| **Author, Year** | **Strategy** | **Mass Casualty Context** | **Innovation** | **Description** | **Results** |
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| Bouman, 2000123 | Optimize resource use | All-hazards | Information technology | Register patients using a bar code to facilitate patient flow | The patient bar system has been in effect in the Netherlands since the late 90s. It has had positive effects on the Major Incident Management Plan and has reduced registration errors. |
| Curtis, 2008122 | Optimize resource use | All hazards | Information technology | Use of the SMART (Scalable Medical Alert Response Technology) to monitor unattended patients (exercise) | An initial evaluation in the ED via a pilot and a city-wide disaster drill showed promise. Future plans include modification of algorithms to reduce number of false positives and increasing integration of the system within the ED. |
| Dan, 2009112 | Optimize resource use | Earthquake | Imaging | Use ultrasonography as a key triage tool (actual event) | Ultrasonography was used during the Wenchuan Earthquake. It played an important role in the triage of earthquake victims, provided accurate and timely diagnosis of closed injury, bedside examination of severe cases, and interventional treatments. |
| Gunawan, 2009121 | Optimize resource use | All-hazards  | Information technology | Use of a simple navigation aid for the walking wounded (simulation) | Use of an arrow-pointing prototype device provides sufficient guidance for the walking wounded to reach the targeted destination, sparing first responders as escorts. |
| Jokela, 2008120 | Optimize resource use | All-hazards | Information technology | Use of Radio Frequency Identification (RFID) technology to provide online triage system for mass casualty | A simulation exercise demonstrated that use of RFID is feasible for use in the field. |
| Körner, 2009115 | Optimize resource use | All-hazards  | Imaging | Use of a CT triage protocol for MCIs (simulation) | Results from 2 large scale exercises demonstrated that a CT triage protocol was feasible and produced similar findings among the exercises conducted. |
| Levy, 2010125 | Optimize resource use | All-hazards | Information technology | IT- hospital administration system, EMR, picture archiving and communication system | IT, including EMR, is feasible in a field hospital operation. |
| Ma, 2007114 | Optimize resource use | All-hazards | Imaging | Utilization of ultrasound as a triage tool to aid clinicians in rapid screening (simulation) | Ultrasound imaging is feasible and may be applied to MCIs. |
| Malik, 2004116 | Optimize resource use | Trauma | Triage tool | Use of multiple scoring systems in the triage process | Triage effectively accomplished at 3 levels using 3 different scoring systems (e.g. on site "Triage sieve", at the primary health care center "field categories of trauma patients", tertiary referral center "Advanced Trauma Life Support" (ATLS) secondary survey"). |
| Mazur, 2009113 | Optimize resource use | Hurricane | Imaging | Use of ultrasound by DMATs as a MCI triage adjunct (Actual event) | US is feasible to use in MCI and can assist in triage decisions. |
| Nilsson, 2008128 | Optimize resource use | All-hazards | Training | Educational tool that links resource allocation decisions to patient outcomes  | Pilot study conducted as part of a national training program. |
| Okumura, 2007117 | Optimize resource use | Chemical | Triage tool | Triage and decontamination with colored clothes pegs (CCP) (simulation) | Effective use of CCP for triage and decontamination in a drill. |
| Probst, 2008118 | Optimize resource use | Cemical, explosive | Provider coordination | Medical Rescue Task Force that combines hospital rescue and ambulance staff to support care at an initial care hospital | In the course of three separate exercises, the protocol was shown to be highly efficient. |
| Roth, 2009126 | Optimize resource use | All-hazards | Information technology | Web based healthcare related all hazards electronic disaster manangement system (simulation) | Describes the tool and its potential uses. |
| Urban, 2007127 | Optimize resource use | All-hazards | Information technology | Automated call-down system to mobilize staff during MCE | In two tests, up to 50% of all workers could be reached (up to 18% could report in under 30 minutes; up to 32% could report within 60 minutes). Among trauma room team members, up to 53% could be reached (up to 21% could report in under 30 minutes; up to 36% could report within 60 minutes).  |
| Young, 2006124 | Optimize resource use | Infectious disease | Information technology | Web-based triage tool for bioterror or ID outbreak (simulation) | Safely reduces the number of clinical positions in managing the Point-of-Dispensing (POD). |
