**Supplementary Material for Online Publication Only**

**Appendix 1: Data and Methodology Used to Determine the Mass Casualty Triage Systems’ Category Assignment and the Criterion Standard’s Category Assignment**

**Table 6**: Data Collected During Initial Emergency Department (ED) Triage and Their Assigned Abbreviations for Analysis

|  |  |
| --- | --- |
| **Initial Emergency Department (ED) Triage Data** | **Abbreviation** |
| *Demographics* | |
| * Patient’s age | ED10 |
| * Patient’s sex | ED11 |
| * Did the patient arrive by ambulance? | ED12 |
| *Brief History of Present Illness* | |
| * What is the patient’s chief complaint? (free text) | ED21 |
| * Did the patient sustain a chemical exposure? | ED22 |
| * + If the answer to ED22 is “Yes,” was external decontamination performed in the ED? | ED23 |
| * + If the answer to ED22 is “Yes,” did the patient receive auto-injector antidotes (i.e. Mark I) in the ED? | ED24 |
| * Did the patient sustain a radiological exposure? | ED25 |
| * + If the answer to ED25 is “Yes,” was external decontamination performed in the ED? | ED26 |
| *General Inspection* | |
| * Does the patient, in your professional opinion as an EMT, have injuries and/or illnesses that appear to be minor? | ED31 |
| * Description of obvious injuries and/or deformities, if any. (free text) | ED32 |
| * Is the patient able to walk or, if a pediatric patient, demonstrates age appropriate movement? | ED33 |
| * Is the patient able to follow commands or, if a pediatric patient, make purposeful movement(s)? | ED34 |
| * Is the patient, in your professional opinion as an EMT, likely to survive given the best medical care possible, without considering barriers to access or availability? | ED35 |
| *Vitals and Scoring* | |
| * What is the initial blood pressure in the ED? | ED41 |
| * What is the initial heart rate in the ED? | ED42 |
| * What is the initial respiratory rate in the ED? | ED43 |
| * What is the initial AVPU in the ED? | ED44 |
| * What is the initial Glascow Coma Scale eye opening sub-score in the ED? | ED45 |
| * What is the initial Glascow Coma Scale verbal response sub-score in the ED? | ED46 |
| * What is the initial Glascow Coma Scale motor response sub-score in the ED? | ED47 |
| *Related to Circulation* | |
| * Does the patient have a palpable radial pulse in either forearm? | ED51 |
| * Is the patient’s capillary refill time less than two (2) seconds? | ED52 |
| * Does the patient demonstrate major hemorrhage? | ED53 |
| * + If the answer to ED53 is “Yes,” is the major hemorrhage able to be controlled during the initial triage process? | ED54 |
| * Does the patient require CPR within fifteen minutes of arrival to the ED? | ED55 |
| *Related to Airway* | |
| * Is the patient able to maintain open airway and protect it without intervention? | ED61 |
| * Did the patient receive an advanced airway (i.e. intubation, LMA, surgical airway)? | ED62 |
| * Did the patient receive a nasopharyngeal or oropharyngeal airway? | ED63 |
| *Related to Breathing* | |
| * Is the patient in respiratory arrest? | ED71 |
| * Is the patient in respiratory distress? | ED72 |
| * Is the patient having agonal respirations? | ED73 |
| * Does the patient require assisted ventilations? | ED74 |
| * Did the patient receive needle decompression? | ED75 |
| * + If the answer to ED75 is “Yes,” did the patient’s respiratory status improve after needle decompression? | ED76 |

