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Fostering Mobile Field Hospitals Collaboration During Disaster Response for Seamless Continuity of Care: A Mini Review

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ABSTRACT

When mobile field hospitals are deployed in response to a disaster, they may sometimes face unprecedented challenges that require collaboration either with other mobile field hospitals or with existing regional hospitals to maintain continuity of care for the impacted populations. This article explores the pivotal role of enhancing healthcare team collaboration to ensure seamless care continuity during disaster response in an austere disaster-stricken environment. To improve patient outcomes during disasters, this study aims to investigate the barriers to care continuity in disaster response and highlight frameworks that can enhance healthcare team collaboration during sudden onset of disasters. Several bibliographical databases, including Pub Med, Science Direct, Web of Science, and Google Scholar were utilized. Articles examined from the databases were focused on state-of-the-art healthcare collaboration frameworks. To shed light on the difficulties and the necessity of implementing a collaborative healthcare disaster response framework, a case study of an American mobile field hospital deployed during the 2010 Haiti earthquake was examined. The literature review highlighted several factors that are responsible for lack of coordination during disaster response especially in an austere setting like Haiti. The review further highlights some frameworks that have the potential to improve care continuity in such an environment. In the event of a disaster, especially in austere settings like Haiti where the usual coordination mechanisms with regional or local government is difficult, deployed mobile hospitals must find alternative frameworks to enable them to work in tandem among themselves and with the local hospitals to improve the affected population's continuity of care. The five frameworks highlighted have the potential to facilitate care coordination and hence continuity of care in such settings.

INTRODUCTION

Disasters, both man-made and natural, are becoming major global problems. Numerous disasters appear to be occurring more frequently and with greater intensity, including earthquakes, tsunamis, hurricanes, floods, explosions, epidemics (such as influenza, Ebola, SARS, and COVID-19), and terrorist attacks (Chen *et al.*, 2020). For the management of large numbers of casualties, prompt medical response to a disaster is essential. Mobile field hospitals are used to treat the impacted populations with emergency care following a disaster's immediate impact, they frequently replace or enhance the services provided by regional and local hospitals that have been damaged or not operating optimally (Yang *et al.*, 2018). Even though mobile field hospitals are made to function independently while on missions, there are times when working in tandem with regional hospitals is required to meet the population's healthcare needs. The lessons from an American field hospital deployed to Haiti following the earthquake in 2010 serves as one example of this requirement for the need for collaboration. In this instance, the responding team experienced shortage in supplies of critical medical materials, including oxygen

tanks (Neyem *et al.*, 2016). Sadly, this setback resulted in one fatality, with two other patients suffering critical conditions before being sent to the closest regional hospital that administered oxygen. In 2010, a comparable incident occurred in an Israeli mobile hospital, where patients undergoing orthopedic treatments were not sure how and where to receive continued care with the retrieval of the mobile field hospital (Dehghani Tafti *et al.*, 2023). The difficulties seen in these cases highlighted the need for a structure that will make it easier for mobile field hospitals and regional hospitals to collaborate in times of disaster to guarantee continuity of care and positive patient outcomes.

Continuity of Care

Care continuity, or continuity of care (COC) according to the World Health Organization (2018) is the extent to which people experience a series of discrete health care events as coherent and interconnected over time and consistent with their health needs and preferences (Gulliford *et al.*, 2006). Prior to 2000, the idea of care continuity was centered on patients' interactions with their doctors or continuous medical care. The multidimensional

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concept of continuity of care was rarely used in studies. After 2000, nevertheless, the idea of care continuity was given a multifaceted approach.

During disaster scenarios, people suffering from already existing chronic conditions need their care to be maintained. This will have to go along with the ongoing treatment of injured victims. Research indicates that COC is highly correlated with outcomes for patients and the health system, including better health, patient satisfaction, and quality of life; lower rates of hospitalization and death; higher patient self-efficacy and treatment adherence; and lower health costs. Continuity of care has also been shown to be strongly correlated with lower complication rates and health service consumption among patients (Dehghani Tafti *et al.*, 2023). These results helped make team-based care and other chronic care management models more important (Goodwin, 2021).

Longitudinal continuity, informational continuity, and interpersonal/relational continuity are the three categories of continuity of care that have been recognized (Panteli *et al.*, 2015). Patients who receive most of their care from a single physician or group of providers over an extended period are said to have longitudinal continuity. Physicians can become familiar with patients' medical histories and present conditions thanks to the ongoing contact that exists between patients and healthcare professionals. Informational continuity is the transfer of a patient's information from one episode of treatment to the next, both between the patient and the providers and among the providers, using both an organized database of medical records and the collective memory of the doctors with whom the patient develops a relationship with patient (such as being aware of their preferences) (Chen *et al.*, 2020).

