Strengthening Healthcare System Disaster Resilience: A Case Study of Health Care Coalition Disaster Preparation Exercises

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Hazards and Disaster Research by New Professionals
Wednesday, July 16, 8:30 AM

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50th Annual Natural Hazards Research and Applications Workshop
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Research Motivation Story

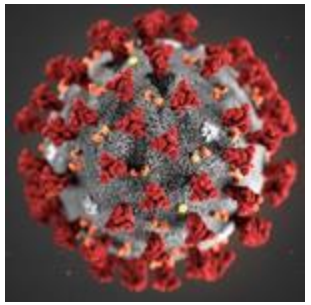
Significant disasters in my childhood

- Rwanda Genocide
- 9/11
- Hurricane Katrina
- 2010 Haitian Earthquake
- Sandy Hook School Shooting

Flint Water Crisis

2017 Undergraduate Senior Design Project

COVID-19



2019 first year in workforce, assigned to the NCAL Kaiser Hospital Incident Command System

Global Conflict

PhD during…

Political Instability in Haiti, Democratic Republic of Congo, Middle East, U.S.
Civil War in Sudan, Syria, and Yemen
Territorial Dispute Russia-Ukraine, Rawand-Congo
Genocide in Palestine
Wildfires, Floods, Hurricanes

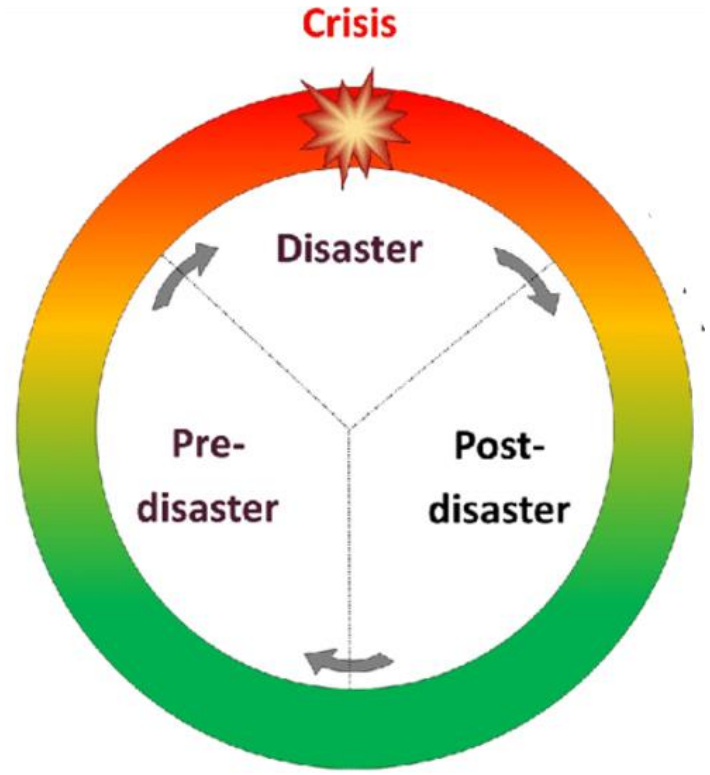

ALL DISASTERS LEAVE LASTING SCARS—impacting HEALTH at individual, community, and societal levels, with trauma that echoes for generations.