**Table 7**: Data Collected During Hospital Medical Record Review and Their Assigned Abbreviations for Analysis

|  |  |
| --- | --- |
| **Medical Record Data** | **Abbreviation** |
| *Brief History of Present Illness* | |
| * Was the patient noted to have a traumatic injury of any kind? | MR10 |
| * + Was the patient noted to have sustain blunt head trauma? | MR11 |
| * + If the answer to MR10 is “Yes,” was the patient noted to have sustain a penetrating head trauma? | MR12 |
| * + - If the answer to MR12 is “Yes,” was the penetrating trauma noted to cross the midline? | MR13 |
| * Was the patient noted to have burns of any kind? | MR14 |
| * + If the answer to MR14 is “Yes,” was the patient noted to have total thickness (third degree) burns? | MR15 |
| * + - If the answer to MR15 is “Yes,” what percentage of total body surface area was involved? | MR16 |
| * + - If the answer to MR15 is “Yes,” did the patient receive an escharotomy within two (2) hours of arrival? | MR17 |
| * Was the patient noted to have a chemical exposure? | MR18 |
| * + If the answer to MR18 is “Yes,” is it noted that the only treatment the patient required was external decontamination (irrespective to whether it was in the field or hospital)? | MR19 |
| * + If the answer to MR18 is “Yes,” did the patient require additional treatment with antidotes within four hours of arrival to the hospital that were provided to correct symptoms and not given solely for patient comfort and/or the relief of minor symptoms (e.g., rhinorrhea)? | MR20 |
| * + If the answer to MR20 is “Yes,” list the “major” symptoms the patient experienced. (free text) | MR21 |
| * Was the patient noted to have a radiological exposure? | MR22 |
| * + If the answer to MR22 is “Yes,” is it noted that the only treatment the patient required was external decontamination (irrespective to whether it was in the field or hospital)? | MR23 |
| * + If the answer to MR22 is “Yes,” was the patient noted to have any nausea? | MR24 |
| * + If the answer to MR22 is “Yes,” was the patient noted to have any seizure activity? | MR25 |
| *Related to Circulation* | |
| * Did the patient receive CPR within four hours upon arrival arrival to the hospital? | MR30 |
| * Did the patient receive IV vasopressors within two hours of hospital arrival? | MR31 |
| *Related to Airway* | |
| * Did the patient receive an advanced airway intervention (e.g., intubation, LMA, surgical airway) not for a surgical procedure performed within four hours of hospital arrival? | MR40 |
| *Related to Breathing* | |
| * Did the patient receive a chest tube placed within two hours of hospital arrival? | MR50 |
| * Was the patient noted to have agonal respirations at any time during emergency department evaluation? | MR51 |
| *Treatment & Disposition* | |
| * Did the patient have any surgeries within four hours of arriving to the hospital? | MR60 |
| * + If the answer to MR60 is “Yes,” was it neurologic, vascular, or hemorrhage-controlling surgery to the head, neck, or torso? | MR61 |
| * + If the answer to MR60 is “Yes,” was it limb-conserving surgery performed on a limb that was found to be pulseless distal to the injury prior to surgery? | MR62 |
| * Was the patient discharged from the ED? | MR63 |
| * + If the answer to MR63 is “Yes,” did the patient receive X-Rays? | MR64 |
| * + - If the answer to MR64 is “Yes,” were the X-Rays of an extremity? | MR65 |
| * + - If the answer to MR65 is “Yes,” was it an uncomplicated fracture (i.e. a closed extremity fracture without significant displacement and neurovascular compromise)? | MR66 |
| * + If the answer to MR63 is “Yes,” was laboratory testing performed on the patient? | MR67 |
| * + If the answer to MR63 is “Yes,” did the patient have a wound repaired? | MR68 |
| * + - If the answer to MR68 is “Yes,” was it simple wound repair (i.e. a single layer suturing only)? | MR69 |
| * + If the answer to MR63 is “Yes,” did the patient receive medications intravenously in the ED? | MR70 |
| * + - If the answer to MR70 is “Yes,” did the patient receive fluids only? | MR71 |
| * + If the answer to MR63 is “Yes,” did the patient receive inhaled medications in the ED? | MR72 |
| * + - If the answer to MR72 is “Yes,” did the patient receive oxygen only? | MR73 |
| * Patient’s discharge ICD9/10 codes (free text) | MR74 |

**Table 8**: Algorithm Used to Determine the Triage Category for Each Triage System Using the Variable Abbreviations listed in Table 6

