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# Risk Management and Disaster Response In the Oil and Gas Industry: Modelling and Implementation of Interoperable Healthcare Systems Solution for Disaster Response in the Oil and Gas Industry

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### 1. Overview

Disaster response in the oil and gas industry remains a critical challenge as a result of the history and complexity of notable incidences, highlighting the need for researches to improve preparedness and response.

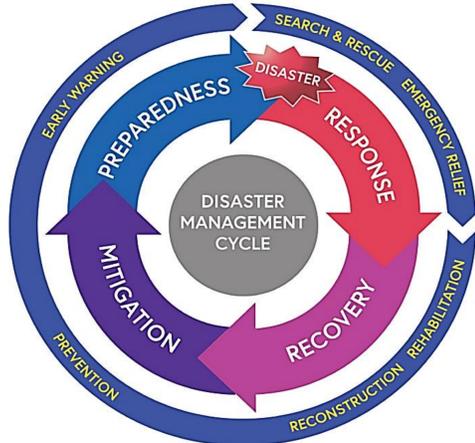


Fig.1: Disaster Management Cycle

### 2. Objectives

- ▶ Detail the system/sub-systems of interacting health systems via modelling language tool-BPMN
- ▶ Model, simulate and implement the interactions of the systems using Agent-based modelling
- ▶ Validate the “situation awareness” of the model via simulation-based Role-playing Game/Analysis.

### 3. Research Questions

- ▶ How is the interaction between hospital systems in a disaster response modelled? (Objectives.1&2)
- ▶ How can the concept of “situation awareness” be conceptualized, to assess the interaction between the healthcare systems?

### 6. Results

- ▶ The modelling and simulation study demonstrated that the deployment and utilization of the MFH as a support healthcare system successfully reduced the mortality outcome (Fig.5 A+B) in the response intervention, thus, revealing the value and promise of NetLogo 6.3.0(ABMS) and RPG validation (Fig.6) combination techniques in disaster response applications.

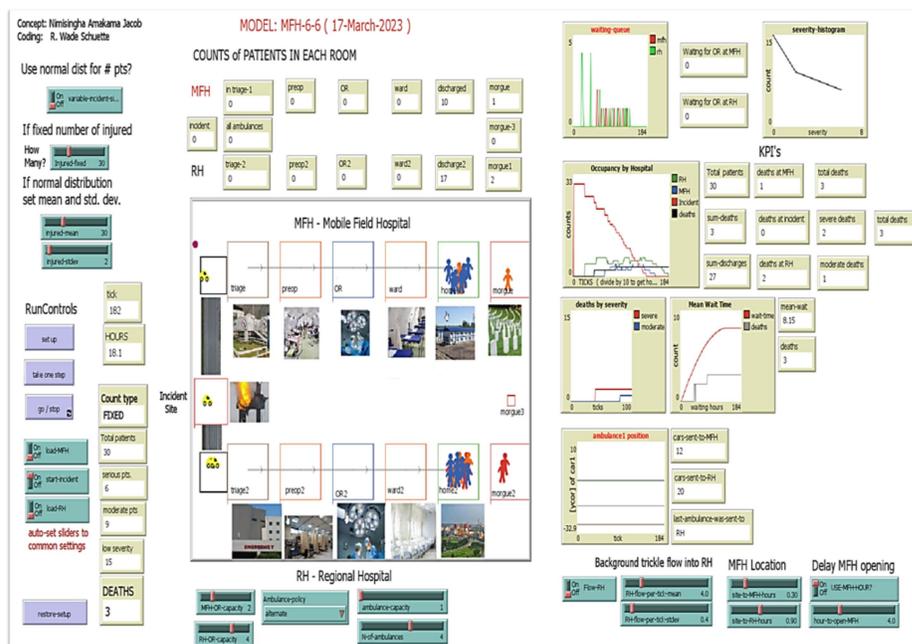


Fig.4: NetLogo (6.3.0) Modelling and Simulation Interface

### 4. Motivations

Healthcare systems face challenges, including interaction, a lack of real-time data sharing and analysis, and the need for patient safety and response efficiency in a complex and dynamic environment, thus, the need for:

- ▶ Enhancement of response coordination in emergency
- ▶ Assessment of impacts of key factors in disaster response
- ▶ Identification of gaps in disaster response plans.

