

high-performance medical container developed by Showa to fill the gap in medical care during a large-scale disaster, especially after the sub-acute stage.

Method: 1) Simulation of the damage to disaster center hospitals in the event of the Nankai Trough Mega Earthquake.

2) To clarify the feasibility of immediate response, a demonstration experiment was conducted by combining and installing ten units of medical containers.

Results: 1) Of the prefectures where the death toll from Nankai Trough Mega Earthquake is estimated to be 5,000 or more, 119 disaster center hospitals located in cities and towns with coastlines were examined to determine if they were in the tsunami inundation zone. The results showed that 44 hospitals, or about 37%, were inundated and their medical functions were likely to be paralyzed.

2) Ten containers of medical treatment rooms, ICUs, CTs, power supplies, and oxygen could be assembled in seven days. This is by far the shortest time compared to the more than two months it takes for a temporary hospital.

Conclusion: It is clear that medical containers can fill the void of medical care in the event of Nankai Trough Mega Earthquake.

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Disaster Education in Hospitals using Metaverse: Focusing on COVID-19

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Introduction: During the COVID-19 pandemic, it became difficult to conduct face-to-face training and practice for disaster medical education. As an alternative to this, it was proposed to build a metaverse world using virtual and augmented reality(XR) technology and implement disaster training education within it. Therefore, the authors investigated the process and effects.

Method: The authors conducted training of healthcare workers through software implementing a metaverse called MediBase and NurseBase, which was created for doctors and nurses in hospitals to respond to disasters such as COVID-19. The trainees were given a practical orientation after basic theoretical education, attached a VR headset, and performed a medical response to a virtual disaster according to their judgment, and the records and debriefing were organized and analyzed.

Results: The satisfaction of trainees with education reached a maximum of 88%. Even in the part where the correct choice was made in the theoretical evaluation, the time was delayed or the wrong choice or behavior appeared in the metaverse practical education and training.

Conclusion: In disaster situations that cannot be implemented identically to reality and most disaster education and training that cannot target actual patients, metaverse-based disaster medical education and training is expected to become a more effective alternative in the future.

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Emerging Technologies for the Early Location of Entrapped Victims Under Collapsed Structures and Advanced Wearables for Risk Assessment and First Responders Safety in SAR Operations, Search and Rescue Project

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Introduction: Natural disasters and catastrophes are challenges faced by emergency services. These are dangerous environments in which there are life-threatening victims as in other CBRN incidents, which can add great risks for nearby populations and the environment. The main objective of this project is the development and testing of new technologies that increase the safety and efficiency of the work of first responders in disasters.

Method: The SnR consortium, with 28 partners, has designed, implemented, and tested new technologies, with an advanced communication and monitoring system for professionals, victims, and other first responders, with innovative positioning and assistance ICT that facilitate the exploration and evaluation of disaster areas.

These technological advances are validated and evaluated with performance, efficiency, and usability indicators, in laboratories and in real working conditions, through a total of seven case studies, in seven different countries, covering a wide range of representative disaster scenarios.

Results: The development of a new communication and monitoring system for professionals and victims, coordinated on the Concorde platform, together with chemical alert sensors, synchronized with smartwatches, smart uniforms, and pediatric immobilizers, are some of the tools tested. The pilots carried out to confirm the usefulness of the 26 technological tools designed and tested in the field, which have helped to reduce the damage and casualties that can occur in S&R operations.

Conclusion: In conclusion, the H2020 European Search and Rescue project (S&R), through the development of new technologies, offers a holistic approach to the effective response to emergencies and provides increased capabilities and resources to first responders in the field, increasing their effectiveness and safety. This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement (No. 882897).