Chen *et al.* (2020), maintained that researchers have

proposed that the concept of care continuity should emphasize care coordination among multiple physicians in various care settings, such as cross-border continuity and managerial continuity, in addition to the ongoing interpersonal continuity between patients and their doctors when patients see multiple providers. Hence, when mobile field hospitals are deployed for instance, it is necessary to establish collaboration between their staff and those of the nearby regional hospitals to ensure continuity of care for the impacted populations.

Mobile Field Hospitals (MFH)

A mobile field hospital is defined as mobile, self-contained, self-sufficient medical facility that is capable of rapid deployment, expansion or contraction to meet immediate emergency requirement for a specified period of time (Rossodivita, 2011). The conditions involved before a field hospital can be dispatched include: (a) written request by the country in need, (b) work with the local healthcare systems (c) Clear definition of their roles, responsibilities and operational attainment. The main purpose of a field hospital is to compliment or substitute local hospitals in advent of sudden impact events that produce a disaster (Malone *et al.*, 2020). Depending on the situation, there are different types of deployable mobile field hospital.

Types of Mobile Field Hospital

Different types of mobile hospitals are deployed depending on what is needed to perform a rescue at the catastrophe site while dealing with a difficult natural environment and a high number of fatalities. Currently, there are three types of mobile hospitals that may be distinguished based on the variations in transportation media: floating, flying, and terrestrial (Skang, 2023).



Figure 1: Rescue Material Delivery Vehicle of National Emergency Medical Rescue Team of the Second People's Hospital of Guangdong Province (Chen *et al.*, 2020)

The most prevalent kind of mobile hospital is the terrestrial kind, which comprises shelter, car, tent, and so on. The mobile hospital on land is modular. As needed, the number of units, the layout, and the care

options might be changed. A floating mobile hospital is a standalone medical institution that is situated on the sea. Floating hospitals are limited to locations close to water and need a significant amount of space to dock

and allow boats to carry patients and workers. The flying hospital has been embraced by numerous governments, non-profits, and air forces worldwide. In times of crisis, flying hospitals might offer surgical hospital services, emergency medical attention, as well as humanitarian

help. Additionally, aeromedical evacuation allowed for the quick transfer of injured people from disaster locations to hospitals. Mobile field hospitals of whatever type must collaborate with regional hospitals during a disaster response to achieve continuity to the affected population.



Figure 2: A Tent mobile fielded hospital used by a Chinese medical team during Earthquake in Nepal

Although there is a wealth of literature on hospital collaboration, they are mainly focusing on larger stationary hospitals, therefore, a framework is essential specifically for the purpose of collaboration between local hospitals and deployed mobile field hospitals. The objective of this research is to answer two questions:

- (1) What are the barriers to continuity of care in disaster response? And
- (2) What are the current frameworks that can enhance collaboration between a mobile and regional hospitals for better disaster response?

LITERATURE REVIEW

Challenges of Providing Care Continuity During Disasters

Research conducted by Hamis *et al.* (2023), on Covid-19 field hospitals shows a considerable number of challenges faced by these hospitals when responding to Covid 19 pandemic. The main challenges include paucity of electronic medical record that is applicable in all the hospitals, poor communication between staffs and that of patient-family, lack of supply and resources, shortage of staffs, difficulty in mobilizing enormous number of qualified professionals with diver's clinic background and experience in field hospitals and poor patient number anticipation (Hamdani *et al.*, 2023, Amakama, 2024a, Amakama *et al.*, 2024b). These factors can have negative impact on the quality of healthcare delivered and hence care continuity.

During high impact disasters, the challenges of continuity of care is another issue that needs to be addressed. For example, during the Israeli EMT3 mission in Nepal (2015), patients who had orthopedic surgery, were sent home with instructions to have the cast or sutures taken out, but it was not obvious where this would be

done. Also, the EMT3 mission in Haiti 2010 highlighted another challenge in continuity of care which is lack of electronic medical record that can be shared between MFH and the regional hospital during follow ups (Alpert & Merin, 2024).

