included ALS Emergency Vehicles and support for main events.

The plan addressed satellite events with varying populations. Health care responses were organized into three levels: aid stations and mobile teams from Pilgrim support and the Portuguese Red Cross; Advanced Medical Posts; and EMT Type 1. Rigorous record-keeping covered admissions, clinical records, vaccination forms, birth certificates, death verifications, informed consents, narcotics controls, and personal belongings.

The response mobilized 500 staff, 124 mobile teams, 94 first aid sites, 4 EMT Type 1, 17 Advanced Medical Posts, and 7 "Calm" tents. This effort assisted 4376 patients within WYD sites, 253 outside, and 153 were evacuated to hospitals.

Conclusion: Key lessons from WYD2023 include the importance of collaborative planning from local to national levels, meticulous record-keeping, diverse logistical and operations levels, and establishing a WHO-classified EMT-based response. Flexibility and dynamic planning were essential for adaptability, and psychological support was integrated across all areas.

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Crowd Simulation Models for Enhanced Mass-Gathering Medical Response: A Practical Application

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Background/Introduction: The ability to predict a dynamic crowd response during Mass Gatherings may improve medical access and egress in a mass casualty incident. Validated models that accurately anticipate the chaos and crowd flow are not readily available. Recent advances in machine learning for crowd simulation offer an under-explored opportunity to improve emergency response strategies.

Objectives: Train a crowd simulation model on video data and prove validity by comparing its predictions to an actual crowd-egress event.

Method/Description: A physics-based Social Force Model was used to simulate crowd movement. The model considers obstacles and other pedestrians in trajectory prediction, seeking best to estimate crowd density rather than individuals' positions. Four parameters– maximum speed multiplier, motivation factor, social force factor, and obstacle repulsion factor –were found to be meaningful when comparing simulations to known pedestrian video. These parameters were optimized using an evolutionary algorithm to predict crowd response to an actual bomb scare in Times Square. A convolutional neural network model, CSRNet, was used to analyze crowd density frame by frame from an actual video for comparison.

Results/Outcomes: Predicted density heat maps were compared to the video, demonstrating a realistic simulation of crowd egress. The pedestrians filter similarly in the prediction model and the ground-truth video. Divergence is mainly noted in the upper portion of the image, accounted for by the fact that the model currently does not adjust for additional population to enter the frame.

Conclusion: This study marks a significant stride in demonstrating the potential of machine learning in crowd-egress prediction using video data.

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Impact of Regular Short Term Humanitarian Missions: A Qualitative Case Study in Uganda

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Background/Introduction: Since the first documented medical mission of Doctor Peter Parker in 1834 to China, the practice and study of medical missions have gained prominence. Despite the increasing prevalence of medical missions, significant ambiguity surrounds their definitions, benefits, and challenges.

Objectives: This study investigates the effectiveness of regular Short-Term Humanitarian Missions (STMMs) focusing on the Mission of Hope (MoHope) III conducted in the Kyangwali refugee settlement in Uganda.

Method/Description: A qualitative case study approach was employed, utilizing semi-structured interviews and focus group discussions (FGDs) to gather insights from participants, including volunteers and beneficiaries. Data collection adhered to the Standards for Reporting Qualitative Research (SRQR), and thematic analysis was conducted using Clarke and Braun's approach. Ethical considerations were strictly followed, ensuring participant confidentiality and informed consent.

Results/Outcomes: Analysis of data from 16 participants revealed six emergent themes: barriers (financial constraints, health information flow, infrastructure, etc.) benefits (quality improvement, capacity building, etc.), doubts (sustainability, patient rights, etc.), requirements (decolonization, training, etc.), and new paradigm. Participants highlighted significant

obstacles that hinder the effectiveness of STMMs, while also recognizing the added value these missions provide to local healthcare systems.

Conclusion: Regular STMMs, such as MoHope III, can enhance healthcare delivery in low-resource settings, but face numerous challenges that must be addressed for sustained impact. Recommendations include improving infrastructure, ensuring better financial support, and fostering local staff training. This study contributes valuable insights into the complexities of implementing effective STMMs in similar contexts, contributing to the broader discourse on the efficacy and sustainability of short-term medical missions.

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EMT Warehousing Solutions in the Pacific Island Countries and Areas: Addressing System and Infrastructure Challenges to Enable Emergency Deployments

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Background/Introduction: Emergency deployment readiness relies on fit-for-purpose warehousing management, a capability that is often under-resourced. Since 2017, WHO has collaborated with 13 Pacific Island Countries (PICs) to establish national Emergency Medical Teams (EMTs). Warehousing EMT supplies can be a challenge due to inadequate storage facilities leading to storing EMT cache in multiple locations, suboptimal tracking, and maintenance.

Objectives: To describe an agile EMT warehousing strategy in the Pacific for rapid mobilization for health emergency response.

Method/Description: WHO has worked with colleagues in PICs on national EMT cache storage, tracking, and maintenance. The warehousing system needed to match available storage solutions in hot, humid climates. An inventory management system was designed for ease of use for national EMT logisticians with small support staff.

Results/Outcomes: WHO logisticians created a two-fold solution for national EMT warehousing: an EMT-focused stock report system and a semi-mobile storage solution. The system automates stock tracking with regular warehousing features while also offering deployment history tracking with a three-color tier coding system of stock readiness for deployment. Complementing the stock tracking is a shipping container, refitted into a modular storage room, which provides a secure, relocatable solution.

Conclusion: Effective EMT warehousing is central to rapid and quality deployments. Continued work is necessary to improve EMT warehousing in PICs and explore its applicability to other low—and middle-income country EMTs. Solutions must be tailored to local contexts, and resources allocated to ensure efficiency and sustainability. The experience in the Pacific with innovative warehousing solutions can be adapted by other national EMTs in low-resource settings.

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The Role of Information Management and Minimum Data Set in Disaster Response

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Background/Introduction: This study explores the role of Information Management (IM) in disaster management, through the use of the Minimum Data Set (MDS). The International Search and Rescue Advisory Group (INSARAG) Asia-Pacific Regional Earthquake Response Exercise (ERE) and the Project for Strengthening the ASEAN Regional Capacity on Disaster Health Management (ARCH Project) have provided platforms for such exploration. As an exercise controller, my involvement has focused on supporting the EMTCC from the IM perspective.

Objectives: The primary objective was to evaluate the effectiveness of IM, through MDS, in supporting EMTCC during disaster response exercises and actual disaster scenarios.

Method/Description: Participation in regional collaboration drills and real-world disaster scenarios provided insights into IM practices. Key activities included supporting EMTCC during exercises, assisting the Moldovan government and WHO regional office affected by the 2022 Russian invasion of Ukraine, and collaborating with WHO's regional office (EMRO) for Palestinian support in 2023. IM support involved data collection, situation analysis, and the ongoing provision of off-site support for MDS implementation.

Results/Outcomes: The exercises and real-world engagements demonstrated significant growth in national EMTs' capabilities and highlighted the critical role of IM. The MDS-supported IM processes effectively facilitated data collection and analysis, enhancing coordination and decision-making.

Conclusion: Ongoing training and support for EMTCC through IM are vital for effective disaster response. The study underscores the importance of structured IM in improving disaster management and the operational readiness of EMTs. Future efforts should continue to focus on refining IM practices and enhancing data management capabilities to ensure robust responses to health emergencies.

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