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| **Study ID** | **Country** | **START Assessor** | **# Providers Completing START Triage** | **Intervention** | **Simulation Level** | **Disaster/MCI** | **Reference Standard** |
| **Arshad 201513**  Non-RCT Comparative Study | USA | Firefighters and Paramedics | 1,457 | Not Reported; however, participants had prior familiarity with START tool | Level 2: computer simulation exercise with images and written summary | Two train collision beneath Penn Station in New York City | Not Specified |
| **Badiali 201714**  RCT | Italy | Nonprofessional Ambulance Crew Members | 400 | The START group received a 30-minute training on START triage protocol immediately before the exercise | Level 0: paper-based scenarios | Not Specified, exercise consisted of various written MCI scenarios | Not Specified |
| **Bolduc 201825**  Non-RCT Comparative Study | Canada | Paramedics, Nurses, and Physicians | 6 | Participants received a 30-minute training session on the use of START disaster triage interface on the hospital information system | Level 3: live simulation with actors in moulage | Simulated train derailment and chemical spill | Not Specified |
| **Buono 200736**  Non-RCT Comparative Study | USA | Professional Emergency Responders | Not Reported | Not Reported | Not Specified | Unspecified MCI | Expert Opinion |
| **Challen 201339**  Non-RCT Comparative Study | England | Not Specified | Not Reported | Not Reported | Level 0: retrospective review of patient charts from health records via London Ambulance Service and Royal London Hospital | Transport bombing in London which occurred on July 7, 2005 | Baxt and Upeniek Criticality |
| **Crews 201840**  Mixed Methods | USA | First Responders | Not Reported | Not Reported | Simulation 1: Level 0: retrospective analysis of publicly available data; retrospective analysis of publicly available data of mass shooting incident  Simulation 2-4: Level 3: live simulation with actors | Four simulations based on:  1. mass shooting incident in San Bernadino  2. car/bus accident  3. natural gas explosion in baggage claim area of Airport  4. A320 aircraft requiring emergency landing | Expert Opinion |
| **Curran-Sills 201741**  Non-RCT Comparative Study | Canada | ED Triage Nurses | 20 | Not Reported; however, participants had prior familiarity with START tool and CTAS | Level 0: paper-based scenarios | Not Specified, mix of different vignettes based on real MCI patient cases presenting to the ED | Expert Opinion |
| **Djalali 201442**  Quantitative Descriptive | Italy | Hospital Staff | Not Reported | Not Reported | Not Specified | Explosion at gas station | Not Specified |
| **Ellebrecht 201243**  Non-RCT Comparative Study | Germany | Paramedics | 25 | Training involving one-hour session including on-site tools (eg, PDA) along with START briefer | Level 1 and 3:  live simulation with actors/mannequins | Airplane collision | Not Specified |
| **Ersoy 201044**  Quantitative Descriptive | Turkey | Emergency Physicians | 110 | All participants were trained in START, including the scenario with questionnaire | Level 0: paper-based scenario | MVC with tree | Not Specified |
| **Ferrandi-Price 201815**  Non-RCT Comparative Study | Spain | Official Emergency and Special Care Nursing Master’s Degree Students | 67 | All participants were trained in the employed software technology | Group 1: Level 2: VR simulation  Group 2: Level 3: live simulation with actors | Unspecified MCI | Expert Opinion |
| **Ingrassia 201316**  Non-RCT Comparative Study | Italy | Emergency Physicians | 36 | Participants were trained in both disaster concepts and software technology | Level 3: live simulation with actors | Ceiling collapse in crowded room | Expert Opinion |
| **Ingrassia 201417**  Non-RCT Comparative Study | Italy | Medical Students | 524 | All participants completed a competency-based course in varied topics of disaster medicine;  one group had no disaster training | Level 2: computer-based exercise | Car accident | Not Specified |
| **Ingrassia 201518**  RCT | Italy | Medical Students | 56 | Two-minute orientation seminars were carried out before VR and live simulation scenarios to allow familiarization with VR software XVR and set of DCCs; Day 2, all students attended two-hour lecture about triage in MCIs focusing on START triage; Day 3, Groups A and B were exposed to VR scenario and live scenario | Group 1: Level 2: VR-based simulation  Group 2: Level 3: live simulation with actors | Simulated MVC accident | Not Specified |
| **Izumida 201719**  Non-RCT Comparative Study | Japan | Undergraduate/ Graduate Medical School Students | 12 | Prior to training, participants read materials on triage, response to sudden change, and decision of victim to be carried | Level 2: VR-based simulation | Unspecified MCI simulation | Not Specified |
| **Jain 201820**  RCT | Canada | Primary Care Paramedic Students | 40 | Prior to the trial, all students were provided with a 15-minute lecture on START triage, a 30-minute UAV lecture, and a one-hour “hands on” session on UAV technology | Level 3: live simulation with actors with START assessment completed via in-person assessment or aided with use of UAV | Simulation based on MVC that occurred on I-84 in Baker City, Oregon on January 17, 2015 | Not Specified |
| **Kahn 200921**  Quantitative Descriptive | USA | Paramedics | Not Reported | Paramedics/participants dispatched to scene used START triage to categorize victim acuity per usual fire department protocol | Level 0: retrospective review of patient health records | Train crash involving commuter train and freight train | Modified Braxt Criteria |
| **Khan 201838**  RCT | Qatar | Physicians and Nurses | 106 | Intervention group went through table top exercise for 60 minutes and pre/post MCI triage knowledge and skills were evaluated by pre/post-tests by 20 standardized START triage cases;  Control group went through written paper-based instructions and scenario of 20 START standardized triage cases used for pre/post reading tests evaluated by the same triage cases which were used for the intervention group | Group 1: Level 2: computer-based tabletop exercise  Group 2: Level 0: paper exercise | Not Specified | Not Specified |