### 5. Methodology

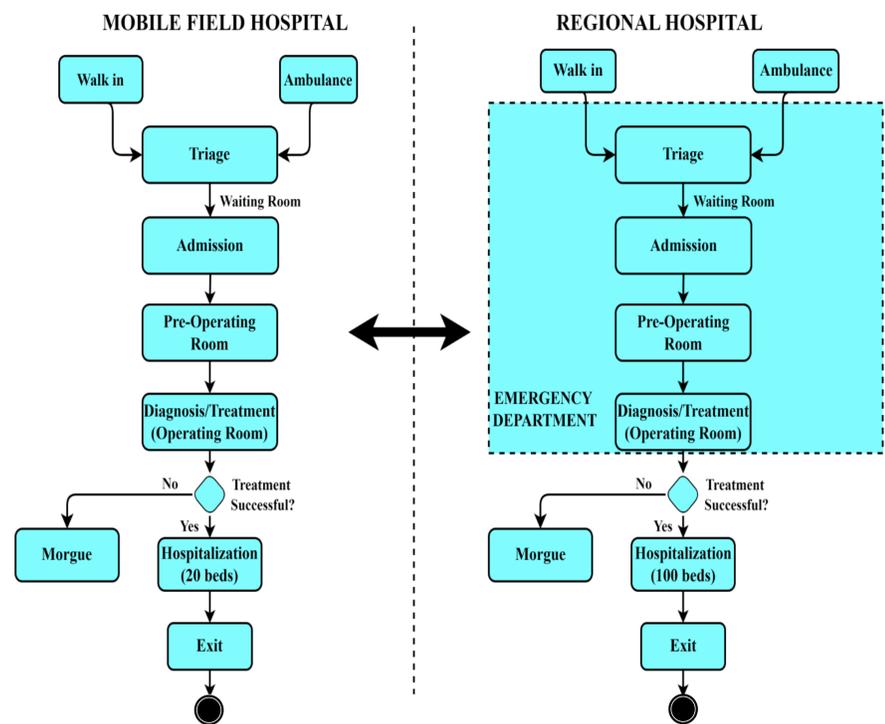


Fig.2: Simplified Interacting Healthcare Systems Conceptualization for Disaster Response (BPMN)



Fig.3: Methodology Block Diagram (PhD thesis)

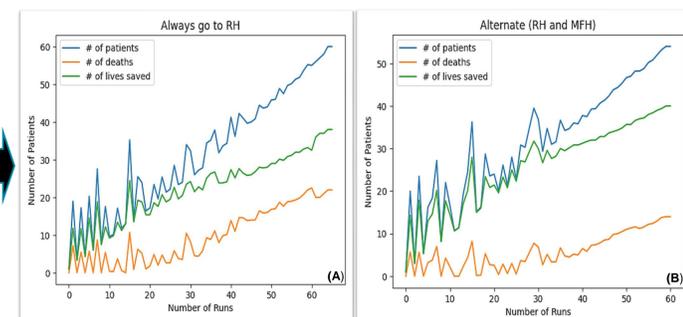


Fig.5: Mortality outcomes for a single (RH) and interacting healthcare systems (RH/MFH) intervention

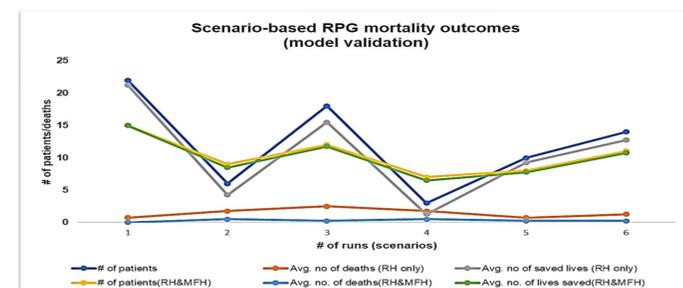


Fig.6: Scenario-based RPG mortality outcomes (Model Validation)