| Linear Growth Curve Multilevel Modeling Results | | | | | |
|---|---|---|---|---|---|
| Module | N Attempts | N Participants | Range of Attempts | Intra-class Correlation | Intercept (Fixed Effect) |
| M1: Planning | 11010 | 5760 | 1-54 | 0.22 | 62.16*** |
| M2: Triage | 7755 | 5647 | 1-29 | 0.23 | 70.41*** |
| M3L Age-Specific Care | 8395 | 5603 | 1-20 | 0.21 | 60.28*** |
| M4: Disaster Management | 10747 | 5577 | 1-43 | 0.34 | 71.09*** |
| M5: Emergency Code Response | 6208 | 5567 | 1-16 | 0.27 | 80.11*** |

| | Intercept Variance (Random Effect) | Slope (Fixed Effect) | Slope Variance (Random Effect) | Role Difference (Fixed Effect) |
|---|---|---|---|---|
| M1: Planning | 127.69*** | 1.84*** | 0.86*** | 16.24*** |
| M2: Triage | 117.05*** | 0.97*** | 0.07 | 13.25*** |
| M3L Age-Specific Care | 122.91*** | 0.59*** | 0.06 | 15.27*** |
| M4: Disaster Management | 123.54*** | 3.77* | 0.28** | 12.62*** |
| M5: Emergency Code Response | 64.60*** | 6.40* | N/A (Constant Slope) | 10.95*** |

**Table 1.** Linear Growth Curve Multilevel Modeling Results. *Significant effect at $P < 0.05$; **Significant effect at $P < 0.01$; ***Significant effect at $P \leq 0.001$

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## A Pilot Study to Assess Whether the Public can Achieve Consensus on Patient Prioritization with Allocation of Scarce Resources during a Catastrophic Pandemic

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**Study/Objective**: To ascertain the lay public's choice as to which of three critical case-scenarios should receive the only ventilator immediately available during a catastrophic, like the 1918 pandemic.
**Background**: The medical/ethical literature continues to prepare the medical community about patient prioritization and allocation of scarce resources issues during a pandemic like 1918. There remains no consensus about what ethical framework to adopt and which tactical markers (ie, physiologic or demographic) to employ when critically ill patients require the same few resources.
**Methods**: An IRB-approved survey was developed and presented to a convenience sample of the general public. It contained a previously-published, validated pandemic case scenario involving three patient-cases, all of whom were critically ill and requiring the only ventilator available. Specific demographics and SOFA (Sequential Organ Failure Assessment) scores differed for each patient. Survival estimates based on the SOFA scores were provided assuming each patient received optimal ICU management.
**Results**: There were 39 lay public individuals in the pilot study. The case selected by the study group for the only ventilator was #1 (young female overdose): 22 (56.4%); #2 (geriatric acute vascular crisis): 1 (2.6%); and #3 (septic, middle-aged male): 15 (38.5%). The factors they considered for their selections, in descending order, were SOFA score, age, Glasgow Coma Score, pregnancy status, and dependents. Noteworthy is that Case #2 had a better chance of survival than patient #3 based on SOFA scores (ie, 50% survival vs 30% survival) and yet received only one vote for the ventilator.
**Conclusion**: These results validate the authors' hypothesis that the general public will not achieve consensus regarding patient prioritization during a catastrophic, resource-poor pandemic. Should future studies verify this data, it should sound an alarm that public education on this subject is essential to avoid, at the very minimum, loss of confidence in the health care infrastructure.

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## Hierarchical Task Analysis as a Method to Support Emergency Response Planning

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**Study/Objective**: The objective of the current work was to use the Hierarchical Task Analysis (HTA) method to support the process of planning the emergency response to a train accident in cold climate and inaccessible terrain. The HTA was used in order to 1) capture essential and critical tasks in a structured manner, 2) to facilitate group workshops, and 3) to identify potential problem areas and pitfalls.
**Background**: HTA is a type of task analysis that focuses on the overall goal of a complex activity. It proceeds to deconstruct the complex activity into subgoals needed to reach the overall goal, and subgoals to those subgoals, etc., through multiple iterations down to specific simple tasks or actions. HTAs are often the foundation for more complex analysis, such as human error or situation awareness analysis.
**Methods**: Three workshops were conducted with regional stakeholders (eg. rescue services, hospitals, ambulance services, police, etc.). The purpose was to construct new emergency response plans to train accidents in the region. An observer participated in the workshops to collect the data necessary for the HTA. Additional observations were conducted during a train accident training course for emergency services personnel, to incorporate more specific tasks into the HTA.
**Results**: The three main subgoals recognized in the HTA were 1) mobilizing resources, 2) establish efficient accident site

management, and 3) saving lives at the accident site. Each subgoal included 20 to 29 additional subgoals at up to eight different levels, with associated specific tasks and plans.
**Conclusion**: The HTA provided a unified structure for the complex task of responding to a major train accident in cold climate and inaccessible terrain. One specific benefit of the HTA was that it provided an overview of organizational interdependencies, and can serve as a tool when developing and streamlining response plans to major incidents.
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## Hospital Disaster Victim Registration: A National Standard in Belgium