Feizolahzadeh *et al.* (2019), classified the barriers to care continuity in disaster into seven primary class and eighteen subsidiary categories: the absence of a disaster paradigm (comprising of two subcategories pertaining to solely emergency approaches and cultural, social, and political matters); the difficulties in the pre-hospital system (comprising of three subcategories pertaining to inadequate risk communication, pre-hospital measures, and poor distribution of injured individuals); the lack of coordination and cooperation (comprising of two subcategories pertaining to intra-organizational and inter-organizational coordination); poor hospital preparedness (comprising of three subcategories comprising of a deficient all hazards approach plan, a failure to learn from disasters, and substandard physician collaboration); the lack of utilization of available resources and capacities (comprising of poor management of volunteers, lack of using home care centers and lack of financial resources. Inadequate planning (with three subcategories: poor early discharge plans, following up of patients after discharge, and inadequate design of special needs shelters) and finally inadequate patient knowledge (with two subcategories: patients and their family lacking pre-disaster education plans and inadequate self-care knowledge). From the forgoing, it is evident that lack of coordination and collaboration stands out as the main concern to providing care continuity during disaster response. In this article, we focused on this barrier and try to look for possible solutions that are applicable to mobile field hospitals.

Review of Some Existing Frameworks with Potential for Disaster Response Coordination

In order to provide effective continuity of care during disaster response, different healthcare systems must work together for the patients best interest (Huber, 2022). Lack of collaboration between healthcare can have great negative effect on response phase during disaster and in return affect the healthcare of the people (Yousefian *et al.*, 2021). Feizolahzadeh *et al.* (2019) proposed solutions to diverse barriers to continuity of care during disaster situations but did not focus them to favour mobile field hospitals operations. Due to the paucity of information focusing specifically on collaboration between mobile hospitals and regional hospitals, we will look at different

healthcare literatures on collaboration and try to find a solution that can be considered applicable and with the potential to improve collaboration and continuity of care between mobile field and regional hospitals:

Sunnybrook Framework

The six core competencies that make up the Sunnybrook framework for interprofessional team cooperation are intentionally formulated as collective competencies and are intended to be applied to teams. The framework also includes 19 related behaviors and definitions for each core competency (McLaney *et al.*, 2022). The primary goal of the framework is to facilitate interprofessional collaboration, as seen in the figure's center below.



Figure 3: The Sunnybrook framework of the core competencies for interprofessional team collaboration (McLaney *et al.*, 2022)

The competencies cover the four domains shown in the picture as encircling interprofessional collaboration:

- (1) Approach to leadership,
- (2) Research and quality improvement,
- (3) Education, and
- (4) Clinical and professional practice and care.

The competence framework defines interprofessional education as “learning about, from, and with each other,” and interprofessional care as “working together to deliver the highest quality of care.” When two or more professions collaborate to integrate knowledge and scientific viewpoints to address a quality issue or answer a common research question. Interprofessional leadership is defined by the framework as utilizing the skills and abilities of team members across all roles and professions. In a complex setting, interprofessional leadership acknowledges the value of a variety of voices and viewpoints in bringing about organizational and cultural change (McLaney *et al.*, 2022).

Conceptual Structure for How Interdisciplinary Team Members at Home Based Medical Care Access and Share Patient Data

The figure below shows the conceptual structure for how interdisciplinary team (IDT) members at home based medical care (HBMC) access and share patient data (Fathi *et al.*, 2016). The framework’s first definition of the general context of HBMC procedures was to draw attention to the difficulties in obtaining and disseminating patient data in this context.

The framework then emphasized four process elements that were found in the literature study results and described the ways in which IDT members in the HBMC environment exchange and obtain patient data. Using electronic medical records (EMRs), holding IDT meetings, standardizing patient assessments, and using secure e-messaging were among them.

