the implementation of blood transfusion protocols, the use of Low Titre O Whole Blood (LTOWB), and the development of Clinical Practice Guidelines (CPGs) for DCR. Data and observations from various medical personnel and organizations involved in the Ukrainian conflict are utilized.
Results: The analysis highlights the essential role of blood transfusion in improving soldier survivability in modern warfare. It identifies significant limitations in the Walking Donor Program and underscores the importance of LTOWB. Innovative medical strategies adopted in Ukraine, such as the use of portable ultrasound devices and drones for blood delivery, demonstrate the adaptability required in LSCO environments. The study also emphasizes the need for improved training, equipment, standardization, and strategies to enhance medical readiness and combat effectiveness.
Conclusion: The findings underscore the need for a unified approach to blood transfusion protocols and the development of adaptable DCR strategies. Enhanced support and collaboration among NATO and partner states are crucial for expanding access to blood products and improving prehospital care in LSCO scenarios. The experiences from Ukraine offer valuable lessons for modernizing military medical care to reduce preventable morbidity and mortality.

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Antidote Response Network

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Introduction: The Antidote Response Network (ARN) strengthens local preparedness and response to a chemical incident by addressing local antidote availability, placement, mobilization, and rapid delivery from pharmacies to an incident area. The ARN comprises entities with antidotes (e.g., hospital pharmacies) and pushes their real-time inventory to be securely received, stored, and accessible by an honest broker (e.g., poison information center). When a chemical mass casualty incident requiring urgent antidote response occurs, the entity urgently needing an antidote notifies the honest broker, the honest broker alerts all ARN members of the need for antidote, and members mobilize and deploy the requested antidote. The honest broker coordinates antidote pick-up and delivery to the incident area, necessitating the development of technological platforms that can accommodate these requirements.
Methods: A secure web-based and smartphone platform was developed to receive and store automated real-time ARN pharmacy antidote inventory uploads that can be accessed by an honest broker and can notify ARN pharmacies of a chemical mass casualty incident requiring urgent antidote response.
Results: Pharmacy-based antidote inventories were successfully interfaced with a secured server, accessible by an honest broker as well as an operationalized smartphone platform that sends alerts to ARN members verified by the honest broker.
Conclusion: The ARN web-based and smartphone platform allows honest brokers rapid access to pharmacy antidote assets and locations, alerts ARN members of a chemical mass casualty incident requiring urgent antidote response as well and coordinates antidote pick up and delivery to the incident area of need.

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Flood Risk Reduction Using a Flood Vulnerability Index

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Introduction: Floods are among the most frequent and destructive disasters globally, posing significant threats to human life, infrastructure, cultural and environmental heritage, and economic activities. The impact of floods is expected to grow due to climate change, population growth, and economic factors. Effective flood risk management involves assessing three key components: the hazard, exposure, and vulnerability. While understanding of hazards and exposure has improved, the terminology and methodologies for assessing vulnerability remain in development.
Methods: This study focuses on evaluating the flood vulnerability level in municipalities of Mazovia Province, Poland, using a flood vulnerability index and open-access data. Research was conducted in municipalities identified as flood hazard areas (fluvial floods) with a 1% probability of occurrence.
Results: The total flood vulnerability index of municipalities showed that the municipality of Wyszków had the greatest vulnerability, which stems from its highest exposure indicator, its high lack of resilience level, and its low level of susceptibility. The proportion of individuals with non-Polish nationality is relatively low in this area. Additionally, the percentages of people living in hardship, older individuals, and women are moderate compared to other municipalities.
Conclusion: Municipalities, where vulnerability is mainly influenced by exposure, should implement spatial policies that limit land use within flood hazard areas. In areas where susceptibility significantly influences flood vulnerability, it is crucial to educate residents on how to protect themselves from flooding and to inform them about appropriate behaviors during a flood. Municipalities with low resilience should invest in the necessary manpower and equipment for effective rescue operations, facilitate a swift return to normalcy, and increase funding for civil protection efforts. Additionally, they should assess whether the number and availability of emergency services (such as firefighters) align with the population size and distribution.

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Optimizing Emergency Responses for Self-Evacuation in Flood-Prone Regions of Poland: A Traffic Modelling Approach

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Introduction: Floods rank among the most frequent and destructive natural disasters globally, presenting severe threats to human life, infrastructure, and economic stability. In Poland, existing flood risk management strategies often neglect the complexities of self-evacuation, particularly in areas with a 1% annual flood occurrence. This study seeks to fill this gap by evaluating the effectiveness of self-evacuation via private vehicles in flood-prone regions, aiming to enhance emergency response strategies and mitigate the adverse consequences of flooding.

Methods: A comprehensive four-step traffic modelling approach was applied to simulate self-evacuation in flood-prone regions. The model integrated national traffic flow data alongside responses from questionnaire surveys conducted among residents in flood-risk areas across Poland. By utilizing Geographic Information Systems (GIS) and traffic engineering tools, a high-resolution network model was developed, encompassing both main and local roads to provide an accurate assessment of traffic distribution. The analysis considered various scenarios, including pre-flood and during-flood conditions, with or without existing commuter traffic, and evacuation travel time thresholds of eight and 15 minutes to designated shelters.

Results: The analysis showed that evacuating before a flood is more effective than during the flood, as a larger portion of the population can reach safety within the set travel time limits. Evacuation routes were significantly hindered by limited road capacity, bottlenecks, and natural barriers, especially under active flood conditions. The model identified key sections of the road network at risk of congestion during evacuation and offered valuable insights into the efficiency of shelters at different time intervals.

Conclusion: Effective flood risk management in Poland requires integrating self-evacuation strategies with advanced traffic modelling. This study emphasizes proactive evacuation planning and stronger infrastructure resilience to reduce flood impacts. Key recommendations include optimizing evacuation routes and improving communication for timely evacuations.

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Declining Willingness to Work Under Radiation Exposure: An 8-Year Follow-up Study of Healthcare Workers Near a Nuclear Power Plant

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Introduction and Background: Healthcare facilities near nuclear power plants face potential staffing challenges during nuclear accidents due to radiation exposure risks. Four years after the Great East Japan Earthquake, in 2015, we surveyed hospital staff working 11km from a nuclear power plant. 90.8% of respondents indicated willingness to work within national radiation dose limits, and 36.4% were willing to work under conditions reaching 100 mSv cumulative exposure. We conducted a follow-up survey at the same hospital eight years later.

Methods: In January 2024, we surveyed staff at a hospital near a nuclear plant regarding their willingness to work under three cumulative radiation exposure levels: 1 mSv, the standard dose limit for radiation workers in Japan, and 100 mSv. The standard annual dose limit for male radiation workers is 50 mSv, while it is 5 mSv per three months for female workers. Respondents indicated whether they were willing, unwilling, or uncertain about working under each exposure level.

Results: The survey had a response rate of 90.2% (358 out of 397). Among respondents, 46.4% (n=166) were willing to work under 1 mSv exposure, 38.5% (n=138) under 50 mSv, and 28.5% (n=102) under 100 mSv. Compared to 2015, Chi-square tests indicated significantly lower acceptance rates across all exposure levels (χ^2=187.4, p<0.001).

Conclusion: Hospital staff near nuclear power plants are essential for patient care and evacuation during nuclear incidents. However, many staff members expressed reluctance to work, even at low exposure levels (1 mSv). Enhancing staff preparedness requires improved risk communication and organizational measures to protect staff from radiation exposure, ensuring an effective response in future nuclear disaster scenarios.

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