| Zhao, 2006119 | Optimize resource use | All-hazards  | Information technology | Use of a portable tool by first responders in documenting and communicating triage of victims (e.g. TACIT software) (simulation) | Two field trials verified that a portable tool could efficiently work in prehospital response e.g. reduced triage collection time, improved collection accuracy. |
| Albanese, 2007153 | Augment resources | Radiological | Load sharing | Establisment of a Biodosimetry Laboratory in Connecticut for surge capacity  | Identified 30 of 32 labs qualified and willing to perform initial biodosimetry processing. Additionally a functional exercise involving a subset of these labs and their technicians was conducted with promising feedback. |
| Baldwin, 2006143 | Augment resources | Hurricane  | Mass transfer | Can the mass interstate transfer of pediatric patients be accomplished during a hurricane? (acutal event) | Despite successful interstate transfer of pediatric patients, there remains a need for planned regionalization of children's services. |
| Barillo, 2010137 | Augment resources | Burns | Response teams | Use of Special Medical Augmentation Response Teams-Burn for rapid ICU expansion (actual event) | Description of a method for and lessons learned from creating a temporary burn center  |
| Björnsson, 2008140 | Augment resources | Tsunami | Mass transfer | Conversion of a charter plane to mass transport patients (actual event) | Alterations of a Boeing 757-300 in 2 days to accommodate 18 patients on stretchers and 78 seated passengers was deemed a success with regard to safe transport from Thailand to Sweden. |
| Chen, 2009141 | Augment resources | Earthquake  | Mass transfer | Trans-province transfer of patients (China - actual event) | Successful trans-province transfer of 10,373 patients (no casualties) |
| Chung, 2011139 | Augment resources | All-hazards | Load sharing | Use of pediatric alternate care site during 2009 H1N1 pandemic | On the days the ASC was open, the mean ED volume was 42% greater than the baseline rate for the same period in the prior year. There wereno adverse reports concerning the ASC filed, and none ofthe patients who returned for evaluation within 72 hours wereadmitted to the hospital. |
| Cryer, 2009144 | Augment resources | All-hazards  | Load sharing | Use of a trauma system structure during multicasualty events (actual events) | The Medical Alert Center for Los Angeles County can coordinate the distribution of casualties among the hospitals serving the region (e.g. most critical patients triaged to level 1 centers) |
| ECRI Institute, 2009132 | Augment resources | All-hazards | Mechanical ventilation | Use of automatic gas-powered resuscitators (AGPRs) for respiratory support in MCI as an alternative to ventilators | AGPRs do not have all features needed for full respiratory support. Usefulness and limitations of APGRS discussed |
| ECRI Institute,2008133 | Augment resources | All-hazards  | Mechanical ventilation | Use of automatic gas-powered resuscitators (AGPRs)for respiratory support in MCI as an alternative to ventilators (simulation) | Conclude that the respiratory needs of most pt in a MCI will exceed what AGPRs can provide.  |
| Epstein, 2010151 | Augment resources | All-hazards | Communications | Text messages for staff recall (simulation) | Successful test of system to rapidly mobilize staff. Text messaging is simple, inexpensive, and easy to implement |
| Fuzak, 2010142 | Augment resources | All-hazards | Mass transfer | Mass inpatient pediatric transfer using parallel circuits - actual event (nondisaster) | Successful transfer of 111 pediatric pts (64 critical) with no adverse outcomes. Describe pediatric considerations and equipment, lessons learned |
| Gao, 2008149 | Augment resources | All-hazards | Information technology | Use of miTag (medical information tag) to track patients throughout the disaster response process (simulation) | Two separate pilots demonstrated feasibility of the miTag in terms of increasing patient care capacity in the field as well as successful transfer of information within radio-interference-rich settings. |
| Hamilton, 2003146 | Augment resources | All-hazards | Information technology | Institute a Web based tool - a mass casualty tracking system- to help reduce the amount of confusion at a MCI (simulation) | The alpha test of the Emergency Patient Tracking System (EPTS) demonstrated that it is possible to coordinate efforts and reduce confusion during MCIs. |
| Hammer, 1996154 | Augment resources | All-hazards | Devices | Use of unilateral external fixation device for stabilization prior to major surgery | The device allowed soft tissue recovery in nearly all cases. |
| Hanley, 2008136 | Augment resources | All-hazards | Mechanical ventilation and cross-training | Implementing a program that trains non-respiratory therapists to assist in providing mechanical ventilation (Project XTREME (Cross-training Respiratory Extenders for Medical Emergencies)) | Pilot testing of Project XTREME demonstrated that evaluated individuals could successfully complete training based on cognitive and performance scores. |
