mass casualty incident (MCI) education and training.

Stage 2: Identify relevant studies

- 7 Databases: PubMed, Embase, Scopus, PsycINFO, CINAHL, Cochrane Library, ClinicalTrials.gov, and Google Scholar.
- 8 Create the search strategy using a combination of keywords and Medical Subject Headings (MeSH), identified through the MeSH database on PubMed.

Population	Concept	Context
paramedic*	"Curriculum design"	"Disaster medicine"
"First responders"	"Instructional design"	"Disaster preparedness"
"Medical student"	"Educational strategies"	"Mass casualty incident"
physician*	"Curriculum"[Mesh]	"Emergency preparedness"
intern*		"Mass Casualty Incidents"[Mesh]
nurse*		"Disaster Medicine"[Mesh]
"Healthcare provider"		"Disaster Planning"[Mesh]
"Paramedics"[Mesh]		
"Health Personnel"[Mesh]		
"Nurses"[Mesh]		
"Physicians"[Mesh]		

Keywords and MESH terms.

- 8.1 Submit the search strategy for peer review following the PRESS (Peer Review of Electronic Search Strategies) guidelines to enhance accuracy and completeness.
- 8.2 Adapt the search strategy for each database: PubMed, Embase, Scopus, PsycInfo, CINAHL, Cochrane Library, and ClinicalTrials.gov.

Database	Search strategy
PubMed	("disaster medicine" OR "disaster preparedness" OR "mass casualty incident" OR "emergency preparedness" OR "Mass Casualty Incidents"[MeSH] OR "Disaster Medicine"[MeSH] OR "Disaster Planning"[MeSH]) AND ("curriculum design" OR "instructional design" OR "educational strategies" OR "Curriculum"[MeSH]) AND ("first responders" OR intern* OR "healthcare provider" OR "Paramedics"[MeSH] OR "Health Personnel"[MeSH] OR "Nurses"[MeSH] OR "Physicians"[MeSH])
Scopus	(TITLE-ABS-KEY ("disaster medicine" OR "disaster preparedness" OR "mass casualty incident" OR "emergency preparedness")) AND (TITLE-ABS-KEY ("curriculum design" OR "instructional design" OR "educational strategies")) AND (TITLE-ABS-KEY (paramedic* OR "first responders" OR "medical student" OR physician* OR intern* OR nurse* OR "healthcare provider")) AND PUBYEAR > 2014 AND PUBYEAR < 2026
Embase	#18, #8 AND #12 AND #17 #17, #13 OR #14 OR #15 OR #16 #16, 'mass casualty incident' #15, 'mass disaster' #14, 'disaster preparedness' #13, 'disaster medicine' #12, #9 OR #10 OR #11 #11, 'educational model' #10, 'curriculum development' #9, 'education program' #8, #1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 #7, 'health care personnel' #6, 'nurse' #5, 'medical intern' #4, 'physician' #3, 'medical student' #2, 'first responder (person)' #1, 'paramedical personnel'/exp OR 'paramedical personnel' OR (paramedical AND ('personnel'/exp OR personnel))

Database	Search strategy
PsycInfo	((Any Field: ("disaster medicine") OR Any Field: ("disaster preparedness") OR Any Field: ("mass casualty incident") OR Any Field: ("emergency preparedness")) AND ((Any Field: ("curriculum design") OR Any Field: ("instructional design") OR Any Field: ("educational strategies")) AND ((Any Field: (paramedic*) OR Any Field: ("first responders") OR Any Field: ("medical student") OR Any Field: (physician*) OR Any Field: (intern*) OR Any Field: (nurse*) OR Any Field: ("healthcare provider")))) AND Year: 2015 To 2025
CINAHL	(paramedic* OR "first responders" OR "medical student" OR physician* OR intern* OR nurse* OR "healthcare provider") AND ("curriculum design" OR "instructional design" OR "educational strategies") AND ("disaster medicine" OR "disaster preparedness" OR "mass casualty incident" OR "emergency preparedness") Last 10 years
Cochrane	(paramedic* OR "first responders" OR "medical student" OR physician* OR intern* OR nurse* OR "healthcare provider") AND ("curriculum design" OR "instructional design" OR "educational strategies") AND ("disaster medicine" OR "disaster preparedness" OR "mass casualty incident" OR "emergency preparedness") in Title Abstract Keyword Filter: last 10 years
Clinicaltrials.gov	(paramedic* OR "first responders" OR "medical student" OR physician* OR intern* OR nurse* OR "healthcare provider") AND ("curriculum design" OR "instructional design" OR "educational strategies") AND ("disaster medicine" OR "disaster preparedness" OR "mass casualty incident" OR "emergency preparedness")

Search Strategies

- 8.3 Manually search Google Scholar to capture relevant studies missed in database searches and to identify grey literature.