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Using Novel Technologies to Implement Belize's First Formal Prehospital Emergency System

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Introduction: Belize has no formal prehospital emergency medical system, leaving the majority of acutely sick and injured persons overwhelmingly dependent on private transport. To

address this issue, a collaboration of public and non-profit partners worked with the Belize National Fire Service to implement the country's first formal prehospital emergency medical service using novel communications technologies. With new resources and vehicles already donated to the fire service, the collaboration focused specifically on the communications component of the response system, specifically to improve the handling of incoming requests for emergency assistance from the public, as well as to improve the process of dispatching prehospital personnel using readily-available mobile technologies.

Method: Working with the Belize National Fire Service, program partners implemented the country's first emergency communications center, trained new dispatchers, field-tested the dispatch technology through intensive training sessions, and launched the system in the capital district of Cayo.

Results: Launched in June 2022, the program has thus far achieved the following outcomes:

- Active Dispatchers: 26
- Active Responders: 104
- Emergencies Dispatched: 156
- Average Scene Response Time: 7m45s

Conclusion: Over the past year, partner NGOs Trek Medics and Empact Northwest have worked collaboratively to implement a first-ever centralized emergency dispatch system for the Belize National Fire Service, using a novel cloud-based dispatch software running on readily-available mobile phones and mobile. In addition to drastic improvements in response performance, satisfaction among system managers and response personnel is high, with plans currently underway to scale the program nationally.

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Considering the Use of Mobile Medical Containers in the Event of Natural Disasters

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Introduction: In recent years, Japan has been hit by a number of natural disasters including the Great East Japan Earthquake, the Kumamoto Earthquake, the heavy rains in western Japan, and the heavy rains in Kumamoto to name a few. In each of these events, a number of hospitals located within the disaster areas were damaged and ceased to function, leading to difficulties in providing regional medical care. This presentation examines the effectiveness of mobile medical containers in handling such situations in the future.

Method: This study organizes lessons learned from past disasters as well as the merits of and challenges facing current mobile medical containers while looking into the future.

Results: When the Great East Japan Earthquake occurred, assembly-and-installation type temporary health clinics were constructed, but due to the numerous Japanese laws and

regulations, it took almost three months for these to be delivered. On the other hand, current mobile medical containers are already in use in countries such as Tonga and Senegal and have the following advantages: (1) High mobility and easy installation, (2) Expandability as necessary, and (3) Durability for long-term use.

Conclusion: Despite challenges such as clarification of legal handling, electricity, water supply and drainage, we consider mobile medical containers to be effective alternative medical facilities in the event of disasters.

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Flexible Composable Health IT Platforms for Emergency Response

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Introduction: Health information technology, especially electronic health records (EHRs) pose difficult design problems due to the data and workflow complexity, high-stakes stressful nature of healthcare work, variability of information and collaboration needs and stakeholders. Emergency response poses further requirements. We propose a different, novel approach in which flexible 'building block' platforms composable by non-programmers could address rapid implementation and sharing of new functionality as needed at the point of care. In order to truly meet unpredictable emergency needs a philosophy of maximal flexibility and data comprehensiveness is required.

Method: Existing technologies were used in new ways to permit prototype design of composable health IT platforms, intended to be added to existing health information systems, allowing nonprogrammers (including clinician end users) to assemble any desired data, visualization, and new logic to permit rapid tool deployment in emergencies. An example is the rapid composition of Covid-19 screening and treatment tools (in minutes) for fast implementation of new screening and care guidelines (as happens in a new epidemic), with usable visualization and decision tools.

Results: Prototype systems were successfully built and configured for rapid tool creation for pandemic-specific needs including setup of automated screening and decision tools using EHR data plus point of care data gathering. These will be demonstrated. A modular, composable approach is usable by non-programmer clinicians, permitting those most familiar with rapidly changing clinical needs and guidelines to implement new health IT functionality directly instead of incurring delays typical when IT staff must do ad hoc programming. At this time new initiatives and mandates for health IT interoperability make this more easily doable than previously.

Conclusion: Disaster response may be facilitated by a different approach to health IT design and use, with advantages for rapid response, streamlining clinician work, and ease of use.

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