| Jacobs, 2006145 | Augment resources | Explosive | Information technology | Web application designed to be the primary communication and resource management tool during a terrorist event or public health emergency (simulation) | State of CT participated in a DHS exercise. The web application was successfully implemented to assess surge capacity and other resources. |
| Killeen, 2006147 | Augment resources | All-hazards | Information technology | Wireless handheld device with an electronic medical record (EMR) for use by rescuers responding to MCEs (simulation) | Records real-time data electronically for simultaneous access by providers and incident command. |
| Körner, 2010152 | Augment resources | All-hazards | Communications | Use of electronic call down system for radiology staff during an MCE | Successul test of system. Automated alarm procedure might be helpful and testing allows for estimation of the manpower reserve and calculation of maximum service capacities.  |
| Lin, 2009135 | Augment resources | All-hazards | Mechanical ventilation and cross-training | Bag-valve-mask technique training for medical students ias an alternative to mechanical ventilation | The majority of students (93%) knew proper head positioning technique in non-trauma cases after a 30 minute didactic session. All 31 students completed and passed the competency checklist. |
| Little, 2009134 | Augment resources | Infectious Disease | Oxygen delivery | Method of providing an improvised oxygen delivery system (simulation) | An improvised system to deliver oxygen in the event of a disaster can be easily assembled and is both feasible and functional. |
| Lucas da Silva, 2008150 | Augment resources | All-hazards | Information technology | Use of pervasive computing technology to non-obtrusively capture contextual information | Describes the concept of the technology, but prototype has not been built or tested. |
| Mead, 2004156 | Augment resources | Infectious Disease | Infection control | Method to establish airborne infection isolation areas using a commercially available portable filtration unit and common hardware supplies | The best-performing designs showed no measurable source migration out of the inner isolation zone. The cost of constructing the filtration unit was less than US$2,300 and required fewer than 3 person-hours to construct. |
| Neyman, 2006129 | Augment resources | All-hazards  | Mechanical ventilation | Simulation study to determine if one ventilator could be modified to provide mechanical ventialtion for four adults simultaneously (simulation) | Single ventilator could sustain four 70-kg individuals for a limited duration. |
| Noordergraaf, 1996148 | Augment resources | All-hazards | Information technology | Use barcoded identifiers to represent patients, injuries, facilities, and locations (simulation) | Minimized errors and made exchange of data possible. The system communicates with the permanent hospital information system. Extensive training to use the tool was shown to be unnecessary. |
| Paladino, 2008130 | Augment resources | All-hazards  | Mechanical ventilation | 4-limbed ventilator circuit connected in parallel (simulation) | Successful oxygenation and ventilation of 4 sheep with a single vent. |
| Rosenbaum, 2004155 | Augment resources | Infectious disease  | Re-purpose space | Conversion of existing space to create a negative-pressure room for respiratory isolation (simulation) | Use of portable HEPA filtered forced air was successful in establishing an operational negative-pressure room. |
| Sandlin, 200951 | Augment resources | Chemical | Information technology | Use of a customized laboratory information system (LIMS), the Emergency Response Management System (ERMS), at the Centers for Disease Control and Prevention (CDC) for rapid analysis of clinical samples (e.g. chemical warfare agents) and reporting of this data  | A customized LIMS was developed to support emergency response laboratory activities at the CDC among all users.  |
| Voelker, 2006138 | Augment resources | All-hazards | Capacity augmentation | Fully equipped mobile surgical hospital (MED-1) | The hospital treated 350 patients per day during Hurricane Katrina. |
| Williams, 2010131 | Augment resources | Infectious Disease | Mechanical ventilation | Use of a low oxygen consumption pneumatic ventilator for emergency construction (simulation) | Three prototypes demonstrated acceptable performance in a test lung model with regard to compliance and rate settings.  |
| Ytzhak, 2012157 | Crisis standards of care | Infectious disease | Triage tool | Application of a decision support tool previously developed for ventilator allocation during an influenza pandemic to evaluate ventilator allocation decisions during the Haitian Earthquake of 2010. | Decision support tool appeared to be a useful tool in the allocation of ventilators by basing decisions on three dimensions. |