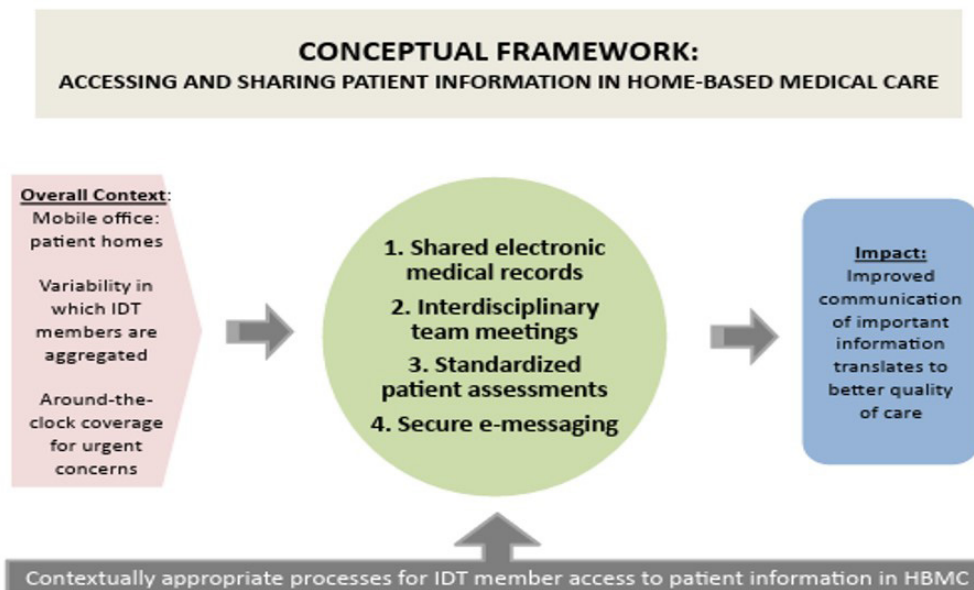


Figure 4: Conceptual framework for how IDT members access and communicate patient information in HBMC practices (Fathi *et al.*, 2016)

Electronic medical record (EMR) use was found to be a frequent method among IDT members for sharing patient information through the literature search. Frequent team meetings were another crucial tool for enhancing IDT communication and guaranteeing that every team member had access to critical patient data. IDT meetings resulted in enhanced collaboration between team members, according to experiences recorded by IDT participants from a variety of specialties. Meetings enhanced team effectiveness, enhanced patient satisfaction, and enhanced the standard of treatment. Another frequently mentioned method for IDT members to send patient medical information in a quick and easy-to-understand format is secure electronic messaging. Better communication, easier access to patient data, and an increased capacity to cut down on errors were all made possible via e-messaging. In a similar vein, improved patient information transmission resulted from the implementation of standardized patient evaluation forms that were readily available to all IDT members and routinely updated. These kinds of documents were especially helpful when patients were being transferred from one type of care facility to another, or when members of the IDT were providing care for difficult patients in nursing homes, inpatient and outpatient palliative care teams.

Healthcare Team Collaboration in Hospital Transfers through Cloud-Based Mobile Systems

Collaborative systems encompass mobile applications that are cloud-based and offer continuous monitoring features and recommendations for healthcare (Neyem *et al.*, 2016). Implementing these software applications can be especially difficult because of front-end and back-end mobility-related constraints. For most apps, mobile front-end needs remain consistent and are linked to the inherent

constraints of communicating with the device. However, the requirements for the application back-end are distinct and specific to platforms used for collaboration and monitoring. These include needs for performance (battery life, storage, and bandwidth), security (reliability and privacy), and environment (interoperability, heterogeneity, scalability, and availability). To address these constraints, (Neyem *et al.*, 2016) invented a technology which leverages mobile cloud computing (mcc) concepts to enhance the capabilities of mobile devices. MCC architectures aim to increase performance and battery life by utilizing the capabilities of external resource-rich nodes. Therefore, the approach merely uses a smartphone as a hub and display for wirelessly sent data from several sensors; whenever a network connection is available, it transmits the data to a server that does all the computer-intensive processing. This keeps the mobile device's battery from being overtaxed by allowing the server to examine and analyze incoming data in real time to gather statistics and contextual information. Based on the overall architecture displayed below, the suggested platform functions as follows. An in-office medical practitioner uses the Web system to allocate the transfer to an ambulance prior to starting the transfer. The mobile system notifies the assigned ambulance's paramedics. The transfer begins as soon as the patient is prepared, and the sensors are attached to him. The embedded sensors take some vital signs during the transfer and transmit the data to the mobile device. The mobile device transfers the data to the cloud, computes the REMS, and shows the results graphically. Afterwards, real-time observation of all patient data by healthcare experts in the office facilitates improved teamwork amongst participating parties. In this way healthcare systems can collaborate effectively using cloud-based technology.