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **SALT** | **JumpSTART** | **Triage Sieve** | **CareFlight** |
| **Dead** | * **ED71** = Yes | * **ED10** ≤ 18 * **ED71** = Yes * **ED51** = No | * **ED33** = No * **ED71** = Yes | * **ED33** = No * **ED34** = No * **ED61** = No *or* **ED71** = Yes |
| **Expectant** | * **ED71** = No * **ED34** = No, **ED51** = No, **ED54** = No, *or* **ED72** = Yes * **ED35** = No | n/a | n/a | n/a |
| **Immediate** | * **ED71** = No * **ED34** = No, **ED51** = No, **ED54** = No, *or* **ED72** = Yes * **ED35** = Yes | * **ED10** ≤ 18 * **ED71** = No * **ED43** < 15 *or* **ED43** > 45 | * **ED33** = No * **ED71** = No | * **ED33** = No * **ED34** = No * **ED61** = Yes * **ED71** = Yes |
| * **ED10** ≤ 18 * **ED71** = No * **ED43** ≥ 15 * **ED43** ≤ 45 * **ED41** = No | * **ED33** = No * **ED71** = Yes * **ED43** ≤ 9 *or* **ED43** ≥ 30 | * **ED33** = No * **ED34** = Yes * **ED51** = No |
| * **ED10** ≤ 18 * **ED71** = No * **ED43** ≥ 15 * **ED43** ≤ 45 * **ED41** = Yes * **ED44** = U | * **ED33** = No * **ED71** = Yes * **ED43** > 10 *or* **ED43** < 29 * **ED42** > 120 |
| **Delayed** | * **ED71** = No * **ED34** = Yes * **ED51** = Yes * **ED54** = Yes * **ED72** = No * **ED31** = No | * **ED10** ≤ 18 * **ED71** = No * **ED43** ≥ 15 * **ED43** ≤ 45 * **ED41** = Yes * **ED44** = A, **ED44** = V, *or* **ED44** = P | * **ED33** = No * **ED71** = Yes * **ED43** > 10 *or* **ED43** < 29 * **ED42** > 120 | * **ED33** = No * **ED34** = Yes * **ED51** = Yes |
| **Minimal** | * **ED71** = No * **ED34** = Yes * **ED51** = Yes * **ED54** = Yes * **ED72** = No * **ED31** = Yes | * **ED10** ≤ 18 * **ED33** = Yes | * **ED33** = Yes | * **ED33** = Yes |

**Table 9**: Algorithm Used to Determine the Criterion Standard Triage Category Using the Variable Abbreviations listed in Tables 6 and 7

|  |  |  |
| --- | --- | --- |
| **Dead** | 1. | * **ED51** = No *or* **ED71** = Yes |
| 2. | * **ED55** = Yes |
| **Expectant** | 1. | * Does not meet the criteria for: Dead * **ED10** ≤ 50 years * **MR16** > 90% |
| 2. | * Does not meet the criteria for: Dead * **ED10** > 50 years * **MR16** > 80% |
| 3. | * Does not meet the criteria for: Dead * **MR13** = Yes * **MR51** = Yes, **ED73** = Yes, *or* **ED47** ≤ 3 |
| 4. | * Does not meet the criteria for: Dead * **MR11** = Yes * **MR51** = Yes, **ED73** = Yes, *or* **ED47** ≤ 3 |
| 5. | * Does not meet the criteria for: Dead * **ED54** = No * **ED55** = Yes |
| 6. | * Does not meet the criteria for: Dead * **MR18** = Yes * **MR51** = Yes, **ED73** = Yes, *or* **ED55** = Yes |
| 7. | * Does not meet the criteria for: Dead * **MR21** = Yes * **MR10** = Yes *or* **MR14** = Yes * **MR51** = Yes, **ED73** = Yes,**MR24** = Yes, **MR25** = Yes, *or* **ED55** = Yes |
| **Immediate** | 1. | * Does not meet the criteria for: Dead *and* Expectant * **MR61** = Yes |
| 2. | * Does not meet the criteria for: Dead *and* Expectant * **MR62** = Yes |
| 3. | * Does not meet the criteria for: Dead *and* Expectant * **MR17** = Yes |
| 4. | * Does not meet the criteria for: Dead *and* Expectant * **MR50** = Yes |
| 5. | * Does not meet the criteria for: Dead *and* Expectant * **ED62** = Yes *or* **MR40** = Yes |
| 6. | * Does not meet the criteria for: Dead *and* Expectant * **MR31** = Yes |
| 7. | * Does not meet the criteria for: Dead *and* Expectant * **ED54** = No |
| 8. | * Does not meet the criteria for: Dead *and* Expectant * **MR20** = Yes |
| 9. | * Does not meet the criteria for: Dead *and* Expectant * **ED55** = Yes*or* **MR30** = Yes |
| **Minimal** | 1. | * Does not meet the criteria for: Dead, Expectant, *and* Immediate * **MR64** = No *or* **MR66** = Yes * **MR67** = No * **MR68** = No *or* **MR69** = Yes * **MR70** = No *or* **MR71** = Yes * **MR72** = No *or* **MR73** = Yes |
| 2. | * Does not meet the criteria for: Dead, Expectant, *and* Immediate * **MR19** = Yes *or* **MR23** = Yes |
| **Delayed** | 1. | * Does not meet the criteria for: Dead, Expectant, Immediate, *and* Minimal |