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**Study/Objective**: Development of a National standard for victim registration.
**Background**: During disasters, hospitals are overwhelmed with questions about potential victims, one of the most disturbing elements during the initial response phase. However, there is a need for early and accurate victim information for the relatives about identification, hospital location, and severity. The Belgian authorities took the initiative to develop and test such a system in a pilot hospital.
**Methods**: The study used a mixed-method design. Initially, a structured questionnaire was developed and sent to all EDs of the Flemish part of Belgium. Out of the questionnaire responses, an exchange disaster victim identification system was distillated. The feasibility of this system was tested in a pilot hospital using a command post exercise. The qualitative part consisted of semi-structured interviews to analyse the structure and actions of the hospital staff within the system.
**Results**: The response rate to the questionnaire was 75%. The awareness of the need of such a system was extremely high - high (x - y): ED head nurses (68% - 30%), disaster coordinators (62% - 22%), ED nurses (44% - 42%), emergency physicians (24% - 38%), and other ED personnel (16% - 38%). A command post exercise demonstrated the feasibility of the developed standardized exchange disaster victim identification system. These structures need sufficient and additional personnel; the observations and interviews provided evidence that there is still room for process improvement.
**Conclusion**: There is a need for a standardized national disaster victim identification system, adapted to the context of hospitals. A national partnership was developed concerning such a system with standard guidelines and usable registration tools. The collaboration agreement will be effectively implemented in all Belgian hospitals. Testing this national system at a pilot hospital was an important step in creating this generic document for Belgium.
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## Disaster Response Coordination among Disaster Management Organizations in Modern Cities: The Case of Nairobi County, Kenya

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**Study/Objective**: To assess disaster response coordination among disaster management organizations in Nairobi County in the last five years, identify factors affecting, and establish ways of improving disaster response coordination in Nairobi County.
**Background**: Disaster response coordination ensures access to core information and efficiency of response actions among responding organizations. This helps mitigate against morbidity and mortality that result following disaster events. However, coordination has remained a significant problem during and after each disaster. In Kenya, frequency of disasters has heightened with observable response coordination challenges among the several disaster management agencies specialized in various fields.
**Methods**: We carried out a cross-sectional study that utilized quantitative and qualitative methods among disaster management organizations in Nairobi County, Kenya. All of the 71 organizations providing ambulance transport, fire-fighting, security, health services, rescue and media were recruited. A respondent drawn from an organization provided information on a self-administered semi-structured questionnaire. Quantitative data was analyzed on SPSS Version 20.0, while qualitative was analyzed thematically. Deductions were drawn from frequencies and proportions of the findings and presented as narrative, tables and figures.
**Results**: Organizations included media houses, air ambulances, military and humanitarian organizations such as the Kenya Red Cross and St. John's Ambulance, that had a broad approach to response. Majority, 46 (75.4%), reported interrelating with experience of in-optimal response (53.2% responded to <10 out of 27 listed emergencies). Factors that affected coordination included age of organizations $\times 2\,(1) = 5.031$, $P = 0.025$, inter-communication $\times 2\,(1) = 34.252$, $P < 0.001$), presence of emergency response policy $\times 2\,(1) = 15.149$, $P < 0.001$) and knowledge sharing $\times 2\,(3) = 12.921$, $P = 0.005$). To improve coordination, they indicated the need to improve success factors such as positive public response, inter-cooperation, enhanced government role, participation of Non-Governmental Organizations and a fair command system. Others were to prioritize disaster operations by continuous integration and synchronization of disaster plans, symposia and funding.
**Conclusion**: Organizations had limited inter-relationships with nonoptimal response to emergencies. A major factor was lack of guidelines. There is need for the organizations and county governments to initiate an overall forum, to hold symposia for stakeholders and to draw coordination standards and guidelines. Further research is needed to determine if regular inter-organizational cooperation would improve disaster response coordination in Nairobi County.
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