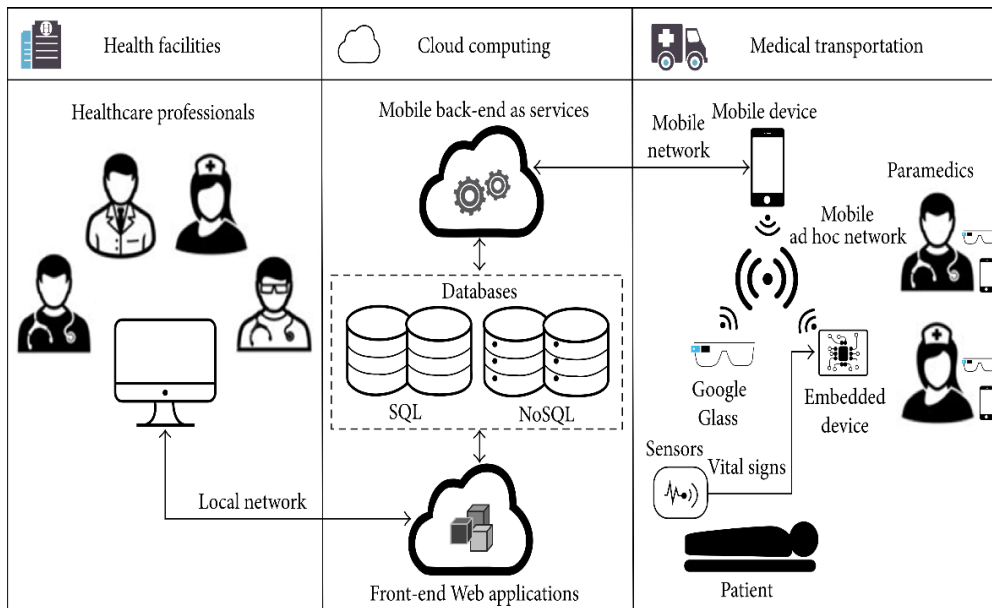


Figure 5: General architecture of the proposed cloud-based mobile system (Neyem *et al.*, 2016)

Onsite Incident Command System

Due to staffing constraints and concerns about infection control, nursing facilities in Boston were forced to close during the peak of COVID-19 pandemic in March and April 2020. Using the incident command system, the military, local administration, and medical professionals worked together to quickly create a 1000-bed field hospital for COVID-19 patients, including 500 respite beds for undomiciled patients and 500 post-acute care (PAC) beds in just 9 days. Using the Incident Command System, which was divided into the areas of clinical care and operations, human resources, facilities/logistics,

finance, data management, and information technology. Three people provided support to the military general incident commander: one military deputy commander and two clinical co-directors. Clinical teams and ancillary services were incorporated in the leadership structure for clinical care and operations, which was adjusted in response to changing demands. All around the region, patient recommendations were accepted and subjected to stringent admissions screening procedures. (Baughman *et al.*, 2020). This approach provided a system for an effective collaboration between the military, local and other healthcare facilities during the pandemic.

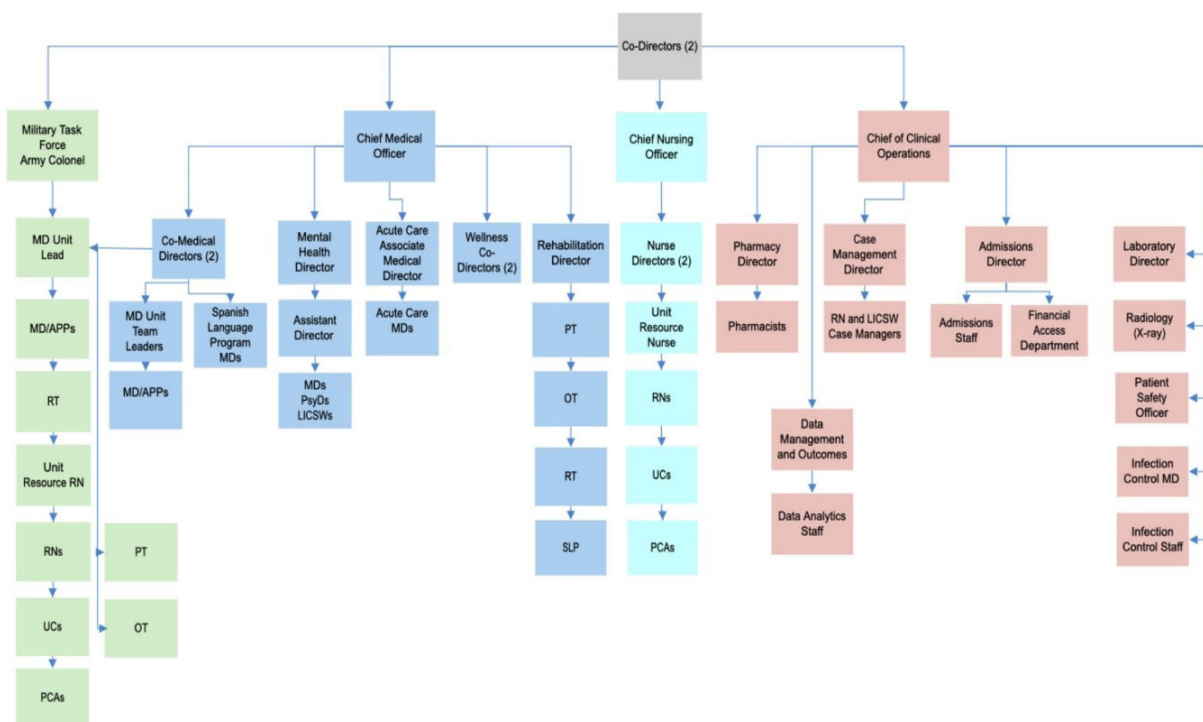


Figure 6: Incident Command System-ICS (Baughman *et al.*, 2020)