| **Lee 201522**  RCT | Canada | Emergency Medicine Residents and Triage Nurses | 23 | All nurses trained to use simulation software; all participants were given a 60-minute tutorial about command-and-control in the ED, which included a 30-minute tutorial in the use of simulation software, and 30-minutes to familiarize themselves with the simulation software with practice patients;  intervention group received a 15-minute tutorial about intervention | Level 2: computer-based exercise | Unspecified MCI | Expert Opinion |
| **Lima 201923**  Quantitative Descriptive | Brazil | Medical/Nursing Students and Prehospital Care Team | Not Reported | All participants took part in 20-hour symposium aimed to train and prepare them; on simulation day, participants trained in the triage method | Level 3: live simulation with actors | MVC between bus and car | Not Specified |
| **Loth 201924**  Non-RCT Comparative Study | USA | College-Level Students | 18 | Both groups underwent simple instructions regarding four triage categories present within a computer‐based image; next, a series of eight images appeared in random order for participants in both groups, and participants triaged the victims in the images given the simple instructions (baseline condition); once completed, each group underwent “training” on another set of instructional slides; experimental group was given instructional slides outlining START triage program while control group was given set of instructional slides outlining how to categorize patients for transportation (separate from the START triage protocol) | Level 0: latent images of victims on computer | Not Specified | Not Specified |
| **McCoy 201935**  Quantitative Descriptive | USA | Various Health Care Providers | 32 | 2.5 hours educational intervention, which included a course on MCI training on START in the prehospital care setting | Level 3: virtual simulation (recorded in first-person perspective via Google Glass) involving real actors with moulage | Active shooter in office building | Not Specified |
| **McElroy 201937**  Quantitative Descriptive | USA | EMS Teams | Not Reported | Not Reported | Level 0 and Level 3: table-top exercise with multimedia facilitated activity completed four months before full-scale exercise involving live simulation with actors with moulage | Terrorist attack involving three geographical distant sites throughout city, including university student rally, soccer stadium, and 4K road race at airport | Not Specified |
| **Mills 201926**  Mixed Methods | Australia | Undergraduate Paramedicine Students | 29 | Participants undertook table-top didactic MCI discussion/ workshop session embedded into the unit; prior to taking VR component, patients completed a virtual tutorial introducing control functions, allowing them to practice obtaining vital signs and triaging a patient | Group 1: Level 2: VR simulation  Group 2: Level 3: live simulation with actors | Car chase between perpetrator and police that resulted in vehicle crashing into pedestrians and a shoot-out resulting in multiple casualties | Not Specified |
| **Navin 201027**  Non-RCT Comparative Study | USA | Emergency Medical Technicians | Not Reported | Participants had a 20-minute refresher training on START prior to the mass casualty exercises | Level 1 and Level 3: live simulation with actors in moulage and mannequins | Building collapse | Not Specified |
| **Risavi 201328**  Non-RCT Comparative Study | USA | Emergency Medical Technicians and Paramedics | 45 | All participants were trained in START method using video presentation demonstrating triage parameters | Level 0 and Level 1: written scenario and moulage | Unspecified MCI | Not Specified |
| **Riza’i 201829**  Non-RCT Comparative Study | Indonesia | First-Year Medical Students | 54 | Participants were given two brief educational lectures in a large-group classroom and simulation; first one-hour lecture about the tabletop disaster exercise and second lecture about simulation and disaster management, including START | Level 0: paper-based table-top exercise | Unspecified MCI | Not Specified |
| **Sapp 201030**  Non-RCT Comparative Study | USA | First-Year Medical Students | 315 | Participants were given two brief educational lectures: first 10-minute lecture informed students about details and health risks of sarin gas exposure; second five-minute lecture dealt with various aspects of disaster management, including disaster triage | Level 0: paper-based exercise consisting of a 15-scenario triage questionnaire | Sarin gas exposure | Expert Opinion |
| **Schenker 200631**  Quantitative Descriptive | USA | Firefighters and EMS Personnel | 40 | No, all EMS personnel had been previously trained in START, but refresher training was not administered before the drill | Level 1 and 3: live simulation with actors and mannequins | Explosion on chemical transport train as it passed alongside a passenger train; gas later identified as arsenic trichloride was released upon detonation | Not Specified |
| **Silvestri 201732**  Non-RCT Comparative Study | USA | EMS Personnel | Not Reported | No, EMS personnel were previously trained in START triage system | Level 1 and Level 3: live simulation with actors in moulage and mannequins | Explosion of chlorine gas in closed auditorium and active shooter on scene | Expert Opinion |
| **Simoes 201233**  Quantitative Descriptive | Brazil | Firefighters | Not Reported | Not Reported | Level 3: live simulation with actors | Based on real MVC between bus and two cars | Not Specified |
| **Wu 199934**  Non-RCT Comparative Study | Taiwan | Various Medical and Non-Medical Personnel | 291 | All participant received a two-hour training session on START | Level 0: paper-based exercise | Unspecified MCI | Not Specified |

**Table 1**. Characteristics of Studies Assessing the Accuracy of START to Correctly Triage Patients in a Live or Simulated Disaster or MCI

Abbreviations: START, Simple Triage and Rapid Treatment; MCI, mass-casualty incident; RCT, randomized controlled trial; ED, emergency department; EMS, Emergency Medical Services; CTAS, Canadian Triage and Acuity Scale; VR, virtual reality; UAV, unmanned aerial vehicle; MVC, motor vehicle collision.