

This paper addresses education and training as the effective modalities that tangibly enhance disaster medical preparedness and response.

**Methods:** A disaster preparedness educational program designed to provide opportunities for education and training and that will increase preparedness and resilience to all types of hazards will be described in this study. This program, aimed at all students irrespective of their specialization, is presented to more than hundreds of thousands students every year throughout the country. Well-trained students are encouraged to register into organized teams prior to an emergency event.

**Results:** The experience shows that students involved in disaster preparedness educational program have an advantage over the others in facing disasters. They are capable of initiating immediate assistance, and providing simple but life-sustaining care until the attendance of professional healthcare personnel.

**Conclusions:** The presenters conclude that early involvement of well-trained students, registered through organized teams into national disaster plans, could enhance a nation's capacity to handle mass-casualty events and mitigate potential losses. This approach might be particularly useful in a future pandemic event.

**Keywords:** disaster medical preparedness and response; education and training

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### Comparison of Two Non-Invasive HbCO Portable Measurement Devices

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**Introduction:** Treatment of carbon monoxide (CO) poisoning is guided by clinical signs and by carboxyhemoglobin (HbCO) level. A "classical," non-invasive portable device for HbCO measurement, using exhaled air analysis was compared to a new device based on infra-red spectrophotometry technique Masimo Rad-57, which seems to be more ergonomic. This new device was tested to see if it better answered the user's expectations.

**Methods:** The two non-invasive devices were used simultaneously with suspected CO poisoned patients and managed by prehospital medical teams. Fifteen users, doctors, and nurses, answered a questionnaire evaluating the new device compared to the older device, considering ergonomic, setup, handling, response time, measurement reliability, and general feeling. Proposed answers were: much lower; lower; identical; greater; and much greater.

**Results:** The new device (Masimo Rad-57) has been judged greater or much greater by 47% of the users for the children, by 60% for the non-cooperative patients, and by 53% for the unconscious victims. Of those surveyed, 87% consider the response time faster or much faster. All together, one-third of the responders evaluated the new device identical as the older, one-third superior, and one third much superior.

**Conclusions:** The new Masimo Rad-57 non-invasive HbCO measurement device based on spectrophotometric technique allows faster measurement compared to exhaled-air analysis, and give a chance to perform measurement on

non-cooperative patients, which are inaccessible to the conventional method.

**Keywords:** carboxyhemoglobin; detection; device

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### Measurable Performance Indicators for Management in Civilian Disaster Medicine and Military Medicine

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**Introduction:** Measurable performance indicators have proven to be a useful tool for evaluation and quality control of management in major incidents and disasters. It also is possible to apply indicators in military medicine training. The aim of this study is to demonstrate the possibilities when using a method of a structured and defined process in which the same evidence-based indicators could be used throughout the whole process.

**Methods:** Indicators have been developed for: (1) prehospital command and control; (2) hospital management; (3) strategic management; (4) staff procedure skills; (5) full-scale exercises; (6) pedagogic skills; and (7) military training. The same indicators were measured and studied throughout the entire process from first the pilot study via education and implementation, to the application in real incidents.

**Results:** Five years passed before results from real incidents could be obtained from the first pilot study. This method shows that evidence based indicators can be used throughout the entire process of education, implementation, and into real-world situations. The method is a tool for creating new knowledge which can be used for evaluation and quality control of real incidents.

**Conclusions:** Measurable performance indicators provide one way to systematically implement knowledge from evidence through education and training into evaluation and quality control of real incidents. This method also can be applied in military medicine.

**Keywords:** disaster medicine; education; implementation; performance indicators

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### Assessment of the Regional Capabilities in Mass-Casualty Incidents

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**Introduction:** The preparation for mass-casualty incidents is one of the major tasks of a healthcare system. A methodology based on the utilization of GIS modeling methods to fuse infrastructure, demographic, and risk sources data with a logistic simulation based on standard operation procedures and tactics of emergency services is recommended for mass-casualty incidents.

**Methods:** Synthesized maps provide visualization of regional medical capabilities to cope with a mass-casualty incident with a high number of casualties. As an input, the simulation utilizes data from GIS (classified road and street network, locations of the medical facilities), and estimated types and number of casualties and available medical

resources according to a given scenario to calculate the time needed to cope with a major incident in a specified point in the territory. The procedure is repeated for all of the defined points—risk locations in the area of interest.

**Results:** The result is a capability map—a map layer covering the territory and containing color-coded information on the capability of the territory to absorb the estimated number of casualties in a given time period.

**Conclusions:** The methodology allows for identifying which gaps must be solved, e.g., by improving management of resources or creating new resources within the territory. The statistical analysis enables an evaluation of changes in the system settings.

**Keywords:** GIS; mass-casualty incident; simulation  
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