WIISARD (Wireless internet information system for medical response in disaster)

When the Israel defense force sent a mobile field hospital to Haiti following the devastating earthquake in 2010, they used a specially designed technology solution called

WIISARD which combine the hospital administration system and electronic medical record (EMR) of the patients. It can collect and display information in a disaster response scenario associated with mass casualty (Demchak *et al.*, 2007). Its basic design is shown below.

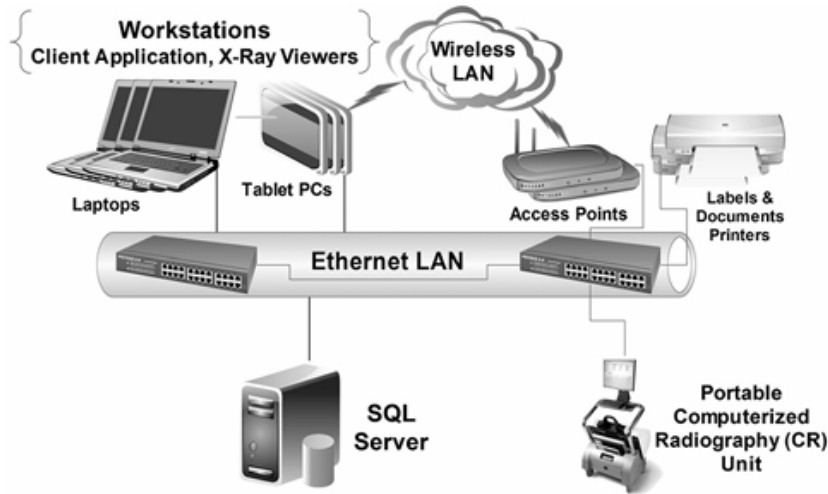


Figure 7: Diagram illustrating the basic system architecture of WIISARD (Levy *et al.*, 2010)

The primary application was an administrative dashboard with textual, numerical, and graphical data that was updated every minute. This includes records of triage and patients’ medical condition, the record of possible discharge, records of hospital deaths, surgical procedures, imaging tests, births, and patient distribution by department all summarized on the dashboard. Along with keeping track of patient movements across the hospital, the system also recorded the dates and times that patients entered each department. From the dashboard panel, the overall data could be narrowed down to the level of a single patient. An electronic patient record was one of the application’s second modules. The patients’ personal details, admission notes, treatments received, laboratory and imaging results were all included in the medical record, which was arranged as tabs on the application screen. The application also featured specific modules for ordering and reporting imaging and laboratory study findings. The hospital included a digital x-ray machine in its imaging department. Consequently, there was a requirement for an image distribution solution. For this assignment, K-PACS open source PACS workstations were selected (Levy *et al.*, 2010).

The implementation of an EMR in a disaster response scenario helps to assure the appropriateness of care in a multiple caregiver environment, allowing for faster patient transfers across hospital departments while minimizing the danger of missing critical medical records of patients. This was especially important in Haiti due to language barriers between patients and caregivers and a lack of translators. Furthermore, such system facilitate easy patient discharge by generating a concise discharge statement that is critical for the continuity of care (Levy *et al.*, 2010).

MATERIALS AND METHODS

Several bibliographical databases were examined, including Pub Med, Science Direct, Web of Science, and google scholar. Articles published on the cutting edge of healthcare collaboration frameworks were among the databases reviewed. This made it easier to comprehend their shortcomings, advantages, and chances for development and use in emergency situations. The reviews played a pivotal role in portraying a suitable methodological framework that possesses the necessary features and capabilities to tackle the typical obstacles associated with healthcare team collaboration during sudden onset disasters. Specifically, the framework aims to improve care continuity and patient outcomes in disaster situations.

Used Case: Mobile Hospital Experience During the Haiti Earthquake 2010

Goodman *et al.* (2015) described the experiences faced by the United States medical disaster teams when they arrived in Haiti following the earthquake on January 12, 2010. 48 hours after the earthquake, the team deployed consisting of 11 doctors, 3 pharmacists, 18 security personnel and logisticians, 29 nurses, and 2 respiratory therapists arrived in a devastated area of Port Au Prince. They set up the mobile medical unit on the site of the destroyed Gheskio hospital. A small procedure tent for wound dressings and debridement, a surgical theater room, an intensive care unit and a pediatric ward as well as two general medicine tents were set up. A maximum of 35 people can be housed at once for triage, treatment, and release. In the first two weeks of operation, they experienced little supply of food, medication, and supplies due to the extensive damage to the airport and the continual

airlifting of individuals out of the country. As a result, they resorted to the use of improvised resources and means to cope with the current situation. For example, even though complicated fractures of the arms, legs, and hips were the most common injury, external fixators were not made available until the second week. One inventive way to straighten the fractures was to employ traction by connecting bits of stone from the debris to ropes that were swung over the army cot poles.