Stage 3: Study selection

- 9 Include studies involving physicians, nurses, paramedics, EMTs, medical residents, medical interns, and university or college students enrolled in health-related fields (e.g., medicine, nursing, EMS).
- 10 Include studies that describe or evaluate curricular design strategies.
- 11 Focus on disaster medicine or mass casualty incident (MCI) education and training.
- 12 Include primary studies (quantitative, qualitative, or mixed methods), program descriptions, and curriculum development reports.
- 13 Include grey literature such as conference abstracts or government/NGO reports if they provide relevant curriculum detail.
- 14 Restrict included studies to those published in English within the last 10 years.
- 15 Exclude studies that do not focus on disaster or MCI training (e.g., general emergency care or trauma surgery without a disaster context).
- 16 Exclude studies solely focused on effectiveness evaluations without describing curriculum structure or instructional design.
- 17 Exclude studies involving non-healthcare populations (e.g., military, engineers, general public) without separate analysis for healthcare participants.
- 18 Exclude systematic reviews, literature reviews, and other scoping reviews.

Stage 4: Data Charting

- 19 Develop the data extraction form by piloting 5 studies and identify common variables relevant to curricular design in disaster medicine education.
 - 19.1 **Study Identification and Context**
 - Study ID
 - Country
 - Study Design

- Target Population
- Educational Setting
- Prehospital Preparedness Focus
- Location of Training
- Duration of Training

19.2 Curriculum Structure and Design

- Curriculum Type
- Disaster Competency Framework Used
- Frameworks/Standards Referenced
- Key Themes or Domains
- Specific Competencies Targeted
- Program Success Characteristics
- Was Study Objective Achieved?

19.3 Instructional Methods and Delivery

- Training Method (Traditional/Technology-Based)
- Delivery Modality
- Pacing Model
- Teaching Strategies
- Use of Combined Training Methods (If Combined, List Methods)
- Orientation Sessions Provided? If Yes, Topics Covered
- Previous Experience of Participants

19.4 Simulation and Scenario Design

- Simulation Included?
- Simulation Type
- Simulation Tasks Assigned
- Real World Scenario Alignment
- MCI Type Used in Scenario
- Scenario Description
- Were Risk Scenarios Assessed?
- Actors' Occupation
- Non-Medical Personnel Involved? If Yes, What Role?
- Team Training Included
- Response Team Role Assigned

19.5 Assessment and Evaluation

- Assessment Methods
- Effectiveness Metrics Used
- Evaluation Level (Kirkpatrick)
- Competency Tracking Used
- Types of Self-Reported Measures
- Was There a Comparator? If Yes, Name Comparator
- Did Study Assess or Control for Stress?

- Was There a Feedback Session?

19.6 Findings and Outcomes

- Reported Outcomes/Effectiveness
- Participants' Positive Feedback
- Participants' Negative Feedback
- Barriers/Challenges
- Limitations of the Study
- Gaps Identified
- Success Factors/Best Practices
- Key Message

Stage 5: Collate, summarize, and report the results.

- 20 Compile, summarize, and present extracted data from included studies using tables, figures, and other visual formats.
- 21 Analyze quantitative information (e.g., study frequencies, participant numbers, training formats) descriptively.
- 22 Examine qualitative data, including implementation experiences and contextual insights, using thematic analysis.
- 23 Use thematic analysis to categorize studies included in the review.
 - Curriculum structure and design approaches.
 - Educational setting and learner level (e.g., undergraduate, in-service).
 - Target healthcare populations (e.g., paramedics, nurses, physicians, students).
 - Instructional methods and pedagogical strategies (e.g., simulation, PBL, lectures).
 - Competency frameworks and disaster-specific standards referenced.
 - Assessment methods and evaluation levels (e.g., Kirkpatrick Model).
 - Use and types of simulation, including roles, tasks, and real-world alignment.
 - Reported outcomes, implementation barriers, gaps, and success factors.

Stage 6 (Optional): Conduct Stakeholder Consultation

- 24 Engage relevant stakeholders involved in disaster preparedness and emergency training as part of an optional consultation step.
 - 24.1 Include participants such as EMS educators, emergency physicians, paramedics, disaster management officials, policymakers, and simulation specialists.



Dissemination

- 25 Submit the final manuscript to a peer-reviewed journal specializing in emergency medicine, disaster preparedness, or simulation-based training.
- 26 Present key results at leading national and international conferences

Timeline:

- 27 Month 1: Registration & stakeholder meeting
- 28 Months 2-3: Search execution & import
- 29 Months 4-5: Screening
- 30 Months 6-7: Data extraction
- 31 Month 8: Synthesis workshop
- 32 Month 9: Draft manuscript
- 33 Month 10: Peer review & protocols.io publication

Protocol references

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