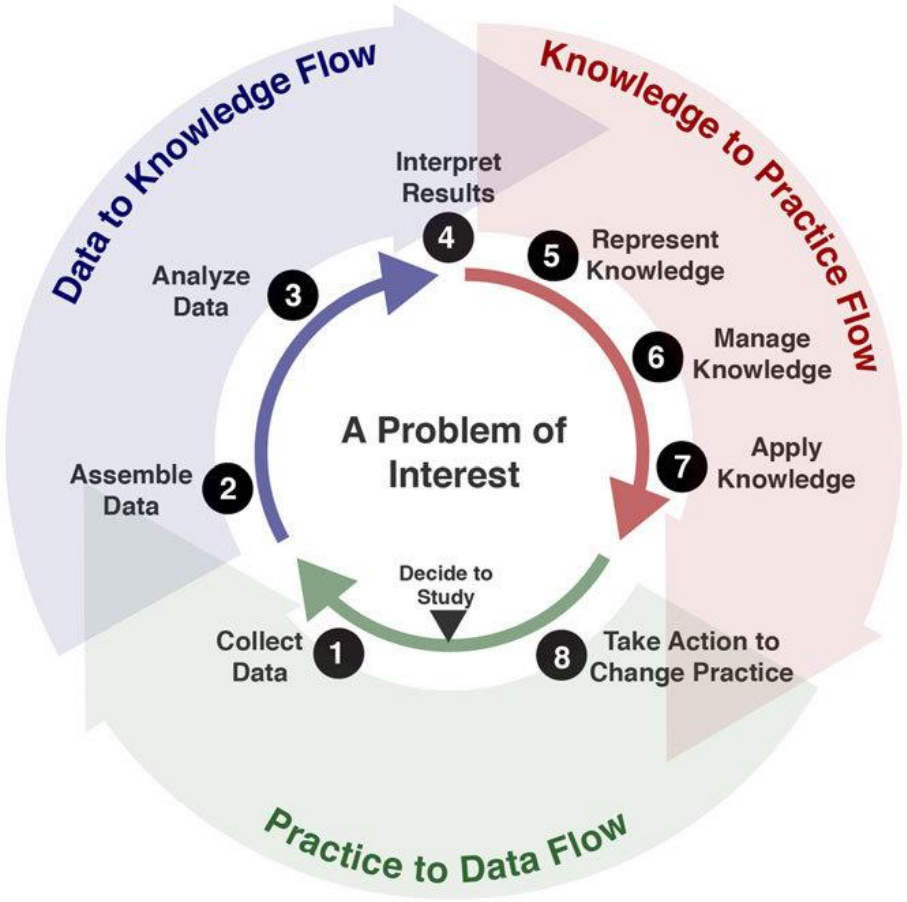




Disaster Management as a Learning Health System



Space-Based Earth Observations for Disaster Risk Management - Scientific Figure on ResearchGate. Available from: https://www.researchgate.net/figure/Disaster-management-cycle_fig2_339835852



The Knowledge Object Reference Ontology (KORO): A formalism to support management and sharing of computable biomedical knowledge for learning health systems - Scientific Figure on ResearchGate. Available from: https://www.researchgate.net/figure/The-learning-health-cycle-of-the-learning-health-system-with-3-information-flows-and-8_fig1_324547694

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Exercises translate **knowledge into practice**, building confidence and improving disaster response in unfamiliar situations.

Dissertation Research Study Overview

Using Implementation Science To Assess Barriers And Facilitators In Health Care Coalitions' (HCCs) Medical Response Surge Exercise (MRSE)

Aim 1: MRSE Sociotechnical Structure

Objective: Apply the Sociotechnical Systems Framework to analyze key components—inputs, activities, outcomes, and context—of MRSE disaster preparation exercises planning, execution, and review.

Research Design: Thematic analysis of MRSE guidance documents (N=3)

Aim 2: MRSE Barriers & Facilitators

Objective: CFIR 2.0, implementation science framework, to examine key barriers and facilitators influencing how HCCs plan, conduct, and evaluate the MRSE.

Research Design: Initial survey (N=17) and semi-structured interviews (N=10)

Aim 3: MRSE Logic Model (IRLM)

Objective: Tailor implementation strategies to address barriers to MRSE adoption using participatory methods and implementation science tools, demonstrating their value for improving disaster preparedness in HCCs.

Research Design: Guided think-aloud interviews (N=10)

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Research Goals

1. **Demonstrate** how **implementation science frameworks** can enhance disaster preparedness by supporting the development and adoption of evidence-based practices

2. **Identify key barriers and facilitators** to local implementation of federally designed disaster exercises using CFIR 2.0

3. **Highlight the essential role of Health Care Coalitions** in promoting community disaster readiness, especially in the context of evolving federal guidance and funding structures.

Implementation Science Methods

Use	Theory/Model/Framework	Intended Use	Associated Aim
Process Models	**Sociotechnical Systems Model**	Understand the infrastructure and processes of the MRSE	Aim 1
	Implementation Research Logic Model (IRLM)	Guide planning and link determinants, strategies, and outcomes	Aim 3
Determinants Frameworks	**CFIR 2.0 (Consolidated Framework for Implementation Research)**	Identify and explain barriers and facilitators to MRSE implementation	Aim 2
Evaluation Frameworks	**Proctor's Implementation Outcomes**	Identify and define relevant MRSE implementation outcomes	Aim 1
	RE-AIM *(Reach, Effectiveness, Adoption, Implementation, Maintenance)*	Quantitatively evaluate outcomes related to MRSE implementation	Aim 2

Early Findings

- **Implementation Science** frameworks have utility for practitioners
- **The Sociotechnical System model** provides a framework for assessing context of critical components of a disaster exercise *(people, technology, infrastructure, culture, policies)*
- FEMA's model **Federal Support, State Managed, Locally Executed** supports effective, flexible, and locally relevant exercises
- **Repetition of standard exercises** with varied scenarios build routine and engagement
- **Tying disaster preparation to existing accreditation standards** (e.g., Joint Commission, CMS) shows value and can boost uptake

Acknowledgements

Dissertation Committee

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Thank you, lets stay in touch!

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