After one week, three seriously ill patients arrived at the Gheskio Field Hospital simultaneously:

- N.S., a middle-aged woman with underlying congestive heart failure was brought with serious breathing problem and was immediately put on oxygen and diuretics
- The second patient was J.P, a man in his mid-twenties who was under the rubble for three days before he was saved by his family members and brought with severe crush injuries. He was immediately intubated and put on a respirator.
- The last patient was a baby suffering from pneumonia who also required manual ventilation and intubation and the field hospital only had one mechanical respirator (Goodman *et al.*, 2015)

The field hospital was running low on gasoline and oxygen when the three patients arrived. The logistician was worried that the gasoline needed to fuel the generators would run out. Although requests for these goods had been made, it was unclear when they would receive them due to the unstable circumstances at the airport. Other medical supplies that were sufficient included antibiotics, heart medicines, and pain relievers. It was evident by that evening that oxygen supplies were running short, but no meeting had been held to discuss how to handle the situation.

The medical officer decided to try rationing the oxygen

by turning down the low rate in the tent where N.S. was receiving treatment. More diuretics and morphine were administered to her to relieve her respiratory distress while her nurse spent the night attempting to keep her comfortable.

When the communications liaison discovered the availability of oxygen and other medications at the University teaching hospital, NS was transported there by pickup truck, but no oxygen was given during the journey. Although the team's doctor accompanied her there while attempting to relieve her pain with inhalers, she had to contend with the lack of oxygen and suffered before finally reaching the destination. She survived and was discharged after a few days.

In the ICU tent, J.P. and the baby were being attended to. When the baby's oxygen tank ran out, room air was used to manually ventilate her. For a full day, the two respiratory therapists and one pediatrician alternated in ventilating the patients using the Ambu bag. When the baby started experiencing respiratory difficulty, the pediatrician providing ventilatory care recommended that J.P. be left to die instead of being put into conscious sleep. Refusing, the other doctor in the tent intubated him and J.P. received the last oxygen tank that was left. Lastly, the infant and J.P. were flown to the Comfort Hospital Ship, which was berthed in the harbor, via helicopter. J.P. passed away enroute, but the infant made it through.

RESULTS AND DISCUSSION

The table below summarizes and compares the various frameworks. The strengths and weaknesses also highlighted to give some insight into each framework and its suitability for adoption by emergency healthcare teams for optimum continuity of care.

Table 2: Table of comparative analysis

Author	Framework	Strength	Weakness	Opportunity	Threats
McLaney <i>et al.</i> (2022)	Sunny brooks framework	Have been successfully applied to different healthcare systems	Does not explicitly address emergency related challenges	Can be adaptable to different scenarios	Must be customized if considered for application in case of emergency
Fathi <i>et al.</i> (2016)	Conceptual framework for IDT members	Provides practical and process-oriented approach focusing on important tools necessary for effective collaboration during an emergency	Reliance on electronic methods may pose challenges in a digital deficient environment	Its principle can be easily applied to an emergency healthcare setting	Require robust cybersecurity when sharing vital patient data via e-messaging
Neyem <i>et al.</i> (2016)	Cloud based system	The inclusion of continuous monitoring features allows for real-time data collection, providing healthcare professionals with up-to-date information during hospital transfers	Relies heavily on the availability and reliability of technology, which may pose challenges in areas with limited network connectivity or infrastructure.	The continuous monitoring features open opportunities for remote patient monitoring beyond hospital transfers, contributing to proactive healthcare management.	The framework may encounter technical limitations, such as delays or errors in data transmission, which could impact the real-time nature of healthcare collaboration during transfers.

Baughman <i>et al.</i> (2020)	Onsite incident command system	The system demonstrated adaptability by adjusting the leadership structure in response to changing demands, highlighting its flexibility in managing dynamic situations.	Implementing and maintaining an incident command system can be resource-intensive, requiring skilled personnel and the allocation of significant time and resources.	The incident command system can be integrated with existing healthcare systems and emergency response protocols, enhancing overall preparedness and coordination	The success of the system in creating a 1000-bed field hospital may not directly translate to other settings or scales, posing limitations to its scalability.
Levy <i>et al.</i> (2010)	Application of information technology within a field hospital deployment following the January 2010 Haiti earthquake	The presence of electronic medical record facilitates and enhances continuity of care in multiple hospitals	One notable weakness is dependency on technology. If the technology fails, the response mission fails	Implementing similar technology in regional or other field hospitals will enhance information exchange and coordination	Regional hospitals may find it difficult to ensure compatibility and integration of such systems; careful planning and collaboration are necessary to reduce data silos and promote constant information flow.

Discussion

The three patients discussed in the case study suffered due to lack of available resources in the mobile field hospital. However, if a collaboration protocol was initially implemented between the mobile hospital or any close by regional or local hospitals, such occurrences could have been curtailed. Table 2 shows summary of some frameworks with the potential to improve collaboration and cooperation between mobile field hospitals and regional hospital during such situation to aid in providing continuity of care to affected individuals in a similar disaster response scenario. The intention is to advice emergency medical teams to explore beyond the box for alternative options, particularly in a nation such as Haiti where the typical humanitarian aid command system framework might appear unworkable due to the absence of an operational government that could support the division of labor and needs assessment for disaster response.

The “Incident Command System” Is an easy to use and can be implemented within the shortest possible time as depicted in case of Boston covid 19 responses. Its effectiveness lies in the leadership and division of labor enabling easy resource allocation where needed. This is a very good approach for healthcare teams responding to disasters especially in austere situation like the case of Haiti where a functioning government may be difficult. The “Healthcare Team Collaboration in Hospital Transfers through Cloud-Based Mobile Systems,” can be used in conjunction with or embedded in any of the framework to facilitate patient transfer from one mobile field hospital to another, or to a regional hospital with available resources that could save the patient’s life. This is because it could provide real time patient status and

the need for immediate intervention whenever needed during transfer. The “Sunnybrook Framework for Interprofessional Team Collaboration” can be adapted by teams when responding to emergencies but must be customized to fit a disaster scenario. The flexibility of this framework could be utilized by deploying mobile field hospitals to facilitate coordination during disaster response. The “Conceptual Structure for How IDT Members at HBMC Access and Share Patient Data” has already been used by heterogenous healthcare teams to organize and divide tasks to provide adequate continuity of care to patients. This is why it can effectively be adopted in any disaster situation, especially by international heterogenous healthcare teams responding to disaster. The “WIISARD (Wireless internet information system for medical response in disaster)” can also be used in conjunction with other frameworks like the cloud based mobile systems. This is because it keeps patients’ records and treatment histories which can be transferred to any nearby hospital whenever a patient is transferred. This facilitates the continuity of care for the patients.

After the incidence of Haiti earthquake and Pakistan floods in 2010, several mobile healthcare teams were sent by international organizations, but they did not make significant impact due to their lack of planning and coordination. As a result, the world health organization (WHO) sets up a minimum standard for all international healthcare teams responding to sudden onset disasters. These teams are meant to be guided by the WHO Emergency Response Framework (ERF) which ensures that deployed teams can provide quality and standard care to the affected populations. The Incident Management System (IMS) of the WHO is like the Incident Command System (ICS) approach mentioned in the case of Boston

from our literature review. This approach is very effective because it provides a system of leadership, coordination and planning among responding teams. It facilitates partner coordination and engagement as well as operational logistics and support. It should however be noted that WHO's IMS is more effective in a country with a functioning government where an in-country incident manager will oversee the affairs between the government and the responding healthcare teams.

Although each of the framework may have a few gaps, however, they each have a great deal of potential and opportunity that, if thoroughly thought through, may help to improve care continuity by facilitating cooperation between mobile field hospitals and regional hospitals during disaster response.

CONCLUSION

In the event of a disaster, there is need for the deployed mobile hospitals to collaborate with the nearby hospital to enhance the continuity of care for the affected population. Numerous scholarly works exist regarding enhancing healthcare collaboration; however, they primarily concentrate on institutionalized healthcare systems. We can demonstrate that the highlighted frameworks offer a potential resolution that can be used in disaster response collaboration between regional hospitals and deployed mobile field hospitals. The frameworks could solve healthcare team collaboration issues and improve patient's outcomes during disaster response. The difficulties faced by the American field hospital which led to death of one patient and suffering of two others further emphasize the need to utilize the function of these frameworks for effective healthcare collaboration and continuity of care.

LIMITATIONS

The limitation of our research lies in the literature review, as we only obtained data from open access publication. This could mask some other important frameworks or work that may have similar results as our findings.

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